



Not at the table but stuck paying the bill: perceptions of injustice in China's Xin'anjiang eco-compensation program

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ABSTRACT

A growing body of research highlights the decisive role that justice claims play in creating sustainable payment for ecosystem services (PES) programs. Employing Sikor et al.'s approach to the study of justice claims in ecosystem governance along three dimensions—distribution, procedure and recognition—we study the negotiation process behind China's flagship interprovincial PES agreement: the Xin'anjiang River eco-compensation agreement between Huangshan (Anhui province) and Hangzhou (Zhejiang province) prefectures. We find that divergent claims between stakeholders on matters of distributive and procedural justice undercut one party's commitment to the agreement. Local officials in the upstream locality (Huangshan) see themselves as having been disadvantaged in both procedural and distributive aspects of negotiation. They claim to have been insufficiently included in a bargaining process that involved not only the downstream locality (Hangzhou) but also the central government. Huangshan stakeholders also see themselves as largely excluded from the benefits of cleaner water and bearing too much of the pollution abatement cost. For their part, Hangzhou stakeholders have advanced a 'polluters pay' view of distributive justice and found partial support for this claim from Beijing. Our findings suggest that attending to environmental justice considerations should be given top priority in China's design of PES schemes.

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Introduction

Payment for Ecosystem Services (PES) has emerged as an important tool in China's sustainability drive. Prior research on China's experience with PES, most often referred to as 'eco-compensation' (*shengtai buchang*) in the Chinese context, has found that such initiatives often reflect the pathologies of China's system of 'coercive' environmental authoritarianism (Li & Shapiro, 2020). In contrast to PES schemes in other regions, Chinese eco-compensation agreements often lack market-based principles and are characterized by the dominance of the state during the negotiation and implementation of agreements (Schomers & Matzdorf, 2013; Sheng et al., 2020); the weakness of positive incentives in agreements (Moore, 2018; Wang et al., 2020), and high barriers to implementation in the context of a complex governance system (Huang & Xu, 2017). While this research has illuminated many facets of PES in China, we know surprisingly little about how China's state-led eco-compensation agreements are actually negotiated and still less about how negotiation practices shape stakeholders' overall perceptions of PES projects.

Building on a growing body of research highlighting the importance of justice considerations in creating sustainable ecosystem governance, this paper studies the role of perceptions of *injustice* in the negotiation

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of China's flagship case of PES in watershed management: an eco-compensation agreement between Huangshan Prefecture in Anhui province and Hangzhou Prefecture in Zhejiang province on the treatment of the Xin'anjiang River. Employing Sikor et al.'s (2014) typology of the dimensions of justice in ecosystem governance, we find that negotiation of this agreement has neglected both *procedural* and *distributive* justice principles. One party to the agreement, the Huangshan prefectural government, sees itself as having been neither adequately consulted in negotiations, nor fairly treated in terms of the distribution of costs and benefits—as having not been at the table but still stuck paying the bill. This perception of injustice has generated deep resentment among Anhui officials, calling into question whether this agreement—lauded as playing an 'exemplary and guiding role in the ecological compensation of transboundary basins in China' (Li et al., 2020)—will survive in the coming years.

The research offers two primary contributions to the comparative literature on PES governance. First, it lends insight into the politics that shape the negotiation of PES agreements in an authoritarian context. Previous research drawn from other regions has pointed out that PES negotiations are shaped by a complex array of social, cultural, and political factors that influence negotiating rules and procedures (Kovacs et al., 2016). We show how China's top-down system of environmental authoritarianism and the lack of formal inter-provincial negotiating platform generated an informal negotiating process which favored the better-connected party and largely excluded the other party. Second, this research provides new evidence on the importance of role of perceptions of justice in eco-compensation agreements. Stakeholders' views of justice in terms of negotiation procedures as well as the distribution of costs and benefits play a decisive role in shaping both compliance as well as the long-term prospects of eco-compensation agreements (Leimona et al., 2015; Pascual et al., 2014; Sikor et al., 2014). Our analysis underscores the difficulties of negotiating agreements that all parties consider just in an authoritarian regime like China, which prioritizes speedy decision-making at the expense of thorough consultation and deliberation.

Our case study draws on 63 semi-structured interviews conducted between July and December 2019 in Anhui, Zhejiang, and Beijing. We selected interviewees at different administrative levels—from county- to central-level—to understand their respective roles in the negotiation and implementation of this agreement. Interviews were conducted with officials in the Bureau of Ecology and Environment, the Development and Reform Commission, and the Bureau of Finance. Interviewees include both participants in the negotiations and street-level bureaucrats responsible for implementing the agreement. The findings also draw on analysis of government documents, including the eco-compensation agreement between Zhejiang and Anhui on the Xin'anjiang River, the Implementation Plan on Energy Saving and Emission Reduction under the 13th Five-Year Plan (FYP) of Zhejiang and Anhui provinces, and several unpublished reports from the Bureau of Finance in Zhejiang province.

The article unfolds as follows. In the following section we review the conceptual framework of justice in sustainable ecosystem governance and its application in cases across the world. Then we move to the discussion of the development of PES in China, especially its use in watershed management in recent years. Finally, we delve into the case analysis of Xin'anjiang eco-compensation agreement and unpack the controversial processes of negotiation and the associated distribution of costs and benefits between the two parties.

The role of justice in sustainable ecosystem governance

Our study employs Sikor et al.'s (2014) approach to the empirical study of justice claims in ecosystem governance along three dimensions: *distribution*, *procedure* and *recognition*. Notions of distributional justice are concerned with the 'ability of different actors to enjoy environmental benefits, avoid environmental harm, and take on a fair share of management responsibilities' (He & Sikor, 2015, p. 208). Procedural, or participatory justice, pertains to the role various stakeholders play in decision-making processes (Sikor et al., 2014, p. 525). Procedural justice directs our attention to the roles played by different actors in decision-making and the formal and informal rules shaping outcomes. Recognition is often invoked as a justice claim by indigenous peoples who call for 'respect for social and cultural differences such as different visions of the environment and desirable environmental management' (He & Sikor, 2015, p. 208). Studying justice empirically means

investigating and comparing justice claims advanced by different stakeholders, with unequal power and influence, in ecosystem governance. Following previous research, we employ this approach to ‘critically interrogate the dynamics of PES by comparing the notions of justice underlying state policy with those held by villagers and local state officials’ (ibid, p. 208).

Studies employing this conceptualization of environmental justice have found that stakeholders’ perceptions of justice play a key role in determining the effectiveness and long-term prospects of ecosystem governance. A study of the Sloping Land Conversion Program in Yangliu watershed in Yunnan province (China) found that congruent notions of distributive justice, although not procedural, between state planners and local villagers have been central to the success of this initiative (He & Sikor, 2015). Case study analysis of the establishment of a protected area in Laos highlighted conflict between stakeholders over procedural and distributive justice claims. Wealthier and more powerful households acquired additional land to cultivate in the process of establishing the protected area, thereby exacerbating pre-existing problems of unequal land distribution and leaving poorer households with a negative impression of the project (Dawson et al., 2018). Research on Vietnam’s National Payments for Forest Ecosystem Services Program found a problematic gap between the distributive equity considerations written into national legislation and local perceptions thereof (Loft et al., 2019). A comparative study of two carbon forestry projects in Uganda suggested that justice had a direct influence on divergent project outcomes: one initiative featuring a targeted payment scheme to households was seen by local stakeholders as distributively just, a central factor in the program’s success; the second project was seen by locals as both procedurally and distributively unjust, contributing to its weak legitimacy and ultimate decline (Fisher et al., 2018). The contribution of our paper to this literature is in shedding light on how justice claims play out in the negotiation of PES in authoritarian China which is characterized by a strict administrative hierarchy and the prevalence of informal negotiation platforms and rules.

PES with Chinese characteristics

Eco-compensation mechanisms are now widely used in China. PES schemes were first proposed and applied in forestry and soon expanded to other areas including water, land, mineral resources, and biodiversity (Sheng et al., 2020). Over the years, scholars began to use the term ‘eco-compensation’ interchangeably with PES when describing these projects, even though eco-compensation is conceptually broader than PES. Eco-compensation includes both the PES-like direct and voluntary payment between the buyer and provider as defined by Wunder (2007), as well as the command-and-control measures coordinated by upper-level governments in the Chinese context, for example, the Paddy Land to Dry Land (PLDL) and the Jiulong River Eco-compensation Programs (Feng et al., 2018). Market-based programs such as the agreement among enterprises along Lake Tai as well as water rights trading between Dongyang and Yiwu city in Zhejiang province were both directly and voluntarily initiated by the buyer and seller without intermediaries (Dai, 2014).

Both the design and implementation of eco-compensation agreements in China are heavily shaped by China’s state-led model of environmental governance. Wang et al.’s (2016) review of 17 pilot watershed eco-compensation programs in China found that the buyers and sellers in these programs were unanimously local governments rather than direct service providers such as local fishermen. This is not unusual in China, where PES agreements are most often imposed by governments, rather than negotiated voluntarily between the sellers and buyers of environmental services. In many cases, compensation is not directly paid out by polluters but instead transmitted through vertical fiscal transfers from the upper- to lower-level governments or households (Kolinjivadi & Sunderland, 2012).

Previous research has highlighted adverse consequences of the state’s dominance in the design and implementation of PES in China with regard to procedural and distributive justice. In their analysis of eco-compensation projects’ poverty alleviation impacts in Guizhou, Wu and Jin (2020) found that the payment method had varied effects on household incomes, with the cash compensation type eco-compensation policy disproportionately benefiting high-income households. Having insufficiently involved farmers in the design of such policies, state planners were typically unaware of important differences in the livelihood strategies of high- and low-income farmers, leading inadvertently to distributive outcomes that widened inequality.

Chen et al.'s (2020) analysis of the Sloping Land Conversion Program found that local officials sometimes diverted funds away from their intended function of compensating local residents for the provision of ecological services. In one locality, local officials hired a local commercial tree-planting team to fulfill state-manded forest cover targets instead of paying villagers to plant trees as state planners had intended.

In recent years, China's eco-compensation mechanisms have become increasingly intertwined with two other core instruments of environmental governance: the allocation of binding environmental targets to local governments through the Target Responsibility System¹ (*mubiao zeren zhi*, TRS) (Wang, 2013) and national zoning initiatives² demarcating the country based on ecological value (Eaton & Kostka, 2018). Targets and zoning initiatives assign local governments onerous environmental responsibilities and simultaneously place limits, or outright bans, on developing industrial activities. As a result, facing increasing costs of pollution treatment and limited revenue streams, local governments where industrial activities are banned are now increasingly motivated to raise revenues through trading ecological services with more developed localities.

Watershed eco-compensation mechanisms in China

Eco-compensation projects are widely implemented in China's watershed management. The number of water eco-compensation projects increased from 7 in 1999 to more than 60 in 2016 (Wu et al., 2019), and more than 20 provinces had adopted at least one watershed eco-compensation agreement by 2016 (Wang et al., 2016). While most watershed eco-compensation projects have some PES characteristics, there are also salient differences. First, the parties to these agreements are typically two or more governments. Affected stakeholders, such as farmers, are not directly paid by the beneficiaries (Moore, 2018). Second, most interjurisdictional agreements are signed by peer localities within the same jurisdiction and coordinated by the upper-level government rather than through proactive initiation by the localities (Jiang et al., 2020). Third, many agreements include a two-way payment scheme—the upstream locality has to pay the downstream locality a certain amount of money if it fails to meet the previously agreed targets. Thus, as opposed to the standard practice of beneficiaries making direct payments to eco-service providers, China has incorporated both the principles of 'polluter pays' and 'beneficiary compensates' in watershed eco-compensation (Bennett, 2009; Wunder, 2007). Fourth, non-state stakeholders are typically marginalized in the design and implementation of eco-compensation projects (Chen et al., 2020).

Despite a growing body of research on PES in China, very few studies have closely examined the negotiation politics and perceptions of justice underlying these agreements. Research on the negotiation of agreements has focused mainly on how China's competitive interjurisdictional relationship discourages cooperation, making negotiations politically fraught (Moore, 2018). Even when localities are incentivized to cooperate, the lack of a coordination mechanism between localities creates an informal and *ad hoc* style negotiation environment by inviting the intervention of upper-level government. This *ad hoc* negotiation style is common to any type of interjurisdictional coordination in China (Moore, 2018). In such negotiations, stakeholders' bargaining positions are heavily influenced by political connections with intermediaries.³ Examples include the Daliushu Dam dispute between Gansu and Ningxia province, during which both provinces claimed to 'have important elements of the central government on their side' (Moore, 2014, p. 770), and the Guangzhou-Zhuhai railway bargaining when localities attempted to win the support of the Ministry of Railway (Xu & Yeh, 2013). Winning the favor of Beijing in such negotiations may be advantageous for the favored side in terms of a) having the bigger say in shaping the agreement (procedural justice); and, b) extracting an advantageous share of costs and benefits (distributive justice). Yet, as our research suggests, there are pronounced downsides to this style of negotiation: agreements that tip too heavily in one direction have weak legitimacy and, consequently, slim prospects of success in the long run.

Case study: the Xin'anjiang eco-compensation program

The Xin'anjiang River program is a fitting case for investigating the role of distributive and procedural justice in PES negotiations in China. This was the first interprovincial eco-compensation agreement in China,

originally signed in September 2012 between Anhui and Zhejiang provinces and implemented by the governments of Huangshan (Anhui) and Hangzhou (Zhejiang) prefectures. The first round of cooperation took place between 2012 and 2014 and the agreement was renewed for an additional two three-year rounds after 2014. It continues to be in effect at the time of writing in mid-2021.

The Xin'anjiang River traverses two prefectures in two provinces. The river's source is located in Huangshan prefecture (Anhui) and its estuary is in Hangzhou prefecture (Zhejiang), running a total of 383 km (Figure 1). The Xin'anjiang River basin covers an area of 11,674 km², with 54% falling under the jurisdiction of Huangshan prefecture and the remainder falling under Hangzhou prefecture (Ma & Du, 2015). The river flows into Qiandao Lake after crossing the Huangshan–Hangzhou border with 7 billion cubic meters of water, making up 68% of the lake's total volume. As one of China's cleanest bodies of water, Qiandao Lake's water quality ranks second out of the 45 major water reservoirs in the country according to the Ministry of Ecology and Environment (MEE, 2019).⁴ Consequently, providing drinking water is one of Xin'anjiang River's most important ecological functions: the river serves as the largest water source for Huangshan, and 20% of the water from Qiandao Lake flows into Hangzhou's reservoir.

Economic and environmental endowments and responsibilities

Huangshan and Hangzhou differ in terms of both economic and environmental endowments. Huangshan's most valuable assets are its ecological resources, including water resources, biodiversity, and natural scenery. The volume of water resources per capita in Huangshan is well above the provincial average (Shi, 2015). One of China's most famous mountains, Yellow Mountain, is also situated in Huangshan and attracted 64 million tourists in 2018 alone, contributing 57 billion yuan to government revenue (Huangshan Bureau of Statistics, 2019). Despite its status as a tourism hub, Huangshan is far less developed than its neighbor Hangzhou and even its peer prefectures in Anhui province. While Hangzhou has a population of 9.8 million and had an average GDP of 140,000 yuan per capita in 2018, Huangshan has only 1.4 million people and a GDP of 46,000 yuan per capita—representing less than one-third of the economy of Hangzhou. Even within Anhui province,



Figure 1. Map of the Xin'anjiang River.

Huangshan's GDP per capita ranks just seventh out of 16 prefectures. The two prefectures' industrial structures are also different. While Hangzhou also has the famous West Lake, which draws millions of tourists every year, its pillar sector is information technology and it is home to China's e-commerce giant, Alibaba (Hangzhou Bureau of Statistics, 2019).

Because of these diverse endowments, Huangshan and Hangzhou are allocated different environmental responsibilities from both the national ministries' zoning practice and the upper-level government's environmental targets. In its *National Function-Oriented Zone Plan* in 2010, the National Development and Reform Commission (NDRC) included Yellow Mountain in a development-prohibited (redline) zone. In a 2015 adjustment of China's ecological function zones, Huangshan prefecture as a whole was categorized as a national water conservation and biodiversity zone. With this new zoning designation, Huangshan now has to maintain water quality at a level between Category I and II, the highest two standards of surface water according to the MEE's *Environmental Standards on Surface Water*. To meet this target, Huangshan has deployed a series of measures, including closing pigpens, imposing a fishing ban, and adjusting local cadre evaluations to reflect the new environmental targets.

Other environmental responsibilities assigned to Huangshan by the provincial government were equally burdensome. In the 13th FYP of Anhui province, Huangshan was allocated the smallest quota for total energy consumption increase among its peer prefectures (see Table 1). It is also required to cut major pollutant emissions (i.e. COD, ammoniacal nitrogen, sulfur dioxide, and nitrogen oxide) and the reduction targets are close to prefectures that are much more polluted than Huangshan (e.g. Anqing and Lu'an). These new regulations imposed by both national and provincial authorities since 2010 had a swift and severe effect on Huangshan's industrial structure—2011 marked a turning point as the share of economic activity in the secondary sector declined immediately after Huangshan was included in the redline jurisdiction (Figure 2).

To ease Huangshan's dual anxiety of economic development and environmental improvement, Anhui province adopted a differentiated approach to evaluating the prefectural governments' performance by assigning redline jurisdictions lower targets for economic development starting in 2011. Despite these accommodations, balancing economic and environmental priorities continues to be a challenge for Huangshan. For example, while Huangshan feels less pressure on its GDP target, it has not been given preferential treatment on other key targets such as fiscal revenue, agricultural production, and private sector development. Huangshan also does not have a lower burden in terms of public service provision, which is paid out largely by local governments (Anhui Provincial Government, 2019). Yet, not only does Huangshan have relatively greater environmental responsibilities based on the FYP, but the weighting of these environmental responsibilities

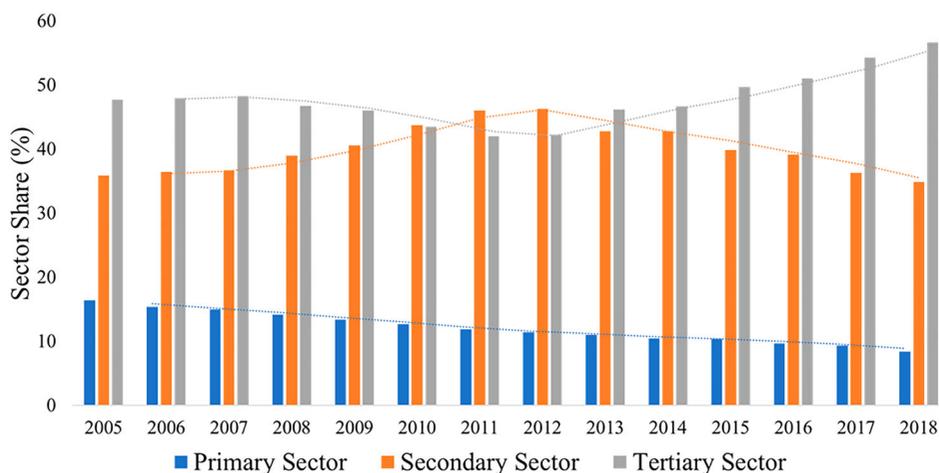


Figure 2. GDP Composition of Huangshan Prefecture (2005–2018).

Table 1. Environmental Targets in Anhui and Zhejiang (13th FYP).

		Energy Consumption Control Targets based on the Consumption Level of 2015		Emission Control Plan: Reduction based on the Pollution Level of 2015			
		Reduction in Energy Intensity per Unit of GDP (in %)	Control Target in Energy Consumption Increase (in 10,000 tons of standard coal)	COD (in %)	Ammoniacal Nitrogen (in %)	Sulphur Dioxide (in %)	Nitrogen Oxide (in %)
Anhui	Hefei	17.0	290.0	9.9	25.0	23.1	24.2
	Huaibei	16.0	87.0	9.9	20.0	17.6	16.0
	Bozhou	14.0	70.0	15.0	14.3	11.0	8.8
	Suzhou	14.0	115.0	9.9	11.0	12.1	11.0
	Bengbu	16.0	80.0	8.0	11.0	15.4	13.2
	Fuyang	14.0	155.0	15.0	14.3	11.2	14.4
	Huainan	16.0	103.0	10.0	14.3	17.9	17.6
	Chuzhou	16.0	100.0	16.0	20.0	13.2	15.4
	Lu'an	14.0	90.0	5.0	11.0	8.8	8.0
	Ma'anshan	17.0	230.0	12.0	16.0	23.1	14.2
	Wuhu	17.0	163.0	8.0	16.0	17.9	17.6
	Xuancheng	16.0	85.0	5.0	11.0	8.5	10.0
	Tongling	17.0	97.0	5.0	11.0	17.6	17.6
	Chizhou	16.0	65.0	5.0	8.0	5.0	6.0
	Anqing	16.0	110.0	5.0	11.0	16.0	14.4
Huangshan	10.0	30.0	5.0	8.0	2.0	2.0	
		Reduction in Energy Intensity per Unit of GDP (in %)	Control Target Energy in Consumption Increase (in 10,000 tons of standard coal)*	COD (in %)	Ammoniacal Nitrogen (in %)	Sulphur Dioxide (in %)	Nitrogen Oxide (in %)
Zhejiang	Hangzhou	22.0	N/A	22.4	18.1	23.0	23.0
	Ningbo	19.5	N/A	21.0	15.0	17.0	17.0
	Wenzhou	15.5	N/A	20.1	16.6	15.0	15.0
	Huzhou	18.5	N/A	16.3	16.3	23.0	23.0
	Jiaxing	18.5	N/A	22.7	23.3	21.0	21.0
	Shaoxing	19.5	N/A	23.6	22.7	22.0	22.0
	Jinhua	18.5	N/A	16.8	16.8	21.0	21.0
	Quzhou	20.5	N/A	13.4	15.6	15.0	15.0
	Zhoushan	18.5	N/A	8.8	10.6	3.0	3.0
	Taizhou	15.5	N/A	21.2	20.3	13.0	13.0
Lishui	15.5	N/A	7.8	7.9	8.0	8.0	

* Zhejiang did not include the data for control on energy consumption increase in the document.

Source: The Implementation Plan of Anhui Province for Energy Saving and Emission Reduction under the 13th FYP and The Implementation Plan of Zhejiang Province for Energy Saving and Emission Reduction under the 13th FYP.

in cadres' evaluation equation is also 25% higher than most other developed jurisdictions within Anhui (Anhui Provincial Government, 2019).

By comparison, Hangzhou has a much stronger capacity to absorb the adjustment costs associated with more stringent environmental regulations. While it also faces pressure under Beijing's push to achieve a green transformation, Hangzhou's assigned pollutant reduction target is not proportional to its economic status as the biggest economy within Zhejiang province. In Zhejiang's 13th FYP, Hangzhou's responsibilities for cutting major pollutants, such as ammoniacal nitrogen, were much lower compared to other prefectures like Jiaxing and Shaoxing, whose GDP per capita levels were much lower but with pollution levels very close to Hangzhou's. The comparison between Hangzhou and Huangshan is even more drastic (Table 2). The Hangzhou government's water quality targets were far less ambitious than those of Huangshan. In the 13th FYP, Hangzhou aimed to maintain only 87.2% of its water under the prefectural monitoring to meet the standard of Category III, compared to Huangshan's target of 100%.

Overall, Huangshan, as a state planner from Beijing commented, was under the 'tightening-crown spell' due to the combined effect of zoning rules and stricter environmental targets (Transcript BJ001). In China's command-and-control system of environmental governance, the distribution of the costs of adjustment are often borne by less-developed localities with weak capacity to both compensate stakeholders who lose their livelihoods and foster new sustainable development pathways.

Negotiations between Huangshan and Hangzhou

Conflict between Hangzhou and Huangshan over water quality stretches back two decades. The first conflict between Hangzhou and Huangshan took place in 1998 when Qiandao Lake suffered an outbreak of blue-green algae. After learning that the outbreak was caused mainly by the arrival of 80,000 migrants resettling in Huangshan prefecture, Zhejiang representatives submitted a strongly worded proposal to the annual meeting of the National People's Congress (NPC) in 1998 entitled *Proposal to Demand Anhui Province to Clean the Floating Debris in the Upstream of Qiandao Lake*.

Zhejiang was unsuccessful in pressuring Anhui to clean up for two reasons. First, Zhejiang and Anhui provinces have equal administrative status. Even with the support of national ministries, the lack of binding environmental targets at the time meant Huangshan had no political incentive to provide Hangzhou with clean water. Instead, Huangshan officials argued the responsibility should not be theirs alone due to the trans-boundary nature of the river and their own weak fiscal capacity (He, 2012). As a result, Anhui representatives appealed to the NPC in 2000 requesting that the central government take care of the pollution. Lacking the

Table 2. Huangshan and Hangzhou Prefectures' 13th FYP Environmental Targets

		Huangshan			Hangzhou		
		12th FYP Target	12th FYP Achieved	13th FYP Target	12th FYP Target	12th FYP Achieved	13th FYP Target
Water and Air Quality	Percent of category III and higher surface water under the prefectural monitoring (in %)	No Target	N/A	100.00	From 66.07 to > 75.00	85.10	> 87.20
	Percent of category III and higher surface water under the national monitoring (in %)	No Target	100.00	100.00	No Target	92.30	> 92.30
	Percent of category V surface water (in %)	No Target	N/A	0.00	From 9.67 to < 5.00	6.40	0.00
	Percent of qualified water bodies under the surface water function zone (in %)	100.00	100.00	100.00	80.00	87.00	No Target
	Percent of days of good air quality (in %)	No Target	N/A	> 90.00	From 91.57 to > 90.00	92.60	From 72.00 to > 81.00
Emission Control	COD Emission Reduction (in %)	5.30	12.67	5.00	12.60	21.75	22.40
	Ammoniacal Nitrogen Emission Reduction (in %)	6.70	14.65	8.00	13.10	17.16	18.10
	Sulphur Dioxide Emission Reduction (in %)	2.00	4.13	2.00	14.80	21.89	23.00
	Nitrogen Oxides Emission Reduction (in %)	2.00	14.46	2.00	17.30	26.53	23.00

Source: Huangshan and Hangzhou's 13th Environmental FYP.

political authority to order Anhui to treat the Xin'anjiang River, the MEE and the Ministry of Water Resources instead referred to some suggestive, rather than binding, clauses from the Environmental Protection Law and the Water Law in an effort to apply pressure on Anhui. As one official recalls, Anhui officials did not receive Beijing's advice warmly: 'We [were] not happy with their replies. [The ministries] did not solve any problems' (He, 2012). The lack of coordination mechanisms between provinces added another wrinkle to the deadlock. To resolve the conflict, the central government ultimately had to intervene informally by setting up *ad hoc* meetings between the two parties in 2001. However, even with the participation of the MEE's Vice-Minister, the mediation was largely fruitless (He, 2012).

A second reason for Huangshan's reluctance to treat the water stems from competing priorities. The early 2000s was a golden age for central China as coastal cities started investing in inland jurisdictions and Huangshan was desperate to develop its manufacturing industry (Ang, 2016). In 2003, Huangshan's manufacturing industry was so far behind that it accounted for just 2% of the total provincial production (Anhui Bureau of Statistics, 2004). At the same time that Huangshan was hungry for development-at-all-costs, Hangzhou's demand for clean water grew quickly after one of its major water sources became heavily polluted and officials were in search of additional clean water supply (Ma & Du, 2015).

Signing the first agreement (2012–2014)⁵

The introduction of binding environmental targets in the 11th FYP was a decisive turning point. This clear signal of the central government's commitment to environmental protection shifted Huangshan and Hangzhou's bargaining positions substantially. The introduction of binding COD targets in the target responsibility system changed the incentive structure and made it effectively mandatory and inevitable for Huangshan to address water pollution issues. Given the prefecture's limited financial capacity and the high costs of improving water quality, Huangshan's best options were to negotiate for additional financial resources from Hangzhou and to commodify its ecological products. At the 2006 NPC Annual Meeting, representatives from Anhui submitted a proposal and restarted lengthy negotiations with Zhejiang (See Table 3).

Distributive justice: the debated payment scheme

The two provinces expressed divergent justice claims during the negotiation. The first gap in their perceptions of justice regards the fair distribution of the cost of water treatment. Huangshan proactively reached out for an agreement with Hangzhou, primarily motivated by an understanding of distributive justice in terms of the 'beneficiaries pay' principle in PES arrangements – that is, Hangzhou should foot the bill for the clean water it enjoys as a result of anti-pollution work in Huangshan. On the other hand, Hangzhou considered its entitlement to enjoy clean water as a fair and just claim. As a provincial official from Zhejiang recounted, 'they approached us first with the eco-compensation idea. They [Anhui] just want money! Of course, we do not want to pay. We think Anhui should protect the environment. Why do we have to pay them?' (Transcript ZJ001). To push its provincial interests through, Zhejiang province started by challenging Anhui's idea of 'beneficiaries pay' by proposing a new compensation scheme that diverts part of the cost to Anhui. Zhejiang

Table 3. Sequence of Events during Negotiations for the First Agreement.

Year	Phase	Event
2005–2006	Proposal	Anhui representatives at the NPC submitted proposals demanding cooperation from Zhejiang.
2007–2008		The MEE and the Ministry of Finance approved the proposal and started working on the terms of agreement.
2009	Negotiation	Zhejiang and Anhui started first round of negotiation, coordinated by the MEE and the Ministry of Finance.
2009		Zhejiang officials visited the MEE to reaffirm their stance on water standards.
2010		The NDRC released the zoning map and Huangshan faced more constraints on development.
2010–2011		Representatives from the central government visited Zhejiang again for another round of negotiation and submitted a report to the central government.
2011		The then vice president Xi Jinping made the comment after reading the report: 'Zhejiang and Anhui should cooperate and control the pollution from the source.'
2012	Signing agreement	Anhui and Zhejiang signed the first round of agreement, lasting from 2012 to 2014.

named this method as a ‘gambling game’ (*duidu*), which combines the principles of ‘beneficiaries pay’ and ‘polluters pay’ (Lü, 2012). In Zhejiang’s proposal, if Anhui failed to meet the agreed level of water quality, Anhui would have to pay Zhejiang. However, if they did meet the goal, Zhejiang would pay.

Building on this ‘gambling game’ compensation scheme, Zhejiang strategically chose specific water quality evaluation indicators that suited its interests to make it extremely challenging for Anhui to win the bet and send Zhejiang the clean-up bill. According to China’s water quality standards, different types of water bodies are subject to different quality standards. In this case, the debate centered on whether the Xin’anjiang River should be evaluated as a lake or as a river. Lake water standards are much stricter than those applied to rivers.⁶ Most importantly, nitrogen is included in the evaluation of lakes but not rivers. While Zhejiang insisted on using lake standards to evaluate the water, Anhui argued that a river should self-evidently be held to the river standard (He, 2012). What worried Anhui particularly was that nitrogen had always been one of the Xin’anjiang River’s most pressing pollution issues, and using lake water standards with harsher stipulations on nitrogen would undoubtedly hurt Anhui’s interests. As a result, Anhui bluntly refused Zhejiang’s request during the early negotiations and complained ‘we would rather not be compensated than agree to use lake standards’ (Lü, 2012).

Procedural justice: informal negotiation brokered by the central government

The second justice matter to arise during negotiation of the first agreement derives from the two parties’ unequal distribution of connections to central state authorities. Faced with a stalemate over the compensation scheme and water assessment standards, Zhejiang appealed to the central government for help, a move that was perceived by Anhui as procedurally unfair since Zhejiang officials had better connections in Beijing. The Deputy Head of the Provincial Bureau of Ecology and Environment in Zhejiang visited the MEE immediately after the first round of negotiation to reiterate Zhejiang’s firm position on using lake standards (Lü, 2012). One of our interviewees from Anhui recalled interpreting that move as a symbol of Zhejiang’s stronger political clout within the central government: ‘Zhejiang is rich, and its GDP is so much stronger than ours. They know how to negotiate. Zhejiang has a tradition of doing business. Businesspeople are strategic and good at bargaining’ (Transcript AH029). Soon after, the central government visited Zhejiang and Anhui again and drafted a report based on this visit (Lü, 2012). There was a view among some Anhui officials that then Vice President and Politburo standing committee member Xi Jinping’s history in Zhejiang—Xi was Party secretary of Zhejiang province from 2002 to 2007 and has been China’s top leader since 2012—made the central authorities tilt in favor of Zhejiang (Transcript AH029). In this follow-up visit from central officials to resolve the impasse, Anhui officials were not even at the table. According to Lü’s (2012) analysis, Zhejiang’s proposals to include a ‘polluters pay’ principle and to evaluate nitrogen level were both agreed by the central authorities during their second visit to Zhejiang, without the participation of Anhui officials. The push for Anhui to accept a deal on unfavorable terms was even stronger when Xi voiced his concern in 2011 after reading the report from the second visit, saying: ‘Zhejiang and Anhui should cooperate and control the pollution from the source’ (Seeking Truth, 2018). Additionally, with the introduction of the zoning changes and strict environmental targets imposed on Huangshan discussed previously, Huangshan’s bargaining position was substantially weakened because they were now under pressure to improve water quality through other channels. This combination of factors, gave Zhejiang the upper hand in negotiations with Anhui.

Zhejiang’s visit to the central government and subsequent negotiations with central officials paid off. The final version of the first agreement (2012–2014) strongly reflects Zhejiang’s interests and adopts both the ‘gambling game’ compensation principle and the evaluation of nitrogen (See Table 4). Based on the ‘gambling’ principle, Zhejiang and Anhui each invested 100 million yuan per year in the fund for three years, and the central government promised an unconditional transfer of 300 million yuan each year to Anhui for environmental projects. However, Anhui would have to pay Zhejiang 100 million yuan if it failed to meet the pre-defined water standards, and vice versa. Even though adopted standards were not the lake standards that Zhejiang had originally sought, the standards that were agreed to still included nitrogen assessments, to which Anhui was strongly opposed. The evaluation used the average percentage of several pollutants—potassium permanganate index, ammonia nitrogen, total phosphorus, and total nitrogen—in the past three years as

standards. Each pollutant had a weight of 25% in the calculation of water quality. An indicator titled *P*-value was then used to calculate the pollution level. Based on the formula, if the *P*-value is larger than 1, the pollutant's intensity is higher than the basic level and Anhui would have to pay Zhejiang, and vice versa.⁷ Considering the recency of the agreement and the time necessary for water treatment to be effective, the central government also permitted a 15% fluctuation with the actual *P*-value (see Table 4).

Renewing the agreement (2015–2017 and 2018–2020)

The agreement has been renewed twice since 2015. During both rounds, Zhejiang played the ‘indicator game’ in favor of its provincial interests as the two agreements that were later signed slowly raised the standards against which the pollutant levels were measured.

Anhui's bargaining capacity constrained by environmental authoritarianism

The second and third rounds of negotiation processes were considered by Anhui as both procedurally and distributively unjust. However, this time, instead of Zhejiang's effective lobbying of the central government, it was instead the structural constraints imposed by China's environmental authoritarianism that weakened Anhui's bargaining capacity. As Figure 3 shows, from 2012 to 2017, only the total amount of nitrogen increased but the other three major pollutants—potassium permanganate, ammonia nitrogen, and total phosphorus—showed a continuous downward trend despite some fluctuations (see Figure 3). As a result, Anhui successfully kept its *P*-value below the benchmark.

Nevertheless, despite these improvements, Zhejiang was not entirely satisfied and sought to push for higher standards. It sought to make adjustments in an incremental way by altering three indicators in the formula used to calculate the *P*-value. First, it slowly raised the benchmark of pollution levels used for evaluations. While the first agreement used the average pollution level from 2008 to 2010, subsequent agreements in 2015 and 2018 used the average pollution level from the three years preceding that particular agreement. As the water quality in the Xin'anjiang River kept improving, this adjustment automatically lifted the bar of assessment and made it progressively more challenging for Anhui to meet its goals. Second, the fluctuation range of 15% allowed in the first round was soon narrowed down to 11% in the second and 10% in the third

Table 4. Xin'anjiang Eco-compensation Agreement's Funding Composition, Pollutant Weight in Assessment, Standards of Assessment, and Scheme for Payment.

		First Round (2012–2014)	Second Round (2015–2017)	Third Round (2018–2020)
Funding (yuan)	Central Government	300 million/year	400 million in 2015, 300 million in 2016, 200 million in 2017	0
	Zhejiang	100 million/year*	200 million/year**	200 million/year**
	Anhui	100 million/year	200 million/year	200 million/year
Major pollutants' weight in assessment	Potassium permanganate index	0.25	0.25	0.22
	Ammonia nitrogen	0.25	0.25	0.22
	Total phosphorus	0.25	0.25	0.28
	Total nitrogen	0.25	0.25	0.28
Assessment standards	Standard level	Average level of pollutants between 2008 and 2010	Average level of pollutants between 2012 and 2014	Average level of pollutants between 2015 and 2017
	Fluctuation range	15%	11%	10%
<i>P</i> -value standard		1*	$P \leq 0.95; 0.95 < P \leq 1; P > 1^{**}$	$P \leq 0.95; 0.95 < P \leq 1; P > 1^{**}$
<i>P</i> -value achieved		2012: 0.833 2013: 0.828 2014: 0.825	2015: 0.886 2016: 0.852 2017: 0.895	N/A

* if $P > 1$, Anhui pays Zhejiang 100 million. If $P \leq 1$, Zhejiang pays Anhui 100 million. 300 million from the central government belongs to Anhui regardless of Anhui's performance.

** if $P > 1$, Anhui pays Zhejiang 100 million. If $0.95 < P \leq 1$, Zhejiang pays Anhui 100 million. If $P \leq 0.95$, Zhejiang pays Anhui 200 million. Anhui's extra 100 million and the funding from the central government go to Anhui unconditionally.

Source: Zhejiang Provincial Bureau of Ecology and Environment Report 2019, requested in person on 3 December, 2019.

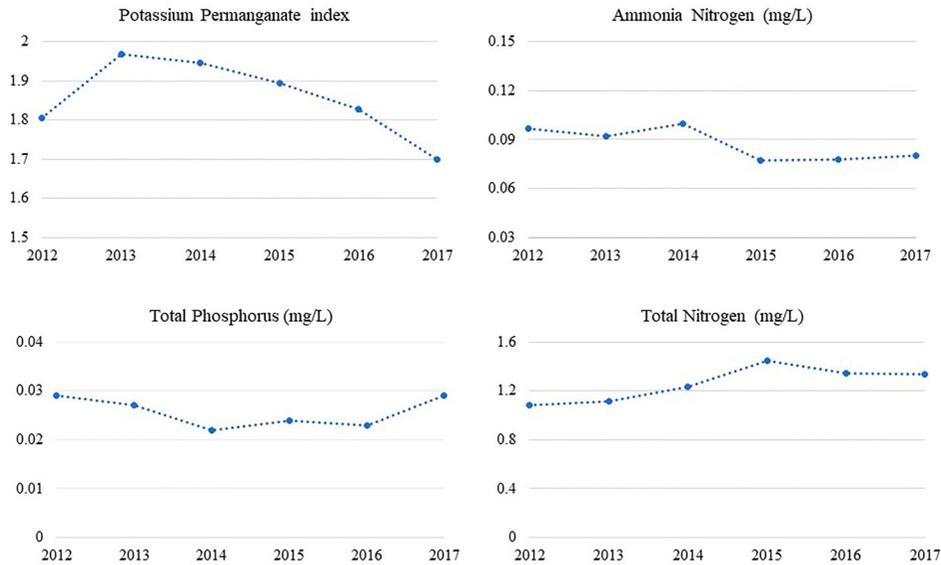


Figure 3. The Change in the Level of Pollutants in Xin'anjiang River (2012–2017).

round of the agreement. Lastly, Zhejiang pushed to raise the weight of the total amount of phosphorus and nitrogen in *P*-value calculations. As Figure 3 shows, Anhui performed worst on these two indicators: the total amount of nitrogen increased since 2014. And phosphorus, although it had generally decreased, it saw an increase again in 2017, the last year prior to the renegotiation. In the 2018 agreement, the weight of the two indicators was increased to 28%, and the potassium permanganate and ammonia nitrogen indicators were weighted lower at 22% each.

These adjustments, especially the last one, caused a lot of frustration among officials in Anhui, but their capacity to alter the terms agreement was weak in practice. Several interviewees (e.g. Transcripts AH028, AH029, and BJ003) reported to us that the provincial Party secretary of Anhui had tried to protest by not signing the agreement, hoping for a chance to rectify the standards. However, Anhui's bargaining position was weakened due to Beijing's growing focus on reversing environmental degradation. In this new context, the party pushing for higher water quality standards was seen to have right on their side. Set against the background of its high visibility as the first interprovincial eco-compensation agreement in China and President Xi's personal intervention, the Xin'anjiang agreement's political salience was high, meaning that, for the actors involved, it was too big to fail. As an interviewee from Beijing noted, the agreement was not a simple environmental matter. It was a political matter (Transcript BJ003). The interviewee even contended that the officially announced *P*-value might have been adjusted to make the agreement 'look successful' (Transcript BJ003). As a result, no matter how hard Zhejiang pushed, Anhui effectively had to sign on to whatever terms were put before them.

In addition to this political pressure, social costs were another concern that kept Anhui from retreating from a process they deemed unfair. In Anhui, the shutdown of hundreds of local enterprises and the forced 'retirement' of fishermen required further investment as Huangshan had to continue restructuring its industry; otherwise, rising unemployment could contribute to social unrest, what local officials in China fear the most (Transcript AH029). Fully understanding Anhui's dilemma, Zhejiang was confident its requests would be met and had come prepared to bargain hard. A Zhejiang official who participated in the negotiations had the following commentary:

Before we proposed to adjust the standards, several of my colleagues (all with a background in economics) did some math based on Anhui's progress after the first agreement. Based on our calculation, we were pretty sure Anhui could do much better and that we could increase the weight of total phosphorus and nitrogen to 28% each. This might be a bit challenging

for Anhui. But it is not unrealistic ... We did not propose the number 28% directly. This is the art of negotiation. ... Let me use a fictional example to explain: It was as if we first proposed a target of 90, and Anhui said no, they can only do 80. So, eventually, we both compromised and agreed on 85. That is how the bargain was struck. (Transcript ZJ001)

As such, while the eco-compensation agreement improved the water quality of the Xin'anjiang River, the nature of the negotiation process sowed deep divisions among the contracting parties and a perception of procedural injustice among Anhui stakeholders.

Unequal distribution of costs and benefits

Anhui's exclusion from the first round of negotiations and its weakened bargaining position in successive rounds resulted in the upstream locality assuming most of the financial cost of pollution abatement while Zhejiang enjoying a greater share of the benefits of clean water. From 2012 to 2019, the Xin'anjiang agreement raised a total of 4.4 billion yuan in compensation funds, with Anhui contributing 1.3 billion yuan and Zhejiang and the central government the remaining 3.1 billion (Huangshan Bureau of Finance, 2020). However, to meet its environmental targets set by the agreement, Huangshan prefecture spent a total of 14.6 billion yuan from 2012 to 2019, a staggering amount for a 'have-less' prefecture considering its total budgetary expenditure in 2018 was only 18.6 billion (Huangshan Bureau of Finance, 2020).

In its implementation of the Xin'anjiang River clean-up, Huangshan authorities launched various projects that were both costly and labor-intensive. Between 2012 and 2019, the prefecture launched 293 projects under its three-point implementation plan: (1) restructuring the prefecture's industrial structure by promoting the service industry; (2) improving the efficiency and coverage of wastewater treatment and waste recycling, and; (3) restoring the ecological environment (Huangshan Bureau of Finance, 2020; Sun, 2019). One wastewater project illustrates the challenges and great expense involved. Before 2012, wastewater from cruisers and fishing boats on the Xin'anjiang River was dumped untreated into the river. After signing the first agreement in 2012, Huangshan built several riverside wastewater treatment plants where boats could dump their wastewater and also provided free renovations for all boats and cruisers on the Xin'anjiang River, equipping them with a storage tank for wastewater and facilities to drain and channel the wastewater to treatment facilities. According to a local official in charge of the project, renovations for one boat cost around 160,000 yuan. If a boat was too old to be renovated, the local government simply offered buyouts of 150,000 yuan for boats and 20,000 yuan for personnel compensation (Transcript AH029). By 2019, a total of 20 million yuan had been spent on this renovation project alone (Transcript AH029). In many cases, township or village administrations had to bear additional expenses not covered by the compensation fund. For example, at a local recycling plant, village committee members told us they receive 50,000 yuan per year from the Xin'anjiang eco-compensation fund. But cost overruns were common. In 2018 alone, the costs amounted to 110,000 yuan, and the county and township governments had to cover the difference out of their own budgets.

The retreat of the central government from its funding role in the project in 2018 has only heightened Anhui officials' concerns about distributive and procedural justice. The financial burden of implementation borne by Huangshan has only grown in recent years, forcing officials to borrow substantial sums: by 2019, Huangshan had borrowed 5.6 billion yuan from the China National Development Bank, 689 million yuan from the Asian Development Bank, and 383 million yuan from the KfW German Development Bank (Huangshan Bureau of Ecology and Environment, 2019). And procedurally, as Anhui officials feared, with the exit of the central government, there was no intermediary to soften the demands placed by Zhejiang on its weaker neighbor. As a result, Anhui might be forced to take on even more of the costs of adjustment without a clear exit strategy. Ultimately, the agreement deepened rather than narrowed the existing developmental gap between Huangshan and Hangzhou prefectures and made Anhui feel 'trapped' and 'tricked' by the central government and Zhejiang province (Transcript AH029).

Conclusion

Based on an in-depth analysis of China's first interprovincial eco-compensation agreement, this paper sheds light on the complex and problematic negotiating processes behind this flagship initiative through the lenses of

procedural and distributive justice. The process of brokering this agreement was deeply imprinted by China's system of 'coercive' environmental authoritarianism in which command-and-control is the *modus operandi* (Li & Shapiro, 2020). Rather than a truly voluntary process in which interested parties are brought to the table with the intent of crafting an agreement acceptable to all, *ad hoc* negotiations involving interventions from national leaders left one side with a sense of having been more or less compelled to sign on. The absence of a thorough and fair process of negotiation is linked, in turn, to enduring disagreements about a fair distribution of the costs and benefits of cleaning up the river. With backing from Beijing, Zhejiang bargained hard, and effectively, for 'polluters pay' features to be written into the agreement. Anhui officials favored a 'beneficiaries pay' design, but were unsuccessful in their push to make this the eco-compensation principle. The pronounced disjuncture between the justice claims advanced by Anhui and Zhejiang and the rising disagreements between them do not bode well for the future of this agreement. Given Huangshan's mounting debt, it is unclear that the upstream locality will be able to stay in the agreement.

Our findings extend the literature on PES and environmental politics, by highlighting the importance of attending to stakeholders' justice claims in the negotiation of eco-compensation agreements. Prior research on the role of justice in PES has pointed out that incongruent justice claims between stakeholders can eventually lead to the failure of such projects. Our study examined the role that justice plays in a setting of authoritarian environmentalism characterized by overdeveloped top-down features and underdeveloped bottom-up governance mechanisms. Our results highlight the difficulties of brokering PES agreements that both parties perceive as procedurally and distributively just in such hierarchical and politicized circumstances. While this study's findings are generated from one case, its implications are far-reaching as the authoritarian conditions for PES negotiation examined in the article are omnipresent in China. Future studies should continue to examine the impact of stakeholder's justice claims on the long-term viability of PES agreements in China.

This study also lends insight into central–local and interjurisdictional relations in China. While the central government's traditional control mechanisms typically operate top-down, horizontal politics also shape PES outcomes. Our case study illustrates that the central government sometimes allies itself with local governments to assert control and ensure policy implementation in a more indirect and less costly way. By nudging agreements between local authorities in the direction it prefers, Beijing can strategically side with the party whose proposal best fits the nation's developmental goals without shouldering all of the costs. While the dramatic improvement of water quality in the Xin'anjiang River underscores how quickly environmental authoritarianism can generate results, the open question is whether these ecological gains can be sustained in the long-term given the agreement's weak legitimacy.

Notes

1. Under the TRS system, local governments are assigned environmental targets by the upper-level government. Environmental targets have slowly been gaining importance in the TRS since the 11th FYP (2006–2010) and might even outweigh economic targets in the near future (Li & Shapiro, 2020). Localities that fail to meet their environmental mandates now face severe consequences, including punishments such as 'regional investment restriction' (*qiyu xianpi*), disqualification for honors, and even a total failure of the annual evaluation if the particular target has veto power status (Kostka, 2016).
2. To resolve the long-standing dilemma between the transboundary nature of pollution and China's jurisdiction-based governance system, the National Development and Reform Commission released a zoning plan in 2010, the *National Function-Oriented Zone Plan* (henceforth, 'the Plan'). A system of four zoning categories was proposed based on economic and ecological endowments, including: development-optimized, development-prioritized, development-restricted, and development-prohibited zones. According to this plan, China's most developed regions, including the Yangtze Delta, are grouped under the development-optimized zone, and most natural reserves and parks are prohibited from developing any industrial activities. Implementation of China's zoning system has been frustrated by bureaucratic fragmentation, particularly the existence of a separate zoning plan issued by the Ministry of Ecology and Environment.
3. Connection with the upper-level government can also be crucial in creating interjurisdictional power asymmetry. For example, Habich-Sobiegalla (2018) showed that such connections help localities get more project funding over other localities, and Hillman (2014) recorded various ways patronage networks work to favor competition over resources among township and village officials.
4. MEE superseded the Ministry of Environmental Protection (MEP) in 2018. While most of the policies discussed in this paper were made by the MEP, we used MEE to reflect the institution's latest status.

5. The timeframe 2012–2014 indicates the period of the first agreement.
6. For example, according to the *Environmental Standards for Surface Water* GB 3838-2002, 0.1 mg/L total phosphorus qualifies the water as Category II river water but Category IV lake water.
7. The P -value is calculated as follows: $P = K_0 * \sum_i^4 K_i \frac{C_i}{C_{i0}}$, where K_0 is 0.85 in the first round of agreement (fluctuation range), K_i is the weight of the pollutant, C_i is the annual average intensity of the pollutant (mg/L), and C_{i0} is the standard level of the pollutant set by the agreement. In the second round, both K_0 (0.89) and C_{i0} (average pollutant level in the past three years) increased to reflect more stringent standards. Since different C_{i0} and K_0 were applied in each stage, P -values should not be compared across stages.

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References

- Ang, Y. Y. (2016). *How China escaped the poverty trap*. Cornell University Press.
- Anhui Bureau of Statistics. (2004). *Statistical yearbook of Anhui Province*.
- Anhui Provincial Government. (2019). 安徽省人民政府关于2019年各市政府目标管理绩效考核工作的通知 [Evaluation towards Prefectural Governments on Targets Management and Performance].
- Bennett, M. T. (2009). Markets for Ecosystem Services in China: An Exploration of China's Eco-Compensation and Other Market-Based Environmental Policies. *Forest Trends*.
- Chen, C., Matzdorf, B., Zhen, L., & Schröter, B. (2020, September). Social-network analysis of local governance models for China's Eco-compensation program. *Ecosystem Services*, 45, 101191. <https://doi.org/10.1016/j.ecoser.2020.101191>
- Dai, L. (2014). Exploring China's approach to implementing 'Eco-compensation' schemes: The lake Tai watershed as case study considered through a legal lens. *Water International*, 39(5), 755–773. <https://doi.org/10.1080/02508060.2014.950860>
- Dawson, N., Martin, A., & Danielsen, F. (2018). Assessing equity in protected area governance: Approaches to promote just and effective conservation. *Conservation Letters*, 11(2), e12388. doi:10.1111/conl.12388
- Eaton, S., & Kostka, G. (2018). What makes for good and bad neighbours? An emerging research agenda in the study of Chinese environmental politics. *Environmental Politics*, 27(5), 782–803. <https://doi.org/10.1080/09644016.2018.1452344>
- Feng, D., Wu, W., Liang, L., Li, L., & Zhao, G. (2018). Payments for watershed Ecosystem Services: Mechanism, progress and challenges. *Ecosystem Health and Sustainability*, 4(1), 13–28. <https://doi.org/10.1080/20964129.2018.1434318>
- Fisher, J. A., Cavanagh, C. J., Sikor, T., & Mwayafu, D. M. (2018). Linking notions of justice and project outcomes in carbon offset forestry projects: Insights from a comparative study in Uganda. *Land Use Policy*, 73, 259–268. doi:10.1016/j.landusepol.2017.12.055
- Habich-Sobiegalla, S. (2018, May). How Do central control mechanisms impact local water governance in China? The case of yunnan province. *The China Quarterly*, 234, 444–462. doi:10.1017/S0305741018000450
- Hangzhou Bureau of Statistics. (2019). *Statistical yearbook of Hangzhou Prefecture*.

- He, H. (2012). 新安江跨省生态补偿试点调查 [Investigation of the cross-provincial eco-compensation agreement on Xin'anjiang]. *Juece*, 7, 50–52. <http://dx.chinadoi.cn/10.3969/j.issn.1005-5940.2012.07.019>
- He, J., & Sikor, T. (2015). Notions of justice in payments for ecosystem services: Insights from China's sloping land conversion program in Yunnan province. *Land Use Policy*, 43, 207–216. doi:10.1016/j.landusepol.2014.11.011
- Hillman, B. (2014). *Patronage and power: Local state networks and party-state resilience in Rural China*. Stanford University Press.
- Huang, Q., & Xu, J. (2017). Scales of power in water governance in China: Examples from the Yangtze River basin. *Society and Natural Resources*, 30(4), 421–435. doi:10.1080/08941920.2016.1268657
- Huangshan Bureau of Ecology and Environment. (2019). 黄山市多措并举 — 全力推进生态文明建设示范市创建工作 [Huangshan took various measures to promote ecological civilization]. <http://sthjj.huangshan.gov.cn/stbh/stwmsfcj/8747954.html>
- Huangshan Bureau of Finance. (2020). *Weekly Financial Newsletter*, 2020(1). <http://czj.huangshan.gov.cn/ztzl/hscz/jb/8766124.html>
- Huangshan Bureau of Statistics. (2019). *Statistical yearbook of Huangshan Prefecture*.
- Jiang, X., Eaton, S., & Kostka, G. (2020). *Getting Along to Get Ahead: Interjurisdictional Relations in a New Era of Political Tournaments in China* [Paper presentation]. Annual Meeting of the American Political Science Association, San Francisco.
- Kolinjivadi, V. K., & Sunderland, T. (2012). A review of two payment schemes for watershed services from China and Vietnam: The interface of government control and PES theory. *Ecology and Society*, 17(4), <https://doi.org/10.5751/ES-05057-170410>
- Kostka, G. (2016). Command without control: The case of China's environmental target system. *Regulation and Governance*, 10(1), 58–74. doi:10.1111/rego.12082
- Kovacs, E. K., Kumar, C., Agarwal, C., Adams, W. M., Hope, R. A., & Vira, B. (2016). The politics of negotiation and implementation: A reciprocal water access agreement in the Himalayan Foothills, India. *Ecology and Society*, 21(2), <https://doi.org/10.5751/ES-08462-210237>
- Leimona, B., van Noordwijk, M., de Groot, R., & Leemans, R. (2015). Fairly efficient, efficiently fair: Lessons from designing and testing payment schemes for ecosystem services in Asia. *Ecosystem Services*, 12, 16–28. <https://doi.org/10.1016/j.ecoser.2014.12.012>
- Li, G., Wang, Q., Liu, G., Zhao, Y., Wang, Y., Peng, S., Wei, Y., & Wang, J. (2020). A successful approach of the first ecological compensation demonstration for crossing provinces of downstream and upstream in China. *Sustainability*, 12(15), 6021. <https://doi.org/10.3390/su12156021>
- Li, Y., & Shapiro, J. (2020). *China goes Green: Coercive environmentalism for a troubled planet*. John Wiley & Sons.
- Loft, L., Gehrig, S., Le, D. N., & Rommel, J. (2019). Effectiveness and equity of payments for ecosystem services: Real-effort experiments with Vietnamese land users. *Land Use Policy*, 86, 218–228. doi:10.1016/j.landusepol.2019.05.010
- Lü, M. (2012, February 19). 亿元对赌水质—中国首例跨省流域生态补偿破题 [A Gambling on Water Quality—The Breakthrough of China's First Cross-provincial Eco-compensation Agreement]. *Southern Weekly*. <https://www.infzm.com/contents/70214>
- Ma, Q., & Du, P. (2015). Evaluation on the effect of ecological compensation in Xin'an River basin. *Chinese Journal of Environmental Management*, 7(3), 63–70.
- Ministry of Ecology and Environment (MEE). (2019). National surface water quality report, 2019. https://www.mee.gov.cn/hjzl/shj/dbsszyb/index_1.shtml
- Moore, S. (2014). Hydropolitics and inter-jurisdictional relationships in China: The pursuit of localized preferences in a centralized system. *China Quarterly*, 219(6), 760–780. doi:10.1017/S0305741014000721
- Moore, S. (2018). China's domestic hydropolitics: An assessment and implications for international transboundary dynamics. *International Journal of Water Resources Development*, 34(5), 732–746. <http://doi.org/10.1080/07900627.2017.1313157>
- Pascual, U., Phelps, J., Garmendia, E., Brown, K., Corbera, E., Martin, A., Gomez-Baggethun, E., & Muradian, R. (2014). Social equity matters in payments for ecosystem services. *BioScience*, 64(11), 1027–1036. <https://doi.org/10.1093/biosci/biu146>
- Schomers, S., & Matzdorf, B. (2013). Payments for ecosystem services: A review and comparison of developing and industrialized countries. *Ecosystem Services*, 6, 16–30. <https://doi.org/10.1016/j.ecoser.2013.01.002>
- Seeking Truth. (2018). 加快建设绿色江淮美好家园 – 推进新安江流域生态补偿试点工作的理论与实践 [Build a green Home in Anhui – promote the theory and practice of Xin'anjiang eco-compensation agreement]. http://www.qsttheory.cn/dukan/qs/2018-11/30/c_1123789559.htm
- Sheng, J., Qiu, W., & Han, X. (2020). China's PES-like horizontal Eco-compensation program: Combining market-oriented mechanisms and government interventions. *Ecosystem Services*, 45(July), 101164. <https://doi.org/10.1016/j.ecoser.2020.101164>
- Shi, S. (2015). Study on the Evaluation of Green Development of the National Key Ecological Function Areas in Huangshan City [Unpublished master's thesis]. Anhui University of Finance & Economics.
- Sikor, T., Martin, A., Fisher, J., & He, J. (2014). Toward an empirical analysis of justice in ecosystem governance. *Conservation Letters*, 7(6), 524–532. doi:10.1111/conl.12142
- Sun, Y. (2019, November 9–10). Huangshan City Mayor's Opening Remarks [Presentation]. Xin'anjiang Eco-compensation Conference, Huangshan, China.
- Wang, A. L. (2013). The search for sustainable legitimacy: Environmental law and bureaucracy in China. *Harvard Environmental Law Review*, 37(2), 365–440. <https://dx.doi.org/10.2139/ssrn.2128167>

- Wang, J., Liu, G., Wen, Y., & Xie, J. (2016). To build China's ecological compensation system innovation roadmap. *Environmental Protection*, 44(10), 14–18.
- Wang, X., Xiao, H., Chen, K., & Niu, X. (2020). Why administrative leaders take Pro-environmental leadership actions: Evidence from an eco-compensation programme in China. *Environmental Policy and Governance*, 30(6), 1–14. <https://doi.org/10.1002/eet.1902>
- Wu, L., & Jin, L. (2020). How eco-compensation contribute to poverty reduction: A perspective from different income group of rural households in guizhou, China. *Journal of Cleaner Production*, 275, 122962. <https://doi.org/10.1016/j.jclepro.2020.122962>
- Wu, L., Kong, D., & Jin, L. (2019). Research on the progress of the eco-compensation mechanism in China. *Acta Ecologica Sinica*, 39(1), 1–8. <http://dx.doi.org/10.5846/stxb201808281842>.
- Wunder, S. (2007). The efficiency of payments for environmental services in tropical conservation. *Conservation Biology*, 21(1), 48–58. <https://doi.org/10.1111/j.1523-1739.2006.00559.x>
- Xu, J., & Yeh, A. G. O. (2013). Interjurisdictional cooperation through bargaining: The case of the guangzhou–zhuhai railway in the pearl River delta, china. *China Quarterly*, 213, 130–151. <https://doi.org/10.1017/S0305741013000283>