

Governing Unequally: Spatial, Discursive, and Historical Dimensions of Injustice in the 2021 Zhengzhou Flood Recovery

Xiaoyu Gu^{1,a,*}

¹University College London, London, UK

^aguxiaoyu0114@yeah.net

*Corresponding author

Abstract: The 2021 Zhengzhou flood, which brought 201.9 mm of rain in a single hour and caused 380 deaths in the city alone, generated one of the largest disaster recovery efforts in recent Chinese history. This paper offers a multidimensional justice analysis of that recovery, integrating spatial justice, environmental justice, and disaster justice frameworks to examine how governance logic, media power, and historical governance legacies together produced a recovery that was rapid and visible in some respects yet structurally unequal in others. Three core arguments are advanced. First, China's centralised, top-down governance system prioritised the swift economic restoration of Zhengzhou's urban core. The resulting resource allocation was spatially discriminatory, directing high-profile infrastructure investment, including the rapid repair of Metro Line 5 and the Jingguang North Road Tunnel, toward the metropolitan centre, while rural counties and mountainous villages, where per-capita casualties were in some cases higher, received slower and less comprehensive recovery support. This pattern reflects distributive and procedural justice failures rooted in a governance logic that equates state legitimacy with economic performance. Second, state-controlled and social media operated in productive but unequal tension. Platforms such as Weibo enabled citizen-led rescue coordination and critical counter-narratives, but the policy attention they generated was unevenly distributed: urban tragedies attracted viral coverage and swift government response, while the quieter suffering of rural communities, migrant workers, and elderly residents remained largely invisible. This constitutes a failure of recognition and discourse justice. Third, the disaster's severity was not simply a product of extreme weather but of a decades-long governance legacy. Growth-first urbanisation had eliminated natural floodplains, and institutional environmental memory was focused on Yellow River flooding rather than intense urban rainfall, leaving the city's infrastructure calibrated to historical norms that climate change had already rendered obsolete. Together, these three dimensions demonstrate that the Henan recovery was shaped by the intersection of centralised governance, unequal media power, and path-dependent historical decisions. The paper contributes to disaster justice scholarship and draws lessons for equitable governance in an era of intensifying climate risk.

Keywords: Disaster Justice, Spatial Justice, Discourse Justice, Zhengzhou Flood, Environmental Memory, Urban-Rural Inequality

1. Introduction

Between July 17 and 21, 2021, catastrophic flooding inundated Henan province, centred on its capital, Zhengzhou. The city received 624 mm of rainfall in a single day, including an unprecedented 201.9 mm in one hour on July 20, a figure that shattered all historical records. The flood submerged subway lines, trapped hundreds of vehicles in tunnels, destroyed tens of thousands of homes, and resulted in 380 deaths or disappearances in Zhengzhou alone^{[7][9]}. Direct economic losses reached 40.9 billion RMB^[27]. Described by meteorologists as a “once-in-a-thousand-years” event, the disaster exposed profound vulnerabilities in a rapidly urbanising metropolis.

Yet the disaster itself is only part of the story. As scholars of disaster studies have long argued, the recovery process is the stage at which pre-existing inequalities are most consequentially reproduced or challenged^{[3][20]}. The decisions made in the aftermath of a catastrophe, about where resources flow, whose suffering is represented, and which structural vulnerabilities are addressed, are fundamentally political choices with lasting distributional consequences.

This paper analyses the Zhengzhou flood recovery through an integrated multidimensional justice framework, drawing on spatial justice ^{[17][5]}, environmental justice ^{[2][22]}, and disaster justice ^{[21][12]}. It addresses three questions: How did governance structures and disaster policies shape resource distribution and recovery inequality? What role did media power play in forming public discourse and influencing recovery priorities? How did the legacy of past governance decisions and "environmental memory" shape both disaster preparedness and recovery outcomes? By integrating these questions, the paper argues that the inequalities produced in Henan's recovery were systematically generated by the interaction of centralised governance, unequal media power, and path-dependent historical decisions.

2. Theoretical Framework

This paper brings together three interrelated bodies of scholarship, integrated through the conceptual framework shown in Table 1. The first is spatial justice, developed most influentially by Soja (2013), which insists that space is not a neutral container for social life but a constitutive medium through which power and inequality are actively produced. Fainstein's (2016) Just City framework adds a normative register, arguing that urban planning and governance should be evaluated against principles of equity, democracy, and diversity. Applied to disaster recovery, spatial justice asks whether reconstruction resources are equitably distributed across different geographic zones, that is, urban centres and rural peripheries, and whether the processes by which those resources are allocated are transparent and inclusive.

Table 1: Conceptual Framework: Multi-Dimensional Justice Analysis of 2021 Henan Flood Recovery

STRUCTURAL FORCES	MEDIATING PROCESSES	MANIFESTATIONS OF INJUSTICE
• Urban governance logic: top-down command, stability & efficiency focus, hierarchical decision-making • Disaster policies: official frameworks guiding disaster management and recovery • Media power: state-led heroic narratives vs. citizen counter-narratives on social media • Flood-prone area distribution: pre-existing spatial risk patterns, natural geography, urban planning decisions	• Resource allocation: spatially biased distribution; urban economic infrastructure prioritised over rural livelihoods • Environmental memory & governance legacy: growth-oriented planning history; underestimated rainfall risks • Social organisation & volunteer action: bottom-up forces operating outside official systems	• Disaster resource distribution: unequal final distribution of recovery resources (Distributive Injustice) • Recovery levels & risk exposure: differential recovery speeds and future risk patterns (Procedural Injustice) • Public attention & discourse power: whose voices are heard in public discourse (Recognition Injustice)
Theoretical Foundation: Spatial Justice (Soja, 2013; Fainstein, 2016) • Environmental Justice (Walker, 2012) • Disaster Justice (Verchick, 2012; Parthasarathy, 2018) Key Causal Relationships: (1) Governance logic → policies → resource allocation bias • (2) Media power → contested discourse → recognition patterns • (3) Flood-prone distribution + legacy → risk exposure • (4) All processes interconnect to produce multi-dimensional injustice		

Source: Adapted from original author's framework. Structural forces (left) drive mediating processes (centre), producing manifestations of multi-dimensional injustice (right).

The second body of scholarship is environmental justice, grounded in Bullard's (2007) foundational work demonstrating that environmental harms are systematically concentrated in minority and economically marginalised communities through structural discrimination rather than accident. Walker (2012) expands the framework to encompass three dimensions: distributive justice (who bears environmental risks and benefits), procedural justice (whose voices shape decision-making), and recognition justice (whose experiences and identities are valued). Verchick's (2012) concept of "disaster

justice” directly extends this framework to catastrophic events, emphasising that the distribution of disaster impacts and recovery opportunities is shaped by pre-existing social, economic, and political vulnerabilities.

The third strand concerns the politics of media and discourse. Peters (1994) established that media does not merely report events but actively constructs post-disaster situations^[15]. Houston et al. (2015) documented the multifunctional role of social media across the disaster cycle (Table 2)^[10]. Of particular relevance here is the concept of discourse justice, which concerns whether all affected social groups have equal power to express, be heard, and be represented in the public sphere^{[22][4]}. In a Chinese context, the tension between state-controlled media and citizen-generated social media creates a contested discursive arena in which recognition justice is continuously at stake^[1].

Cutting across all three frameworks is the concept of governance legacy and environmental memory. Parthasarathy (2018) argues that disasters are not discrete events but manifestations of the continuity of historical governance structures. Vale and Campanella (2005) observe that post-disaster reconstruction in cities tends to rebuild original power structures rather than creating a more equitable order. These insights ground the paper’s third analytical axis.

Table 2: Functions of disaster social media (Houston et al., 2015)

Disaster Social Media Use	Disaster Phase
Provide and receive disaster preparedness information	Pre-event
Provide and receive disaster warnings	Pre-event
Signal and detect disasters	Pre-event → Event
Send and receive requests for help or assistance	Event
Inform others about one's own condition and location and learn about a disaster-affected individual's condition and location	Event
Document and learn what is happening in the disaster	Event → Post-event
Deliver and consume news coverage of the disaster	Event → Post-event
Provide and receive disaster response information; identify and list ways to assist in the disaster response	Event → Post-event
Raise and develop awareness of an event; donate and receive donations; identify and list ways to help or volunteer	Event → Post-event
Provide and receive disaster mental/behavioural health support	Event → Post-event
Express emotions, concerns, well-wishes; memorialise victims	Event → Post-event
Provide and receive information about (and discuss) disaster response, recovery, and rebuilding; tell and hear stories about the disaster	Event → Post-event
Discuss socio-political and scientific causes and implications of and responsibility for events	Post-event
(Re)connect community members	Post-event
Implement traditional crisis communication activities	Pre-event → Post-event

3. Methodology

This study adopts a qualitative, single-case study design appropriate for in-depth analysis of a complex social phenomenon in its real-world context^[24]. Data are drawn exclusively from publicly available secondary sources to enable triangulation across multiple evidence streams: the State Council’s official investigation report on the July 20 disaster; municipal and provincial government policy documents on urban planning and flood management; geospatial and socio-economic data from official statistical yearbooks; systematic review of state-controlled media (Xinhua, CCTV, People’s Daily) and social media analyses^{[13][16]}; and peer-reviewed academic literature. Analysis was conducted using thematic coding, moving from open codes through axial to selective coding, integrating findings under

three central categories: governance and resource allocation, media and discourse, and governance legacy.

4. Governance Logic, Policy, and Resource Allocation

China's disaster management system is highly centralised and hierarchical. When the Henan flood struck, a chain of escalating emergency response was activated, culminating in a State Council investigation team tasked with overseeing accountability [18]. The mobilisation of People's Liberation Army units, emergency supplies, and financial transfers from central to provincial and municipal authorities was rapid and substantial. This capacity for large-scale, fast resource mobilisation is a genuine strength of China's centralised governance architecture [26].

However, the same centralised logic that enabled rapid deployment also produced systematic spatial bias in resource distribution. The criteria governing allocation of direct economic loss, population density, political prominence structurally favoured the urban core of Zhengzhou over surrounding rural counties and mountainous villages. The most conspicuous investments were directed at repairing the metropolitan infrastructure most visible to national and international audiences. Metro Line 5 received immediate high-priority reconstruction. The Jingguang North Road Tunnel, where over 200 vehicles were submerged, underwent rapid safety review and upgrade [7][23]. These were legitimate priorities, but their prominence absorbed political attention and resources in ways that disadvantaged less visible needs.

In contrast, the reconstruction of rural roads, irrigation systems, and agricultural facilities, that is, economic lifelines of communities outside the urban core, proceeded more slowly and with less comprehensive funding [9]. The village of Wangzongdian, where 49 deaths were recorded in flash flooding, exemplifies this disparity: isolated by road damage, lacking early-warning systems, and receiving humanitarian aid with significant delay. Such rural communities had lower administrative capacity to navigate the bureaucratic processes of securing discretionary recovery funds and fewer political connections to translate into resource priority.

The exclusion of migrant workers deserves particular attention. This population lacks local hukou (household registration), leaving them outside formal disaster compensation structures. Their concentration in informal urban settlements, disproportionately located in low-lying, flood-prone areas classified as “urban villages”, combined with their absence from official recovery mechanisms, meant that some of the most severely affected people received the least support [25]. This is a concrete failure of both distributive and recognition justice.

The overall pattern replicates what Soja (2013) would recognise as core-periphery spatial relations. Recovery resources, like pre-disaster investment, followed the logic of protecting and restoring the economically and politically dominant centre while the periphery recovered more slowly and incompletely. As Fainstein (2016) argues, procedural justice requires not merely that recovery plans exist, but that affected communities participate meaningfully in their formation. The absence of formal community consultation mechanisms in China's top-down recovery architecture meant that the needs of marginalised populations were not systematically heard and resource distribution was not subject to democratic accountability.

5. Media Power and Discourse Justice

The media landscape surrounding the Henan flood was characterised by a productive but deeply unequal tension between state-controlled narratives and citizen-generated content. State media outlets, including Xinhua, CCTV, People's Daily, constructed a dominant discourse of national unity, heroism, and governmental competence. Footage of PLA soldiers rescuing trapped civilians and the “Henan, Jia You!” (Henan, Keep Going!) mobilisation framing created a narrative that emphasised collective resolve and state capability [8][16]. This served a clear political function: to reinforce state legitimacy and manage public anxiety through the projection of authority.

Social media, primarily Weibo, simultaneously enabled a very different information ecosystem. In the hours following the July 20 peak flooding, trapped residents posted their locations and distress calls directly to Weibo. Online volunteer communities aggregated and verified these calls, compiling collaborative documents on platforms like Tencent Docs and transmitting rescue information to ground teams [16]. This spontaneous, decentralised coordination was not only practically effective, it almost certainly saved lives, but also opened a discursive space through which citizen journalists provided footage and testimonies absent from state media: images from inside flooded subway cars, accounts of

inadequate government preparation, and documentation of the scale of infrastructure failure^[13].

The policy consequences of this dual media landscape were significant but unevenly distributed. The intense online attention generated by viral urban events created real accountability pressure. The subway flooding, documented in real time by passengers with smartphones, triggered a high-level investigation and rapid policy review of urban transit safety standards. The viral spread of footage from the Jingguang North Road Tunnel prompted a formal review of urban tunnel safety^[18]. In this sense, social media functioned as a check on governmental performance, but only in domains where events were visually dramatic, geographically central, and emotionally resonant with urban audiences.

The problem is that this accountability mechanism was systematically selective. Rural and mountainous communities lacked the connectivity, audiences, and visual grammar that generates virality. Farmers who lost livelihoods, villagers cut off by landslides, elderly residents in poorly drained older districts — these groups did not produce media content that drives social mobilisation, and consequently did not generate the policy pressure that translates attention into resource flows. The 49 deaths in Wangzongdian received a fraction of the sustained coverage devoted to the subway incident despite comparable human loss^[9].

The government's response to social media was not passive. State authorities monitored online public sentiment systematically to identify potential flashpoints of social unrest. This monitoring occasionally produced responsive policy adjustments but also produced strategic censorship of content deemed excessively critical^{[1][25]}. Critical posts questioning official casualty figures or the timeliness of government response were removed; narratives of citizen volunteerism were co-opted and reframed within the state's heroic narrative. Over time, the state's superior capacity to manage the information environment meant that the dominant historical memory of the disaster became the officially sanctioned version.

These dynamics constitute a failure of discourse justice in the sense Walker (2012) intends. Equal access to a platform for expression is a necessary but insufficient condition. What matters is whether structural differences in expressive capacity, institutional acceptance, and representational power among different social groups are addressed. They were not. Migrant workers, rural residents, and elderly people, precisely those whose recovery needs were greatest, remained largely invisible in the dominant discourse, and their invisibility translated directly into policy invisibility.

6. Governance Legacy and Environmental Memory

The catastrophic scale of the Zhengzhou flood was not simply an expression of the extreme rainfall's intensity. It was the product of a city whose built environment had been shaped by decades of governance decisions that systematically underestimated and underprepared for the specific hazard of intense urban rainfall. For decades, Zhengzhou's urban planning was driven by the logic of rapid economic growth. The city expanded aggressively, converting vast areas of natural floodplain and wetland into impermeable urban surfaces^[6]. This dramatically increased surface runoff, overwhelming drainage systems designed for a landscape that no longer existed. The commodification of urban space eliminated the green infrastructure that might have absorbed some fraction of the deluge^[11].

The city's historical approach to flood risk was shaped by an environmental memory focused overwhelmingly on the Yellow River. For generations, the Yellow River's propensity to breach its banks represented the dominant flood threat in the region, and the institutional and engineering response was calibrated accordingly. Massive resources were directed at dyke construction and river regulation; the prospect of catastrophic flooding from intense localised rainfall was underweighted in both official risk planning and public consciousness^[26]. This selective environmental memory was institutionally consequential: the drainage systems of Zhengzhou's subway, tunnels, and road infrastructure were designed using historical rainfall records that could not accommodate the tail-risk event that climate change had already made more likely.

The Sponge City programme, nationally launched to enhance urban water resilience, was implemented in Zhengzhou from 2016 onward. However, its scale, pace of deployment, and geographic concentration in newer urban districts meant that by 2021 it had not materially altered the city's aggregate vulnerability^[14]. Its benefits accrued primarily to areas that were already better governed and better resourced.

These governance legacies directly shaped the distribution of disaster impact. The elimination of floodplain functions meant that water had nowhere to go except into the lowest-lying areas,

disproportionately occupied by low-income residents and migrant workers in urban villages ^[25]. The recovery process, rather than correcting these legacies, largely reproduced them. Reconstruction plans were formulated by the same administrative logic that had shaped pre-disaster development, directing resources toward economically significant infrastructure. As Vale and Campanella (2005) argue, post-disaster reconstruction rarely represents a genuine institutional reset; it more commonly rebuilds the existing power structure in physical form. The rebuilding of 40,000 destroyed houses, concentrated overwhelmingly in historically marginalised communities, remained the largest and slowest element of the recovery effort ^[9].

7. Discussion

The three dimensions of analysis converge on a single structural argument. The inequalities produced in the Zhengzhou flood recovery were not random, nor were they the result of isolated administrative failures. They were systematically generated by the intersection of three mutually reinforcing forces: a centralised governance architecture whose legitimacy logic privileges visible urban recovery over equitable rural reconstruction; a media ecosystem whose accountability functions are activated selectively by virality rather than need; and a historical governance legacy that embedded differential vulnerability into the physical landscape long before the storm arrived.

Each of these forces, examined separately, offers a partial account of disaster injustice. Spatial justice analysis identifies the urban-rural resource disparity but might not explain why it persists across successive recovery cycles. Environmental justice identifies the structural roots of vulnerability but requires the institutional and media dimensions to explain how those vulnerabilities are sustained post-disaster. Discourse justice reveals whose suffering reaches the policy agenda, but without the spatial and historical dimensions, risks treating media bias as a stand-alone problem rather than a symptom of deeper governance asymmetries. The multidimensional integration proposed here is therefore not merely additive: each dimension amplifies and explains the others. The urban bias of resource allocation, for instance, is not simply a product of state preference, but reinforced by media attention that renders urban suffering more legible, which in turn is reinforced by a governance legacy in which urban infrastructure was always the political and economic priority. These dynamics form a self-sustaining cycle that single-dimensional analysis is ill-equipped to break.

A notable finding is the limited effectiveness of social media as an equalising force. The technology of bottom-up civic mobilisation was present and consequential in specific domains, particularly real-time rescue coordination. But its accountability function was captured by the logic of virality, which is correlated with urban visibility, emotional resonance, and audience scale, not with need. The communities that suffered most were precisely those least capable of generating the kind of media content that drives policy pressure. This suggests that treating social media access as a solution to discourse justice failures substantially underestimates the structural inequalities in expressive capacity that Walker (2012) identifies as the core problem. Indeed, the Weibo mobilisation of July 2021, for all its genuine heroism, illustrates a paradox: the same platform that saved lives through decentralised rescue coordination also, in its policy effects, concentrated attention on the most visible urban crisis at the expense of more dispersed rural suffering. Platform architecture and audience dynamics, not just political censorship, explain this selectivity.

The governance legacy dimension carries perhaps the most important implication for policy. The 2021 Henan flood offered a genuine window for institutional reform ^[12]: the failure of growth-first urbanisation was starkly visible, the cost of distorted environmental memory was measured in lives, and the inadequacy of existing drainage and tunnel standards was beyond dispute. Yet the recovery largely failed to capitalise on this opportunity. Instead of using reconstruction to address the structural roots of vulnerability, the recovery primarily restored what existed before, in the same spatial hierarchy of priority. This is consistent with Vale and Campanella's (2005) observation that post-disaster reconstruction tends to rebuild the existing power structure, but it is no less troubling for being expected.

The concept of environmental memory deserves further attention here, as it operates at both the institutional and the cultural level. Institutionally, the preoccupation with Yellow River management had shaped budget allocations, engineering standards, and emergency response protocols in ways that left urban drainage infrastructure deeply underprepared. But culturally, this same memory had shaped what residents and local officials considered a credible flood threat. The notion of catastrophic flooding from intense rainfall within the city — *neilao*, as the Chinese term has it — was understood as a nuisance, not an existential risk. This cultural dimension of environmental memory is not easily corrected by technical

standard revision alone; it requires a more deliberate effort to communicate changing risk landscapes to both the public and to the street-level bureaucrats who must act under time pressure in the critical hours of a disaster. Tao and Han's (2022) documentation of the blame avoidance pressures experienced by local officials during the Henan response suggests that the institutional culture around risk communication remains poorly equipped for this task^[19].

A further tension worth examining is the relationship between procedural justice and the pace of disaster response. China's centralised system is defensible on grounds of response speed, that is, the mobilisation of PLA units, the rapid transfer of emergency funds, the deployment of national resources are genuine achievements that saved lives. The trade-off is that speed and procedural justice pull in opposing directions. Meaningful community consultation, transparent allocation criteria, and participatory recovery planning all take time — time that is scarce in the immediate aftermath of a catastrophe and politically costly in a governance culture that measures success by rapid restoration of normality. This tension is not unique to China; it appears in disaster governance globally, and it has no easy resolution. What the Henan case demonstrates, however, is that consistently resolving this tension in favour of speed creates a structural bias against the groups most likely to be marginalised — those whose needs are complex, whose administrative capacity is limited, and whose voices take time to organise. A more equitable governance architecture would need to build procedural safeguards not into the emergency response phase, where speed is genuinely paramount, but into the medium-term reconstruction phase that follows, where the urgency is lower and the scope for meaningful participation is greater.

Finally, the Henan case raises a broader question about the relationship between state legitimacy and justice in disaster governance. China's government measured the success of its Henan response in terms of the speed of infrastructure restoration, the maintenance of social stability, and the projection of state competence — the metrics through which it constructs and sustains its political legitimacy. A justice-oriented assessment, by contrast, would ask different questions: Were the most vulnerable communities prioritised? Were pre-existing inequalities reduced? Did affected populations have meaningful agency in shaping their own recovery? The gap between these two evaluative frameworks is not incidental; it reflects a fundamental difference in the conception of what governance is for. As climate change makes extreme weather events more frequent and severe, the political sustainability of efficiency-first, legitimacy-focused disaster governance will face growing strain. Communities that repeatedly experience asymmetric recovery, bearing the greatest risk while receiving the slowest support, will eventually find ways to make their dissatisfaction politically consequential, as the social media pressure visible in the Henan case already foreshadows. The question is whether governance systems can adapt toward justice-orientation before that pressure forces the issue.

8. Conclusion

This paper has argued that the recovery process following the 2021 Henan flood was shaped by the structured interaction of three dimensions of injustice. Distributive and procedural injustice, rooted in centralised governance logic, produced a spatially biased allocation of resources that prioritised urban economic recovery over rural livelihoods. Discourse and recognition injustice, rooted in the unequal dynamics of state and social media, ensured that the policy agenda responded to visible urban crises while the quieter suffering of marginalised groups remained largely unaddressed. The governance legacy — decades of growth-first urbanisation combined with a Yellow River-focused environmental memory — produced the differential vulnerability that the disaster exposed and that the recovery largely failed to correct.

Three practical lessons follow. First, recovery frameworks need explicit mechanisms for directing resources proportionally to need rather than to administrative capacity, economic output, or media visibility. Second, disaster management systems need to cultivate environmental memories that incorporate the full risk landscape of a changing climate, rather than calibrating preparedness to historical experience with a single dominant hazard. Third, achieving discourse justice requires more than platform access; it requires active investment in the representational capacity of groups whose needs are most likely to be structurally invisible.

Taken together, these lessons point toward a form of disaster governance that Parthasarathy (2018) describes as justice-oriented: one in which success is measured not by the speed of infrastructure restoration or the maintenance of social order, but by the degree to which recovery reduces pre-existing inequalities. In a period of accelerating climate risk, the capacity to make that shift — from efficiency-

first to justice-first disaster governance — may prove to be one of the most consequential institutional challenges facing rapidly urbanising societies.

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