

IMPROVING SUSTAINABLE STORMWATER MANAGEMENT FROM A GOVERNANCE PERSPECTIVE: A CASE STUDY OF THE SPONGE CITY PROGRAM IN YIBIN CITY, CHINA

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Abstract

Urban pluvial flooding has become one of the most severe problems confronting cities in China over the recent decades. The sponge city initiative, proposed by the Chinese government in 2015, is aimed at mitigating the threats of urban pluvial flooding in a sustainable way. Although there is an increasing body of literature on the technical aspect of the sponge city, the governance aspect does not gain much attention from scholars. This research takes a governance perspective to focus on public participation and policy integration of the sponge city. A conceptual framework proposed in this research consists of two main components: a citizen perspective of public participation to understand citizens' perceptions and potential motivations for participation as well as a framework to analyze policy integration, containing four dimensions – policy frame, subsystem involvement, policy goals, and policy instruments. Applying this conceptual framework to the case study of the sponge city program in Yibin can become a foundation to find feasible improving means for the implementation of sponge city. The conclusion chapter reveals specific issues existing in the aspects of public participation and policy integration in Yibin's sponge city program and offers several recommendations for the future success in implementing the SPC program in Yibin.

Keywords: Urban pluvial flooding, stormwater management, sponge city, governance, public participation, policy integration

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1. Introduction

1.1 Background

In recent years, under the effects of climate change and rapid urbanization, many cities in China are confronted with urban pluvial flooding. According to statistical analysis by the Ministry of Housing and Urban-Rural Development (MOHURD) in 2010, 62 percent of 351 Chinese cities investigated experienced severe urban floods from 2008 to 2010 (Duan et al., 2016; Lu and Zhao, 2013). Meanwhile, another report also shows that, during the period between 2010 and 2016, more than 180 cities in China are waterlogged each year (Li, 2018). Apparently, more pervasive urban flooding will impose adverse impacts on social, economic, and environmental development of China (Zheng et al., 2016). Shepard (2016) considers that this situation is expected to become worse. Against this backdrop, the Chinese government in April 2015 proposed a brand-new initiative named 'Sponge City' (SPC), which is regarded as the new generation of stormwater management and aimed at tackling urban pluvial flooding in a more sustainable way (MOHURD, 2014). Sponge city as a sustainable stormwater management strategy received much attention from the national government. In order to support the implementation of this initiative, the central government selected two batches of total 30 cities as pilots, including Beijing and Shanghai, and simultaneously about € 5.2 billion are provided for these cities as subsidies (Feng, 2016).

Yibin City, the researcher's hometown, was prone to fluvial flooding as this city is located along the Yangtze River. However, the threats of fluvial flooding have been mitigated after the completion and operation of Xiangjiaba Hydropower Station in 2014. This is because one of this dam's functions is to control floods of the Yangtze River (Chen, 2006). In the meantime, with the implementation of the Great Western Development Strategy, a policy formulated by the central government to foster the holistic development of western region in China (National Development and Reform Commission, 2017), the rapid socio-economic development of Yibin City leads to the constant expansion of the urban scale (Xiong et al., 2018). This brought many negative consequences, one of which is increasingly severe urban pluvial flooding. A typical example cited is the downpour event which took place on 23 June 2016, making several main roads waterlogged and leading to a serious traffic congestion concurrently (Li and Zhou, 2016). In order to control pluvial flooding in urban area, Yibin municipal government and Yibin Urban-Rural Planning Bureau (YURPB), cooperating with Shanghai Municipal Engineering Design Institute, compiled the plan of the sponge city and at the same time started to implement this program.

From the outset, the sponge city initiative is regarded as a significant contribution to sustainable development (Jiang, 2017). Sustainable development encompasses the reorientation of development path and thus governance as a means of organizing the reorientation is a necessary condition (Lange, 2017). Clearly, the sponge city initiative as a sustainable stormwater management strategy is not merely a technical issue but a

governance issue (Dai et al., 2018; Qiao et al., 2018). However, Zevenbergen et al. (2018) present that there are two governance problems existing in the actual implementation of the sponge city initiative. The first challenge is related to the public participation. Hence, this research will firstly take a citizen perspective to investigate the public's perceptions of the sponge city program and motivations for participation. The second problem refers to the aspect of sectoral coordination, which is essentially related to policy integration (Tosun and Lang, 2017). The governance of cross-cutting theme such as urban flooding necessitates the policy integration (Candel and Biesbroek, 2016). The implementation of the sponge city initiative involving various policy domains and policy subsystems (i.e. sectors) can be considered as a cross-cutting theme and thus needs the policy integration. To cope with the problem of coordination between sectors, this research will apply a policy integration framework proposed by Candel and Biesbroek (2016), to analyze the status quo of policy integration in the sponge city program in the city of Yibin.

1.2 Research Questions

Based on background above, this thesis proposes research questions as follow:

Primary research question

What are the feasible means for improving Yibin's sustainable stormwater management in terms of public participation and policy integration?

Secondary research questions

1. How is the sponge city initiative governed in China?
2. What are the problems in policy integration of the sponge city program in Yibin City?
3. What are the public perceptions of the sponge city program in Yibin City?
4. What are the motivations for the public to participate in the sponge city program in Yibin City?

1.3 Outline of Thesis

The Chapter 1 gives an introduction on the research background and research questions. The Chapter 2 describes the causes and effects of urban pluvial flooding, the concept of stormwater management, and how the sponge city initiative is governed in China. The Chapter 3 reviews the literature about governance, public participation, and policy integration and ends with a conceptual framework. This research conducts a case study of the sponge city program in Yibin. Thus, the Chapter 4 explains this case study's research design and units of analysis; also, this chapter details the methods for data collection and data analysis. The Chapter 5 presents and discusses the findings of this research along two main components of the conceptual framework (i.e. public participation and policy integration). Based on the findings, the Chapter 6 concludes with recommendations for improving the sponge city in Yibin, reflects the limitations of this research, and gives suggestions for further researches.

2. Context

The target of this chapter is to introduce the context of the sponge city initiative. First, the causes and effects of urban pluvial flooding will be described. Second, based on the identification of grey and green infrastructure, the concept of sustainable stormwater management (SSM) will be introduced as well. Third, the relationship between sustainable stormwater management and governance will be elucidated, which is followed by the discussion on the current situation of the governance of the sponge city initiative in China. Finally, this chapter will return to two governance challenges mentioned above and explain them more explicitly.

2.1 Urban Pluvial Flooding in China

2.1.1 Causes

Cause of climate change

Climate change is a driving factor leading to urban pluvial flooding in China (Jiang et al., 2018). The first impact brought by climate change in China is the rise in extreme rainfall events, which increases precipitation (Donat et al., 2016; Nguyen et al., 2019). Most parts of China are located in the monsoon climate zone, which means that cities in these areas are prone to be influenced by heavy rainfalls especially during the summertime (Zhou et al., 2018). Increasing precipitation makes the short-duration rainfall events more intense and therefore magnifies the issue of urban pluvial flooding. Simultaneously, climate change also brings about an increase in the frequency of heavy rainfall events (Nguyen et al., 2019). For example, as a report shows, the number of rainstorm days and the probability of urban flooding in China has increased from 1960s onwards, and more cities are negatively influenced by more frequent extremes of rain (Qin et al., 2015; Zhang et al., 2016).

Cause of urbanization

China's development in the recent decades is characterized by urbanization (Jiang et al., 2018). In the study of Xu et al. (2016), they find that in the process of urban expansion, urban land in China increases from 1.22×10^4 km² to 7.29×10^4 km² between 1992 and 2015, which is around 2.5 times as fast as the global average. With such a massive and rapid urbanization process, many natural water bodies in urban areas, such as lakes, rivers, and ponds have gradually been infilled (Zheng et al., 2016; Huang, 2018). In general, natural water bodies can function as detention, retention, and storage of stormwater (Zou et al., 2014). Consequently, these vanishing natural water bodies indicate that the capabilities of cities to withstand urban pluvial flooding will be curtailed. For example, 'Tushucheng' area in Wuhan's Hongshan District, previously a part of South Lake, was infilled and used for urban construction and development and then it becomes a district which is easiest to be waterlogged in the whole city when rainfall events take place (Ye et al., 2010). Besides, under the effects of urbanization, the area of imperious grounds in urban area gradually enlarges as well (Zheng et al., 2016). As a research shows, the one-

hour infiltration rate in newly built asphalt roads is merely 14% of that in bare grounds and 6% of that in grassy grounds (Ye et al., 2010; Zheng et al., 2016). From this it can be deduced that the storm runoff will rise considerably in these impervious areas and therefore the occurrence probability of urban pluvial flooding will increase as well. Also, along with urbanization, the 'Urban Heat Island' (UHI) effect becomes apparent. Apart from the effect on temperature, the urban heat island can change cities' precipitation patterns and lead to a noticeable escalation in precipitation in urban areas (Sun and Li, 2013). In China, this change on precipitation is also called as the 'Urban Rain Island' effect (Wang et al., 2012; Yu et al., 2017; Zhou et al., 2018). For instance, the average annual growth rate of precipitation in Shanghai urban area is 1.6 times that of suburbs (Jiang et al., 2015).

Causes of drainage system

In this respect, the first manifestation is that the drainage standard set by the urban drainage planning is at a low level (Zhang and Li, 2015). According to the 'Code for Design of Outdoor Wastewater Engineering' (2011), the rainfall return period for designing the drainage system in urban areas is 1-3 years (i.e. withstanding once-in-one-year to once-in-three-year flood). In fact, when designing the drainage system, most cities are based on the return period of one year, which indicates that the drainage system is able to handle 36 mm/h of precipitation (Zhang and Li, 2015). However, due to the diverse circumstances, the precipitation of every city is different. Hence, this one-size-fit-all design standard cannot help all cities in China to tackle the issue of urban pluvial flooding. In particular, for those southern cities with a large precipitation such as Wuhan, Fuzhou, Shenzhen, and so forth, such a design standard is clearly insufficient. Second, the drainage system in China cannot keep pace with the urbanization (Jiang et al., 2018). Rapid urban development demands a well-constructed drainage system, which needs adequate funding supports. However, as the 'China Urban Construction Statistical Yearbook' (2017) reveals, the funds used to construct and maintain the drainage system account for only 7% of the total funds for urban maintenance and construction activities. In this case, the development of the drainage system lags behind the expansion of urban scale and growth of urban population, thereby causing the occurrence of urban pluvial flooding. Finally, under the combined influence of climate change and urbanization, the design and construction of drainage systems in China urban areas are full of uncertainty and complexity (Notaro et al., 2015; in Jiang et al., 2018). In a sense, these two features also make urban pluvial flooding more likely to take place.

2.1.2 Effects

Since 2000, an average of more than 200 urban floods hazards has occurred each year (Liu, 2016). Only from 2008 to 2010, there were 137 cities where urban pluvial flooding occurred more than three times each year; these cities cover all major cities throughout the whole China (Liu et al., 2015). As the frequency of urban flooding rises, its effects become more serious. The first effect exists in the aspect of traffic, which is mainly manifested in traffic congestion, vehicle damage and the resulting loss of life and property

(Li, 2013). For example, the torrential rain, which took place in Beijing on 21 June 2012, made many arterial and branch roads in urban areas waterlogged to form a serious traffic congestion (Zhou and He, 2016). Also, traffic at a standstill caused by urban pluvial flooding can affect the operation of urban industries, especially for logistics industry. Second, urban pluvial flooding causes direct economic losses (Li, 2013). For example, the cloudburst occurring in 2007 led to an estimated direct economic loss of € 1.6 billion for Jinan City (Zhou et al., 2018). Figure 1 depicts the economic loss led by urban pluvial flooding in China in 2013. Finally, the urban ecological environment is negatively affected by urban pluvial flooding. In some cases, urban flooding in parts of urban areas can cause domestic wastes to be immersed in water for a long time, thereby emitting harmful gases and polluting the air (Li, 2013).

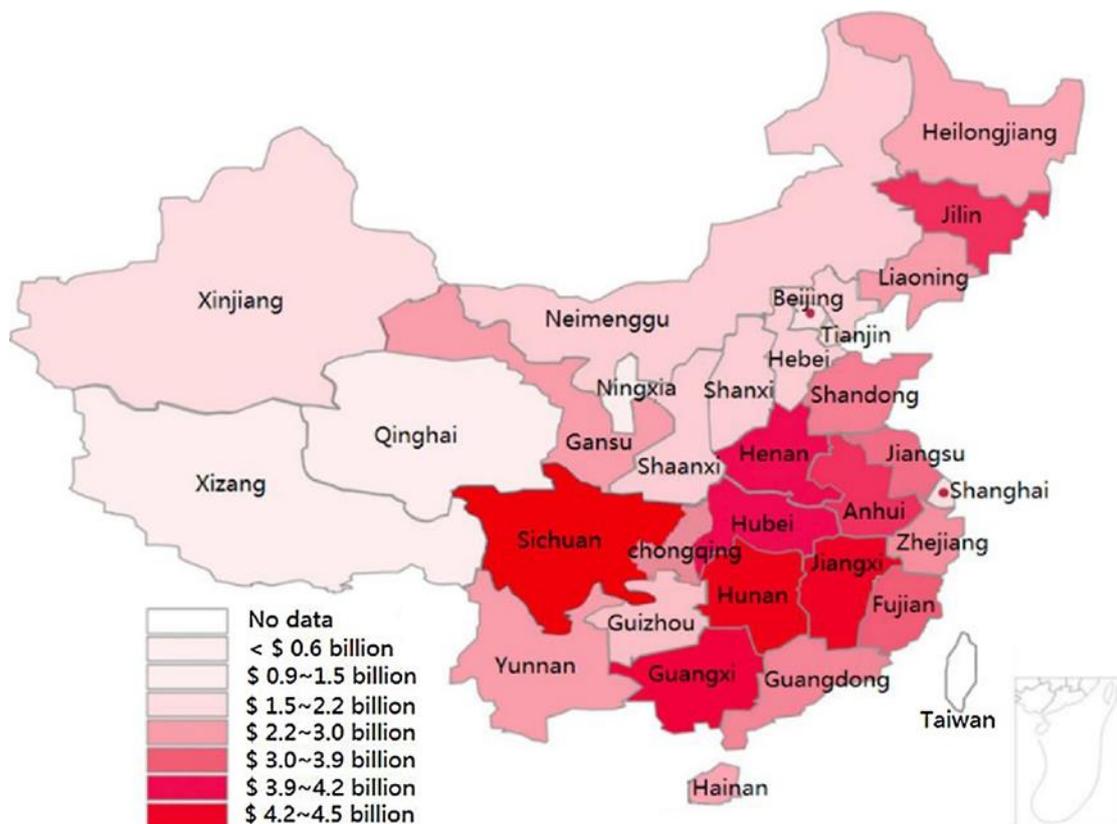


Figure 1. Economic Loss led by urban pluvial flooding in 2013. Source: Jiang et al., 2018.

2.2 Stormwater Management

2.2.1 Grey Infrastructure

What is central to conventional stormwater management is the traditional stormwater system, i.e. grey infrastructure. Grey infrastructure stands for the conveyance of gutters and pipes and is designed and constructed to remove rainwater/stormwater from urban areas as fast as possible to rivers or other natural water bodies such as lakes and ponds so as to reduce flooding (Brears, 2018; Dhakal and Chevalier, 2016; Novotny et al., 2010). Grey infrastructure generally consists of stormwater downspouts, roadside ditches, inlets,

manholes and so forth (Brears, 2018). However, although most cities rely on grey infrastructure to handle the problem of urban pluvial flooding in the past (Porse, 2013), it is found that grey infrastructure is unable to deal with the environmental problems brought by urban flooding and leads to certain unexpected unsustainable consequences associated with water for example aggravating water quality and generating pollution (Qiao et al., 2018; Brears, 2018; Dhakal and Chevalier, 2016).

2.2.2 Green Infrastructure

In comparison to grey infrastructure, green infrastructure is more environmentally friendly and cost-effective (Law et al., 2017). Green infrastructure can be outlined as natural or semi-natural spaces deploying certain components such as soil and vegetation to mimic natural processes in which benefits for human in urban areas are provided (Brears, 2018; Law et al., 2017). Green infrastructure usually contains green roofs or green walls, rain gardens, permeable pavements, constructed wetlands, etc., which are able to retain, detain and infiltrate stormwater. Apart from the stormwater, green infrastructure can provide benefits in the facet of environment such as the betterment of water quality, the protection of biodiversity, the mitigation of the urban rain- and heat-island effects and so forth (Qiao et al., 2018; Brears, 2018; Law et al., 2017). With respect to the economic benefits, Law et al. (2017) also point out that, in between the grey and green infrastructure, the latter is much more cost-benefit than the former. This is because the requirement of grey infrastructure is constant inputs of energy for sewage treatment. A case studied by Brix (1999) also illustrates this view: in treating the same amount of stormwater, the energy that a wastewater treatment plant requires is almost 10 times that a constructed wetland would need.

2.2.3 Sustainable Stormwater Management

In the last century, some western countries initiated their respective new approaches to manage stormwater in a more sustainable way (Fletcher et al., 2015), such as low impact development (LID) in North America and New Zealand (Pyke et al., 2011; Gogate et al., 2017), water sensitive urban design (WUSD) in Australia (Bach et al., 2015; Sharma et al., 2016), sustainable urban drainage systems (SUDS) in the UK (Zhou, 2014; Ellis and Lundy, 2016), and rainproof cities in the Netherlands (Dai et al., 2018). Likewise, China in 2015 also initiated its own new and sustainable approach named the sponge city (SPC) to manage stormwater (Jiang et al., 2018; Chan et al., 2018; Nie and Jia, 2018). Using the afore-mentioned green infrastructure is the key concept of these new approaches (Law et al., 2017). But it is noteworthy that this does not mean that grey infrastructure is no longer important. On the contrary, concrete grey infrastructure such as drainpipes and curb inlets can still play a role in new solutions managing stormwater; for instance, the sponge city initiative combines green infrastructure with grey infrastructure (Xiang et al., 2018). In the article of Qiao et al. (2018), these new solutions to cope with urban pluvial flooding are referred to as sustainable stormwater management (SSM), which is defined as 'using green infrastructure as Nature-based Solutions (NbS) to mitigate and manage stormwater,

and simultaneously provide multiple environmental, economic and social benefits' (see Qiao et al., 2018, p.944). From traditional grey infrastructure towards sustainable green infrastructure, a wider range of facets such as water quality and recreation rather than merely mitigation of urban pluvial flooding is included in stormwater management (Figure 2).

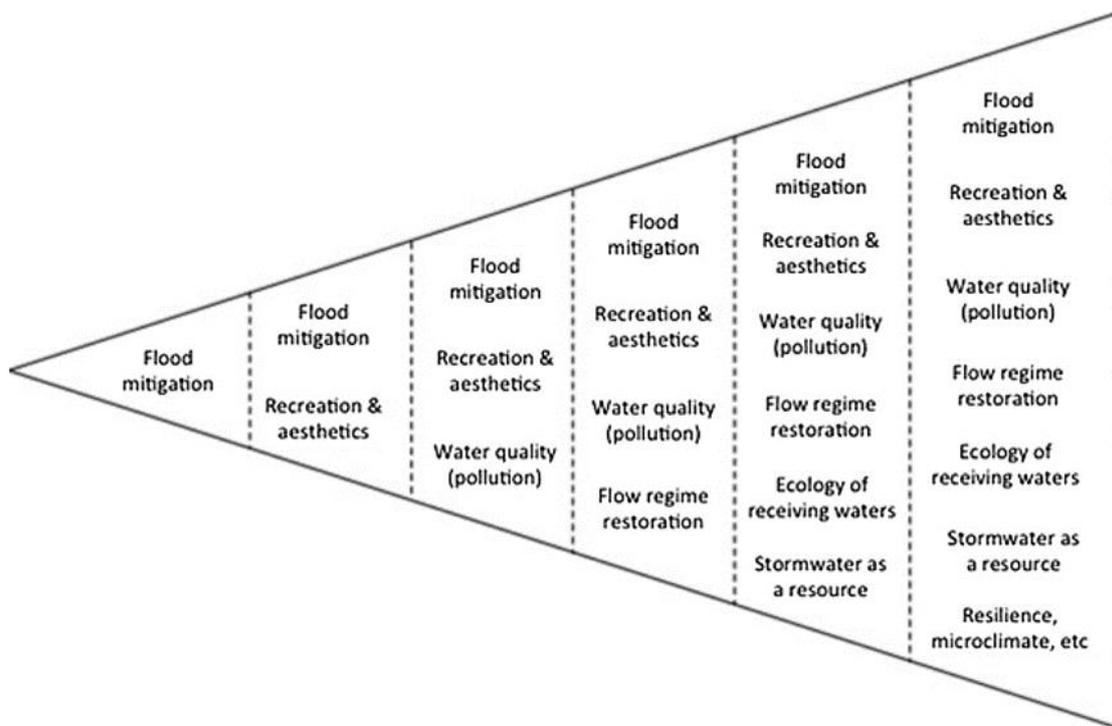


Figure 2. Increasing sophistication and integration of stormwater management over time. Source: Fletcher et al., 2015.

2.3 SSM and Governance

2.3.1 The Relationship

In order to understand the governance of the sponge city, it is important to shed light on the relationship between the sustainable stormwater management and governance. Generally, the sustainable stormwater management is regarded as a technical issue (Jiang et al., 2018); but in the literature, more and more scholars start to highlight that the SSM is also a governance issue. Qiao et al. (2018) argue that the implementation of sustainable stormwater management in a slow pace is mostly influenced by governance factors instead of technical ones. To illustrate this, an online questionnaire conducted in three Australian capital cities reveals that the improvement of urban stormwater management is affected by institutional arrangements, regulations, approval processes, etc., which are all considered as governance factors (Brown and Farrelly, 2009). Likewise, OECD (2016) in the book 'Water Governance in Cities' points out that the adaptation to the risks of too much water in urban areas in the coming few years is a governance issue as well as a technical issue. Furthermore, Dhakal and Chevalier (2016) directly propose the concept

of urban stormwater governance, which refers to ‘the organizational authority that formulates as well as implements stormwater policies and programs’ (p.1114).

Simultaneously, considering that sustainable stormwater management embraces not only environmental protection but also sustainability (Zevenbergen et al., 2018), the relationship between governance and sustainable development/sustainability can also provide valuable insight into why the SSM in essence is a governance issue. In his book, Lange (2017) gives an accurate explanation of sustainable development (SD) and an elucidation of why governance is of great importance for reaching sustainable development. Based on the definition given in the Brundtland report, i.e. ‘the development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (WECD, 1987, p.43), the explanation is that under the conditions of limited social and environmental resources as well as fragile socio-environmental systems, the aim of sustainable development is to ensure the wellbeing of present and future generations (Lange, 2017). In the processes steering society towards the direction of sustainable development, a reorientation of initial development paths is necessitated; hence, governance for organization of collective actions becomes inevitable, because it is able to organize the reorientation (ibid.). Also, due to the fact that ‘flawed governance practices encourage unsustainable development pattern’ (see Lange, 2017, p.33), the enhancement of governance is important as well. When connecting this to the sustainable stormwater management, given that the SSM helps to steer society towards the sustainable development, governance thus plays a significant role in managing stormwater in a sustainable way.

2.3.2 Governance of the Sponge City

In Dai’s et al. (2018) research, authors modify a framework proposed by Kern and Alber (2009) to analyze the governance of Wuhan’s sponge city initiative. This four-facet framework contains governing by experiment, authority, provision and funding, which can be helpful to understand the governance of the sponge city in China from a holistic perspective.

The method making use of examples and experiments is usually adopted by Chinese governments when developing new policy programs. This is also reflected in the sponge city program. For instance, the Ministry of Housing and Urban-Rural Development (MOHURD) in the ‘Technical Guideline for the Construction of the Sponge City’ (2014) provides 7 projects as examples, which cover different kinds of projects such as green roofs, municipal roads, rainwater collection system and so forth in Shenzhen, Shanghai, Beijing and Urumqi (MOHURD, 2014). These examples show not only the design plans but also comprehensive benefits of the sponge city initiative. The role of disseminating good examples is emphasized (Bulkeley and Broto, 2012; Dai et al., 2018), which is conducive to stimulating the passion of local governments to engage in the sponge city initiative.

With respect to the ‘governing by authority’, Dai et al. (2018) touch upon that construction

of the sponge city must respect the basic law, which is the point of reference for the compilation of the special plan for sponge city construction or the actual implementation of the SPC. The so-called basic law includes the Urban and Rural Planning Law, the Construction Law, and so forth (MOHURD, 2016). Apart from this, the evaluation system is also of critical significance (Jiang et al., 2018; Dai et al., 2018), which refers to a system insuring the implementation performance of the sponge city performance at the local level. According to the ‘Performance Evaluation and Assessment Method of the Construction of the Sponge City’ announced by the MOHURD (2015), this evaluation system contains six categories including water ecology, water environment, water resources, water safety, institutional building, and execution effectiveness (Table 1). These six categories have their respective specific indexes, which are either recommended or compulsory. Moreover, when evaluating these compulsory indexes, this evaluation system can be divided into three steps: first, a self-assessment is adopted by a municipal government and its result needs to be submitted to the provincial government; second, after reviewing the result of self-assessment, the provincial government or reputable third parties write a report, which needs to be submitted together with the report of the city’s self-assessment to the MOHURD; third, the MOHURD needs to examine these reports selectively (MOHURD, 2015; Dai et al., 2018). Regarding the technical aspects among these six indexes, the MOHURD (2018) also compiled an ‘Assessment Standard for the Construction of the Sponge City’.

Category	Index	Properties
Water Ecology	Control rate of annual total runoff	Compulsory
	Ecological restoration of riverbank and lakeside	Compulsory
	Groundwater level	Compulsory
	Urban heat island effect	Recommended
Water Environment	Quality of water environment (for the black and smelly river)	Compulsory
	Quality of water environment (for groundwater)	Recommended
	Urban non-point source pollution control	Compulsory
Water Resources	Sewage recycling rate	Compulsory
	Rainwater utilization rate	Compulsory
	Pipe network leakage control	Recommended
Water Safety	Urban pluvial flooding prevention and control	Compulsory
	Drinking water safety	Recommended
Institutional Building	Planning and construction management and control system	Compulsory
	Division and protection of ‘Blue Line’ and ‘Green Line’	Compulsory
	Technical specification and standardization	Compulsory
	Investment and financing mechanism	Compulsory

	building	
	Performance appraisal and reward mechanism	Compulsory
	Industrialization	Recommended
Execution Effectiveness	Demonstration effect	Compulsory

Table 1. Performance Evaluation and Assessment Method of the Construction of the Sponge City. Source: Ministry of Housing and Urban-Rural Development, 2015.

As regards the ‘governing by provision’, the term ‘provision’ stands for the provision of services and expertise (Kern and Alber, 2009). In the case of the sponge city, in addition to the ‘Technical Guideline’ mentioned above, the MOHURD provides the ‘Application Guideline’ about how to apply for pilot cities of the sponge city initiative. Also, the MOHURD and other ministries such as the Ministry of Finance (MOF) and the Ministry of Water Resources (MWR) organize several seminars to share knowledge of and accumulated experience in the construction of the SPC. In the fourth facet – ‘governing by co-funding’, the pilot cities are provided with three-year special funding support by the central government, but the amount of funding is dependent on cities’ administrative levels: € 78 million per year for four municipalities – Beijing, Shanghai, Tianjin and Chongqing; € 65 million per year for provincial capital cities such as Jinan and Wuhan; € 52 million per year for other cities such as Qingdao and Dalian (MOF, MOHURD, & MWR, 2014). Besides, after realizing the importance of development finance in the construction of the SPC initiative, the China Development Bank as the only development finance institution in China provides credit support for two batches of pilot cities as well (MOHURD, 2015). Simultaneously, considering that the construction of the sponge city requires a huge investment, the model of public-private-partnership (PPP) is encouraged by the central government, i.e. the central government awards 10% of initial funding to those pilot cities that raise a certain percentage of funds through the model of PPP (MOF, MOHURD, & MWR, 2014).

2.4 Two Challenges in SPC

Among the literature analyzing the implementation challenges of the sponge city program, the governance problems related to public participation and sectoral coordination are mentioned frequently. (Zevenbergen et al., 2018; Jiang et al., 2018; Qiao et al., 2018). In the respect of the public participation, many scholars touch upon that the public perception of the sponge city is not adequate and that the role of the public in the sponge city is constrained. For example, Wang et al. (2017) conduct questionnaires in the city of Zibo and Doingying and find that despite knowing about urban pluvial flooding and the sponge city through media coverage, most citizens know little about the specific causal relationship between urban flooding and the SPC initiative. Additionally, the results of questionnaire surveys show that most citizens still hold a mindset that the implementation and maintenance of the sponge city program is mainly the responsibility of governments, which indicates that the citizen participation is limited yet (Wang et al.,

2017). The implementation and construction of the sponge city program spans boundaries of diverse policy domains and associated sectors, which calls for the cooperation and coordination between multiple sectors (e.g. Zevenbergen, 2018). However, Jiang et al. (2018) point out that the existing governance structure of the sponge city program in China is characterized by fragmentation, which not only becomes a barrier to the sectoral coordination but also makes the chance of joint efforts between various sectors easily missed. The sectoral coordination refers to the need to synchronize policies of different sectors (Zingerli, 2004). Tosun and Land (2017) also point out that the coordination between actors from diverse policy sectors always characterizes policy integration. Therefore, the implication here is that the low extent of coordination between sectors leads to a limited policy integration.

3. Theoretical Framework

Governance is the primary focus of this research. A theoretical framework offered in this chapter will look at two dimensions of governance: processes and contents, whose respective focuses are 'actors' and 'policies'. This develops a better awareness of the role of public participation and policy integration in the sponge city program. This chapter ends with a conceptual framework, which will serve as a foundation for the analysis of public participation and policy integration in the sponge city program in Yibin.

3.1 Governance

3.1.1 Introduction on Governance

Having explained the relationship between sustainable stormwater management and governance and described the governance of the sponge city, it is time to make a definition of governance. Therefore, this section introduces what the governance is and three dimensions of governance.

In the literature of governance, there is a classical discourse named 'from government to governance', which signifies a shift from hierarchical governance towards non-hierarchical governance (Lange et al., 2013). In between the dichotomy of government and governance, the notion of governing, as the key point, encompasses a creation of relationships between governments and non-governmental actors, which is able to alter from hierarchical controls by governments towards arrangements monitored loosely (Capano et al., 2015). Therefore, 'government' in this discourse emphasizes the role of the state, who can make decisions in a strictly top-down way (Driessen and Vermeulen, 1995). Regarding the conception of governance, this term implies 'a process of governing; or changed condition of ordered rule; or the method by which society is governed' (see Rhodes, 2007, p.1246). Rhodes (2007) also gives a more precise definition of governance, which is comprised of (I) interdependency among organizations (i.e. the boundaries between the state, the market and the civil society is changing or blurred), (II) continuous interactions among relevant actors driven by the demand for resources exchange and shared goals negotiation, (III) game-like interactions that are based on inter-trust and regulated by rules of the game, and (IV) a certain degree of autonomy from governments, which means that the state is still capable of steering networks.

Apart from that, after reviewing relevant literature, Treib et al. (2005) bring governance into the realm of 'politics, polity and policy' and provide a distinctive definition of governance. In respect of 'politics', governance is connected with the processes of decision-making and policy-making. According to Kohler-Koch (1999; in Treib et al., 2005), governance refers to that 'the ways and means in which the divergent preferences of citizens are translated into effective policy choices, about how the plurality of societal interests are transformed into unitary action and the compliance of social actors is achieved' (p.5). Regarding the 'polity' dimension, the conceptualization of governance

considers the institutional factor and therefore it is conceived as a system of rules of games, which influences the actions of social actors (Treib, 2005). Finally, drawing upon Hérítier's (2002) definition of governance as 'mode of political steering' (p.1) either in a broad or a narrow sense, Treib et al. reckon that governance can also be linked to the 'policy' dimension since steering instruments used in diverse modes can distinguish policies.

Likewise, Lange et al. (2013) treat the long-established structuring of the political, namely the triad of politics, polity, and policy, as three dimensions of governance (Figure 3) and speak to 'the triad is an all-embracing approach since all aspects of governing can be classified in one of the three dimensions' (see Lange et al., 2013, p.409). Within this triad framework, the 'politics' dimension denotes governance processes and refers to the actors and their interactions. The 'polity' dimension encompasses the structures of governance and refers to the institutional 'rule of the game' consisting of formal and informal institutions, which can shape the interactions between relevant actors. Finally, the 'policy' dimension stands for governance contents and it focuses on the formulation and implementation of policies. More specifically, this dimension entails 'the appearance of problem definitions, decisions, objectives and steering instruments as well as of general characteristics such as the degree of the pursuit for learning and integration' (see Lange, 2017, p.61). Given that the problem of public participation is associated with the governance processes (i.e. politics) and that the issue of policy integration can be categorized as governance contents (i.e. policy), the following section elaborates more on the 'politics' and 'policy' dimension of the triad framework.

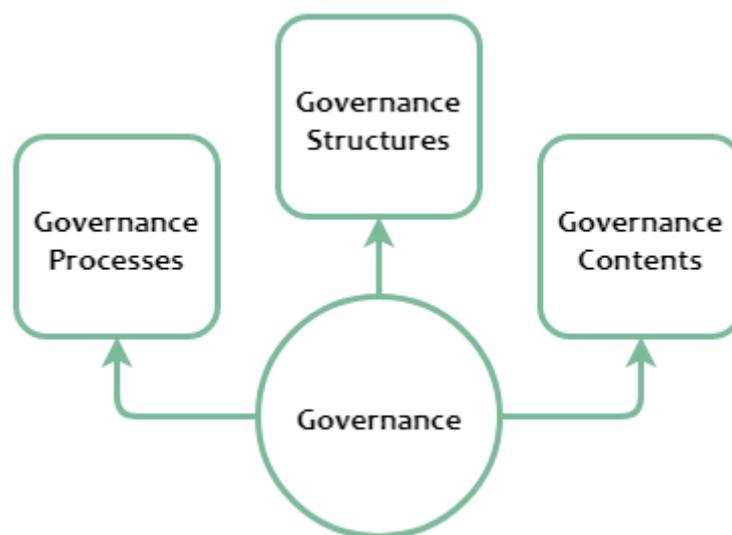


Figure 3. Three dimensions of governance. Source: Lange et al., 2013; Lange, 2017.

3.1.2 Politics: Governance Processes

What is central to the 'politics' dimension is actors, because governance processes are built upon the interaction between actors. According to Lange (2017), the actors stand for social units who not only possess power of actions but also can be engaged in governance.

Based on the 'governance triangle' (Martens, 2006), actors cover governments as well as non-governmental actors such as market actors and those from civil society. In general, actors denote individuals, but they can participate in governance as representatives of an organization as well (Van der Brugge, 2009). Arts et al. (2006) also point out that actors can build their coalitions, which indicates that actors in the processes of governance can take actions in an individual as well as collective way. It is noteworthy that the coalitions of actors are changeable rather than stable; for example, the emergence of new actors results in a change in their coalitions, i.e. breaking up or extending the existing actors coalitions (Arts et al., 2006). For government arrangements per se, Lange (2017) also mentions that there are variations in the number of actors interplaying in the implementation processes across different governance arrangements. Likewise, from a temporal perspective, the boundaries of so-called 'actor field' might change during the different stages of interactions between actors, as some actors take part in or leave the processes of governance (Lange, 2017).

Thorn (1984) in her study considers that a necessary and desirable part of decision-making processes concerning the allocation of resources is the public participation. In line with this, Lange (2017) also argues that the way in which the interests of participants (i.e. actors) are included in the governance processes is affected by the exchange and mobilization of resources. Different types of resources are divided by Buizer (2008) such as financial resources, knowledge, land and legitimacy. Power of actors is closely connected to resources and is defined as 'the mobilization, division and deployment of resources' (see Arts et al., 2006, p.99). For example, the appearance of new actors or the variation in actor coalitions (i.e. the change in power) can lead to a new division of resources (Arts et al., 2006; Qiao et al., 2018). In addition, under the effects of resources, power becomes more relative. More specifically, power of some actors who are capable of having control over mobilization and allocation of resources is greater than that of actors who do not have such control (Buizer, 2008). After mobilizing resources and power, actors are able to deploy them to impose influences, i.e. capacities to take actions to influence or determine outcomes of policies (Arts, 2006; Lange, 2017).

3.1.3 Policy: Governance Contents

What is at the core of the 'policy' dimension is public policy. In the relevant literature, there are numerous definitions of public policy. Dye (2017) argues that 'public policy is whatever governments choose to do or not to do' (p.18). Jenkins (1978; in Howlett and Cashore, 2014) conceptualizes public policy as 'a set of interrelated decisions taken by a political actor or group of actors concerning the selection of goals and the means of achieving them within a specified situation where those decisions should, in principle, be within the power of those actors to achieve' (pp.18-19). Knoepfel et al. (2011) in their public policy analysis define public policy as 'a series of intentionally coherent decisions or activities taken or carried out by different public (...) actors, whose resources, institutional links and interests vary, with a view to resolving in a targeted manner a problem that is politically defined as collective in nature' (p.24). In the field of public

policy analysis, the concept of policy cycle, which regards the policy process per se as evolving through stages, is a significant part (Jann and Wegrich, 2007). The policy cycle contains four stages: agenda-setting, policy formulation, implementation, and evaluation (ibid.). Driessen et al. (2012) argue that within the 'policy' dimension of governance, the substantive components, namely goals and targets as well as instruments, of public policy are of great importance. From Lange's (2017) point of view, the goals and targets of policy exist in the stage of formulation, as within this phase several special objectives are established by plans, strategies and programs. The type of targets and goals varies across different governance arrangements (Lange, 2017). To realize the policy goals set up in the formulation, certain instruments are adopted. The stage of implementation includes the implementation of policy programs to meet goals and targets as well as translation of these programs into concrete circumstances to cope with problems (Knoepfel, 2011; Lange, 2017). Thus, the policy implementation stage corresponds with policy instruments. Similarly, Lange points out that there are variations in terms of instruments between different governance arrangements. For example, in study of Mees et al. (2013) policy instruments are classified into three categories: legal, economic, and communicative instruments and they find that all kinds of instruments are utilized in hierarchical arrangements despite a preference for legal instruments. Regarding non-hierarchical arrangements, market governance mainly adopts economic instruments whereas interactive governance mostly makes use of communicative instruments.

Except for the goals and instruments of policy noted above, the policy integration (PI) is equally crucial in the 'governance contents' dimension (Driessen et al., 2012). Lange (2017) shares this view and thinks that 'policy settings reflect a more or less pronounced pursuit of integrating contents' (p.75). Briassoulis (2004) classifies two types of policy integration: horizontal/inter-sectoral and vertical/intra-sectoral. According to Rouillard et al. (2013), the horizontal approach to PI stands for 'the linkages across policies to foster exchange and partnership working' (p.380), while the vertical approach refers to 'mechanisms within a policy to incorporate and implement other policies' objectives' (p.380). Also, there are variations regarding the attitudes towards policy integration across different governance arrangements (Lange, 2017). Generally speaking, non-hierarchical governance arrangements are more positive about policy integration than hierarchical governance arrangements.

3.2 Public Participation

3.2.1 Public Participation in SSM

While policymakers and scholars (e.g. Porse, 2013) point to the importance of public participation in sustainable stormwater management, there are certain obstacles existing. For example, in the USA, public participation is required by 'Stormwater Phase II Rule' but motivations and opportunities for public participation are deficient (Dhakal and Chevalier, 2017). In the case of the sponge city, the necessity of public participation is still highlighted by scholars. Wang et al. (2017) think that 'public participation is vital for

sponge city construction (...) [and] public behaviors and perceptions can significantly influence sponge city implementation of in practice, as with green roofs construction, for example, which is connected to people's daily lives' (p.12). In line with this, Li et al. (2017) mention that the sponge city, different from traditional stormwater management that is based on underground infrastructures, is constructed above ground as well and is relevant to the daily lives of the public; hence, attitudes and opinions of citizens and their participation are necessary. Nguyen et al. (2019) argue that the concept of the sponge city, that is very new for the public, necessitates improving public attitudes towards and perceptions of this initiative, which is helpful for the achievement of public participation. Having pointed out the significance of public participation in the implementation of the sponge city, Dai et al. (2018) pay more attention to the impacts of the context of China on public participation, i.e. 'the governing socialist ideology and traditional Chinese culture give priority first to national interests, then to collective interests, and lastly to individual interests' (p.591). Consequently, in the processes of policy- and decision-making, the role that the public plays is limited. But, nonetheless, due to the fact that the creation of cities is aimed at satisfying the needs and interests of citizens and that citizens know most about their own needs, the role of public participation in the actual implementation of the SPC still needs to be emphasized (Dai et al., 2018).

3.2.2 A Citizen Perspective of Participation

By comparison with conventional participation focusing more on the role of administrators, authentic participation places citizens closer to the core of the issue, which implies that there are two perspectives of public participation, namely the administrator and citizen perspective (King et al., 1998). Indeed, the study built upon an administrator perspective of public participation is highly valuable and pragmatic since it can provide administrators or other decision-makers with guidelines when they design public participation processes. 12 design guidelines of participation processes proposed by Bryson et al. (2013) for government administrators can illustrate this. But taking a citizen perspective of public participation is of equal value and of crucial importance, which can not only help scholars understand public participation in a more holistic way but also make government administrators know more about citizens' motives (Hafer and Ran, 2016). If administrators do not understand motives of citizens, '[they] are left with an inadequate if-you-build-it-they-will-come approach to design participation processes' (see Hafer and Ran, 2016, p.209). Apart from this, Roberts (2004) touches upon that residents are busy with earning a living to sustain daily lives of their families so that they are unable to participate and thereby he thinks that 'the assumption that people will participate if given the opportunity does not fit with reality' (p.325). This indicates that merely providing citizens with opportunities to be involved is not adequate and that there is a need to understand what motivations stimulate citizens to participate (Hafer and Ran, 2016).

Likewise, Gustafson and Hertting (2016) also point out that theorists and administrators know less about participants' motives and expectations and that a better understanding

of participants' motives for participation is helpful for policy- and decision-makers. To identify which motives, they collect survey data from a large-scale urban renewal program in Sweden and find three categories of motives, which are common good motives, self-interest motives, and professional competence motives. Common good motives denote a desire to make contributions to local development; self-interest motives stand for a blend of enhancement of citizens' own political efficacy and expression of thoughts of their own groups; and professional competence motives show participation based on professional knowledge (Gustafson and Hertting, 2016). Also, when connecting this citizen perspective of public participation with the field of sustainable stormwater management, Brown et al. (2016) in their study on a stormwater retrofit program in Australia find that participation is affected by internal and external motivating factors such as citizens' pursuit of personal benefits, their distrust of implementation agency, and so forth.

3.3 Policy Integration

3.3.1 What Is Policy Integration?

There are various definitions of policy integration (PI) in the literature. For example, Briassoulis (2004) defines policy integration as 'a process either of coordinating and blending policies into a unified whole, or of incorporating of one policy into another' (p.10). Tosun and Lang (2017) argue that policy integration is 'always characterized by the cooperation of actors from different policy domains – or policy sectors' (p.554). According to Stead and Meijers (2009), the definition of policy integration is 'the management of cross-cutting issues in policy making that transcend the boundaries of established policy fields, and that do not correspond to the institutional responsibilities of individual departments' (p.321). Besides, Stead and Meijers also think that although authors hold different understandings and interpretations in conceptualizing policy integration, a consensus that policy integration is advisable is formed by them. Simultaneously, in addition to horizontal and vertical dimension of policy integration mentioned in the section 3.1.3, there are certain other dimensions of policy integration existing in the literature. Cowell and Martin (2003) differentiate inter-organizational and intra-organizational dimensions. In between these two dimensions, the inter-organizational dimension plays a progressively significant role in policy integration since the engagement of different agencies to the formulation and implementation of policies within policy sectors becomes increasingly common (Stead and Meijers, 2009). Regarding the aspect of jurisdiction, what is related to the inter-organizational dimension is the intra-jurisdictional dimension, which stands for 'integration between the same sector in geographically adjacent agencies' (see Stead and Meijers, 2009, p.320).

What bears a close relationship with policy integration is policy coordination and thus the concept of policy coordination and differences in between need to be pinpointed. According to Peters (1998), the term 'policy coordination' refers to 'the need to ensure that the various organizations – public and private – charged with delivering public policy work together and do not produce either redundancy or gaps in services' (p.5). Also, he

thinks that there is a need to consider the maximal and minimal levels of policy coordination – in other words, the spectrum of coordination exists. The maximal level of policy coordination requires ‘much tighter controls over the activities of organizations and some means of enforcing jurisdictional controls over disputed turf, or of demanding that the gaps in services be remedied’ (see Peters, 1998, p.5). The minimal definition is a level at which ‘organizations simply are cognizant of each other’s activities and make an honest effort not to duplicate or interfere’ (ibid.). With respect to distinctions between policy integration and policy coordination, considering the aspect of aim, policy integration is aimed at involving policy sectors to produce a joint policy, whereas policy coordination is aimed at reaching a mutual enforcement and consistency between policies through adjusting sectoral policies (Stead and Meijers, 2009). Hence, in terms of the interaction between sectors, the requirement of policy integration is much higher than that of policy coordination. Presently, in the case of the sponge city, sectoral policies are emphasized in numerous cities’ special plans for sponge city construction. For instance, Yibin City’s special plan (2016-2030) states that ‘multiple sectors such as planning, land and resources, housing and construction, finance, water resources, ecological environment, transport, parks and greening and so forth need to study and initiate sectoral policies to support the construction of the sponge city’ (p.28). In comparison with policy coordination, cross-cutting objectives are at the heart of policy integration (Stead and Meijers, 2009). Similarly, Candel and Biesbroek (2016) present that policy integration is needed for the cross-cutting theme. Given that the sponge city is classified as a cross-cutting theme as it involves several policy domains or sectors, the sponge city program thus needs policy integration rather than merely policy coordination.

3.3.2 Policy Integration as a Process: A Four-dimension Framework

Tosun and Lang (2017) in their paper summarize two groups of policy integration, one of which is to ‘seek to create inter-dependencies between two or more policy domains and to attain the desired degree of integration by means of cooperation and coordination’ (p.555), while the other is that ‘policy integration as a process that occurs at a meta-level and involves the use of specific instruments designed to integrate a set of considerations, issues, and stakeholders across different policy domains’ (ibid.). Within the second group, Candel and Biesbroek are the representatives, because contrary to other scholars who regard policy integration as an unchanged ideal outcome, they take a processual understanding to consider policy integration as a process varying over time (Candel and Biesbroek, 2018). Based on this, they propose a framework (Table 2), which can function as a useful tool for evaluating the current degree of policy integration regarding the governance of a cross-cutting theme (Candel and Biesbroek, 2016). This framework is comprised of four dimensions of policy integration, including policy frame, subsystem involvement, policy goals, and policy instruments, and moreover each dimension has its respective specific sub-dimensions (ibid.). Noteworthy, Candel and Biesbroek also mention that these four dimensions of policy integration do not always move concertedly, which means that they can move at their own speed and even towards opposite directions.

	Lack of policy integration ←		→ Full policy integration	
Policy frame	The sponge city is defined in narrow terms. The cross-cutting nature of the sponge city is not recognized. The sponge city is considered to fall within certain sectors (e.g. planning bureau) and efforts of other sectors (e.g. finance sector) are not involved. There is no impulse to integration.	Realizing that externalities of policies of different sectors influence outcomes of the sponge city. The sponge city is considered to fall within the boundaries of one main domain sector while some attentions paid to potential contributions of other sectors. There is no strong impulse to integration.	Understanding that the sponge city as a cross-cutting theme spans the boundaries of various sectors. Therefore, there is a need to coordinate efforts of these relevant sectors. Integration here is encouraged.	All potential sectors related to the SPC program have developed ideas about their role in the governance of the sponge city. Integration is advocated and adopted as dominant steering philosophy.
Subsystem involvement				
Subsystems involved	One dominant sector governs the sponge city independently. Formally, no other sectors are involved.	Idem, but concerns emerge in one or more additional sectors.	Two or more sectors take a formal responsibility for the sponge city program.	The sponge city is imbedded in all potentially relevant sectors.
Density of interactions	-No interactions.	Infrequent information exchange between the dominant sector and one or more additional sectors.	There are interactions between various sectors, part of which occurs more frequently than others.	High level of interactions between all relevant sectors.
Policy goals				
Range of policies in which	Sector-specific goals relative to the sponge city	Idem, while additionally concerns about	Different sectors adopt their respective	All potentially relevant sectors have

problem is imbedded	in one specific sector.	the sponge city might be imbedded to some degree in other sectors' policies.	concerns in their policy goals, and some sectors even formulate comprehensive sectoral strategies to help the implementation of the sponge city.	adopted concerns about the sponge city in their policy goals.
Policy coherence	Very low or no coherence. This occurs when the cross-cutting nature not recognized, or when policy sectors are highly autonomous in setting their own goals.	Sector may address externalities of some policies to some extent in their goals.	Coordinated policy goals are set and sectors attempt to develop synergies.	Shared policy goals are imbedded with an overarching strategy of the sponge city.
Policy instruments				
Range of subsystems' policies that contain policy instruments	Sector-specific instruments are adopted in one specific sector.	One or more additional sectors might adapt their instruments to mitigate negative effects or address concerns of the sponge city.	Introducing various sectoral instruments or instrument mixes to make contributions to the sponge city.	All potentially relevant sectors adopt instruments related to the sponge city in their policies.
Procedural instruments at system-level	No relevant procedural instruments at system-level.	Some information-sharing instruments for example inter-service consultations may be initiated.	Increasing number of cross-sectoral instruments facilitating sectors to address concerns about	Establishment of coordinative structure(s) at system-level, for example inter-sector task force(s).

			the sponge city jointly.	
consistency	Very low or no consistency, which means that policy instruments are totally sectoral.	Sectors consider externalities of sectoral instruments mixes considering intra- and inter-sectoral consistency.	Sectors adjust and attune their policy instruments so as to jointly address concerns of the sponge city. Consistency here becomes an explicit target.	Achievement of full consistency between sectoral policy instruments implicitly or explicitly influencing the sponge city.

Table 2. The sponge city concept explained in a four-dimension framework of policy integration based on Candel and Biesbroek, 2016.

The first dimension of policy integration is the policy frame, which focuses on ‘how the problem (...) is perceived within a government or governance arrangement’ (see Candel, 2018, p.105). In other words, in the case of the sponge city, are environmental, socio-economic, and recreational matters considered in the sponge city program, or is the sponge city mainly categorized as planning and building different kinds of green infrastructures to tackle urban pluvial flooding? From Candel’s viewpoint, the key point of this dimension is that ‘whether the crosscutting nature of a problem is recognized as such, and whether the need for an integrative approach is acknowledged’ (ibid.). The second dimension pays more attention to the subsystem involvement. According to Adam and Kriesi (2007), policy subsystems refer to specific policy domains or sectors. The central question in this dimension is which subsystems are (not) engaged in the governance of cross-cutting theme (Candel, 2018). Apart from this, this dimension also includes the interactions between subsystems. In the sponge city program, for instance, the sector of housing and construction, of planning, and of water resources might work in a close cooperation because at the national level these three sectors undertake the main responsibility for the SPC program. This facet assumes that a higher extent of policy integration involves a limited number of subsystems who not only frequently communicate and interact with each other but also maintain less frequent interactions with those so-called ‘loosely coupled’ subsystems (Candel and Biesbroek, 2016). Regarding the third dimension, there are two points: the range of policies in which concerns of cross-cutting theme are adopted and the coherence between these policy goals (Candel and Biesbroek, 2018). Connecting this dimension to the sponge city, the engagement of multiple sectors in the program would lead to multiple sectoral policies within which different sectors show their own perceptions and concerns of the program. To pursue and attain afore mentioned policy goals, various policy instruments are deployed by sectors, which is the fourth dimension of policy integration. This dimension contains three sub-dimensions: (I) range of subsystems’ policies containing policy

instruments; (II) procedural instrument facilitating the coordination between sectors; and (III) the consistency (Candel and Biesbroek, 2016; 2018). According to Howlett (2000; in Candel and Biesbroek, 2018), there are two kinds of policy instruments differentiated: substantive and procedural instruments. The substantive instruments intend to allocate governing resources to 'directly affect the nature, types, quantities and distribution of the goods and services provided in society' (see Candel and Biesbroek, 2018, p.199). Hood (1983) classifies the substantive instruments into four types: informational, regulative, financial, and organizational instruments. The procedural instruments are deployed to 'indirectly affect outcomes through the manipulation of policy processes' (see Candel and Biesbroek, 2018, p.2018). Finally, the 'consistency' stands for the consistency of the instrument mixes. The instrument mixes refer to the sets of instruments that sectors have developed in an incremental way over a period of time (Candel and Biesbroek, 2016).

3.4 Conceptual Framework

The conceptual framework depicted by Figure 4 visualizes the relationship between different aspects of literature described above. Due to the fact that the main research question is about finding improving means for the implementation of the sponge city program in terms of public participation and policy integration, this research elaborates further on the 'processes' and 'contents' dimensions of governance.

First, from a viewpoint of public participation, the researcher has looked in particular to the citizen perspective, which more specifically means understanding the public perceptions of the sponge city program and the public's motivations to participate. This analysis can answer the secondary research questions '*What are the public perceptions of the sponge city program in Yibin City?*' and '*What are the motivations for the public to participate in the sponge city program in Yibin City?*'.

Second, the framework of policy integration put forward by Candel and Biesbroek (2016) is adopted, consisting of four dimensions – policy frame, subsystem involvement, policy goals, and policy instruments. In particular, the 'policy coherence' and 'consistency' sub-dimensions cannot be measured directly and there is no concerted method for assessing them (Candel and Biesbroek, 2018; Candel, 2018). Based on this, the research of policy integration will focus more on other subdimensions of the 'policy goals' and 'policy instruments' dimensions. Hence, the adoption of this framework can respond to the secondary research question '*What are the problems in policy integration of the sponge city program in Yibin City?*'.

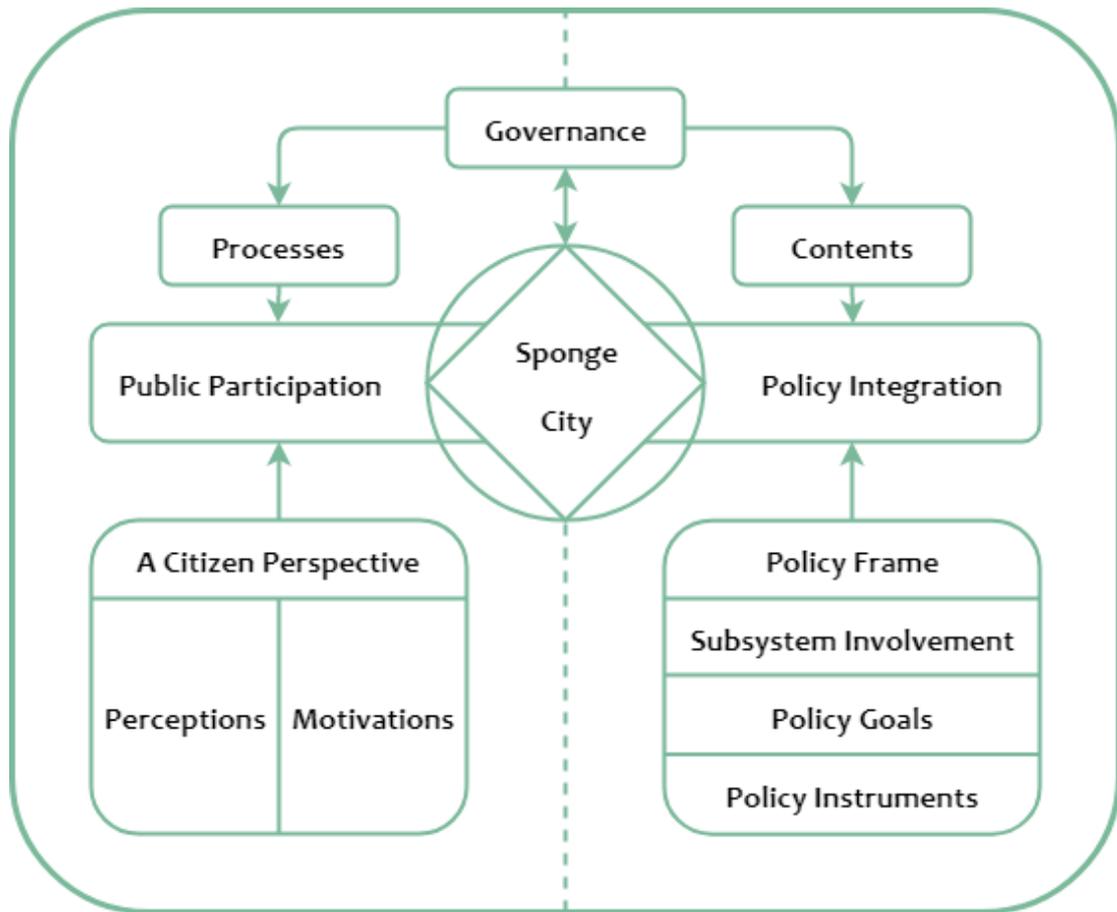


Figure 4. Conceptual framework for analyzing public participation and policy integration in the sponge city program in Yibin City. Source: Author, 2019.

4. Methodology

This research adopts the case study as a research methodology. Design of the case study calls for researchers to make choices with great care in defining the type of the case study, the research design, and methods for data collection and data analysis (Yin, 1994). Therefore, this chapter will firstly define the type of the case study in this research and explain why the case study is suitable for utilization, which is followed by an elaboration of the research design of this case study. Subsequently, the unit of analysis will be explicated as it is a significant part of the research design (Dolma, 2010). Finally, techniques for data collection and approaches to data analysis will be presented.

4.1 Case Study: A Research Methodology

Gillham (2000) defines the case study as ‘one which investigates the case to answer specific research questions and which seeks a range of different kinds of evidence, (...) and which has to be abstracted and collated to get the best possible answers to the research questions’ (p.1). What is central to the case study is the case, which denotes an entity, an event and a unit of analysis (Yin, 1994; in Noor, 2008). Cases can be divided into single and multiple cases (Gillham, 2000). Similarly, Yin (1994) differentiates four types of the case study, including holistic single-case study, embedded single-case study, holistic multiple-case study, and embedded multiple-case study. Besides, according to diverse purposes, he also states that there are three categories of the case study: descriptive, exploratory, and explanatory (Yin, 1994). Built upon these typologies, the case study in this research is classified as an exploratory, single-case study. This research is aimed at gaining understanding of the governance of the sponge city program through case analysis, especially in facets of public participation and policy integration. The city of Yibin is the only case, which will be focused on in this research.

With respect to the research questions, Yin (1994) argues that ‘why’ and ‘how’ questions are suitable for adoption of case studies. Additionally, he mentions that regarding some exploratory types of ‘what’ questions, the case study as a research strategy can also be used (Yin, 1994). Connecting with this research, while secondary research questions that needs to be answered are mainly ‘what’ questions (e.g. What are the public perceptions of the sponge city program in Yibin City?), the case study can still be used since these three ‘what’ questions are typically exploratory. Also, from Noor’s (2008) viewpoint, the case study is particularly appropriate when researchers focus on a special issue and study complex real-life activities. The focus of this research is the sponge city program, which can be regarded as a special issue. The complexity is reflected in both public participation and policy integration. Public perceptions and motivations for participations can be affected by various factors such as age and education background while policy integration involves coordination and interaction between sectors who have different interests. Hence, the necessity and significance of case study in this research are apparent.

4.2 Research Design

From Yin's (1994) point of view, research design can be considered as research's 'blueprint', which deals with four questions: 'what questions to study, what data are relevant, what data to collect, and how to analyze the results' (p.20). Five components constitute the research design: research questions, the case study's underlying propositions, the unit of analysis, the logic that links the collected data to the propositions, and the criteria for interpreting the findings (Yin, 1994). Here, the last two components stand for the data analysis step in the research. Based on these five components, Noor (2008) proposes a three-stage framework (Figure 5) to explain how to undertake a case study, which contains preliminary stage, analysis stage, and conclusion stage. The first phase is comprised of three parts: formulating theory, selecting case, and designing research questions. The core point of the second phase is to conduct the case study, which involves the establishment of the unit of analysis as well as the collection and analysis of research data. In the data collection, the principle of triangulation is of importance, which is aimed at finding diverse data sources to confirm relevant information and bringing these sources together (Rahim and Daud, 2015). Policy documents, questionnaires, and interviews are the data sources in this case study research. The last phase is mainly concerned with combing theory and findings of the case study to draw a conclusion which fits the initial research questions. In this research, the Chapter 1 proposes research questions and the Chapter 2 and 3 explicate the context and the underlying propositions (i.e. theories) of the case study, both of which correspond with the preliminary stage. In the rest of this chapter, the unit of analysis will be defined and the specific methods for data collection and analysis will be introduced as well. The following Chapter 5 and 6 are about discussing findings, drawing conclusions, and making recommendations.

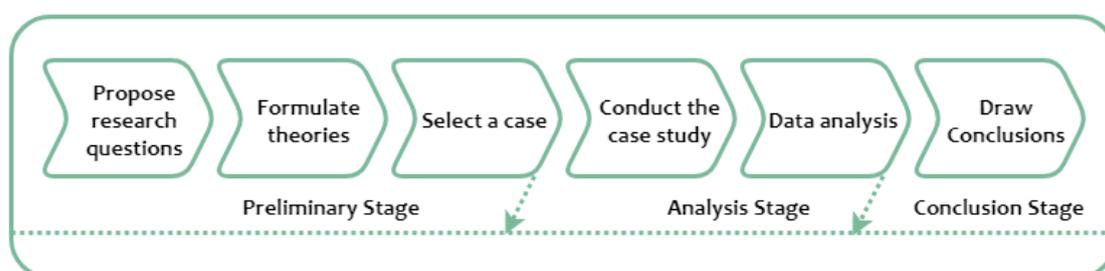


Figure 5. Research framework of the case study. Source: Noor, 2008 (Modified).

4.3 Units of Analysis

According to Yin (2003), defining theoretical scope, spatial boundary and timeframe determines the unit of analysis. This section will discuss these three facets respectively. The role that previous literature can play is a guide for defining the unit of analysis (Yin, 2003), and thus the theoretical scope is defined based on the literature review. Governance, public participation, and policy integration as the key concepts are included. The core point of this research is governance. The literature shows that governance has three dimensions: 'governance processes', 'governance structures', and 'governance

contents', respective focuses of which are actors, institutions, and policies. The reason why public participation and policy integration are incorporated into this scope is because not only are they associated with the first and third dimensions of governance, but they also reflect two challenges in the implementation process. The findings of this case study can become a foundation to find feasible improving means for the sponge city construction. The conceptual framework (Figure 4) makes this theoretical scope visualized.

The spatial boundary of this case study is the city of Yibin, which is located in the southeast part of Sichuan Province. There are two reasons for selecting Yibin City as the case. First, the researcher is familiar with the basic situation of Yibin City as it is his hometown. Second, the construction of the sponge city has already been added to the agenda of Yibin municipal government, which is manifested in the compilation of the Yibin City's special plan for sponge city construction (2016-2030). In this special plan, the government puts more importance to this city's southern part called as Nan'an. This is because Nan'an not only is the main urban area of Yibin City but also has already become the most easily waterlogged area throughout the entire city (e.g. Liu and Liu, 2015; Li and Zhou, 2016). Hence, this case is conducted based on the southern area (Figure 6).

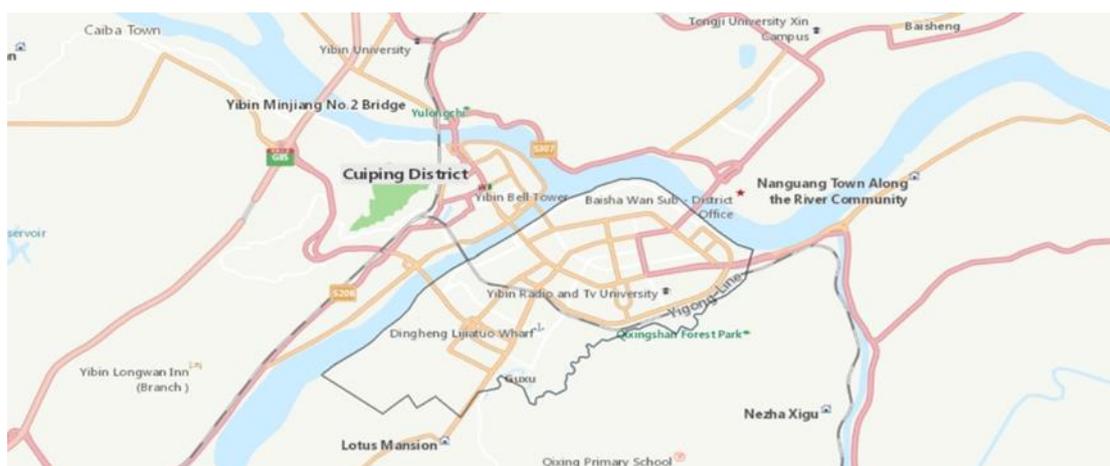


Figure 6. The spatial boundary of this research. Source: Author, 2019.

Finally, regarding the temporal boundary, this research starts from November 2018 to July 2019. Data collection and data analysis are held during the period from May 2019 to June 2019. The outputs of the case study rest on respondents' perceptions over that period.

4.4 Methods for Data Collection

The case study is not only related to qualitative research method but also associated with quantitative research method (Yin, 2003). Therefore, this research adopts a mixed method approach. Three methods were used for this research, which are an analysis of policy documents relevant to the sponge city program, a questionnaire survey and semi-structured interviews.

4.4.1 Document Analysis

Document analysis denotes a systematic procedure in which documents (including printed and electronic material) are reviewed and evaluated (Bowen, 2009). From Bowen's point of view, there are various forms of documents in the systematic evaluation, consisting of journals, background papers, journals, public records, manuals, books, newspapers and so forth. O'Leary (2014) summarizes these forms into three categories: the first is public records, which includes the official records of organizations' activities (e.g. policy documents); the second is personal documents, which refers to the account of personal experiences and actions (e.g. blogs); and the third is physical evidence, whose examples are posters and certain training materials. In addition, Atkinson and Coffey (1997) use 'social facts' to refer to documents, which 'are produced, shared and used in socially organized ways' (p.58). Policy documents are chosen to be analyzed in this research since additional information can be provided by these documents and can be a supplement to interviews. With respect to the sponge city initiative, the central government and relevant ministries instigated several policies for instance the 'Interim Provisions for the Special Plan of the Sponge City', which will be used for document analysis. At the local level, the policy document analyzed is the special plan for sponge city construction, which is compiled by Yibin municipal government.

4.4.2 Questionnaire Survey

A questionnaire refers to an instrument aiming to elicit useful information for analysis (Babbie, 2011). The utilization of a questionnaire in this research is aimed at knowing about local residents' perceptions of the sponge city and potential motivations for participation in the sponge city program in Yibin City. McLafferty (2010) pinpoints three basic principles for designing a questionnaire survey, including (I) keeping it simple, (II) defining terms clearly, and (III) using the simplest possible wording. Hence, when designing the questionnaire, the researcher avoids using some complicated words and tries to make each participant¹ better understand the content of the questionnaire. This questionnaire is comprised of 12 questions (see Appendix 1), which can be divided into three parts. The first part is to understand the basic information of the participants including their gender, age, and education background. Three variables of the education background (low, medium, and high) reflects the Chinese education system. The "low" stands for the nine-year compulsory education, an educational policy instituted by the national government; the "medium" denotes the senior high school education with three additional years; and the "high" represents the higher education. The second part is to understand the participants' perceptions of the sponge city program and its relationship with urban pluvial flooding, and the third one is an enquiry into the participants' motivations for their prospective participation in the sponge city projects. The third part provides six statements (Table 3) as descriptions of possible motivations for participating in the SPC program. Questions in this part take a form of Likert scale, which allows the participants to measure each statement from 'strongly disagree' to 'strongly agree'. The

¹ Participants in this section refers to citizens who participate in the questionnaire survey.

questionnaire survey usually contains open-ended and close-ended questions (Babbie, 2011). Most questions in this questionnaire are close-ended ones. But considering that there might be other motivations existing, one open-ended question is added to the third part to allow the participants to fill in alternative motivations for participation from their own perspectives.

1	Concern about urban development
2	Protect the safety of me and my family
3	Influence ultimate decisions and make them beneficial to community
4	Acquire more knowledge in the process of participation
5	Master professional knowledge in aspects of planning, architecture, etc.
6	Receive a certain number of rewards after participation

Table 3. Six possible motivations for participation. Source: Author, 2019.

This questionnaire is conducted online with the help of Tencent Questionnaire. Given that the spatial boundary of this research is the southern part of the city of Yibin, the target population of this questionnaire survey are citizens living in the southern part. The link of this questionnaire was shared by the researcher in two ways (Table 4). Finally, in total 279 citizens filled out this questionnaire.

Number	Date	Method
1	23/05/2019	The link was shared through Wechat. The researcher shared the link of this questionnaire to his friends and neighbors who live in the southern part of Yibin City. Next, these friends and neighbors also shared this link to their friends who live in the southern part as well. Therefore, it can ensure that most of respondents are from the focus area of this research.
2	24/05/2019	The link was shared through local bulletin board system named YBVV.

Table 4. Methods for spreading the questionnaire. Source: Author, 2019.

The analysis is based on answers provided by 279 respondents to all twelve questions. The analysis contains four parts. In the first part, the researcher conducted a frequency analysis of the respondents' basic characteristics and perceptions. In the second part, the researcher explored the characteristics of the respondents with different perceptions of the sponge city. In a third part, due to the fact that the Kaiser-Meyer-Olkin (KMO) test showed the KMO index was 0.735 that is suitable for an exploratory factor analysis (EFA), the EFA was utilized to reduce the data for the respondents' motivations to three factors (using principal component analysis, varimax rotation with Kaiser normalization). In the fourth part, these three factors were used to explore their relationship with the socio-demographic characteristics of the respondents shown in Table 5.

n	Percentage (%)
----------	-----------------------

Gender		
Male	141	50.5
Female	138	49.5
Age		
≤29	63	22.6
30-54	187	67.0
≥55	29	10.4
Education		
Low	26	9.3
Medium	71	25.4
High	182	65.2

Table 5. The socio-demographic characteristics of the respondents. Source: Author, 2019.

4.4.3 Semi-structured Interview

In qualitative research interviewing is the most common form of data collection (Jamshed, 2014). Interviews can be classified as three fundamental types: structured, unstructured, and semi-structured (Gill et al., 2008). This research adopts the semi-structured interview for data collection. According to Ayres (2008), the semi-structured interview is ‘a qualitative data collection strategy in which the research asks a series of predetermined but open-ended questions’ (p.811). Compared with structured interviews using close-ended questions, no fixed answers to questions are included in semi-structured interviews, while compared with unstructured interviews, the researcher is able to gain more control over topics of interviews (Ayres, 2008). Preparing an interview guide in advance is necessary for researchers who conduct semi-structured interviews (ibid.). Hence, one interview guide (see Appendix 2) is made based on the four-dimension framework of policy integration mentioned in the section 3.3.2.

O’Leary (2014) in his book points out the importance of selecting proper interviewees. Because of the aim to understand the status quo of policy integration between multiple sectors in Yibin City’s sponge city program, the researcher interviewed 8 representatives of sectors associated with the construction of sponge city and one official from Yibin municipal government as his routine work is closely related to the sectoral coordination. The specific interviewing timetable is depicted in Table 6.

Sector	Date	Medium	Code
Sector of Housing and Construction	20/05/2019	Face-to-face interview	Interview 01
Sector of Planning	20/05/2019	Face-to-face interview	Interview 02
Sector of Water Resources	21/05/2019	Face-to-face interview	Interview 04

Sector of Finance	21/05/2019	Face-to-face interview	Interview 06
Sector of Land and Resources	20/05/2019	Face-to-face interview	Interview 03
Sector of Ecological Environment	21/05/2019	Telephone	Interview 08
Sector of Garden	21/05/2019	Telephone	Interview 05
Sector of Transport	22/05/2019	Telephone	Interview 07
Municipal Government	22/05/2019	Telephone	Interview 09

Table 6. Overview of interviewees, date, medium and code of interviews. Source: Author, 2019.

4.5 Methods for Data Analysis

From Yin's (2003) point of view, data analysis is a process comprised of 'examining, categorizing, tabulating, testing or otherwise recombining both quantitative and qualitative evidence to address the initial propositions of a study' (p.109). This research collects quantitative and qualitative data at the same time, and therefore different methods for data analysis are adopted. With the help of IBM SPSS software, quantitative data obtained by the questionnaire survey is analyzed through tables and charts. The coding is of great importance in analyzing qualitative data (O'Leary, 2014). Therefore, qualitative data collected through semi-structured interviews is coded and analyzed using Atlas.ti software. The utilization of codes is decided on the basis of the four-dimension framework for analyzing the current situation of policy integration. The code book with definitions of codes can be found in Appendix 3.

5. Findings and Discussion

This chapter will describe the empirical findings of the case study. The conceptual framework proposed in the Chapter 3 contains two constituent elements: public participation and policy integration. Hence, the results of these two aspects will be presented and discussed in turn. Based on the results, more recommendations for improving the implementation of the sponge city program will be given in the next chapter.

5.1 Public Participation in the SPC Program

5.1.1 Respondents' Perceptions

Perceptions towards the sponge city & urban flooding

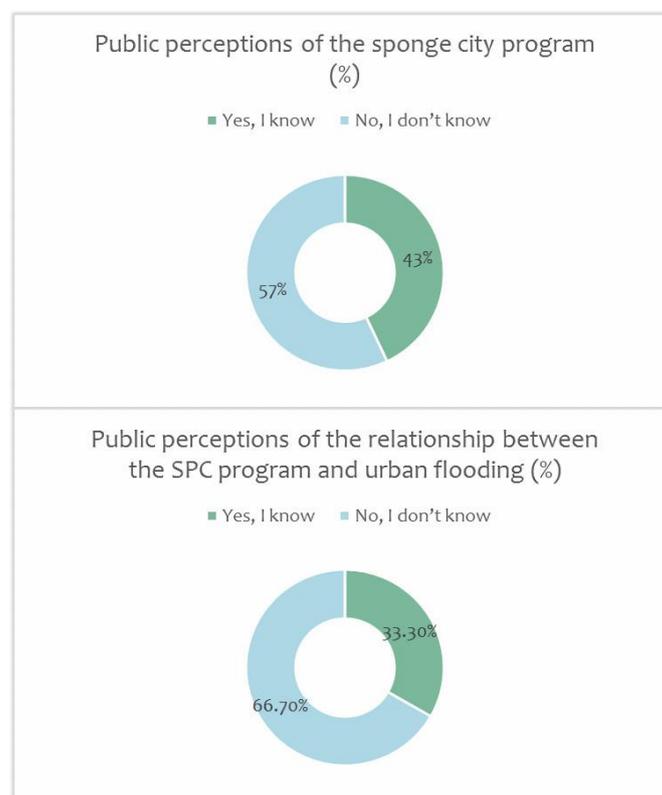


Figure 7. Public perceptions of the sponge city program. Source: Author, 2019.

In Yibin's special plan for sponge city construction (2016-2030), it mentions that the public perceptions of the sponge city are currently at a low level. Corresponding with this, most respondents (57%) did not know what the sponge city program is (Figure 7). This indicates that the concept of the sponge city is relatively new to local residents. Apart from this, regarding the fact that the sponge city is aimed at addressing the issue of urban pluvial flooding, most respondents (66.7%) did not get an understanding of this relationship (Figure 7). Therefore, although urban pluvial flooding is reported by local

media almost every year, there is a lack of public awareness of how the sponge city can assist in coping with the issue of flooding brought by intense rainfall events. The low level of public perceptions calls for an establishment of information dissemination mechanism to make the knowledge or construction progress of the SPC program more understandable for local residents in Yibin, which is also highlighted by the special plan. But, as is said by Interviewee 02 (2019, 20 May) in the sector of planning, no information dissemination mechanism was established until now, indicating that there are not many channels through which local residents are able to learn about the sponge city.

Socio-demographic characteristics influencing public perceptions

Title	Category	Perception 1 (%)		Total	p
		No, I don't know	Yes, I know		
Gender	Male	79(56.0)	62(44.0)	141	0.74
	Female	80(58.0)	58(42.0)	138	
Age	≤29	45(71.4)	18(28.6)	63	0.00**
	30-54	87(46.5)	100(53.5)	187	
	≥55	27(93.1)	2(6.9)	29	
Education background	Low	20(76.9)	6(23.1)	26	0.00**
	Medium	47(66.2)	24(33.8)	71	
	High	92(50.5)	90(49.5)	182	

**p<0.05; **p<0.01*

Table 7. The influence of socio-demographic characteristics on respondents' perceptions of the sponge city program. Source: Author, 2019.

As is shown by Table 7 and Table 8, the respondents with diverse socio-demographic characteristics had differences in their perceptions of the sponge city program and of its relationship with urban flooding. As regards the education variable, the statistical significance was found between respondents with a university-level education and those with a junior or senior high school education. Most respondents with high education background had more knowledge about the sponge city, whereas 6 lowly educated residents knew about the concept of the SPC program and even only 1 respondent in this category was aware of the relationship between the sponge city and urban flooding. This result confirms the suggestions from other researches (e.g. Wang et al., 2016) that education can play a significant role in affecting perceptions. Age was another important variable influencing respondents' perceptions. Regardless of the perceptions of what the sponge city is, or the perceptions of how the sponge city deals with the problem of urban pluvial flooding, only 2 people in the oldest group (≥ 55) thought that they knew about these two aspects, while, similar to the youngest group (≤ 29), less respondents between 30 and 45 years old chose that they understood the relationship between the SPC and urban flooding. Nevertheless, the group of respondents between 30-45 years old still had

better perceptions among three age groups. As for the difference in gender, there was no statistical significance found, which means that the difference between male and female in perceptions is not obvious. Actually, the influence brought by gender varies from case to case. For example, in the study of Wang et al. (2017), gender variable plays a vital role in perceptions of the possibility of urban pluvial flooding.

Title	Category	Perception 2 (%)		Total	p
		No, I don't know	Yes, I know		
Gender	Male	93(66.0)	48(34.0)	141	0.80
	Female	93(67.4)	45(32.6)	138	
Age	≤29	50(79.4)	13(20.6)	63	0.00**
	30-54	109(58.3)	78(41.7)	187	
	≥55	27(93.1)	2(6.9)	29	
Education background	Low	25(96.2)	1(3.8)	26	0.00**
	Medium	49(69.0)	22(31.0)	71	
	High	112(61.5)	70(38.5)	182	

**p<0.05; **p<0.01*

Table 8. The influence of socio-demographic characteristics on respondents' perceptions of the relationship between the sponge city program and urban pluvial flooding. Source: Author, 2019.

5.1.2 Respondents' Motivations

Motivations for participation

Motivations	M	SD
Protect the safety of me and my family	3.51	0.75
Influence ultimate decisions and make them beneficial to community	3.27	0.96
Concern about urban development	3.15	1.01
Acquire more knowledge in the process of participation	3.01	0.98
Receive a certain number of rewards after participation	2.87	0.90
Master professional knowledge in aspects of planning, architecture, etc.	2.50	0.92

Table 9. Motivations for participation. Source: Author, 2019.

In Yibin's special plan for sponge city construction (2016-2030), the installation of green roofs and permeable pavements in numerous residential quarters and local communities is incorporated in the SPC program, which necessitates the involvement of local residents during the process of building sponge city projects in these residential quarters or communities. More specifically, local residents' opinions about these projects need to be heard, considered, and, if possible, adopted by officials. However, due to the fact that the

implementation of the sponge city is not ideal (Interview 01 2019, 20 May), public participation is not included in the SPC program until now. Nevertheless, understanding the potential motivations for participation would be helpful for administrators to involve local residents in the future implementation process. Based on a descriptive analysis, these six motivations for participation are sorted according to the score, which is presented in Table 9. The desire to protect the safety of oneself and one's family had the highest score. This indicates that the concern about personal safety is most likely to become the motivation for participation. One negative impact brought by urban pluvial flooding is the damage to personal safety. For instance, in a cloudburst which took place on 21-22 2018, some drivers and pedestrians got hurt during the process of sheltering from the rain (Luo, 2018). The focal point of sponge city is to remove stormwater as soon as possible, which thereby can alleviate the threat of urban flooding to local residents' safety. The motives to make final decisions beneficial to community and to concern about urban development received the second and third highest score from citizens in southern Yibin. As mentioned above, the construction of the sponge city in the future will be closely related to the community and therefore the former motivation shows that residents hope that their opinions could be incorporated. This is also illustrated by other researches. For example, in Liu's et al. (2015) study of energy-saving retrofitting of residential building in China, they argue that local people need to be involved and their opinions need to be considered because the retrofit project involves their neighborhoods or communities. The result of the latter motivation shows that citizens' concerns about the urban development of Yibin City make them willing to participate. What relates to this is the benefits promised by the SPC program (e.g. improving urban environment or promoting urban economic development), which raises citizens' expectations of this program. Next, the desire to acquire more knowledge in the process of participation ranked fourth, which is followed by the desire to receive a certain number of rewards after participation. The participation process is conducive to self-improvement, which is mentioned by some scholars (e.g. Ye and Zhu, 2014). Likewise, the role of the financial factor in public participation is emphasized (e.g. Brown et al., 2016). But, as is indicated by Interviewee 02 (2019, 20 May) in the sector of planning, the reward mechanism for public participation has not been set up yet in Yibin. This means that the lack of a reward mechanism may become a hurdle of participation. Finally, the arithmetic mean was the lowest for the motive to contribute professional knowledge relative to the domain of planning, architecture, water management, and so forth.

Meanwhile, a factor analysis was also conducted to delve into the relationship between these six motivations. This analysis generated three factors with an Eigenvalue more than 1, as is shown in Table 10. The first factor had a positive correlation with the motivations to protect the safety of one and one's family, to acquire more knowledge in the process of participation, and to receive a certain number of rewards after participation. These three motivations appeared to concern more about people's own safety, self-improvement, and pecuniary interests. Consequently, this factor is labelled as 'personal interest'. The second factor was positively associated with the motivations to influence ultimate decisions and make them beneficial to community and to concern about urban development. Compared

with the first factor, this factor focused more on the development of community and city, which therefore can be labelled as ‘public interest’. Regarding the third factor, it was only strongly associated with the motivation to master relevant professional knowledge. Hence, this factor is labelled as ‘professional knowledge’.

Motivations	Personal Interest	Public Interest	Professional Knowledge
Protect the safety of me and my family	0.85	0.07	0.00
Influence ultimate decisions and make them beneficial to community	0.08	0.90	0.04
Concern about urban development	0.19	0.84	0.18
Acquire more knowledge in the process of participation	0.82	0.13	0.12
Receive a certain number of rewards after participation	0.83	0.17	0.24
Master professional knowledge in aspects of planning, architecture, etc.	0.17	0.16	0.97
Eigenvalue	2.16	1.60	1.04
Explained variance (%)	35.9	26.7	17.3

Table 10. Motivations for participation based on factor analysis. Source: Author, 2019.

The influence of socio-demographic variables on motivations

	Personal Interest	Public Interest	Professional Knowledge
Male	3.11	3.49	2.85
Female	3.15	2.92	2.15
p	0.69	0.00**	0.00**
≤29	3.51	2.68	2.19
30-54	3.13	3.38	2.71
≥55	2.33	3.22	1.86
p	0.00**	0.00**	0.00**
Low	2.82	2.69	2.15
Medium	3.46	3.33	2.35
High	3.05	3.23	2.61
p	0.00**	0.00**	0.02*

* $p < 0.05$; ** $p < 0.01$

Table 11. Socio-demographic characteristics with three types of motivations for participation. Source: Author, 2019.

Based on three types of motivations, the relationship between respondents’ socio-demographic characteristics and motivations for participation was explored. As the cross-

tabulation (Table 11) shows, different categories of citizens have different motivations for participation. Compared with women, men were more likely to participate because of their concerns about the public interest and their professional knowledge. However, regarding the personal interest motivation, no statistical significance was found, which indicates that the difference between men and women in this respect is relatively small. Age differences in motivations for participation were notable. The respondents who were from 30-54 years of age scored high on the public interest factor and the professional knowledge factor, whereas the young citizens (≤ 29) had high scores on the personal interest motivation. The older citizens (≥ 55) did not have high scores except for the public interest factor. As for this factor, the difference between the elderly and the age group of 30-54 years old was not considerable, which means that these two age groups are willing to participate with the motivation of the public interest. The citizens who had medium and high education background both scored high on the public interest factor, and the difference between them was not statistically significant. Thus, for citizens who had an education level of senior high school and above, the public interest could be a motivation for participation. The respondents with a medium education scored high on the personal interest factor but the difference in scores that the lowly and highly educated citizens had was not significant. Roughly speaking, the education level of respondents had a positive correlation with the professional knowledge factor. The highly educated citizens had the highest scores, the citizens with a medium education level had the second, and the lowly educated had the third. But the statistical significance was not found in the difference between the groups of senior high school education (medium) and of junior high school education (low).

All in all, high scores on the personal interest motivation were young citizens with a senior-high-school education. As regards the public interest factor, the characteristics of citizens who scored high were mainly male and more than 30 years old. Finally, the motivation of the professional knowledge can be found among citizens who were male, who were 30-54 years old, and who had a university-level education. Having taken a citizen perspective of public participation to understand citizens' perceptions of the sponge city and potential motivations for participation, this chapter next will present the findings of policy integration based on the four-dimension framework mentioned in the section 3.3.2. To make each sub-dimension more explicit, multiple networks acknowledged by Atlas.ti software are added to the text.

5.2 Policy Integration in the SPC Program

5.2.1 Government Institutional Reform

What relates to policy integration and sectoral coordination is the Chinese government institutional reform, which was first carried out at the national level. On 17 May 2018, the National People's Congress (NPC) approved the 2018 State Council Institutional Reform Plan, which refers to the reorganization of ministries and agencies that constitute the central government. This reform is aimed at streamlining the governance system,

improving efficiency of administration, and making the government better-structured and service-oriented (Xinhua News, 2018). Subsequently, governments at the provincial and municipal level formulated their own government institutional reform plans and instigated the reform. This was done by Yibin municipal government in January 2019. With respect to the sponge city, this reform involves the sector of housing and construction, of planning, of land and resources, of water resources, of parks and greening, and of ecological environment (Table 12). This reform has impacts on the attention paid by sectors to the sponge city program, which will be shown in this research.

Sector	Government Institutional Reform			
	Before		After	
	Organization	Ministry	Organization	Ministry
Sector of housing and construction	Yibin Housing and Urban-Rural Development Bureau	Ministry of Housing and Urban-Rural Development	No change	No change
Sector of planning	Yibin Urban-Rural Planning Bureau	Ministry of Housing and Urban-Rural Development	Yibin Natural Resources and Planning Bureau	Ministry of Natural Resources
Sector of land and resources	Yibin Land and Resources Bureau	Ministry of Land and Resources*	Yibin Natural Resources and Planning Bureau	Ministry of Natural Resources
Sector of water resources**	The affiliated office of water supply and drainage was merged into the sector of housing and construction.			
Sector of parks and greening	Yibin Forestry and Parks Bureau	China State Forestry Administration	Yibin Housing and Urban-Rural Development Bureau	Ministry of Housing and Urban-Rural Development
Sector of ecological environment***	Yibin Environmental Protection Bureau	Ministry of Environmental Protection	Yibin Ecological Environment Bureau	Ministry of Ecological Environment

**The Ministry of Land and Resources was revoked and replaced by the Ministry of Natural Resources.*

***The organization and national ministry of the sector of water resources has not been changed.*

****The newly established Ministry of Ecological Environment (MEE) undertakes all original responsibilities of the Ministry of Environmental Protection and environment-related responsibilities of other ministries. For example, the National Development and*

Reform Commission's responsibility to address climate change and reduce emission was transferred to the MEE.

Table 12. The government institutional reform (relevant sectors of the SPC). Source: The State Council, 2018; Ye, 2019.

5.2.2 Policy Frame

In Yibin's special plan for sponge city construction (2016-2030), the establishment of the leading group² is mentioned and its responsibility is to coordinate the works of different sectors such as planning, housing and construction, transport, parks and greening, water resources, and ecological environment, make them able to contribute to the construction of the sponge city program within their own range of responsibility, and thereby guarantee the completion of important projects (YURPB, 2017). More specifically, the responsibilities of these potentially involved sectors are specified in this special plan roughly. The responsibility of the sector of planning is to compile the special plan and include technical indicators and requirements of the sponge city construction to the planning approval system. The sector of housing and construction is responsible for the construction of sponge city projects and their check and acceptance. Regarding newly built parks with the concept of the sponge city, the sector of parks and greening takes on the responsibility for maintenance and operation. The responsibility of the sector of water resources has two main parts: the first one is the management of the water supply and drainage system and the second is the improvement on water quality. The sector related to the work of water quality is ecological environment, whose responsibility is to monitor water quality and its variation. The sector of transport is in charge of the construction, maintenance, and operation of urban roads with permeable pavements. Besides, this special plan also points out the importance of sectoral policy in supporting the sponge city program and it states that 'multiple sectors such as planning, land and resources, housing and construction, finance, water resources, ecological environment, transport, parks and greening and so forth need to study and initiate sectoral policies to support the construction of the sponge city' (see YURPB, 2017, p.28). Based on the special plan, it can be found that the construction of the sponge city program spans the boundaries of different sectors and therefore the cross-cutting nature of the sponge city is recognized. Meanwhile, Interviewee 04 (2019, 21 May) in the sector of water resources was also aware of the cross-cutting nature and thought that the construction of the sponge city cannot be done by only one sector and it needs two or more sectors to cooperate.

5.2.3 Subsystem Involvement

Subsystems involved

² The leading group is a unique working mechanism in China and often established for a special affair or program.

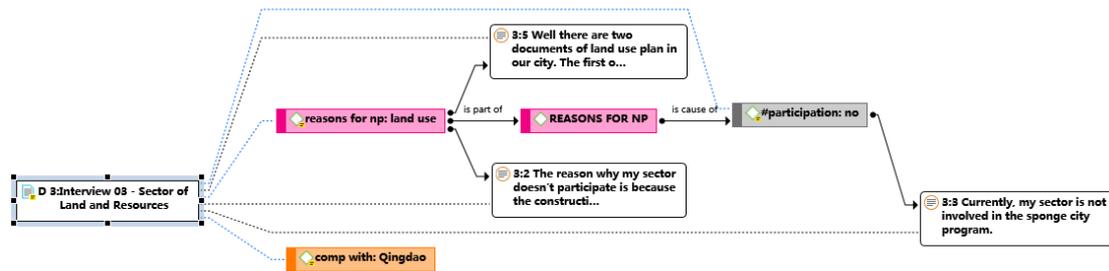


Figure 8. Analysis of the motives for no participation in the sponge city program based on Interview 03. Source: Author, 2019.

With respect to the ‘subsystems involved’ dimension, both the sector of land and resources and of transport indicated that their sectors were not involved in the implementation of the sponge city program. The reasons why these two sectors did not participate were different. The contribution towards the sponge city program that the sector of land and resources can make is in the aspect of land use, but the construction of the sponge city in Yibin was based on the land that had already been identified for use (Interviewee 03 2019, 20 May). To give an example, the construction of the Danfeng Park, a demonstration project of the rain garden, was based on the land identified as the ‘green space and square’³. In Yibin, one of the responsibilities of the sector of land resources is the compilation of the land use plan. Interviewee 03 mentioned that there were two land use plans compiled in Yibin. The first document was the Comprehensive Land Use Plan of Yibin City (2006-2020), which was completed in 2010 and was adjusted in 2016; in the same year, the second document, the Comprehensive Land Use Plan of Yibin City's Urban Area was also completed in December. However, after the municipal government decided to implement the sponge city program, no adjustments were made by the sector of land and resources on these land use plans. No adjustments on original land use plans or no compilation of new land use plans mean that “the compilation of the special plan for sponge city construction must correspond with the requirements in [existing] land use plan” (Interview 03 2019, 20 May). Consequently, the sector of land and resources did not play a role in the implementation process (Figure 8). Despite no participation so far, Interview 03 also thought that the selection of Yibin as one pilot city of the new round of compiling comprehensive land use plan can become a window of opportunity for his sector to participate. As regards contributions that his sector can make towards the promotion of the SPC program, Interviewee 03 cited the sector of land and resources in Xihai New Area, Qingdao as an example to illustrate that his sector could integrate the concept of the sponge city into the new land use plan. In doing so, priority can be given to the important sponge city projects in the land layout⁴ part of the land use plan or in the ‘Annual Plan of the Utilization of Land’ (Interviewee 03 2019, 20 May).

³ ‘Green space and square’ denote one type of urban development land and are used for building parks or squares.

⁴ The land layout part refers to the arrangement of two main types of land – agricultural land and development land.

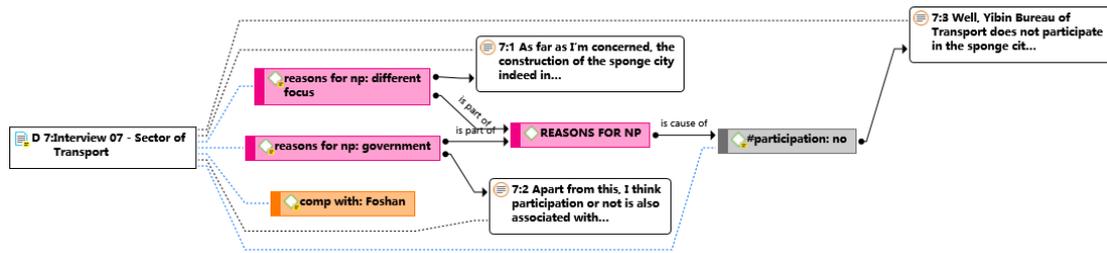


Figure 9. Analysis of the motives for no participation in the sponge city program based on Interview 07. Source: Author, 2019.

Interviewee 07 (2019, 22 May) in the sector of transport thought that the reason for no participation was twofold (Figure 9). First, the construction of the sponge city indeed involved urban roads, but this was incompatible with the focal point of his sector, that is the regulation of the transportation. But Interviewee 07 pointed out that the sectoral focal point may vary between cities. To illustrate this, Interviewee 07 invoked his counterpart in Foshan as an example. The sector of transport in Foshan participated in the sponge city construction because of its focus on urban roads, and it undertook the responsibility for compiling the ‘Foshan’s Technical Guideline for Transport Infrastructure in Sponge City Construction’. Second, participation or not was also relative to the extent to which the local government put emphases on the SPC program. From Interviewee 07’s point of view, if adequate attention was paid to the sponge city program, all relevant sectors would be asked to share the responsibilities for implementing the sponge city program. Contrasted with Foshan, the sponge city program in Yibin seemed to not gain much attention from the municipal government (Interviewee 07 2019, 22 May).

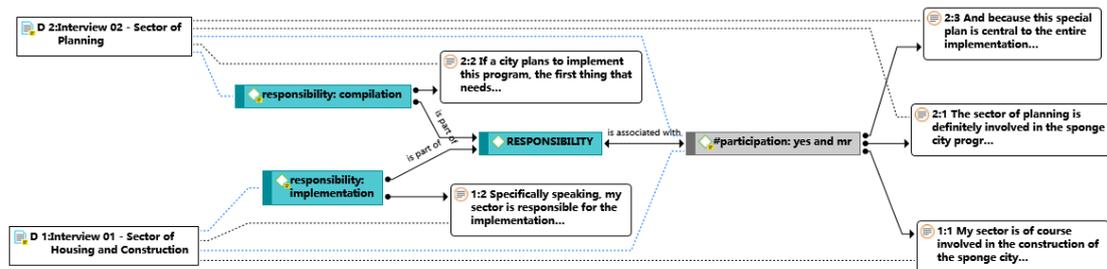


Figure 10. Analysis of the responsibilities of two dominant sectors based on Interview 01 and 02. Source: Author, 2019.

The rest of sectors were all involved in the implementation of the sponge city program and they undertook diverse responsibilities. The main responsibility was taken by the sector of housing and construction and of planning (Figure 10): the former was responsible for the specific implementation (i.e. construction) and the latter was responsible for the compilation of the special plan for sponge city construction (Interviewee 01 2019, 20 May; Interviewee 02 2019, 20 May). The sponge city program at the national level was mainly initiated and promoted by the Ministry of Housing and Urban-Rural Development (MOHURD), the Ministry of Water Resources (MOWR), and the Ministry of Finance (MOF). In the context of Yibin, Interviewee 04 in the sector of water

resources held a different view, that his sector no longer took the main responsibility because of the government institutional reform. “Well, actually before the government institutional reform in this January, we were the sector taking the main responsibility for this program. Specifically, at that time, the office of water supply and drainage in my sector was responsible for the related works of the sponge city program. But after that, this office was merged into the sector of housing and construction” (Interviewee 04 2019, 22 May). Yet, due to the fact that the sponge city program contained the improvement on water quality of the black and smelly river⁵, the sector of water resources in Yibin still took charge of the cleanup of the black and smelly river (Figure 11). Likewise, despite being responsible for funding for the sponge city construction, Interviewee 06 did not think that the sector of finance undertook the main responsibility. From his view, this was confirmed in the special plan (2016-2030) that when speaking to multiple sectors' specific responsibilities in the SPC program, his sector was even not included. Finally, for the sector of parks and greening and of ecological environment, both of them did not play a significant role in the sponge city, and their respective responsibilities (Figure 11) were the maintenance and operation of parks equipped with technologies of the sponge city as well as the cleanup of the black and smelly river (Interviewee 05 2019, 21 May; Interviewee 08 2019, 21 May).

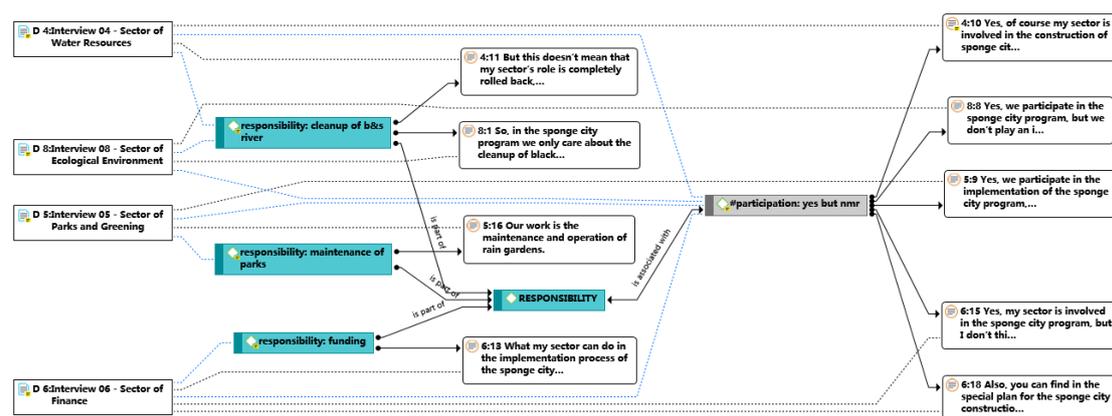


Figure 11. Analysis of the responsibilities of the non-dominant sectors based on Interview 04, 05, 06, and 08. Source: Author, 2019.

Density of interactions

Sector of housing and construction, Sector of planning, & Sector of finance

Because the implementation of the sponge city program had to be based on Yibin's special plan for sponge city construction (2016-2030), Interviewee 01 (2019, 20 May) pointed out that his sector as the actual implementer of this program had a close cooperation with the sector of planning (Figure 12). This close sectoral cooperation was also touched upon by Interviewee 02 (2019, 20 May). As Table 12 shows, the sector of housing and construction and the sector of planning had their own organizations in Yibin, but this did

⁵ The black and smelly river (or the black and smelly water body) refers to the river that is organically polluted (Xu et al., 2015). The clean-up of the black and smelly river is one part of the sponge city program.

not bring an impact on their close cooperation. This is because both these two sectors were affiliated to the Ministry of Housing and Urban-Rural Development. After the government institutional reform in January 2019, the sector of housing and construction and of planning were totally separated from each other and the works of planning were administrated by the Ministry of Natural Resources (MNR), a ministry newly established in 2018. Nonetheless, the cooperation between two dominant sectors stayed close as “the construction of ordinary projects and of sponge city projects still needs to be approved by our two sectors [the sector of housing and construction and of planning]” (Interviewee 02 2019, 20 May).

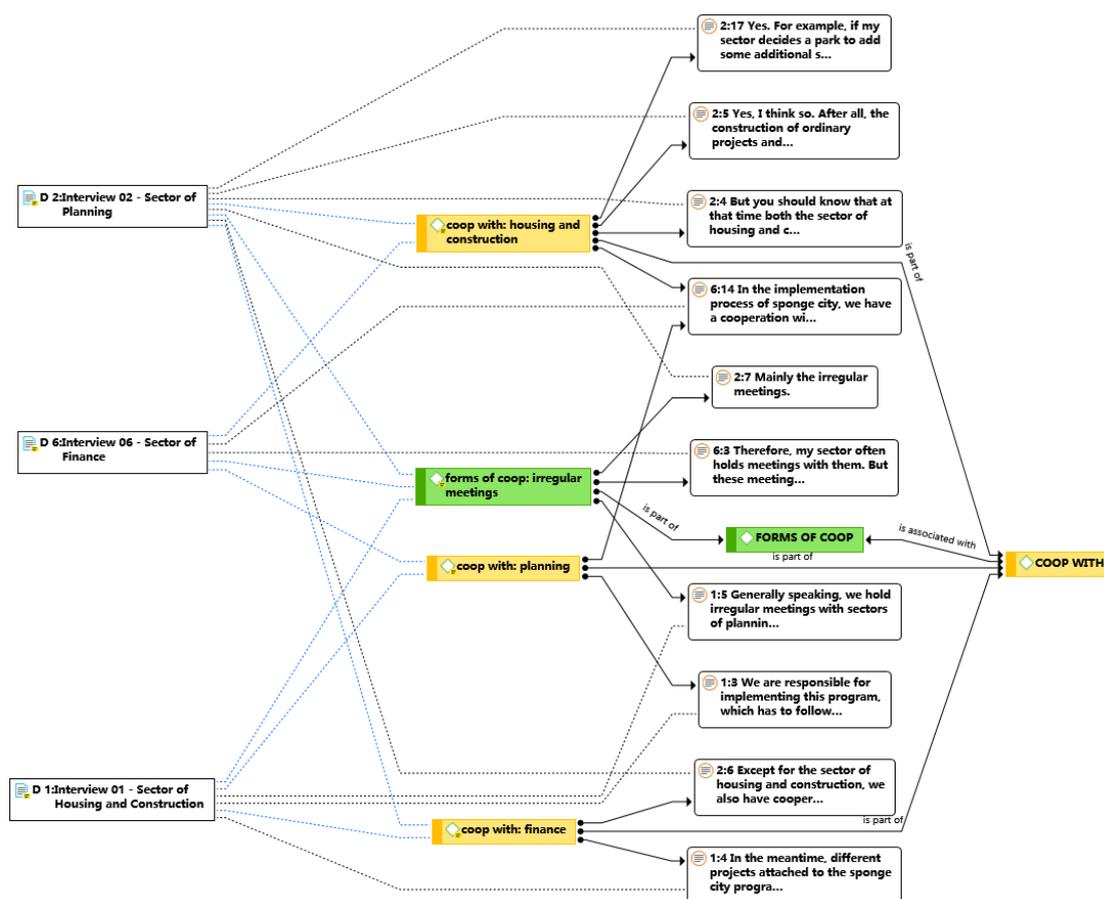


Figure 12. Analysis of the cooperation between the sector of housing and construction, of planning, and of finance. Source: Author, 2019.

In terms of the matter of funds, Interviewee 01 thought that the reason for cooperation with the sector of finance was that the construction of each project attached to the sponge city program demanded the financial support. For the sector of planning, Interviewee 02 mentioned that the compilation of the special plan for sponge city construction (2016-2030) was done with the help of professionals in Shanghai Municipal Engineering Design Institute – this needed adequate funds and therefore the sector of finance provided the financial support for his sector. Clearly, the cooperation with the sector of finance (Figure 12) was on the basis that, for these two dominant sectors, the fulfillment of their responsibilities needed financial supports. This is also consistent with the view of

interviewee 06 (2019, 21 May) in the sector of finance.

Although the close cooperation between two dominant sectors was mentioned by Interviewee 01 and 02, the form of cooperation that they took was still irregular meetings. “When there are some problems emerging during the implementation process, our sectors will be gathered together to discuss or negotiate some solution plans to these problems” (Interviewee 01 2019, 20 May). Apart from this, from the perspective of finance, these irregular meetings were convened when some new projects planned to be built and involved the matter of funding (Interviewee 06 2019, 21 May).

Sector of water resources & sector of ecological environment

As mentioned above, the sector of water resources was currently in charge of the cleanup of the black and smelly river, though it no longer took the main responsibility. Simultaneously, due to the focus on the environment issues, the sector of ecological environment also played the same role as the sector of water resources in the sponge city program. It appears that the cleanup of the black and smelly river is the overlap of these two sectors' responsibilities. Indeed, Interviewee 04 (2019, 21 May) and Interviewee 08 (2019, 21 May) presented that they worked on the cleanup in close cooperation with each other (Figure 13). As for the form of cooperation, the irregular meetings were still held to discuss solutions to the problem of water pollution. Additionally, merely relying on irregular meetings to tackle water pollution was not enough and therefore the form of field works was adopted by these two sectors as well. “Only in this way can we truly know about the specific situations of these black and smelly rivers” (Interviewee 08 2019, 21 May).

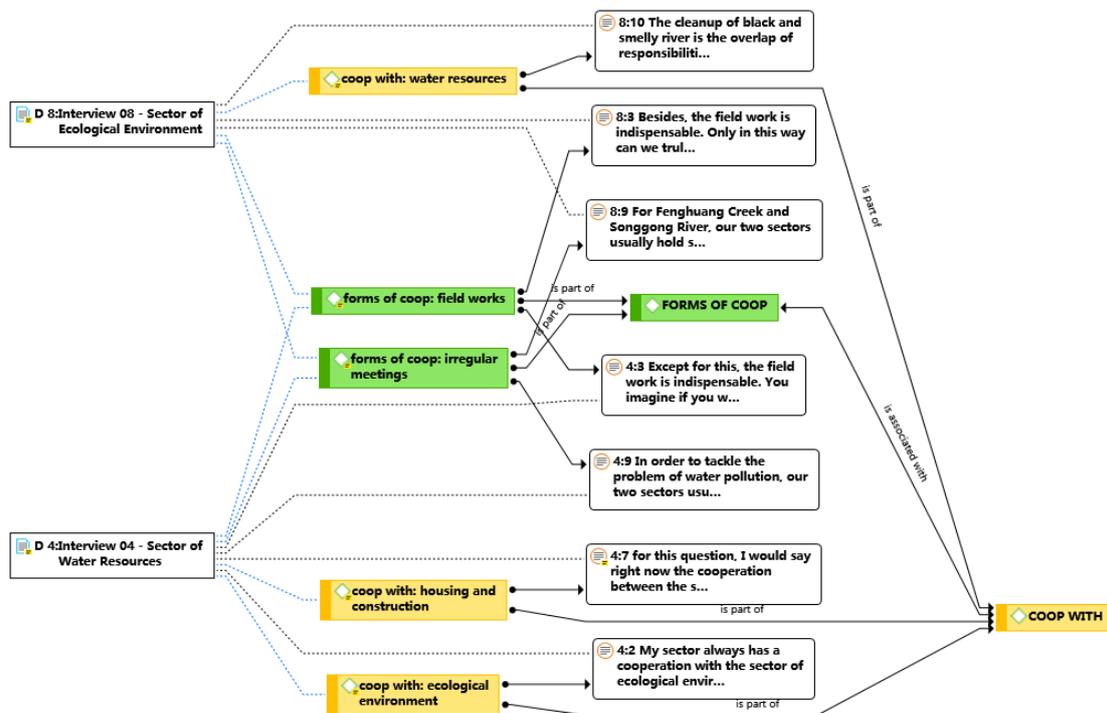


Figure 13. Analysis of the cooperation between the sector of water resources and of

ecological environment. Source: Author, 2019.

However, the cooperation between the sector of water resources and of housing and construction was not as frequent as before (Interviewee 04 2019, 21 May). Before the government institutional reform, except for the cooperation in the sponge city program, the responsibility to compile the special plan for urban drainage and waterlogging prevent and the special plan for urban water system was taken by these two sectors. Afterwards, with the separation of the office of water supply and drainage from the sector of water resources, the main responsibility was transferred to the sector of housing and construction and accordingly the intersectoral communication was not frequent anymore.

Sector of parks and greening

In the sponge city program, the construction of parks or green spaces was still included in the duties of the sector of housing and construction, while the sector of parks and greening focused on the maintenance and operation works. Hence, the cooperation between two sectors was a necessity (Interviewee 05 2019, 21 May; Figure 14). Similarly, the form of irregular meetings was adopted so as to facilitate the communication between sectors. Aside from this, the sector of parks and greening was transferred from Yibin Forestry and Parks Bureau (YFPB) to Yibin Housing and Urban-Rural Development Bureau (YHURDB) after the government institutional reform. Given that presently the sector of parks and greening and of housing and construction work together in the same organization, the regular work meetings are convened once or twice a week, which becomes another form of cooperation (Interviewee 05 2019, 21 May).

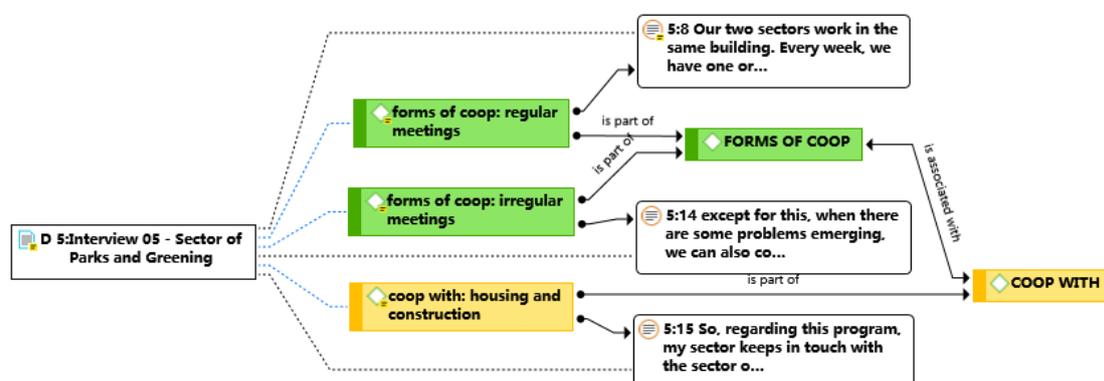


Figure 14. Analysis of the cooperation between the sector of parks and greening and of housing and construction. Source: Author, 2019.

As seen above, compared with field works and regular meetings, irregular meetings are the dominant form of cooperation adopted by all involved sectors. Even the cooperation between these two dominant sectors is also in the form of irregular meetings. This implies that the interactions between sectors are not very frequent.

5.2.4 Policy Goals

Existing policies

In order to foster the sponge city program, the Ministry of Housing and Urban-Rural Development, on behalf of the State Council, formulated many policies. The sector of housing and construction and of planning were affiliated to the MOHURD before the government institutional reform, so both of these two dominant sectors implemented policies pertaining to the SPC program at the local level. Those policies that the sector of housing and construction took were mainly relative to the technical aspects for example the 'Technical Guideline for the Construction of the Sponge City' (Interviewee 01 2019, 20 May). Although affiliated to the Ministry of Natural Resources currently, the sector of planning still rested on policies formulated by the MOHURD to implement the sponge city program (Interviewee 02 2019, 20 May). For example, because of the responsibility to compile Yibin City's special plan for sponge city construction (2016-2030), the 'Interim Provisions for the Special Plan of the Sponge City', a policy document aimed at guiding the compilation work, was taken by the sector of planning.

The control of water pollution in the black and smelly river is an important part of the sponge city program. At the national level, the Ministry of Environmental Protection⁶ and the Ministry of Water Resources jointly formulated several policies such as the 'Work Guideline for Clean-up of Urban Black and Smelly Water Bodies' and the 'Implementation Plan for Clean-up of Urban Black and Smelly Water Bodies'. In Yibin, the Fenghuang Creek, located in the southern part of Yibin, was polluted severely and a number of local residents complained about this to the sector of water resources. Simultaneously, in the northern part, the Songgong River was polluted because of its location near a biggest distillery in China. Hence, the clean-up of these two rivers was incorporated in Yibin City's special plan for sponge city construction (2016-2030). To improve water quality in polluted water bodies, the sector of water resources and of ecological environment adopted these national policies to fulfill their responsibilities in the SPC program (Interviewee 04 2019, 21 May; Interviewee 08 2019, 21 May).

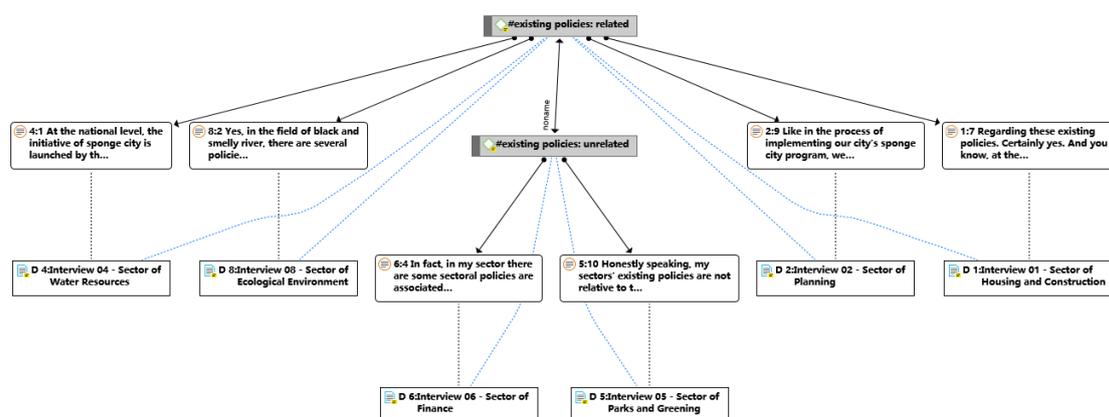


Figure 15. Analysis of the existing sectoral policies related or unrelated to the sponge city program in Yibin. Source: Author, 2019.

⁶ The Ministry of Environmental Protection had formulated these documents before the 2018 State Council Institutional Reform.

In addition to the afore-mentioned sectors (Figure 15), Interviewee 05 (2019, 21 May) in the sector of parks and greening argued that there were no policies in his sector related to the sponge city program; nevertheless, these policies could basically be applied to the maintenance and operation of parks built with the concept of the sponge city. In the field of finance, the Ministry of Finance cooperating with the Ministry of Housing and Urban-Rural Development and the Ministry of Water Resources formulated the policy document, the 'Notice on Development of Central Finance to Support the Construction of the Sponge City', to promote the sponge city program in 2015. However, "this document is only applicable for the first batch of pilot cities and it mainly talks about the way in which the central and provincial finance supports the construction and about the amount of money that is provided for these pilot cities at different administrative levels" (Interviewee 06 2019, 21 May). In 2016, the Ministry of Finance formulated another policy related to the central finance to promote the SPC initiative, which, however, is suitable for the second batch of pilot cities. Hence, for a non-pilot city such as Yibin, Interviewee 06 thought there were essentially no existing sectoral policies relative to the sponge city program.

Special policies

According to Yibin's special plan for sponge city construction (2016-2030), sectors are required to formulate special policies for Yibin's sponge city program instead of only relying on existing national or provincial policies. For instance, the sector of housing and construction could make some policies (e.g. the 'Guideline for Sponge City Planning and Design'⁷) for the sponge city program in Yibin. But six involved sectors indicated that none of them formulated sectoral policies specially for the SPC program in Yibin. "My sector treats the sub-projects of the sponge city program in our city in the same way as other ordinary infrastructure construction projects (...) [and] the municipal government also does not ask us to provide a special appropriation for them" said Interviewee 06 (2019, 21 May) in the sector of finance. Thus, all of six sectors relied on policies formulated by the national ministries or the provincial departments to foster the implementation of the SPC program in Yibin. For instance, the sector of parks and greening drew upon the national and provincial policies to maintain the Danfeng Park, a demonstration rain gardens in the southern urban area (Interviewee 05 2019, 21 May).

⁷ This guideline can be regarded as one technical policy and the sector of housing and construction in many pilot cities such as Suining and Wuhan formulated this policy to foster the implementation of the SPC program.

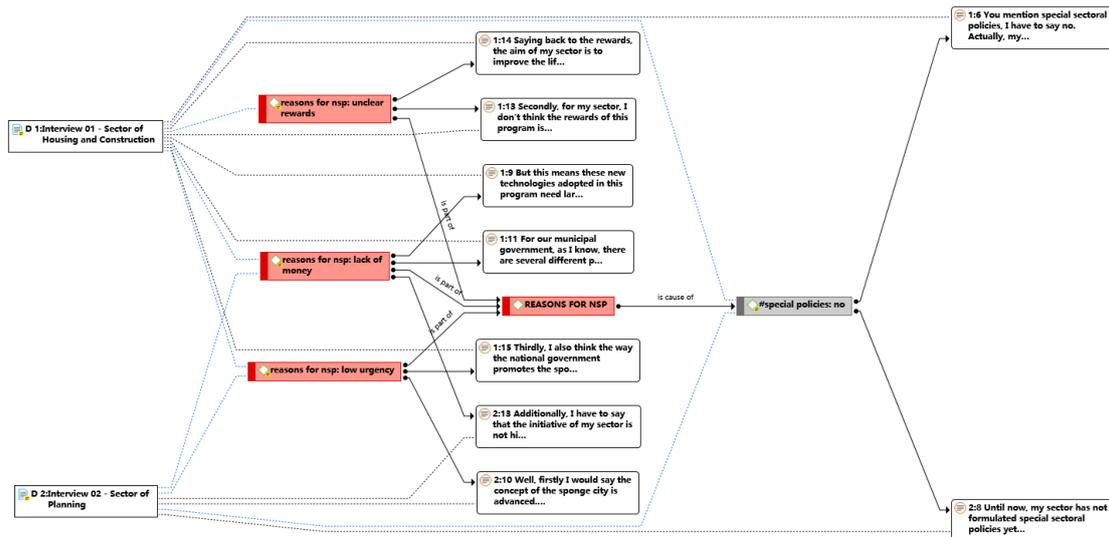


Figure 16. Analysis of the reasons for the lack of special policies formulated for the sponge city program in Yibin based on Interview 01 and 02. Source: Author, 2019.

All of these six sectors had their respective interests and perspectives owing to their diverse particular areas of responsibility (Interviewee 06 2019, 21 May). Thereby, regarding the lack of special policies for the sponge city program, six sectors had different reasons. For the sector of housing and construction, Interviewee 01 (2019, 20 May) listed three reasons (Figure 16): first, the reward of the sponge city program was not clear. Interviewee 01 mentioned that most sectors in China focused on the short-term benefits rather than the long-term ones. From his point of view, the sector of housing and construction ultimately hoped that its works could contribute to the economic growth or social development of Yibin in the short run but the benefits that the SPC program can bring were not clear in the short-term. Also, comparison of the unclear reward with the high cost of the construction of the SPC program also led to his sector's unwillingness to formulate special sectoral policies for the sponge city in Yibin. Second, the urgency of Yibin to construct the sponge city was not high. "Honestly speaking, I don't think the problem of urban pluvial flooding in Yibin is as severe as Beijing, Wuhan, or Jinan. As a city located along the Yangtze River, Yibin has no problem in drainage. (...) If the urban flooding occurs to our city, it will be soon removed through the pipe network to the Yangtze River" (Interviewee 01 2019, 20 May). Thus, for him, the sponge city was more suitable for those cities confronted with truly severe urban flooding but not for cities like Yibin that did not have many problems in drainage. What relates to this is the reason given by Interviewee 02 (2019, 20 May) from the sector of planning. The altitude of most urban area in Yibin is higher than that of the Yangtze and Min Rivers, so this terrain was conducive to drainage; thus, the sector of planning took advantage of the terrain when planning the pipeline (Interviewee 02 2019, 20 May). Instead, the urgency to build the sponge city did not seem to be high.

Finally, the lack of money was another reason, which was elucidated by not only the sector of housing and construction but also the sector of planning. Apart from that the central

government selected 30 cities as the pilot cities of the sponge city initiative in 2015 and 2016, the Sichuan provincial government also selected 5 cities and 10 counties as the pilot cities in 2017 to promote the SPC program in Sichuan Province (Xie, 2017). However, Yibin was not included in these two lists. “Not being a pilot city means [that] there are not any subsidies that the State Council or the provincial government can give” (Interviewee 01 2019, 20 May). Consequently, the local finance became the only source of funds but merely relying on the local finance was unlikely to complete the construction of the sponge city due to the high cost of the construction. (Interviewee 02 2019, 20 May). As is said by Interviewee 01, currently there were several different policy initiatives proposed in Yibin. For example, the so-called smart city program was discussed frequently and the construction plan for new smart city (2017-2021) was completed in 2017. Clearly, similar to the sponge city construction, the construction of the smart city program needed the municipal government to invest much money. Thus, the competition between various programs made the limited government funding unable to support the completion of some programs (Interviewee 01 2019, 20 May). Interviewee 01 also took this further to compare Yibin with Suining, the only pilot city in Sichuan selected by the central government and found that the implementation of the SPC program in Suining was very ideal. Also, he pointed out the relationship between the lack of money and the low initiative: “the sector of housing and construction in Suining is very active about implementing this program (...) [and] one official told me that this is because of the financial support from the central government. ‘Although the cost of construction of sponge city is not cheap, the subsidies from the State Council can share a large part of the cost. Without the pressure of revenue and expenditure, we are very willing to build our Suining better through the sponge city program’ says he” (Interviewee 01 2019, 20 May). Likewise, this relationship between funds and initiative was highlighted by Interviewee 02, who thought that, under the circumstance of lacking funds, the sector of planning was more inclined to utilize traditional approaches to tackle the issue of urban flooding because the cost of building grey infrastructure was more inexpensive than the sponge city. Hence, the formulation of special policies for the sponge city program was not chosen by two dominant sectors.

As for Interviewee 01 and 02's opinions about the lack of money, Interviewee 06 (2019, 21 May) in the sector of finance showed a total disagreement. From his perspective, why Yibin cannot be selected as a pilot city was because the municipal government, the sector of housing and construction, and the sector of planning were not active about the application for the pilot city. Generally speaking, the application for a pilot city requires the local government and relevant sectors to prepare different kinds of plans or policies in which to show enthusiasm about and attention to the sponge city program. For example, the leading group needs to be established. Or, some tools for supervision and performance assessment need to be in place. But as far as Interviewee 06 knows, Yibin municipal government and these two dominant sectors almost did nothing for the application. Despite not mentioning the reasons for no special policies, Interviewee 06 still thought that the sector of finance was always supportive for the sponge city program as it brought benefits for the city of Yibin. Based on a perspective of finance, constructing the sponge

city would be helpful for improving the construction of infrastructure in Yibin as well as the so-called city image of Yibin. This improvement would attract investors from outside to invest in some construction projects for example a new urban complex in Yibin. Consequently, this would bring the increase in the urban land price and ultimately the municipal government's revenue would rise as well.

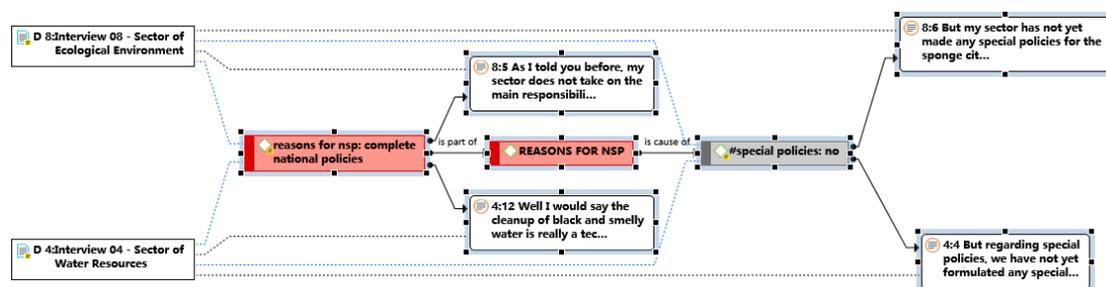


Figure 17. Analysis of the reasons for the lack of special policies formulated for the sponge city program in Yibin based on Interview 04 and 08. Source: Author, 2019.

For the sector of water resources and of ecological environment, national policies regarding the clean-up of the black and smelly river were complete enough for the fulfillment of their responsibility (Figure 17). To clean up the Fenghuang Creek and the Songgong River, the sector of water resources could rely on the principles, technologies, and standards proposed in the 'work guideline' and the 'implementation plan' mentioned above to carry out the specific works. In particular, in the facet of technology utilization, the 'Technology Policy for Clean-up of Black and Smelly Water Bodies' could become a supplement (Interviewee 04 2019, 21 May). As for the clean-up work, the sector of water resources took the main responsibility whereas the sector of ecological environment did not and was only responsible for monitoring and regulating the polluting factories along the Fenghuang Creek and the Songgong River. Based on a narrow range of responsibility, "these existing policies from the national ministry are quite enough for my sector [of ecological environment] to finish the task" (Interviewee 08 2019, 21 May).

Interviewee 05 (2019, 21 May) thought that there were no national policies related to the sponge city program in the field of parks and greening, and therefore the formulation of special sectoral policies was not necessary for the sector of parks and greening at the local level (Figure 18). But Interviewee 05 also mentioned that his counterpart in Xiamen formulated special policies, namely the 'Maintenance and Operation Standards of Sponge City Facilities', for Xiamen's sponge city construction. To explain this, Interviewee 05 agreed with the relationship between a lack of funds and a low initiative. Xiamen was a pilot city of the SPC initiative, which indicates that its sector of parks and greening could obtain more subsidies from the Ministry of Finance and thus were more active about the SPC program.

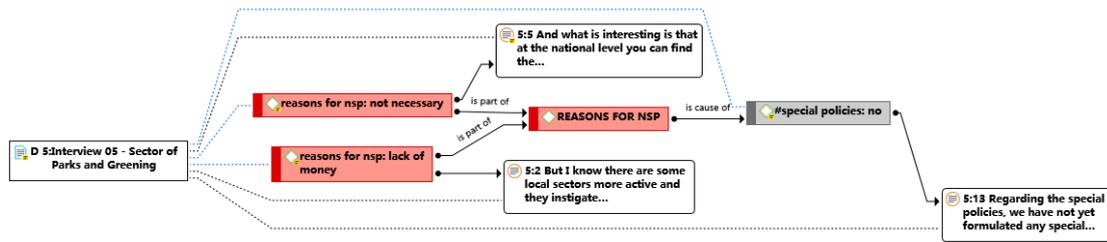


Figure 18. Analysis of the reasons for the lack of special policies formulated for the sponge city program in Yibin based on Interview 05. Source: Author, 2019.

5.2.5 Policy Instruments

Range of policy instruments

Among all eight interviewed sectors, only the sector of parks and greening did not adopt policy instruments to promote the implementation of the sponge city (Figure 15). From Interviewee 05's (2019, 21 May) standpoint, the focus of the sector of parks and greening was on the phase after the implementation instead of taking certain measures to foster the sponge city construction. In order to fulfill the responsibility to maintain and operate these parks built with the concept of the sponge city, one inspection team was organized by the sector of parks and greening to check the conditions of these parks weekly (Interviewee 2019, 21 May).

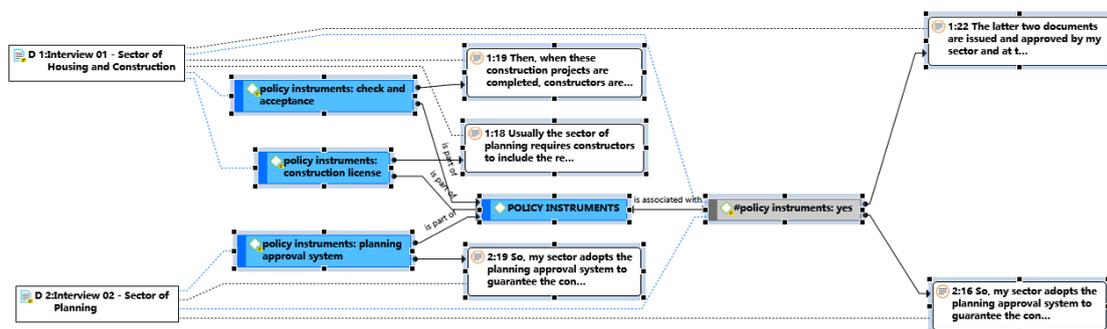


Figure 19. Analysis of the utilization of policy instruments in sector of housing and construction and of planning. Source: Author, 2019.

Roughly speaking, in China, all projects need to be approved by the sector of housing and construction and of planning before their commencement of building. This so-called approval process is comprised of four phases, as is depicted by Table 13. The former two stages are also called as the planning approval system because of being regulated by the sector of planning. Despite the not ideal implementation of the sponge city program in Yibin, Interviewee 02 (2019, 20 May) from the sector of planning held a positive attitude towards the sponge city and recognized that it was advanced. Accordingly, this sector took the planning approval system as a policy instrument to “guarantee the concept and requirements of sponge city can be reflected in different kinds of construction projects” (Interviewee 02 2019, 20 May; Figure 19). The planning approval system covers three documents, which are the permission note for location, the land use permit, and the

planning permit on construction projects. For those projects not included in the special plan for sponge city construction but conducive to addressing the issue of urban pluvial flooding, their constructors are required by the sector of planning to add technical indicators of the sponge city to the project plans when applying for the ‘one note and two permits’⁸. Only in so doing could these construction projects be approved (Interviewee 02 2019, 20 May). Within the latter two phases, when applying for a construction license, constructors need to submit the planning permit on construction projects; thus, taking the construction license as a policy instrument (Figure 19), the sector of housing and construction is able to verify whether these technical indicators or the concept of the sponge city are reflected in the projects (Interviewee 01 2019, 20 May). Subsequently, after receiving a completion-based check report, a document created when construction projects are completed, from constructors, the sector of housing and construction preliminarily evaluates the report to decide whether the projects satisfy the requirements of acceptance. If it is, an on-site check-and-acceptance work will be conducted. The adoption of the check-and-acceptance work as a policy instrument (Figure 19), the sector of housing and construction could ensure that the requirements and concept of the sponge city were truly taken into the effect (Interviewee 01 2019, 20 May).

Phase 1	Issuing the permission note for location and the land use permit to constructors.
<hr/>	
Phase 2	Issuing the planning permit on construction projects to constructors.
<hr/>	
Phase 3	Issuing the construction license to constructors.
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Phase 4	The evaluation of the completion-based check report and the check-and-acceptance work.

Table 13. The approval process of construction projects in China. Source: Author, 2019.

The sector of water resources and of ecological environment utilized their respective policy instruments to undertake the clean-up work of the black and smelly river in Yibin (Figure 20). Along the Fenghuang Creek, there were two paper mills, three slaughterhouses, and several poultry farms, all of which were identified as the source of pollution by the sector of ecological environment. The clean-up of the Fenghuang Creek in essence is to limit the discharge of wastewater. In doing so, the sector of water resources applied two types of discharge permits. The first one is the river discharge permit, with which factories are allowed to discharge wastewater to the river directly. The second one is the urban drainage permit, which means that factories with this permit can discharge wastewater to the urban pipe network. To tackle water pollution, part of the factories noted above was not granted the river discharge permit from the sector of water resources and concurrently they were required to install the wastewater treatment facilities to obtain the urban drainage permit. “The treated wastewater was transferred through the pipes to the sewage treatment plants set [up] by us. Eventually after the second-time treatment by this plant we can ensure the wastewater discharged into Fenghuang Creek

⁸ ‘One note and two permits’ stand for the permission note for location, the land use permit, and the planning permit on construction projects.

meets the water quality standards, thereby improving water quality of Fenghuang Creek thoroughly” (Interviewee 04 2019, 21 May). In the meantime, the sector of ecological environment utilized the administrative order as a policy instrument to do the cleanup work. Before being asked to install the wastewater treatment facilities, those two paper mills were shut down under the administrative order because they were established illegally. After the installation, some poultry farms, whose discharged wastewater was unable to reach the standards of water quality, were asked to move to other locations in Yibin under the administrative order (Interviewee 08 2019, 21 May).

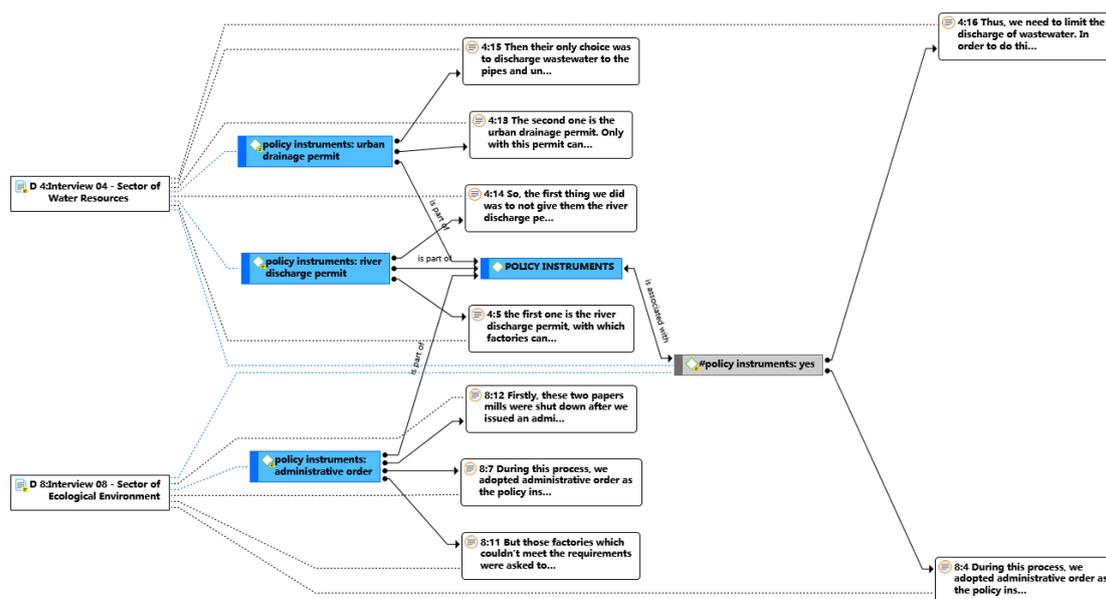


Figure 20. Analysis of the utilization of policy instruments in sector of water resources and of ecological environment. Source: Author, 2019.

Aside from the local finance, the sector of finance in Yibin also took the PPP model to support the implementation of the sponge city program (Figure 21), but “the proportion of funds raised by the PPP model is not high in all funds for the sponge city” (Interviewee 06 2019, 21 May). Furthermore, Interviewee 05 also pointed out the potential financial policy instruments such as the provincial government bonds and some special bonds, which can be utilized to support the implementation of the SPC program if needed.

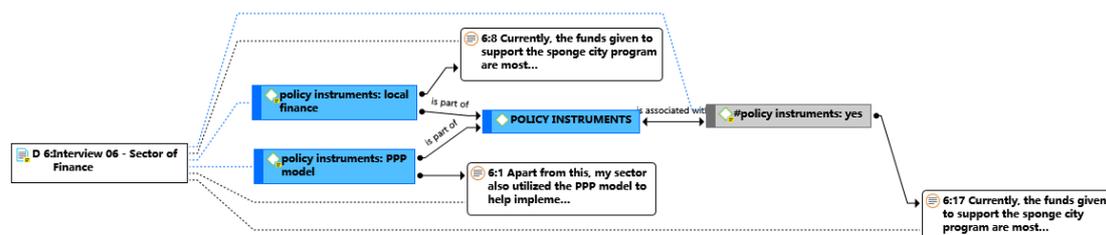


Figure 21. Analysis of the utilization of policy instruments in sector of finance. Source: Author, 2019.

As noted in the section 3.3.2, the substantive instruments can be classified into four

categories: informational, regulative, financial, and organizational instruments. Combining with the above analysis, it can be found that, except for the sector of parks and greening, the rest of sectors mainly utilize the regulative and financial instruments to foster the implementation of the sponge city program.

Procedural policy instruments at system-level

With respect to the procedural instrument facilitating the coordination between sectors at the system level, the municipal government still chiefly rested on the irregular meetings to deal with routine works that necessitate the sectoral coordination (Interviewee 09 2019, 22 May). This form was also used to the process of implementing the sponge city program. Clearly, this indicates that there is not a formal information sharing mechanism or a sectoral coordination mechanism established. For those officials in different sectors for example Interviewee 06 (2019, 21 May) in the sector of finance, they did not reckon that the irregular meetings could be seen as an information exchange mechanism between sectors. While the leading group was proposed to be set up in Yibin's special plan for sponge city construction (2016-2030), it was not actually established due to the shift in the municipal government's focus from the SPC program to other affairs (Interviewee 09 2019, 22 May). Regarding the potentially positive effects that the leading group would bring, Interviewee 09 believed that, although there was no guarantee that a formal information sharing mechanism would be established, the information exchange between sectors was likely to be improved. An essential part of the establishment of the leading group is to set up an office to be especially responsible for the issues of the sponge city program, and this office is comprised of representatives from multiple relevant sectors. Hence, these representatives can communicate important information to their respective sectors and exchange information related to the SPC program between sectors as well.

This chapter discusses the findings of this research along two components of the conceptual framework: public participation and policy integration. In the next chapter, some problems existing in these two aspects will be restated and accordingly improving means will be put forward.

6. Recommendations and Conclusion

In the last chapter, the findings of the case study of Yibin City is presented and discussed. Based on the findings, this chapter will draw conclusions to respond to the main research question “*What are the feasible means for improving Yibin’s sustainable stormwater management in terms of public participation and policy integration?*”. Additionally, a brief reflection as well as suggestions for further researches will be also presented.

6.1 Recommendations on Public Participation

A questionnaire survey was used to investigate citizens’ perceptions of the sponge city and urban pluvial flooding. The findings showed that citizens not only knew less about what the sponge city is but also lacked knowledge of how the sponge city program assists in addressing the issue of urban pluvial flooding. The statistical analysis of the influence of socio-demographic characteristics on perceptions showed that differences in age and education background indeed influenced respondents’ perceptions of the sponge city and of its relationship with urban pluvial flooding. This suggests that implementers of the SPC program need to bolster the dissemination of information about the sponge city. More channels of information dissemination are needed, such as TV, radio, newspaper, smartphone applications, and so forth. The content of information should include the definition of the sponge city, the introduction of the SPC program in Yibin (e.g. different sub-projects), the benefits of the sponge city (especially those unfamiliar to local residents), some successful practices (including projects in pilot cities and demonstration projects in Yibin), etc. The main object of the information dissemination should be citizens with less knowledge about the sponge city, such as the respondents who are more than 55 years old and those who are less educated. The more citizens know about the sponge city, the more they can be supportive of the construction of the sponge city program. Undoubtedly, this can make different sub-projects of the SPC program more acceptable to citizens and therefore help implementers to implement these sub-projects more smoothly. In some cases, having a better-informed group of citizens otherwise might lead to the protests against constructing the sub-projects. A good way to resolve the protests is the respect for citizens’ right to know and to participate. Therefore, due to the fact that citizens know their actual needs best, the involvement of citizens in the construction of the sponge city program becomes important.

Understanding citizens’ motivations for participation could help implementers to engage citizens. The questionnaire survey also provided six potential motivations, which were grouped into three factors by analysis, namely ‘personal interest’, ‘public interest’, and ‘professional knowledge’ motivations. Based on these three kinds of motivations, implementers can adopt different strategies to mobilize citizens to participate in the sponge city program. For instance, the motives to acquire more knowledge in the process of participation and to receive a certain number of rewards after participation reflect the importance of the spiritual and material rewards. Hence, when engaging citizens,

implementers should combine these two types of rewards together. Specifically, implementers should increase opportunities for citizens to learn knowledge about the sponge city, urban flooding, participation and so forth. Also, the establishment of reward mechanism should be considered by implementers. Along with the improvement in citizens' perceptions of the sponge city, citizens might have more knowledge about the benefits of the sponge city. For example, the motives to protect the safety of one and one's family and to concern about urban development indicate that the construction of the sponge city is helpful to alleviate the threats of urban pluvial flooding, protect citizens' safety, enhance urban ecological environment, and promote urban development, etc. An awareness of these benefits in a sense could make citizens have higher expectations of the sponge city. Thus, apart from focusing on whether the objectives of the sponge city program are achieved, implementers should also be more attentive to ensuring that the outcomes of the sponge city program correspond with citizens' motivations and expectations.

6.2 Recommendations on Policy Integration

Apart from the aspect of public participation, some recommendations for improvement can be proposed in the aspect of policy integration. After applying the four-dimension framework to know about the current situation of policy integration regarding the sponge city program in Yibin, there are three notable issues manifested in the 'subsystem involvement', 'policy goals', and 'policy instruments' dimensions.

With respect to the 'subsystem involvement' dimension, the cooperation between sectors are analyzed. To implement the sponge city program, three forms of cooperation adopted by involved sectors are irregular meetings, regular meetings, and field works. Among these three forms, the form of irregular meetings has a dominant role and is adopted by all involved sectors. These irregular meetings are usually convened when problems emerge during the implementation process of the sponge city program. Despite being conducive to problem-solving, irregular meetings are not adequate for the sharing of routine information about the construction of the sponge city. Therefore, the role of the leading group should be emphasized. The regular working conference system is one important part of the leading group, which can make the regular information exchange between sectors possible. Simultaneously, officials from multiple relevant sectors constitute the office affiliated to the leading group, which facilitates the inter-sectoral communications as well. The establishment of the leading group is presented in the special plan (2016-2030) but actually it is not established yet. To promote the regular sectoral information-sharing, the leading group needs to be established and the sponge city program needs to gain more attention from Yibin municipal government.

The 'policy goals' dimension focuses on the sectoral policies. All involved sectors rely on the existing national and provincial policies to promote the sponge city construction and no policies are specially formulated for Yibin's sponge city program. Three main reasons for not formulating special policies are lack of funds, unclear rewards, and low urgency. In

respect of lack of funds, the fact that Yibin is not a pilot city is highlighted by certain sectors. Being a pilot city means that more financial supports can be obtained from the central and provincial governments. However, the number of pilot cities of the SPC program will no longer increase, meaning that the financial supports from the higher-level governments will be limited and thus the construction of the sponge city program needs Yibin's sector of finance to provide funds. As illustrated by the sector of finance in Yibin, compared with the local finance, the public-private-partnership (PPP) model has not played a dominant role in raising funds yet. Therefore, the future success would demand that the sector of finance pay more attention to the PPP model. Also, some sectors connect the lack of funds with the competition between various programs in Yibin. The important policy programs instigated by Yibin municipal government contain not only the sponge city program but also other programs such as the eco-city program, the smart city program, and the city betterment and ecological restoration program. Clearly, the limited local finance cannot support the implementation and completion of each program. Hence, the integration or synthesis of these programs would be recommended. As for other reasons – unclear rewards and low urgency, the improvement on implementers' awareness of the sponge city can play a significant role. The benefits that the sponge city program can bring are manifested in not only the mitigation of threats of urban pluvial flooding but also other aspects such as enhancing water quality, contributing to the safeguard of water supply, and so on. However, the interviews with the sector of housing and construction and of planning reveal that the concept of the sponge city is simply perceived as one approach to cope with the issue of urban pluvial flooding and the sponge city's other functions are neglected. Thus, under such a circumstance, the role of training to deepen the officials' understandings of the sponge city should be highlighted.

Finally, although all involved sectors except for the sector of parks and greening deploy policy instruments to foster the development of the sponge city program, there is a lack of a system-level procedural instruments facilitating information-sharing between sectors. Apart from the leading group, the sectoral joint meeting mechanism can also function as an information exchange instrument. But what needs to be pointed out is that these two types of mechanisms are usually established for special affairs or programs and are unable to become a procedural instrument to facilitate the information exchange or the sectoral coordination at a system level. Considering that in the context of China the abilities and resources of local governments are limited, the deployment of a formal procedural instrument requires the central government to make more efforts.

6.3 Brief Reflection

6.3.1 The Limitation of Questionnaire Survey

In a questionnaire survey, the size of sample is of importance. The choice of sample size is dependent on the overall size. As mentioned in the Chapter 4, the focus area of this case study research is the southern part of Yibin City, and therefore the overall size of the questionnaire survey is the population of citizens living in this area. However, in general

the official demographics in China are based on the administrative units. For example, as the Yibin Statistical Yearbook 2018 shows, the total population of Cuiping District in 2018 is 846,400 (Yibin Municipal Bureau of Statistics, 2018). But the Cuiping District contains the entire urban area of Yibin and certain rural areas. Sample size cannot be determined due to the unavailability of the population of the southern part. Therefore, 279 collected questionnaires may reduce the reliability of the questionnaire survey. Another limitation is the neglect of spatial diversification. The risks of urban pluvial flooding confronting citizens who live in different parts of the focus area are different, which may impose influences on citizens' perceptions of the sponge city and motivations for participation. However, the spatial diversification is not included in the socio-demographic information of participants⁹. Therefore, this research cannot make detailed exploration on how the spatial diversification can impact citizens' perceptions and motivations.

In addition, the design of the part that investigates local residents' perceptions of the sponge city and its relationship with urban pluvial flooding is somewhat inadequate. These two questions in this part merely ask about whether respondents know about what the sponge city is and about how the sponge city assists in addressing the problem of urban flooding. But for those respondents who gave positive answers, it would be of value to investigate the channel of information dissemination through which they acquire the knowledge about the sponge city. In so doing, it could clearly identify which channel of disseminating information can be improved for the future success. Similarly, given that people have various kinds of motivations for participation, the six motives presented in the questionnaire may be not enough to cover all motives relevant to the citizens. Although one open-ended question is set for respondents to allow them to write down other motivations, the collected answers cannot provide many values for this research.

6.3.2 The Limitation of Semi-structured Interview

It is clear that officials in the identical sector have their own views or attitudes towards the same thing. And in some cases, it is possible that the interviewee's viewpoints will represent, or at least impose certain impacts on, his/her sector's standpoints. In order to avoid this, when designing the plan for data collection, the researcher originally planned to interview two officials in each sector. However, due to the time factor, many officials in sectors were not always available; interviews were actually conducted with one official in one sector. Therefore, in the findings about policy integration presented in the Chapter 5, it cannot be ruled out the impacts of officials' personal opinions.

6.4 Further Researches

In this research, it can be seen that most citizens are not aware what the sponge city is and the relationship between the SPC program and urban pluvial flooding. Also, citizens have their own motivations for participating in the sponge city program. Meanwhile, analyzing

⁹ Participants here also refers to citizens who participate in the questionnaire survey.

status quo of policy integration also brings to light problems in the actual implementation of the sponge city, and accordingly feasible means for improvement can be found. However, it is noteworthy that these conclusions are based on the context of Yibin, a non-pilot city of the sponge city program. For those cities which are pilot cities, more emphases put by local governments on the SPC program may increase the channels of disseminating information and therefore the public perceptions towards the sponge city in those cities may be at a higher level than that in Yibin. Additionally, the implementation of the sponge city in those pilot cities may be more ideal as the financial support from the central government can be garnered. Therefore, relevant sectors in pilot cities are likely more active about the SPC program and the situation of policy integration might be better than Yibin. The suggestion for future researches is to conduct the case study of pilot cities to understand the local residents' perceptions of the sponge city and the motivations for participation. Also, the four-dimension framework can be applied to analyzing policy integration regarding the sponge city program in pilot cities. More importantly, a comparative research between pilot and non-pilot cities would be recommended as it can identify the gap between the two types of cities. Hence, the approach of city-to-city learning can provide new insights into the improvement on the construction of the sponge city. Finally, this research only takes two dimensions of governance (i.e. governance processes and governance contents) to conduct the case study; for future researches, the 'governance structure' dimension can be paid more attention to study the impacts of formal or informal institutions on the implementation of the sponge city.

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For a Chinese student, learning Environmental and Infrastructure Planning (EIP) gives me a good opportunity to combine knowledge that I have learned in Groningen and the Chinese context to write my master thesis. Hence, I adopted a governance perspective to focus on the Sponge City, a stormwater management program initiated by Chinese government to address the problem of urban pluvial flooding.

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Appendices

Appendix 1 | Questionnaire

1. What is your gender?
 - Male
 - Female

2. What is your age?
 - Under 29 years old
 - 30-54 years old
 - 55 years or older

3. What is your educational background?
 - Low (under 9 years)
 - Medium (10-12 years)
 - High (more than 13 years)

4. Do you know what the sponge city program is?
 - Yes
 - No

5. Do you know how the sponge city program addresses the issue of urban pluvial flooding?
 - Yes
 - No

The construction of the sponge city is closely linked to citizens' daily lives. For example, probably your community is involved in the installment of green roofs. Or, the park near your home perhaps needs to be upgraded to rain garden. Hence, public participation is essential. The following questions aim to understand your motivations for participating in the sponge city.

6. "the concept of the sponge city is environmentally-friendly, which can not only improve our city's ecological environment but also enhance the city image. I'm concerned about the urban development of Yibin and therefore I'm willing to participate in the sponge city program". Do you agree?
 - Strongly disagree
 - Disagree
 - Agree
 - Strongly agree

7. "the construction of the sponge city can mitigate the threats of urban pluvial flooding. For instance, some green infrastructures (e.g. permeable pavements) can remove

stormwater as soon as possible and thus people's commute safety can be guaranteed. Also, the safety of me and my family can be guaranteed, so I would like to participate".

Do you agree?

- Strongly disagree
- Disagree
- Agree
- Strongly agree

8. "the construction of the sponge city involves the transformation of part residential quarters or communities. As a resident, I hope that decision-makers to a certain extent can refer to our opinions. Including residents' opinions would make the ultimate decisions beneficial to community development, and thus I'm willing to participate".

Do you agree?

- Strongly disagree
- Disagree
- Agree
- Strongly agree

9. "participating in the construction of the sponge city is a good opportunity for me to acquire more knowledge, which would be helpful in achieving self-improvement. This is why I'm willing to participate". Do you agree?

- Strongly disagree
- Disagree
- Agree
- Strongly agree

10. "I have professional knowledge of planning, architecture, engineering, water management, and so forth. In this respect, I think I can make my own contributions to the construction of the sponge city. Thus, I would like to participate". Do you agree?

- Strongly disagree
- Disagree
- Agree
- Strongly agree

11. "if I can obtain a certain number of rewards after participation, I will be very happy to participate in the construction of the sponge city". Do you agree?

- Strongly disagree
- Disagree
- Agree
- Strongly agree

12. Apart from these above motivations for participation, do you think there are other motivations for participation? if so, you can write them down below.

Appendix 2 | Interview Guide

General questions:

1. Is your sector involved in the construction of the sponge city program?
2. Does your sector take the main responsibility for the construction and implementation?
3. Does your sector have a regular information exchange or cooperation with other relevant sectors during the implementation of the sponge city program? More specifically, which sectors?
4. Among the existing sectoral policies, are there any policies related to the construction of the sponge city program?
5. Are any special sectoral policies formulated regarding the sponge city?
6. Within your sector's policy domain, are any policy instruments utilized to promote the implementation of the sponge city program?

Additional questions:

For the sector of housing and construction:

1. Under what circumstances will these meetings be held?
2. Why doesn't your sector formulate special policies for this program?
3. Well then why does Yibin still choose to build a sponge city?

For the sector of planning:

1. Is the cooperation with the sector of housing and construction still close after the government institutional reform?
2. How about other sectors that your sector cooperates with?
3. What is the form of the cooperation that your sector adopts?
4. As a sector to take the main responsibility, why doesn't your sector formulate special policies for this program?
5. But I am wondering why some roads like the Jinsha River Road is easily flooded in recent years?
6. How about Jixiang Mingdu?
7. How about the sector of housing and construction? Do they know your sector do this to promote the sponge city program?

For the sector of land and resources:

1. When did your sector compile land use plan?
2. Has your sector started working on the new round of compiling comprehensive land use plan?
3. Do you think your sector can play a more important role?
4. How about the land use permit? Is your sector's responsibility to issue that permit?

For the sector of water resources:

1. Regular meetings or irregular meetings?
2. Does your sector still cooperate with the sector of housing and construction?

3. Why doesn't your sector formulate special sectoral policies?

For the sector of parks and greening:

1. What role does your sector play in the implementation of the sponge city?
2. What is the form of cooperation your sector takes? Irregular or regular meetings?
3. Will your sector compile some technical policies for example the guideline for maintenance in the future?
4. How about the maintenance work? Has your sector adopted any policy instruments?

For the sector of finance:

1. Is there a relatively complete information exchange mechanism established?
2. Do you think not being a pilot city would bring some bad impacts on the implementation?
3. Why do you think they are not active about the application for a pilot city?
4. Had this so-called leading group been established?
5. Do you think the sponge city is beneficial for our city?

For the sector of transport:

1. Why is your sector not involved in the construction of the sponge city program?

For the sector of ecological environment:

1. Are these meetings regular or irregular?
2. What are these sectoral policies involved?
3. Why doesn't your sector make special policies for this program?

For the municipal government:

1. In general, is information sharing mechanism or sectoral coordination mechanism established between various sectors in Yibin City?
2. Regarding the sponge city that has a cross-cutting nature, is there a special information sharing mechanism or sectoral coordination mechanism for it?
3. Has the leading group for Yibin's sponge city special work been established?
4. Do you think if established, the leading group would be helpful for the establishment of the information exchange mechanism or sectoral coordination mechanism?

Appendix 3 | Code Book

Code	Comment	Code Groups
#existing policies: related	attribute code: existing sectoral policies related to the sponge city program	attribute codes
#existing policies: unrelated	attribute code: existing sectoral policies that are not related to the sponge city program	attribute codes
#participation: no	attribute code: sectors not involved in the implementation of the sponge city program	attribute codes
#participation: yes and mr	attribute code: sectors involved in the implementation of the sponge city program and mainly responsible for it.	attribute codes
#participation: yes but nmr	attribute code: sectors involved in the implementation of the sponge city program but not mainly responsible for it	attribute codes
#policy instruments: no	attribute code: not taking policy instruments	attribute codes
#policy instruments: yes	attribute code: taking policy instruments	attribute codes
#special policies: no	attribute code: not formulating special policies for the implementation of the sponge city program	attribute codes
*benefits of the SPC	benefits of the sponge city program	
*government institutions reform	a reform carried out by the municipal government to reorganize different sectors -> certain interviewees mentioned this	
*no ISM/SCM	no information sharing mechanism/sectoral coordination mechanism	
*not ideal implementation	the implementation of the sponge city program in Yibin is not very ideal – certain interviewees mentioned this	

*relation btw money and initiative	the relation between money and the initiative of sectors to formulate special policies	
*the cross-cutting nature	the cross-cutting nature of the SPC program	
COMP WITH		comparison with
comp with: Foshan	comparison with the sector of transport in Foshan	comparison with
comp with: Qingdao	comparison with the sector of land and resources in Qingdao	comparison with
comp with: Suining	comparison with the sector of housing and construction in Suining	comparison with
comp with: Xiamen	comparison with the sector of parks and greening in Xiamen	comparison with
COOP WITH		cooperation with
coop with: ecological environment	having cooperation with the sector of ecological environment	cooperation with
coop with: finance	having cooperation with the sector of finance	cooperation with
coop with: housing and construction	having cooperation with the sector of housing and construction	cooperation with
coop with: planning	having cooperation with the sector of planning	cooperation with
coop with: water resources	having cooperation of the sector of water resources	cooperation with
FORMS OF COOP		forms of cooperation
forms of coop: field works	the cooperation is in the form of field works	forms of cooperation
forms of coop: irregular meetings	the cooperation is in the form of irregular meetings	forms of cooperation
forms of coop: regular meetings	the cooperation is in the form of regular meetings	forms of cooperation
POLICY INSTRUMENTS		taking policy instruments
policy instruments: administrative order	taking administrative order as a policy instrument	taking policy instruments
policy instruments: check and acceptance	taking a check-and-acceptance mechanism as a policy instrument	taking policy instruments
policy instruments: construction license	taking construction license as a policy instrument	taking policy instruments

policy instruments: local finance	taking the local finance as a policy instrument	taking policy instruments
policy instruments: planning approval system	taking the planning approval system as a policy instrument	taking policy instruments
policy instruments: PPP model	taking the PPP model as a policy instrument	taking policy instruments
policy instruments: river discharge permit	taking two types of discharge permits as policy instruments	taking policy instruments
policy instruments: urban drainage permit	taking two types of discharge permits as policy instruments	taking policy instruments
REASONS FOR NP		reasons for no participation
reasons for np: different focus	reasons for no participation: focusing on the transportation industry, which is not relative to the sponge city	reasons for no participation
reasons for np: government	reasons for no participation: participation or not is related to whether the local government pays enough attention to the sponge city program in Yibin, this program doesn't gain much attention from the municipal government	reasons for no participation
reasons for np: land use	reasons for no participation: the construction of the sponge city projects is based on land that had been identified for use	reasons for no participation
REASONS FOR NSP		reasons for no special policies
reasons for nsp: complete national policies	reasons for no special policies: the national policies are enough for local sectors to implement	reasons for no special policies
reasons for nsp: lack of money	reasons for no special policies: the cost of the sponge city program is expensive the local finance cannot support the completion of every projects Yibin is not a pilot city	reasons for no special policies

reasons for nsp: low urgency	reasons for no special policies: because Yibin is located along the Yangtze River, the drainage is easy the problem of urban pluvial flooding is not very severe -> the urgency is low	reasons for no special policies
reasons for nsp: not necessary	reasons for no special policies: at national level there are no sectoral special policies for the sponge city program -> for the local sector, it is not necessary to formulate special policies	reasons for no special policies
reasons for nsp: unclear rewards	reasons for no special policies: the rewards for sector is unclear	reasons for no special policies
RESPONSIBILITY		responsibility
responsibility: cleanup of b&s river	responsibility in the sponge city program: the cleanup of black and smelly river	responsibility
responsibility: compilation	responsibility in the sponge city program: the compilation of the special plan for sponge city construction	responsibility
responsibility: funding	responsibility in the sponge city program: providing funds for sponge city projects	responsibility
responsibility: implementation	responsibility in the sponge city program: the specific implementation/construction of the sponge city program	responsibility
responsibility: maintenance of parks	responsibility in the sponge city program: the maintenance and operation of parks with the features of sponge city	responsibility
TRAD APPROACH		traditional approach
trad approach: JRR	traditional approach: Jinsha River Road the adoption of traditional approach to tackle urban flooding	traditional approach

trad approach: JXMD	traditional approach: Jingxiu Mingdu the adoption of traditional approach to tackle urban flooding	traditional approach
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