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Intersectional Justice in The Environmental Context: Exploring Surface and Ground Water Redemption in Urban Planning Adaptation with the Framework of Lucknow

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A B S T R A C T

Even if justice is stated as the main objective of the climate change plans, residents are typically addressed in a fragmented manner by conventional adaptation tactics in order to devise distinct ways by the many local governing bodies throughout the world to confront climate change. To address this, we suggest an intersectional approach to climate adaptation research and practice, which would analyse the interrelated types of social-environmental injustices that contribute to urban vulnerabilities and open the door to more comprehensive and integrated approaches to just urban transformation and adaptation. The conceptual instruments offered by intersectionality aid in clarifying and advancing environmental justice. The most populous state in India, Uttar Pradesh, contains Lucknow at its center. In recent decades, the region has seen significant and uncontrolled population increase as well as development activities, both of which have had a detrimental effect on the ecology and ecosystem.

In this paper, we point out that a socio-environmental justice approach necessitates that resource managers and decision makers take into account the ways that social norms and values that are mediated by culture affect people's daily relationships with water and water infrastructure, as well as the legacies of inclusion and exclusion in urban development and resource governance. Therefore, we suggest that in order to address historical injustices and make sure they are not sustained through GBI (Green and Blue Infrastructure), conversations about water equity in urban water management must be positioned within a socio-environmental justice framework.

Keywords: Intersectionality, Urban climate justice, Place-based adaptation, urban water governance.

1. INTRODUCTION

The effects of climate change are getting increasingly evident at the same time that inadequate mitigation of climate change policies causing more hazardous situation. While more severe effects like heat waves, droughts, and flooding have already been dealt with by cities (EEA 2020). Critics have countered that by emphasizing the resilience of economic and urban growth, historical and present urban climate adaptation (UCA) initiatives typically prioritize maintaining the socioeconomic status quo (Long 2019). By doing thus, such interventions miss the underlying causes of climate impacts and the differential sensitivity of people to them, which results in an uneven implementation of policies, programs, and infrastructure focused on mitigating climate change. Furthermore, it is acknowledged that adaptation is essentially political and that full disclosure of inevitable trade-offs is necessary to avoid procedural and distributional climate injustices.

Climate change is most acutely felt in the water sector (IPCC 2022). Water scarcity or excess is having an impact on communities along the urban-rural spectrum. Urban resource managers face a variety of challenges, including increased frequency of flooding that contaminates watersheds and damages infrastructure, prolonged droughts that reduce available water supplies, heat waves and drier soils that raise demand for water and intensify competition among various sectors for this scarce resource. Furthermore, resource managers in cities will need to provide services to a growing population in the coming years. Currently, 55% of people on the planet live in cities, and by 2050, that number is predicted to rise to 68% (DESA 2018Experts expect that in addition to political and economic considerations, climate displacement will intensify waves of internal and external migration to cities.

Since its inception in the 1970s, water equality has evolved into a guiding framework for planning and execution in the water sector, thus it serves as our starting point for this piece. Before placing the water equity framework in dialogue with the environmental justice literature that focuses on urban green space, we first provide an outline of it. Next, we present the empirical case study. We offer a comparative overview of the findings from assessments of the program that the principal author oversaw. The discussion section then places these findings within the historical framework of the programs to talk about how resource managers and their partners can integrate a socio-environmental justice framework—paying particular attention to distributive, procedural, recognition, interactional, and mobility justice—into the development of GBI (Green and Blue Infrastructure).

1.1 Methodology

Based on the suggested framework, the three goals of this literature review are as follows: (1) to examine how the three pillars of climate justice discourse emerged in relation to urban climate adaptation; (2) to look into any correlations between the climate justice discourse and the three adaptive urban form interventions (GBI); and (3) to pinpoint the scalar and spatial relationships between the three pillars of climate justice and the three urban form adaptive interventions. We modify our approach to fit the goals of this study, which combines content analysis and a systematic assessment of the literature. This combination makes it easier to analyze the majority of the available sources on a given issue in an accurate, repeatable, and impartial manner. It also makes it easier to categorize the sources' contents for systematic review and content analysis.

2. The Background of Theory

2.1 Equity in Water: An Overview

The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), two global governance organizations, link water equity to a systematic decrease in inequalities in the availability, accessibility, and quality of home water. Their agenda has a strong focus on how water resources are distributed, particularly through initiatives that aim to improve domestic water sources' pricing structures and infrastructure development (UN General Assembly 2015). Stated differently, the focus lies on the quantity and quality of household water. A similar understanding of water fairness is increasingly being included by national institutions into their policies and initiatives. For instance, the National Association of Water Companies released a policy statement on water equity in 2021 as a result of the financial fallout from the COVID-19 pandemic, highlighting the commitment of its members to advancing universal access to safe, dependable, and reasonably priced water. Outside of official institutions, social movements advocating for the human-right-to-water have worked for water equality in order to expose unequal distribution and criticize the accountable practices of the water sector. Water equity has gained global traction in light of issues such as the lack of sewage and potable water infrastructure, excessive drinking water bills, water shutoffs caused by nonpayment, and service suspensions resulting from contaminated water that disproportionately affect historically marginalized populations (Blatter 2001).

Water equity drew heavy criticism for encouraging a narrow understanding of the human right to water when it emerged as an international institutional goal. These criticisms show that a framework for water equality is more or less in line with the privatization of water and that it tends to classify people as anonymous individuals rather than historically and socially placed actors with particular connections to different waters. Additionally, this methodological individualism may encourage contempt for the various cultural norms and incommensurable values linked with water, as well as hinder society from addressing the causes of unequal water distribution and exploitation. Numerous meanings and values associated with water that are shared between and even within cultures have been recorded by scholars. The human-water relationship is made complex and multifaceted by this variability in a way that the water equity narratives frequently fail to convey.

2.2. Moving Towards Environmental Justice

Scholars have established that there are numerous ways in which they interpret environmental justice (Holifield, Chakraborty, and Walker 2018). We concentrate on the three principles of socio-environmental justice here. Distributive justice is the first premise. The placement of hazardous sites, such as incinerators and toxic dumps, near neighborhoods mostly populated by low-income minorities was highlighted in early environmental justice literature. Crucially, by paying attention to past power dynamics and their ongoing reproduction, this work linked racial and economic inequalities to uneven environmental exposure—to lead-tainted water or particle air pollution, for example. Thus, the disparate distribution of environmental dangers, or distributive justice, served as the basis for environmental justice frameworks developed by state and local environmental management agencies (Schlosberg 2007).

This concept highlights procedural justice by acknowledging that different resident groups' access to the decision-making processes that impact their local environments informs the uneven distribution of environmental dangers. There is a continuous disparity in the information and decision-making domains accessible to vulnerable populations. Cultural-political recognition and relational justice are now included in the broader understandings and implementations of environmental justice. It was first presented by Schlosberg (2004) and entails recognizing various cultural identities, particularly those that have historically been marginalized due to racism and colonial links and are often left out of project design and execution. Building on Fraser (1996, 2000), recognition justice draws attention to the behaviors and rights of marginalized groups, those subjected to regular mistreatment or denigration, and those forced into the mainstream.

Environmental justice has become a popular technique among academics and activists to study how different groups of people have different access to environmental services and facilities. The distribution and accessibility of urban green areas, such as parks, street trees, community gardens, and riparian corridors, have received a lot of attention. Research indicates that there is significant racial and socioeconomic stratification in access, along with gender and (dis)ability factors (Dai 2011). Synergistic effects result from a lack of access to urban green spaces: groups lacking access do not consistently and directly benefit from reduced noise levels, improved air quality, shade, cooler temperatures, reduced flooding, or spaces for socialization and recreation (Heynen, Perkins, and Roy 2006).

This will cover interactional and mobility justice in addition to the trifecta of distribution, procedural, and recognition justice. The concept of interactional justice highlights the importance of interpersonal interactions within a particular setting (Blatter 2001). Researchers have focused on how vulnerable

populations may perceive public places as friendly or unwelcoming depending on how they are managed and designed. Lastly, the term "mobility justice" describes the unequal prospects for obtaining resources from the development of green spaces, which would enable people and their communities to raise their socioeconomic status. This research highlights how the implementation of urban greening in line with the global sustainability goal may result in the displacement of underprivileged populations through increases in rent and taxes (Radonic, Cooper and Omans 2020)**.**

2.4 Urban climate justice in adaptation

Given the importance of cities' adaptation to climate change as primary drivers of global economic development, justice considerations in urban climate adaptation (henceforth adaptation) arise (Long and Rice, 2019). Therefore, mainstream climate policies either reinforce the political-economic patterns of privilege in distributing adapted resources or utilize adaptation as a pretext for economic development in the absence of power balance checks and political representation. These policies burden the already marginalized and disadvantaged with the costs of adaptation while exacerbating their susceptibility and exposure (to hazards). They also prevent them from enjoying the advantages of adaptation. Adaptive policies are one example of this, since they focus public services and climate-adaptive initiatives like GBIs in "exclusive enclaves" for the wealthy while denying marginalized populations access to the advantages of these interventions. A number of social justice experts, such as Fraser (2009), Young (2011), and Schlosberg (2001), contend that the absence of at least one of the three interrelated pillars of justice leads to the unfair results of adaptation efforts in response to climate change.

First is the fairness of the results is the distributive justice. Drawing upon Rawls' (1971) seminal definition of justice as the allocation of resources to maximize the welfare of the most marginalized, distributive justice has been broadened to encompass a variety of temporal, geographical, scalar, and thematic aspects. Regardless of the various socio-economic conditions, adaptable capacity, and political voice of urban communities, distributive justice in adaptation refers to the equitable spatial and temporal distribution of the material and social gains and drawbacks of adaptation responses among urban populations.

In order to balance the other two pillars of climate justice, the second recognitional justice addresses the social, political, and economic disparities that influence unfair decision-making processes and outcomes. The equitable legitimization of all racial, ethnic, gender, cultural, and social identities in the processes and results of adaptation is known as recognitional justice. This calls for the analysis of past processes that have formed and continue to produce patterns of privilege, operation, inequality, and segregation in urban areas (Chu 2019).

The fairness of the rules, procedures, and processes that control decision-making is the subject of the third is procedural justice (Adger, 2006; Romero-Lankao and Gnatz, 2019). According to Chu and Michael (2019), procedural justice in adaptation refers to the equitable inclusion of various needs, values, and interests in decision-making processes connected to climate adaptation so that many viewpoints are heard in the distribution and allocation of adaptive resources. Fair access to democratic decision-making processes, including participation, deliberation, and negotiation, among others, is the foundation of this equitable inclusion in political processes.

3. Context of Study

Uttar Pradesh's capital, Lucknow, is located 123 meters above sea level. Its coordinates are 80.30 & 81.13 East longitude and 26.30 & 27.10 North latitude. The area of Lucknow is 3,244 square kilometers. The Gomti River passes through the city. Kukrail, Loni, and Beta are a few of this river's tributaries. With over 4 million people residing in the metropolitan area, Lucknow is one of India's fastest-growing metropolitan areas. The Lucknow region has historically seen 827 mm of annual precipitation on average, with some variation in rainfall from year to year. Climate projections indicate that this region may have more days of high heat exceeding 48.8 degrees Celsius by the end of the twenty-first century, and that extreme heat events may become more intense due to the urban heat island effect. Climate models expect less frequent but more intense summer rains, with less confidence in total rainfall. These circumstances provide a significant challenge to urban administration because they force policymakers to create fair frameworks for responding to the dual effects of climate change—intense heat waves and increasingly scarce water resources.

The Gomti River used to be the primary supply of drinking water in Lucknow City, but today ground water supplies account for 70% of municipal water supplies, making ground water a major source of water for the city. This demonstrates the crucial role that groundwater has played in the urban water system, even if its supply is rapidly running out in Lucknow's changing concrete environment (GWDUP 2015).

Currently, the pre-monsoon groundwater exploitation in Lucknow exceeds the groundwater system's total recharge from rainfall and the Gomti River by almost 17 times. About 43% of families in Lucknow use both sources of water, with 71% of households receiving their water from Jal Sansthan and 72% from groundwater. 91% of multistory group housing societies and nearly 70% of Lucknow's commercial users, including hotels and restaurants, hospitals, offices, malls, and schools, rely on ground water, according to a survey of various water users. Due to the local water table dropping, at least 25% of commercial users also stated that they had to drill down nearly 100 meters into their borewells after the drilling. The majority of hotels and restaurants in the organized sector were found to have two separate water supply systems: in order to meet their water needs, they had their own borewells in addition to a connection to Jal Sansthan. Within the cantonment board, there are 61 tubewells total; 45 of these are micro tubewells with 1 HP submersible pumps. Although the frequency and duration of pump operation were unknown, the cantonment board's daily water abstraction is probably in the neighborhood of 2.4 MLD (GWDUP, Sustainable Groundwater Management in Lucknow City n.d.).

4. Discussion

We consider ways to integrate environmental justice principles into GBI policies by drawing on the evaluation of the grant and rebate programs. Here, we address facets of the interrelationship between distributional, recognition, procedural, interactional, and mobility justice independently, and provide insights into each one separately. Although our study mainly draws on environmental justice literature, it also has resonances with political ecology research since it highlights the intricate power dynamics that result in uneven urban environments.

4.1 Distributive Justice

Distributional justice demands that trends in the GBI benefit distribution be taken into consideration in order to guarantee that historically excluded people are neither overlooked nor refused access. While there is some degree of poverty throughout the entire city. The loan/grant program's establishment shows that water managers and community organizations are aware of tendencies of unequal distribution. The water provider mapped out the locations of all participating families after a few years of the rebate program, and they discovered minimal participation in neighbourhoods populated by minorities and low-income people. Stated differently, they discovered that a program financed by all utility consumers disproportionately benefited middle-class and upper-class households.

In order to improve fairness in access to public funding, a loan/grant program that provides low-income households with the financial, administrative, and educational tools needed to install rainwater harvesting systems must be established. In addition, the initiative educated households on the paperwork needed to qualify for this kind of incentive and introduced formal rainwater harvesting to a few that had never heard of it before or had no idea they could implement it on their own. Through the provision of bilingual materials (in both Hindi and English) and outreach staff, the water utility modified the program's procedural aspect in order to address distributional inequality.

4.2. Recognition Justice

In light of long-standing racism and colonial ties, recognition justice draws attention to local histories of oppression and exclusion, particularly how historically marginalized communities have been routinely left out of state project design and implementation. In Lucknow, differences in contemporary exposure to the urban heat island effect may be traced back to the history of recognized inequity. Low-income neighbourhoods are particularly susceptible to urban heat and the negative health effects of heat waves because they have historically had less funding, investment, and representation in local government. It is discovered that the city's southern side, which has more trees and is higher up, is warmer than its northern side. Furthermore, there is evidence that participants in the loan/grant program sought rainwater as a potential higher-quality water supply, indicating that water quality inequalities have a history in this section of the city and are still present in this community. Even though it occurred retroactively, we contend that this is a good place to start when it comes to recognition justice in GBI.

Recognizing and respecting the ways in which marginalized people interact with water and water infrastructure, as well as the power dynamics that underpin these relationships, should be at the heart of recognized justice in the particular instance of GBI development. This involves paying methodical attention to knowledge and behaviors related to water as well as the different ways that people value, handle, organize, and discuss water. We take inspiration for this from Boelens' (2014) ideas regarding recognizing justice in water management. We discovered that, as a group, low-income participants in Lucknow possessed situated experience about rainwater collecting, which was frequently derived from previous rainfall gathering because of unstable piped water supplies. Both residents and institutional specialists often disregarded this expertise. In India, rainwater collection is sometimes stigmatized rather than lauded as a sustainability tool because basic methods are linked to informality and a family's lower socioeconomic position. The historical informality around rainwater collecting highlights minor but significant sociocultural variations in the definition and methods of rainwater harvesting.

Apart from emphasizing equitable distribution through enhanced accessibility for low-income groups, water managers also aimed to comprehend the ways in which individuals' backgrounds and present living circumstances impacted the motivations behind GBI implementation and administration. They were looking to understand how decisions are made at the household level, not to assume or expect that all users relate to (rain)water in the same way. Policies and program resources can be created to respect and acknowledge the various ways that people engage with water and water infrastructure while adhering to institutional priorities by taking into account current practices and values. For instance, the utility was thinking about compiling a list of suggested fruit-bearing plants suitable for this region's dry climate, given that many homes used the rain to encourage the growth of fruit-bearing vegetation. Making mention to the extensive history and current diversity of rain collection techniques across Indigenous and Hispanic populations in outreach and instructional materials is another step towards recognized equity. By taking this action, it would be possible to identify local expertise among disadvantaged groups and make it easier to explain how various approaches to rainwater gathering might enhance current practices in general.

Furthermore, recognition is fundamentally still required to resolve questions of justice pertaining to citizenship and land tenure. Rebate programs typically exclude renters by purpose, favoring homeowners. The same is true for undocumented immigrants, who tend to live on the west side of the city and are cautious about formal documentation, which makes them less likely to apply for loan/grant programs or the refund. Renters and undocumented immigrants do not profit from this GBI scheme, despite the fact that they do pay the conservation charge through their water bill. Landlords have no actual need to implement this kind of infrastructure as it won't increase their rental income. If this policy takes these categories into account, it implies that landlords who rent out their houses receive some kind of incentive from the program—possibly in the form of a property tax rebate. In this approach, renters and undocumented immigrants gain from a more shaded and green neighbourhood, while landlords can save a little cash.

4.3. Procedural Justice

Fair representation and participation in environmental governance—that is, in the decision-making procedures that will determine how environmental services are distributed and accessed—are highlighted by procedural justice. In terms of GBI, this entails making efforts to guarantee that interested parties can take part in the decision-making process concerning the planning, design, location, and execution of GBI in order to prevent injustices from being perpetuated through the exclusion of historically marginalized groups.

The question of what broad participation in the design of such incentive programs would entail is brought up by the private and individualistic nature of domestic rainwater collection. In general, inclusivity issues are the same as those related to the location of GBI on public property. These include giving the public access to sufficient information, ensuring their ability to engage and be heard, and ensuring impartial decision-making processes for implementation. Furthermore, this implies that rather than "targeting" recipients to boost program participation, focus should be placed on creating the program with the needs and concerns of possible participants in mind. This suggests that outreach to underrepresented groups in conventional public engagement methods is a necessary precondition. Procedural justice is also enhanced by neighborhood association engagement, collaborations with local non-profits or activist groups, and explicit delineation of rights and responsibilities concerning project design, as has been discussed with regard to GBI implementation in public property, such as street medians and pocket parks.

Based on our study, it appears that a lack of inclusion throughout the program's initial design decision-making process contributed to the distributional injustice issues previously mentioned. The research of Gerlach (2021) supports this. Whose documentation showed that the tight-knit group of policy entrepreneurs and stakeholders that developed this program came from the shared interests and experiences of mostly middle-class neighbourhoods, and that stakeholders in low-income neighbourhoods excluded them by default. Increasing the number of employees involved in the management of the loan/grant program, reaching out to this demographic through partnerships with neighbourhood associations and nonprofits, and creating materials in Hindi to increase information availability are all positive steps in the direction of procedural justice.

5. Conclusion

We conclude by suggesting some potential lines of inquiry and practical applications in light of the expanding spectrum of climate adaptation measures. To begin with, further research might build on this approach by examining how power dynamics at different scales affect water equality in climate adaptation measures by incorporating more urban political ecology. Case studies could demonstrate how neighbourhood-level GBI and other local interventions fit into larger networks of resource exploitation, partnerships, and/or rethinking, as well as how such networks impact socio-environmental justice. Second, as municipal adaptation efforts inevitably affect and have an impact on the socio-technical components of daily living, there is a need for thorough qualitative investigations in this area. Subsequent research endeavours may persist in thoroughly examining ethnographic data in order to highlight cultural norms and values and record ecological imaginaries. Lastly, we observe that, with consideration to power dynamics and intersectionality, there is a great deal of space for methodological reflection and creativity about the function of and obstacles to community participation and co-design. This is especially critical given the growing emphasis on public participation as a means of achieving just urban adaptation and the growing blurring of boundaries between the public and private spheres caused by climate adaptation efforts.

References

Assembly, U. G., 2015. *Transforming Our World: The 2030 Agenda for Sustainable Development..* [Online] Available at: https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%

Blatter, J. I. H., 2001. *Reflections on Water: New Approaches to Transboundary Conflicts and Cooperation.* Cambridge, MA: MIT Press.

Chu, E. M. K., 2019. Recognition in urban climate justice: marginality and exclusion of migrants in Indian cities.. *Environ. Urban,* pp. 31 (1), 139–156.

Dai, D., 2011. Racial/ethnic and socioeconomic disparities in urban green space accessibility: Where to intervene?. *Landsc. Urban Plan.*

DESA, U., 2018. Revision of World Urbanization Prospects. *Population Division of the United Nations Department of Economic and Social Affairs.*

EEA, 2020. Urban adaptation in Europe: How cities and towns respond to climate change.. *European Environment Agency..*

Goldberg, M. A., 1983. *Th e housing problem : A real crisis? : A primer on housing markets,.* Vancouver: University of British Columbia Press.

GWDUP, 2015. *Lucknow City – Under Ground Water Stress,* Lucknow: Ground Water Department, U.P..

GWDUP, n.d. *Sustainable Groundwater Management in Lucknow City,* s.l.: The Energy and Resources Institute (TERI).

Heynen, N., Perkins, H. & Roy, P., 2006. The Political Ecology of Uneven Urban Green Space: The Impact of Political Economy on Race and Ethnicity in Producing Environmental Inequality in Milwaukee. *Urban Aff. Rev.*

Holifield, R., Chakraborty, J. & Walker, G., 2018. *The Routledge Handbook of Environmental Justice.* Abingdon, UK: Routledge.

IPCC, 2022. Climate Change 2022: Impacts, Adaptation, and Vulnerability. *International Panel on Climate Change; Cambridge University.*

Long, J. &. R. J. L., 2019. From sustainable urbanism to climate urbanism. *Urban Studies.*