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The socio-ecological fix by multi-scalar states: The development of ‘Greenways of Paradise’ in Chengdu

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ABSTRACT

This paper examines the recent green turn in China by investigating a large-scale urban greenway project. Using the perspective of the socio-ecological fix, we demonstrate that multi-scalar states strive to upgrade environmental quality. Specifically, the local state seizes the opportunity for ‘ecological civilisation’ envisioned by the central state to carry out green infrastructure development. We reveal complex motivations to incorporate ecological changes into entrepreneurial urban governance instead of encroaching greenspace for economic growth. Our state-centred analysis reveals that such an environmental strategy, the making of Chinese green urbanism, is promoted like a political mission, despite its operation by the development corporation. We argue that, while the socio-ecological fix facilitates capital accumulation, its deployment must be understood through state politics and actors.

1. Introduction

The ‘Greenways of Paradise’ (*tianfu liudao*) in the city of Chengdu is by far the largest urban greenway system in China. The greenway is a linear green space, often combined with transport routes. The earlier experiment in the Pearl River Delta built the non-motoring trail in green spaces for recreational uses (Chung et al., 2018; Liu et al., 2019). Launched in 2017, the greenway system includes three levels: 1920 km at the metropolitan level, 5000 km at the district level, and 10,000 km at the neighbourhood level. The project has received endorsement from the central government. When President Xi Jinping visited Chengdu in 2018, he inspected the greenway and suggested that Chengdu should be further built into the ‘Park City’ (*gongyuan chengshi*), which would become an exemplar of China’s exploration of sustainable pathways in the new era of his leadership.

Among the vast literature on China’s eco-cities, which documented greenwashing and using the name of green urbanism to promote real estate development (Caprotti et al., 2015; Chang et al., 2016; Chien, 2013; Sze, 2015; Wu, 2015; Xie et al., 2020; Xu, 2017), the greenway appears to be a massive environmental project. Rather than reinforcing the insights of China’s eco-cities research on green imagineering and place branding, this paper seeks to explore the actual motivations of the greenway project by its actors across different scales and the features of

ecological changes. We ask what motivates this ambitious project and how ecological changes have been incorporated into entrepreneurial urban governance. Here, we stress the importance of multi-scalar state governance.

The paper applies the perspective of the ‘socio-ecological fix’ (Ekers & Prudham, 2015, 2017) and multi-scalar states to understanding China’s green turn. We explain the concept of the ‘fix’ in the following literature review, and then introduces multi-scalar states and its application to China’s environmental governance. We elaborate our method in the following section about the background to this case. The three sections that follow will address the actors associated with greenway development – the central government, the local government, and the development corporation respectively. Then, the features of the social-ecological fix in greenways are elaborated. We conclude that the local government exploits the opportunity for ecological civilisation envisioned by the central government and uses the development corporation to perform the socio-ecological fix.

2. The socio-ecological fix

There is a vast body of literature on the ‘spatial fix’ in advanced capitalism (Bok, 2019). The concept has evolved through three stages. First, the concept was originally developed by Harvey (1981) to describe

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the shift from the capital circuit of primary production to that of the built environment. The spatial fix is a temporary solution to fix capital over-accumulation. In other words, the built environment absorbs surplus capital.

Second, applying the spatial fix to the environmental aspect, the sustainability fix has been invented (While et al., 2004; Hodson & Marvin, 2007; Témenos & McCann, 2012). The concept still retains its association with the crisis of capital accumulation. In other words, environmental projects are a temporary solution to solve the crisis of capital accumulation, because it is imperative to fix the environment in order to sustain growth. The concept describes the selective incorporation of environmental goals into urban governance (While et al., 2004). Different from greenwashing, the sustainability fix points out that environmental manoeuvres and initiatives are possible or even necessary under growth-first capital accumulation. However, such an environmental improvement cannot address the substantial causes of environmental challenges. Mostly, the sustainability fix is achieved through 'best practices' and policy mobility (Témenos & McCann, 2012). The sustainability fix improvises the quality of the built environment. The concept is still confined within the form of urban development and its function to deal with economic crises.

Third, the socio-ecological fix emphasises the special type of fix that advances ecological changes, or the 'production of nature', in addition to the production of space (Angelo & Wachsmuth, 2015; Ekers & Prudham, 2017; Keil, 2003). While still following the logic of capitalism, the socio-ecological fix points out the possibility and importance of environmental development through changing socio-nature relations, as seen from political ecologies (Témenos & McCann, 2012). Different from the previous sustainability fix, the socio-ecological fix is not driven by the imperative of economic growth. Rather, it intends to upgrade the ecological environment. Moreover, the socio-ecological fix presents further explanations to cope with the crises of social reproduction and nature beyond the crisis of capital over-accumulation. The concept thus is not limited to urban development but stresses environmental objectives through strengthened environmental regulation (McCarthy, 2015), the shift of capital and public investment in the built environment (Castree & Christophers, 2015), and 'eco-state restructuring' (While et al., 2010). In short, the socio-ecological fix aims to deal with social and ecological crises beyond the crisis of capital accumulation. In other words, the fix is not simply for an economic purpose.

As can be seen from the history of the spatial fix, the notion is more associated with the response to various crises. The fix refers to a solution to these crises. However, the motivation of applying the fix is less investigated in a territorial logic. That is, it is less clear why and how the actors invent and deploy the socio-ecological fix. To understand the motivation, we need to investigate the context of governance. This paper thus does not focus on the crises themselves as a driver but rather expands the scope to understand agencies associated with the fix. The perspective of the socio-ecological fix is relevant to China because it faces not only the imperative for economic growth but also profound environmental challenges (Shapiro, 2016). In an institutional context of multi-scalar states, we can understand why it is possible to create the natural environment rather than encroaching the environment for economic growth. We further reveal how this socio-ecological fix might be implemented by multi-scalar states in China.

3. Evolving multi-scalar environmental governance in China

Before we can understand the development of greenways, we must review changing environmental governance in China. China has experienced environmental degradation alongside fast urbanisation and economic growth (Geall & Ely, 2018; Shapiro, 2016). Recently, environmental governance has shifted from the earlier policy of 'growth first, treatment second' to 'ecological civilisation' (Chung & Xu, 2021; Geall & Ely, 2018; Kostka & Nahm, 2017; Kostka & Zhang, 2018; Xie et al., 2020). This is because China has introduced stringent

environmental enforcement such as 'lifelong responsibility system' and consequently has undergone a recentralisation of environmental governance (Kostka & Nahm, 2017, p. 575). The Chinese government raises the importance of nature to advocate a 'harmonious relation' between humans and nature. This vision means more than a technical treatment of the environment and requires a new way of thinking about nature as an aspect of civilisation (Geall & Ely, 2018).

There is extensive literature on China's eco-cities. Earlier studies noted that eco-cities are initiated as 'environmental imagineering' (Pow & Neo, 2013), grabbing greenfield land for urban development (Chien, 2013), ecological fantasies (Sze, 2015), spectacular mega urban projects (Caprotti et al., 2015; Chang et al., 2016). These green urbanism projects are real estate projects driven by 'aestheticisation' (Pow, 2018) for the wealthier population, leading to eco-enclaves (Caprotti et al., 2015). These descriptions reveal the 'selective incorporation of ecological goals' in economic and urban development (While et al., 2004: 551) and these studies rightly cast serious doubts on the ecological value of eco-cities. As Chinese planning officials have come to recognise 'fake eco-cities', eco-city development is often regarded as simply greenwashing.

These studies also point out that eco-cities might be regarded as environmental experiments promoted by the central state, reflecting a stronger environmental regulation (Chang et al., 2016). Sino-Singapore Tianjin Eco-city, for example, involves the rescaling of environmental governance. Despite real estate oriented development and unsold properties, the national state has had great expectations for this new eco-city model (Caprotti et al., 2015; Pow & Neo, 2013; Xu, 2017). This raises the need to study the multi-scalar government and understand the power and concrete motivation of the state at different government levels (Westman et al., 2019; Xie et al., 2020; Zhang & Wu, 2022). Moreover, the advancement of ecological standards is not seen as counterproductive for the realisation of entrepreneurial ambition. Local particularities and extra-local political-economic contexts define different motivations and variegated practices in eco-cities, such as a more real estate-centric development (Sino-Singapore Tianjin Eco-City), an ecological project led by environmental projects (Chongming Eco-Islands in Shanghai), and industrial upgrading towards a low-carbon economy (Shenzhen International Low-Carbon City) (Xie et al., 2020). Different from earlier studies on eco-cities, diverse strategies are identified which show the objective of ecological improvement rather than profit-making (Xie et al., 2020; Zhang & Wu, 2022). For example, 'in the Chongming Eco-Islands project, urbanization is strictly curbed and industrial development is not actively promoted by the local state' (Xie et al., 2020, p. 7). In Wuxi, wetland parks and green spaces are created (Zhang & Wu, 2022).

These ecological changes need to be understood in the context of multi-scalar states, as China is a large country with multiple levels of administration ranging from the central government, provincial government, to the governments of prefecture cities, cities, districts and counties, towns, and finally to the quasi government agencies of street offices in the cities and townships. China's political geography landscape reveals the importance of administrative rank of cities (Lim, 2019; Ma, 2005; Su, 2022). While the local (subnational) states may engage inter-city competitions, they are not simply territorially-conditioned endeavour but rather subject to upper-level governments control (Su, 2022). Beyond the notion of central-local relation, Chinese economic governance demonstrates state rescaling involving multi-level states (Lim, 2019). In other words, local projects often reflect the influences of the central government. In the field of climate change governance, Westman et al. (2019) find the enduring authority of the central government and continuation of top-down control. Rodenbiker (2020: 696) describes the 'ecological enclosure' caused by conservation planning, which is centrally coordinated, and locally adaptive and self-interested'. This structure of multi-scalar states means that local government has to absorb the objectives beyond the local territory (Shen et al., 2020; Wu, 2018; Xie et al., 2020; Zhang & Wu, 2022).

As shown in the multi-scalar eco-state (While et al., 2010), ecological objectives may also be defined outside the local territory as a response to national strategic considerations (Kostka & Nahm, 2017; Wu, 2018; Xie et al., 2020). While short-term land profit incentives may be an important driving force for the local government, these are not mutually exclusive with ecological purposes, which is also imperative under other political considerations such as alignment with central government policies and long-term economic development (Wu, 2018; Xie et al., 2020; Zhang & Wu, 2022). This means that we should not simply regard the ecological turn as greenwashing or taking the chance to pursue real estate development. The case of zero-waste neighbourhoods shows the state action of climate governance to reduce emission and grassroots environmental activism for better environmental quality (Lin & Kao, 2020). The case of Chongming Eco-Island project shows state-led eco-modernisation (Xie et al., 2019). In the Pearl River Delta and the city of Maanshan, greenways provide environmental amenities and promote active travel as greenway routes are used for walking and cycling (Chung et al., 2018; Liu et al., 2019; Zhang et al., 2020).

4. China's greenway development

Focusing on the recent development of greenways in China, the literature provides a diverse range of motivations and outcomes. In China there was a national campaign for creating forests for flood defence, soil erosion, and sandstorm prevention at a regional scale. The development of greenway appeared in this context. However, in 2006, the first article in English on the greenway in China found that the greenway was used as a 'city beautiful' or cosmetic approach (Yu et al., 2006). Urban greenway systems have become popular and have mainly been built along transportation corridors as landscaping projects.¹ The Pearl River Delta Greenway is perhaps an epitome of greenways in China (Chung et al., 2018; Liu et al., 2019). Launched in 2010, the project aimed to build nearly 9000 km of green paths in this region and was largely completed within five years. The initial motivations were to prevent further encroachment on rural land and to add environmental amenities due to the shortage of green spaces. Interestingly, the essence of greenways is not an urban reforestation project of planting a large quantity of trees but rather the use of existing green spaces along rivers and transport routes to create recreational trails and connect major parks, nature reserves, scenic spots, heritage sites, and existing settlements. As a form of linear green open space, in addition to landscaping (beautification), the salient feature of the PRD Greenway is its emphasis on recreational usage, for example using existing agricultural fields and countryside routes for walkers and cyclists (Chung et al., 2018).

However, China's urban development has been driven by land-based public finance (Lin, 2014). The local government has a strong interest in land revenue generation. In this context, it is difficult to carry out environmental projects which might not generate land revenue. In PRD Greenway, the development of greenways tries to use the 'residual' land such as underused land that does not count in the land development quota (Chung et al., 2018). Moreover, the government also rented rural land for greenways. Without converting rural land into built up areas, greenways still introduce green amenities for urban recreational uses. In addition, real estate development either contributes greenways in kind or invests in greenways because the developer can benefit from property value increase due to the enhanced green space (Chung et al., 2018). Despite adapting in land-driven urban development, the creation of PRD greenways is first and foremost a political mission initiated by key provincial politicians. The greenway was the 'first-order political

¹ In fact, Professor Yu, the architect based at Peking University, has a large landscaping architecture practice and has created many greenway projects consisting of pedestrian and cycling paths and bridges, often in a curved shape and coloured red, across wetlands. The style is controversial but makes the design fairly distinct.

mission' decreed by the then Party secretary of Guangdong province, Wang Yang (*ibid*: 902), and also helped to foster rural tourism.

In contrast to a well-accomplished strategy in the prosperous PRD, in Maanshan, a medium sized city in the less developed Anhui province, rural tourism failed to materialise as the area was still far away from the urban centre (Zhang et al., 2020). However, rather than seeing greenways simply as greenwashing, beautification, or economic value capture, the greenway has achieved some positive effects as an 'environmentally benign form of urbanisation' (Zhang et al., 2020, p. 508). The greenway promotes active travel and a green environment and urban greenways are extensively used by residents as a leisure space and commuting routes. This project represents an 'environmental turn' which has been initiated by the national plan of 'new-type urbanization' in 2014.

The literature of China's greenway development reveals the inherent tension between entrepreneurial governance and environmental improvement (Chung et al., 2018). Although land-based finance has been studied extensively in China (Lin, 2014), the development of greenways shows that China's environmental governance is not exclusively determined by financial logic. The earlier entrepreneurial governance did lead to rampant urban expansion and encroachment on rural land (Shi & Tang, 2020). However, both central and local governments began to tackle the loss of arable land as a severe environmental challenge. The existing literature suggests the possibility of adopting the greenway in order to fix social reproduction and environmental crises caused by profit-driven development (Zhang & Wu, 2022).

The development of greenway is influenced by the land policy of the central government. The central government initiated a 'land linkage policy', which issues development land quotas and requires the local government to maintain the overall quantity of arable land (Shi & Tang, 2020). In many places, concentrated villages or resettlement areas are developed, driven by municipal governments' reliance on land revenues and financing urban infrastructure through land incomes. At the same time, the transfer of development rights (TDR) opens up the trading of rural land. In the land market in Chengdu, the system is well-developed which has facilitated the conversion of rural land for real estate development (Shi & Tang, 2020). However, the underlying motivation of land consolidation is also due to a strategic manoeuvre to create a more balanced pattern of regional development and better environmental quality. As will be shown in this paper, the local government uses greenway development as both a developmental and an environmental strategy. Similar to city-regionalism (Jonas, 2020; Li & Jonas, 2019), it is important to recognise that China's environmental governance includes multiple logics, not just capital accumulation (Wu, 2018; Xie et al., 2020).

5. Methodology

This paper mainly draws on fieldworks from 2018 to 2019, just in time for the initiation for the greenway project. In total we have conducted 24 intensive interviews, including the planning bureau, the development companies, the office of greenway management, the architects involved in greenway design, local district/street officers, residents, and several short and unstructured interviews with the users of greenways. In addition, we maintained our contact with the planners in Chengdu who paid a return visit to the researchers' institution. In addition to interviews, we were able to collect the plans for greenways, the master plan for Chengdu, the party secretary's presentation in a high-profile forum, and a paper prepared by the director of the Chengdu Urban Planning Institute.

The choice of case is not incidental. Chengdu has attracted positive attention since the Pearl River Delta greenway. Different from a regional greenway system, Chengdu is a metropolitan area and an economic centre in western China, known for its coordinated urban and rural development and the experiment of transfer of development rights (TDR) in rural areas (Shi & Tang, 2020; Ye & LeGates, 2013).

According to Chengdu Urban Master Plan (2003–2020), at each side of the fourth ring road, a belt of 500 m of land is designated for preservation. Together with the wedge-shaped areas, the preservation area covers 198 square kilometres, which is protected through special legislation as the ecological zone of Chengdu. The ecological zone serves as the greenbelt. In 2012, the project of ‘six lakes and eight wetlands’ began to introduce landscaping alongside preservation. Inspired by the Boston Emerald Necklace, the project thus began to incorporate recreational uses into the ecological zone, aiming to create a chain of parks on the outskirts of Chengdu. Thus, the landscape greenway no longer achieves the function of containment as a greenbelt. In reality, Chengdu has been experiencing fast urbanisation. The built-up area has quickly been extended towards this fourth ring-road. The area along the fourth ring-road is quite far from the central city. Its environment is not polluted or of low quality. Rather, the suburbs lack amenities and recreational space. The suburban residential development has created demand for a higher quality environment.

However, the ‘six-lake and eight-wetland’ project lacked investment and was suspended in 2016 because of a change in political leaders. In 2017, the project was relaunched as the ‘Greenways of Paradise’. It consists of three rings: an inner ring, Panda Greenway, which is complete, the Landscape Greenway which is under construction, and the Countryside Greenway which is planned. The Landscape Greenway is the most significant and expensive greenway of this mega urban project. It is built along the fourth ring road of Chengdu, covering an area of 133 square kilometres, equivalent to a quarter of the central built-up area of Chengdu.

Fig. 1 shows a southern section of the Landscape Greenway which consists of a series of linked parks with water landscaping. On both sides of the greenway, the land has already been extensively built up.

6. ‘Ecological civilisation’ initiated by the central government

Ecological civilisation is a slogan and national development goal announced by the central government, which aims to shift China’s development strategies from a growth-oriented approach to the balance of economic growth and environmental qualities (Kostka & Zhang, 2018; Xie et al., 2019). The term represents the changing ethos of the

national state about the environment, as President Xi announced: ‘clear waters and green mountains are as valuable as mountains of gold and silver’ (Geall & Ely, 2018). The narrative of ecological civilisation is increasingly absorbed in development and environment policies which reflect the strong steer from the central government. The codification of ecological civilisation in policies reveals state rescaling towards the central government and the rise of the eco-state (Chung & Xu, 2021).

China’s green development in general and specifically regarding greenways echoes changing environmental politics and governance in which the central government has strengthened its role in environmental governance (Wu & Zhang, 2022; Wu et al., 2022). The development of greenways demonstrates the local government’s willingness to align with the central government’s policy for a new development approach, which considers and cares for the environment. Under this new environmental state, the conventional ‘achievement in office’ is now measured not in terms of GDP growth rates alone but also of the quality of environment. Thus, the central government has strengthened the environmental responsibilities of local governments (Chang et al., 2016; Chung & Xu, 2021).

The central government is also imposing stricter environmental evaluation on local governments. For example, during President Xi’s visit to the upper reach of the Yangtze River, he instructed that the Yangtze River economic belt should not initiate large-scale construction and development but that the top priority should be preservation. Following this instruction, for Chengdu ‘there have been constant checks over the implementation, thus creating a lot of pressure on local leaders. It is not a matter of economic performance, it is a political achievement’ (Interview with senior planner, December 2019).

In April 2019, Chengdu organised an international forum. The party secretary of Chengdu, Fan Ruiping, reported the official endorsement of President Xi Jinping when he visited Chengdu in 2018 and put forward the concept of the Park City. The forum officially launched the slogan ‘Park City, City of the Future’ to indicate that the greenway project implements President Xi’s vision for the whole city to become a park or a city of parks. Different from Howard’s Garden City which plans low-density residential development in a small town outside a large metropolis, the Park City emphasises the development of green infrastructure (parks) for a large metropolis, reflecting the socio-ecological



Fig. 1. The southern section of the Landscape Greenway in Chengdu.

fix rather than real estate development. The party secretary of Chengdu indicates that the greenway project fully embodies President Xi's instruction: 'The characteristics of Chengdu as a park city should be highlighted, its ecological value should be considered, and a city embodying the new development philosophy fully should be built' (The report of Fan Ruiping, April 22, 2019).

The planning of the greenway follows President Xi's vision of 'green mountain, clean water' as part of China's ecological civilisation. As such, the development of the greenway has increasingly shown its political considerations and has been implemented as a state-initiated project, albeit using the development corporation to carry out the actual construction work. The manager of the greenway planning office remarked that

The greenway has been the first mega project since the change of the leader [of the municipality]. It represents an achievement of the new leader. The greenway initiative is considered important for career advancement and reputation for the local leaders (Interview with the manager of greenway planning office, July 2018).

The development of the greenway is seen as a political mission. The Planning and Design Institute of Chengdu received this important task from the municipal government and is responsible for landscaping and design. The assignment of planning tasks suggests the importance of the project: 'We are the executive agency of the government, delivering the government requirement to the design institute' (Interview with general manager, July 2018).

To be clear, the greenway is not a top-down project initiated by the central government. The strategy of the greenway was first raised by the local government as the name of greenway appeared in planning documents before the visit of President Xi. The project was then recognised by the central government and consequently expanded into the Park City. While it is widely noted that the local state uses the discursive frame of the central government, such as ecological civilisation, to act locally (Chung & Xu, 2021), the existing literature often portrays the distortion of central policies for local economic purposes. What has been observed in this greenway project is that the local government did adhere to the environmental requirement and push forward an agenda of the socio-ecological fix.

7. 'Ecological zones' established by the local government

Although the greenway is an effort to align the local environmental strategy with the central government's vision for ecological civilisation, the actual development has been carried out by the municipal government of Chengdu. To meet the requirement by the central government for arable land protection, the greenway preserved approximately 100 square kilometres of agricultural land, including 35.2 square kilometres of 'basic farmland' (a type of farmland under strict protection). The land has been redesigned into an ecological area. However, the greenway is constructed not just by preservation but also through the expansion of existing green space and upgrading the environment, including demolition and the creation of mixed land uses near and along the greenway.

Although the land has been reserved for ecological protection since the last urban master plan in 2002, about 240,000 rural residents still live in the preserved area. In this area, land owned collectively by villagers coexists with state-owned land. The widespread rural non-agricultural land uses led to the loss of arable land and a lower quality environment. The greenway project required land expropriation but has no national policy to support land acquisition, unlike an airport or railway project. The district governments faced a great challenge as they were responsible for demolition and relocation but could not initiate compulsory purchase. The greenway project has provided some legitimacy for demolition. Together with the street offices, the district governments also provide a higher compensation standard than compulsory purchase, which explains why the overall compensation cost is very high.

But the district governments have incentives to act, not only in showing their support for the municipal project but also in gaining land ownership. The area was facing spontaneous development by local villagers. Through building the greenway, the government can control the actual use of the land, although some land has been zoned as non-developable and under 'permanent' protection. But the greenway can create two effects: the spill-over effect on nearby land values and the generation of land quotas. A municipal officer explains how the greenway project provides an opportunity to gain control over development rights in the area through obtaining land ownership:

Rather than being developed by local villagers, the government prefers to monopolise this area. The previous ecological zone along the ring road will be the linear 'central park' at the scale of new district. (Interview with municipal officer, July 2018)

First, the greenway has brought significant opportunity for development because 1.17 square kilometres of land owned by the government-owned corporation (the greenway development corporation, see later) has been allowed for development, as explained by a street officer in the greenway site:

The lands are scattered and dispersed in the area like sesame seeds. This actually means that they have great potential as they are closer to the consumers nearby. Apart from these small plots of land, larger plots roughly reach by average 0.6 square kilometres each. These plots form 16 'towns', which are still owned by different districts. Adjacent to these new towns, the Landscape Greenway greatly enhanced the quality of these residential areas. Although the district governments are asked to cover the cost of demolition and relocation, as high as 160 billion Yuan, they are willing to do so because they also expect to sell land nearby. Although the land within the inner area of the greenway belongs to the municipality, we are entitled to the land outside of the greenway. It doesn't matter how the development benefit is distributed. We just sell our own land. (Interview with street office director, June 2018)

After the construction of the greenway and landscaping, the land price of the area increased from 0.5 million Yuan to the highest price of 20 million Yuan per *mu*. The highest price was recorded in a land auction in 2016.

Land is the key consideration:

The land near the greenway is about 5 million Yuan per *mu* now, and we expect the price will increase to 20 million Yuan per *mu* after the completion of this greenway project. The most important reason for the municipality to do this project is still the land price [increase]. Compared with the previous green infrastructure that focused on green space, this greenway project [landscape greenway] is multi-functional. It will create a more liveable, pleasant environment which can raise the land price. (Interview with greenway general manager, July 2018)

This explains why the previous ecological zone was suspended because the ecological function could not generate business opportunities. Through this new conceptualisation of multi-functional greenway development, the spill-over effect allows the developers and the local government to capture the land value.

Second, the greenway is a project that consolidates existing rural land development and, in this way, it aims to fix inefficient land use, similar to other eco-cities (Zhang & Wu, 2022). By removing existing rural dwellings and converting them to arable land, the local government can gain additional quotas of land development. Farmhouses are built in the form of low density, with a big courtyard and an allotment for farmers to cultivate agricultural products for self-consumption. These are all counted as 'built-up land' or 'construction land'. After relocation and resettlement, farmers live in a more compact resettlement area. Through clearing existing 'built-up land' and prohibiting further construction in the ecological park, the greenway project generated the

quota of construction land, which can be transferred to other places for real estate development (For the policies, see Shi & Tang, 2020).

Under the leadership of the municipal government, the district governments finally managed to initiate large scale demolition. From 2012 to early 2017, for the ecological zone Chengdu demolished 410.9 million square metres of buildings in urban villages. The total rural construction land was reduced to 20 square kilometres. In 2017, 4700 farmers were relocated to a different area, an achievement reported by the director of Chengdu Planning Institute. The city also built 27 square kilometres of forests and 4.1 square kilometres of wetlands, and restored 'basic agricultural land' of 35.2 square kilometres (Zeng, 2017). In summary, the greenway project allows the municipal government to implement 'ecological zones', preserve green spaces, create additional green areas and parks for recreational uses, and generate more developable spaces at a different location. The development of 'ecological zones' combines environmental objectives and a development mission of entrepreneurial governance.

8. The greenway project implemented by the development corporation

Although the central and local governments play an active role in environmental agenda setting, the actual operation of the greenway project is through market instruments, or more specifically here the development corporation, just like other urban development projects in China (Feng et al., 2022a, b; Li & Chiu, 2018; Shen et al., 2020). According to the director of Chengdu Planning Institute, the new model of greenway development is an integrated one of investment, construction, and operation through the Greenway Development and Investment Corporation (Zeng, 2017). The director explains that the development approach has transformed constructions by district governments into an integrated operation by the corporation. Through business assets to obtain operational capital and land value capture, the development corporation ensures construction, implementation, and capital circulation after the construction of the greenway (Zeng, 2017). By 'integrated operation' is meant that the corporation, as a market agent, builds and operates for the government.

The history of the development corporation reveals its role as a market agent for the government. In 2017, the municipal government set up the Office of Ecological Zone Management under its construction commission. The office is a government agency with streamlined structure. In the same year, the Chengdu Tianfu Greenway Development and Investment Corporation was established.

Urban development and investment corporations are also known as *chengtou* in China. They are state-owned enterprises owned and controlled by the State-owned Asset Supervision and Administration Commission (SASAC) (Feng et al., 2022b, p. 8). SASAC imposes a vertical ownership control for the multi-scalar state. At the municipal scale, there is the municipal SASAC. In the case of Chengdu, Tianfu Greenway Development and Investment Corporation is a state-owned Xingcheng Group subsidiary company. The latter is a large *chengtou* under Chengdu SASAC. The municipal government thus can influence the corporation through personnel management and capital injection. The greenway corporation can then subcontract actual construction tasks to other SOEs or private builders. Because the development corporation faces the market or is the 'market agent' of the state, it needs to consider the development costs and profitability. However, because of the state ownership, it behaves differently from a shareholding company that often prioritises profitability. In this case of greenway development, the Chengdu Tianfu greenway corporation has to consider the 'mission' of ecological civilisation and the political pressure on the municipal government. Thus, the state plays an important role in governing urban development (Wu & Zhang, 2022).

To be clear, the municipal development corporation cannot directly command the district governments; rather, it has to work through partnerships with lower-level governments such as district or town

governments. Instead, the municipal government controls these district governments through administrative power, for example, the appointment of their officers. However, the introduction of municipal-level development corporation has strengthened the municipal government's authority because the corporation has independent funding sources, including raising funds through the capital market, like in many other cities (Feng et al., 2022b). The district governments bear some initial costs (compensation for land clearance and construction) because the municipal government allocates land development quotas to district governments or literally 'returns' the developable land after land clearance to them for land value capture. In the case of Chengdu greenway, the municipal government, together with its development corporation, can better 'control' entrepreneurial district governments than in the earlier phase of greenway development.

In the rest of this section, we detail the operation by the development corporation in greenway development. The company is responsible for financing, negotiating with various stakeholders, and recruiting construction companies to build the greenway. According to estimates by the municipal government, the development of the Landscape Greenway cost over 200 billion Yuan, consisting of 47 billion Yuan construction costs and 160 billion Yuan of compensation for relocation and resettlement. In interview a municipal officer remarked that 'It is a tremendous capital cost and in excess of the annual municipal revenue' (July 2018). In 2018, the revenue of Chengdu was 142.4 billion Yuan. How is this greenway project financed?

For the construction cost, it is mainly financed through land value capture. The huge demolition and compensation cost of 160 billion Yuan are shouldered by the 11 district governments that hope to achieve similar land value capture.

As the market agent for the government, the development corporation opens the channel of capital for the greenway project which itself is not profitable in a market term. As mentioned earlier, it is hoped that the greenway will raise the land value of adjacent areas which are possessed by the development corporation, as explained by the general manager of the greenway project:

Except for the 1000-metre-wide restricted land within the greenway, we designated 500-metre-wide areas along the greenway for development. In total we will be able to develop 37,500 *mu* (about 150 square kilometres) of land. Once the land is sold, we expect a price of one million Yuan per *mu*. So we may get a total of 37 billion Yuan. (Interview with general manager, July 2018)

In addition to land sale, the municipal government contributed 5 billion Yuan of registered capital to the greenway development corporation and promised to provide an investment of 12 billion Yuan in total (including the registered capital). The corporation then invested in demolition and obtained the development rights of the nearby land. Together, the total funding for construction is 49 billion Yuan, slightly exceeding the construction cost. In practice, the corporation does not expect to gain a profit from building the greenway; rather, it hopes to make a profit from business operations in land and assets in the future (Interview with business manager, July 2018). The cost and profit data show that this project is treated as an infrastructure one instead of profitable commercial development.

For the operational cost, it is financed by incomes from facilities developed within the greenway. After the construction of the greenway, the company continues to manage and operate the Landscape Greenway. The project is necessarily combined with new developments and can hardly serve to contain development because the company needs to cover its operating costs:

From our calculation, the operation cost of the Landscape Greenway is about 0.8–1 billion Yuan per year. The government does not allocate any funds to us. We can only generate income from businesses like hotels, restaurants, and entertainment facilities. (Interview with general manager, July 2018)

The business manager explains:

As a state-owned company, apart from making profits to sustain ourselves, we also undertake the responsibility to serve the public like a government. For example, we need to provide cultural and sports facilities, besides tourism, commercial promotion, and agricultural protection. However, cultural activities such as museums are barely profitable. Overall, public services cost 20% of our business. The government also requires us to have the ability to sustain ourselves and finance the greenway. We also need to reduce the debt, to avoid becoming a burden on the government. (Interview with business manager, July 2018)

In short, the construction of a greenway is costly. The construction cost is covered by land sale, while the district governments bear the cost of land compensation. The development corporation does not make a profit from greenway construction. The company hopes to attract private funds for the expensive daily operations. But it is difficult to do so without a profitable business and the greenway project is still trying to find a business model. As green infrastructure, the greenway is financed by land value capture along the greenways and implemented by the development corporation. In this sense, greenway is a project to create high-quality green spaces; but at the same time the project relies on land value capture.

9. Discussion: the socio-ecological fix

The greenway is not oriented towards real estate development. Rather, it facilitates the development green infrastructure and environmental amenities. Rather than 'greenwashing' or environmentally detrimental development, the project invests significantly in the creation of green spaces. As mentioned earlier the greenway is a costly operation which relies highly on land value capture to finance its construction. To be financially viable the development of businesses is imperative, which imposes the requirement for the development of high value added activities in the area. As such, first and foremost, the greenway does not simply contain land development. While the local government seems to use the title of Park City to justify the greenway, the actual implementation is not necessarily confined by a rigorously defined concept, which is observed in many other eco-cities and development under the environmental discourse (Caprotti et al., 2015; Chung & Xu, 2021). Besides asking for endorsement from the central government, the local government always maintains the flexibility to redefine the content. The greenway development is still a local government initiative rather than a direct requirement from the central government. But the salient feature of this initiative is its ecological emphasis, consolidating non-agricultural rural uses and building green spaces and parks, which is also seen in China's conservation planning in peri-urban areas (Rodenbiker, 2020).

The development of greenways represents three features of socio-ecological fix. First, landscaping becomes an important task, as a landscaping architect remarks:

We spared no effort to utilise the last [agricultural] land. The river is repaired too and connected to the lakes, wetlands. Various plants help improve biodiversity. For the [landscape] greenway, the 133-square-kilometre ecological park consists of forests, a green corridor for urban air ventilation, repaired farmland and a water system. It will add 10 square metres of green space per capita in Chengdu. All residents benefit from environmental upgrading. (Interview with landscape designer, July 2018)

As the name suggests, the Landscape Greenway aims to create scenery and a green landscape with ecological parks, meanders, and wetlands. It is about landscaping the whole developable suburb rather than being confined to adding ecological value. The greenway project helps to create a better landscape in the suburbs and this development also fixes the environment for future development in the whole city-

region of Chengdu. The socio-ecological fix prioritises rendering existing green space more prominent, which allows the local state to capitalise nature and capture its value for the city.²

The priority of greenway design is placed on providing large-scale 'landscaping' to the suburbs rather than increasing overall green space, as explained by the landscape architect:

Technically, the statement [adding ten square metres of green space per capita] is imprecise, because the status of the land has not changed very much. We didn't create additional green space. We just made use of former farmland that had no ecological value. (Interview with landscape architect, July 2018)

This interview conveys a particular view of ecological value, which regards rural farmland as lower-quality use and green spaces for urban recreational uses and tourism as a higher quality one, which is also found in Shanghai's Chongming Eco-island (Xie et al., 2019).

Although it is difficult to assess the ecological value of this large-scale landscaping project, the greenway helps to improve the quality of the suburban built environment and to upgrade the image of the liveable city of Chengdu. The greenway project, as seen by the municipality, helps to attract talent and highly skilled workers to settle in Chengdu as a 'park city':

Chengdu wanted to be famous, catching up with other mega cities and raising its international profile. The Greenways of Paradise shows our 'city ambition'. Our plan for population growth and urban expansion already demonstrates our ambition to pursue the position of the first-tier mega cities [in China]. The greenway is an engine to establish the 'city brand' in the long term. (Interview with planning manager, July 2018)

Second, the mixed-use is introduced as a major feature of greenways. In addition to landscaping, the new Landscape Greenway expands the use of the greenway. Through creating multi-functional recreational uses, the greenway encourages more exercise and promotes lifestyle changes:

The municipal officers proposed to provide some guidance for [healthy] lifestyles. For instance, people should now do more exercise in the public green space, on pedestrian pathways and in high-quality sports facilities. (Interview with director of planning of greenways, June 2018)

This healthy city agenda to 'improve the life quality of all citizens' has also been promoted in recent years by the central government. In response to this new guideline, the greenway design incorporates the provision of sports facilities (interview with director of planning of greenways, June 2018). As the landscape designer explains:

Compared with the previous project of six lakes and eight wetlands that only emphasise aesthetic landscape, the Landscape Greenway adds more functions. We need to create 'focus points' to attract and keep people inside the greenway. The main work of our design group is to 'insert' new venues³ into the scenic places. (Interview with landscape architect, July 2018)

Another planner involved in the landscape design explained that the Landscape Greenway is not just a collection of parks, but a 'comprehensive development with multiple functions':

The municipal government emphasised that the greenway is never merely a pedestrian path or green belt. It needs to contain a mix of urban functions such as cultural and sports activities, tourism,

² Thanks for one reviewer for remaindering this point.

³ By new venues he means various sports uses such as football pitches and tennis courts.

commercial development, agricultural uses and technological industries. (Interview with a greenway planner, June 2018)

As pointed out by the business manager, the ‘integration of these functions should be the core [function] of the greenway’ (interview with business manager, July 2018). The new concept combines the greenway and a series of recreational and entertainment facilities such as museums and hotels. This further supports new town development in the outer suburbs. Fig. 2 shows the scene of the Landscape Park where the purpose-built red bridge for recreational uses runs over the wetland and across the river. Near the park is a huge complex comprising a shopping mall and a hotel, office buildings, and residential buildings. This new area is part of the new high-tech park of Chengdu. Both sides of the Landscape Greenway have already been developed. Within the fourth ring road of ecological protection zone, a huge commercial complex consisting of the Intercontinental Hotel and shopping malls has been constructed.

Third, facilitating strategic spatial expansion is a feature of socio-ecological fix. The development of the Landscape Greenway helps Chengdu to realise a new spatial development strategy towards the south and east. The south side is Tianfu new district, through which the Landscape Greenway runs, and high-tech industries concentrate in this new district of Chengdu. The municipality made plans to reduce population density in the central area and disperse more residents towards the urban fringes. The director of the planning office explained:

As the total population is expanding, to achieve the objective to reduce the density in the inner city, we definitely cannot ‘force’ residents to move out. The only feasible way is to use the ‘magnet’ of the Landscape Greenway to create a better living environment to attract residents. (Interview with director of the development office, July 2018)

In 2016, Chengdu annexed a nearby county, Jianyang, which opened up development opportunities in the east. The size of the central city then increased from five districts in the earlier urban master plan (2002–2020) to 11 districts. With this expansion, the Landscape Greenway now lies in the middle of the central districts and its original function as the urban growth boundary was lost as new development has now jumped over the fourth ring road. In addition, the new international airport is located in the eastern area, which means that the development of the Landscape Greenway in previous far-away suburban areas has actually turned into the frontier of new development.

As can be seen in the greenway project, enhancing environmental quality and promoting spatial expansion are not regarded as mutually exclusive. When we pursued the question of whether the development of the greenways was for economic, political, or ecological reasons, the planner did not feel that these were contradictory:



Fig. 2. The Landscape Park in the city of Chengdu.

The instruction from the central government surely needs to be implemented. But we also have an intention to do so. Our economy has developed to such a level that the ecological quality matters now. We need to protect the environment and enhance its quality and to attract the skilled labour force. Previously our strategic priority was [in the order of] industry, the city and people (*chai cheng ren*). Now ours is people, the city, and industry (*ren cheng chan*). (Interview with senior planner, December 2019)

The answer to our question actually reveals an inappropriate assumption in our question, which is that the central government protects the environment while the local government is entrepreneurial and the development corporation is profit-seeking. The question also assumes that the entrepreneurial local government has to circumvent restrictions from the central government as seen in the earlier phase of eco-cities, or else remain passive in implementation (Caprotti et al., 2015; Chien, 2013), which creates a significant enforcement gap (Eaton & Kostka, 2014). Our investigation shows that the local government has significant interests in the creation of green spaces (Chang et al., 2016; Xie et al., 2019; Zhang & Wu, 2022), due to both political consideration and development imperatives. It is necessary to analyse concrete underlying local interests in environmental initiatives, as ‘particularly during the current phase of decentralisation, central and local interests cannot be assumed but need themselves to be examined, through empirically rich analysis, across policy issues and government agencies’ (Kostka & Nahm, 2017, p. 579). With eco-state restructuring (White et al., 2010), Chinese multi-scalar state governance provides a concrete institutional context for greenway development. While the socio-ecological fix shows some familiar features such as green imagining and place branding (Pow, 2018) and support for urban expansion (Chung & Xu, 2021; Theurillat & Graezer Bideau, 2022), the greenway project demonstrates some novel features such as the treatment of ecological values and advancement of a particular way of ecological improvement (such as park creation).

10. Conclusion

This paper attempts to understand China’s recent environmental turn through interrogating a city-wide greenway project, the ‘Greenways of Paradise’ in Chengdu. Green space, greenbelts, and greenways provide good entry points to understanding environmental governance which attempts to regulate urban and regional environment. In Canada, the development of the Ontario Greenbelt, a regional green space, is a ‘state spatial project’ to regulate the relationship between cities and regions, town and hinterland (Macdonald & Keil, 2012). The greenbelt provides an environmental solution to solve inter-city conflicts and it is a socio-ecological fix to incorporate ecological objectives in local development. In Europe, to cope with the pressure of growth, the greenbelt around Frankfurt has been upscaled to the regional level (Macdonald et al., 2021). These cases reveal the institutional complexity and fragmentation between planning institutions in governing a regional green space. Similar to these studies on green infrastructure and greenbelts, this paper reveals mixed motivations for green space development in China. First and foremost, the project is not regarded merely as preservation but rather as an environmental project to create more green spaces and upgrade the quality of existing green areas. The project is thus ‘developmental’ in the sense that it aims to produce the new green environment. Associated with China’s state entrepreneurialism which foregrounds the state’s strategic vision (here ‘ecological civilisation’), the green project can perhaps be most appropriately characterised as a new socio-ecological fix. The state tries to promote a vision of a Park City with a higher environmental quality. Although the actual creation of green spaces is implemented through market development by the development corporation, the socio-ecological fix is not primarily for real-estate developments but rather for a green infrastructure project like greenways.

This paper confirms that the perspective of the ‘socio-ecological fix’ is illuminating because it helps to reveal an extra-economic condition beyond the earlier concern with capitalist accumulation (Ekers & Prudham, 2017). Here, as an environmental project, the greenway represents the city’s endeavour to change its earlier failed preservationist approach (the monotone land use of greenbelts) to a new strategy of multi-urban functions with recreational, residential, commercial, and office uses. The project is for *both* capital accumulation and green infrastructure development. The former provides the means of corporation style development (the so-called ‘integrated approach’ under the greenway development corporation rather than diverse district governments); the latter lends legitimacy to environmental utopianism (the Greenways of Paradise). The greenway is intrinsically embedded within political legitimacy which is aligned with the vision of ‘ecological civilisation’ under the current Chinese leadership. As such, the local political leaders are fully aware of and further utilise appropriate language to portray greenway building as a political mission. The project is thus not presented with economic motivation and growth-oriented scenarios, although the development of greenways reflects the mentality of developmentalism in both economic and ecological arena. In this sense, the motivation of ecological development as shown in the creation of green spaces is understood as the socio-ecological fix. In fact, the project often intentionally downplays the imperative of economic growth, although this growth logic has necessarily been built into the operation because the cost of development is huge and financed by land value capture. Similar to the finding that entrepreneurialism and environmental altruism can both be relevant to the adoption of the green city label (‘green branding’) (Andersson & James, 2018), here building greenways is both an entrepreneurial and environmental action.

The ‘Greenways of Paradise’ project illustrates China’s socio-ecological fix is ultimately political and ecological (Wu et al., 2022), although the market operation is instrumental and pervasive. Different from its earlier local entrepreneurialism, which often resorted to greenwashing, the socio-ecological fix is implemented by multi-scalar states to create more green spaces or upgrade ecological qualities. China’s green turn reveals the environmental ambition besides economic consideration. Concurring with the socio-ecological fix literature, this paper suggests that it is possible to incorporate ecological objectives into entrepreneurial governance because of the nature of multi-scalar states. Our empirical research in China reveals the concrete motivations and operational mechanisms of this socio-ecological fix. That is, the state strategic vision occupies the central position in the making of Chinese green urbanism. The entrepreneurial local state can also perform the socio-ecological fix. Although a fix connotes the meaning of a temporary solution, the greenway project is a response from the multi-scalar states to address environmental challenges (such as agricultural land loss). Put simply, it is an environmental strategy.

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