

Chapter 19

Concluding Reflections on the Indigenous and Local Water Knowledge, Values, and Practices and Lessons Learned



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Abstract The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Global Assessment (GA) demonstrated the importance of Indigenous peoples and local communities (IPLC) to global biodiversity conservation and ecosystem management. Bridging indigenous and local knowledge systems with scientific knowledge systems is vital to enhance knowledge, practice, and ethics to move toward sustainability at multiple scales. Apart from the indigenous water knowledge, religious and spiritual value of water demonstrates the significance of water and employs its followers as caretakers of water resources. As editors, we summarize the key lessons in the final chapter drawn from the 17 chapters included in this book volume. The chapter concludes with the key learnings which emphasizes on the mainstreaming of indigenous water knowledge, values, and practices into the formal water management process.

Keywords Indigenous knowledge · Water management · Water conservation · Cultural value · Water governance · Religious value

19.1 Introduction

Discourses around the use of indigenous knowledge started five decades back in Allan's, 1965 text on standard narrative on development, population, and land pressure. Allan (1965) recognized that indigenous agricultural systems demonstrated knowledge that could positively contribute to development. In addition, a significant number of literatures unveil how local knowledge has contributed immensely to rural development (Barker, 1979; Howes, 1979; Brokensha et al., 1980; Scoones & Thompson, 1994). A common perspective shared by the scholars is the shift from centralized technically oriented solutions toward development projects that valued

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indigenous knowledge (Agrawal, 1995, p. 414). Around the 1990s, development was discussed in the context of social capital and development which encapsulated indigenous knowledge as part of mainstream development (Eyzaguirre, 2001). Furthermore, literature mentioned the acceptance of the indigenous knowledge discourse in development.

However, Briggs (2005) argued that, around the late 1990s, there were tensions between indigenous and western claims. Local knowledge rejected western science's claim to universality and its institutionalization that it can be archived and transferred. This study concurs with the view that, despite the acknowledgment of the role of indigenous knowledge in development, indigenous knowledge has failed to contribute profusely to the development discourse or mainstream despite the optimism (Sillitoe, 2010, p. 12). Briggs (2013) mentioned three thematic areas that highlight why indigenous knowledge has failed to impact and to be mainstreamed over the years.

Indigenous knowledge has been locally and geographically specific, i.e., it varies due to geographical, economic, and cultural settings. Sillitoe (2010) attributed the failure of indigenous knowledge to settings which are different; therefore, unless the communities share similar economic, geographical, and cultural settings, it may be difficult to understand the utility of some indigenous practices or processes. Briggs (2013) mentioned how the IK can inform research beyond the context and geographical location undertaken. It might be difficult to use ideas, concepts, and results derived from one specific context to the other which poses the problem of universality.

The second concern raised is how indigenous knowledge can be formally integrated with formal science to produce hybrid knowledge. Barrera-Bassols et al. (2006) carried a study on the interface between natural and social sciences. Several scholars have embarked on studies related to the integration of indigenous knowledge and formal science (Homann et al., 2008; Thomas & Twyman, 2004; Blanckaert et al., 2007; Lado, 2004; Liwenga, 2008). The challenge of incorporating the two still remains a concern (Homann et al., 2008; Liwenga, 2008) although some scholars like Lado (2004) call for intertwining the two modes of knowledge in a sustainable, realistic manner for sustainable development. Despite realistic propositions on how these binaries can integrate, there are issues of power relations between stakeholder groups and knowledge systems themselves (Briggs & Sharp, 2004). Western knowledge has been prioritized, and still there is unwillingness to use indigenous knowledge ignoring local social, cultural, and economic priorities.

The third and recent concern raised is the appropriation of indigenous knowledge into the prevailing discourse of neoliberalism (World Bank, 1998, 2007). IK is still seen as a poor relation of Western scientific knowledge. The important grounded nature of IK will be lost in trying to universalize systems which are locally and geographically specific. This runs the risk to serve the needs of capitalism and neoliberalism (Busingye & Keim, 2009; Laurie et al., 2005).

The 17 chapters included in this book (except Chaps. 1 and 19) reflect and highlight the diversity and significance of indigenous and local water knowledge and the religious and spiritual values of water to different community of people and

enlist several local and indigenous practices which are vital toward the sustenance of local and indigenous people.

19.2 Key Lessons and Takeaway from each Chapter

The first chapter presents an overview of the book highlighting the already existing knowledge, gaps, and challenges related to indigenous water knowledge, values, and practices. The chapter explains the definitions, concepts, and characteristics of indigenous knowledge and the challenges in mainstreaming the existing information into policymaking and governance.

Chapter 2 of this book discussed a detailed and critical scenario of water management and how indigenous people and knowledge are seldom included in the decision-making process. The author highlighted the dominance of technology and scientific information and tools which in turn results in a gap in translating the local knowledge into the decision-making process. In the process of discussing the hindrances in mainstreaming indigenous knowledge, the author pointed out that increasing privatization of water resources and infrastructural facilities has narrowed down the value of water to mainly economic values. This in turn masks the benefits of local indigenous system. On the other hand, indigenous water knowledge is dynamic and context-specific, but generally adopt an integrated, insightful, and harmonious perspective. The chapter emphasized on the power dynamics, political preferences, and discourses that limit the mainstreaming of indigenous water knowledge and practices into the decision-making process. Knowledge sharing and collaboration, as identified by the author, is one of the key avenues that can transform the water system by integrating indigenous knowledge and western science and technologies.

The cultural, spiritual, and religious values of water constitute an integral part of the indigenous knowledge system. The first section of this book presents the cultural, spiritual, and religious values of water and the role of these values in transforming the water use behaviors, conservation practices, and decision-making. Chapter 3 explored the symbolization of water in Hinduism, and the author profoundly explains how different rivers, especially the Ganges River, are represented in Hindu texts and scriptures. As per Hindu scriptures and mythology, water contains purifying power and has properties to wash away sins and impurities. River Ganga is synonymous to Hinduism and India. River Ganga water is indispensable when carrying out any Hindu ritual, and the water is considered to possess supreme purifying powers that cleanses not only the body but also the soul. Water is a multifaceted symbol in Hinduism. Along with earth, fire, air and ether, it is regarded as one of the *Pancha Tattva*, five primeval elements of the universe. Water as a particular element with associated characteristics and related symbolism forms the basis of the texts of the *Jyotish Shastra* (Hindu astrology) and the *Ayurveda* (ancient Hindu medicine). A myth which brings to the fore the symbolism of water as a vivifying force is recounted in the *Rig Veda*, the oldest of the Hindu scriptures. It

tells the story of the god Indra slaying the demon Vritra after a long battle and freeing the river Indus (*sapta-sindhu* in Sanskrit). Figuratively, this act is seen as representing the slaying of primal inertia and the setting flowing of the waters of life. A disjuncture is also apparent between the scriptural (*dharmashastric*) view of water and that of modern legislation. While the *dharmashastras* associate water with cleanliness and ritual purity and leave the ownership of water undefined, modern legislation views water as a resource and vests its ownership in the State. Referring to the convenience and economic benefit of the general public as its rationale, the State has increasingly expanded its role in controlling and managing this national resource. Associating water with physical health, it simultaneously disassociates water from ritual purity. The orientations of the *dharmashastras* and modern legislation pertaining to the role of water are based on quite different value premises.

Culture, including religion, clearly influences how people perceive and manage a resource such as water. Although this aspect was often neglected in development projects in the past, development agencies increasingly acknowledge the importance of local culture and values in their policies. In Chaps. 4 and 6, authors examined the relation between Islam and water. The chapter is highly interesting and significant as it provided a detailed explanation of how water is valued among Muslim people directed by their holy sayings and book. In Islam, two main Sharia ideas define water rights: “shafa,” which provides the most basic need of humans and animals to satisfy their thirst, and “shirb,” or the right to irrigate field. Based on geographic, social, ethical, and cultural variations, many Islamic nations interpret these two core Sharia concepts (*shafa* and *shirb*) differently as per their characteristics. The authors critically reviewed various existing literature and the holy book of Quran to interpret how water is envisioned in Islam. Water management in Islam primarily follows two concepts – *Tawhid* and *Fitra*. While *Tawhid* directs people to be responsible and use the natural resources including water sustainably, *Fitra* encourages basin- and inter-basin-level collaboration. Conservation is a fixed concept in Islamic teaching. It is a way of living that should be implemented through the Muslim’s whole life: not as an ad hoc solution to shortages nor in occasional situations. All human beings rely on water for life and good health, but, for Muslims, it enjoys special importance for its use in *wudu* (ablution, i.e., washing before prayer) and *ghusl* (bathing). A Muslim cannot hoard excess water – rather, he is obliged to allow others to benefit by it. The Prophet (pbuh) stated that among the three people Allah will ignore on the day of resurrection are “a man [who] possessed superfluous water on a way and he withheld it from the travellers.” The recognition of water as a vital resource, of which everyone has the right to a fair share, is emphasized by the following hadith, which effectively makes water a community resource to which all, rich or poor, have a right: “Muslims have common share in three things: grass (pasture), water and fire (fuel).” There is no contradiction between what Islam says about water management and the emerging international consensus on the issue. However, as highlighted in Chap. 6, several Muslim-dominated countries across the Middle East and North Africa (MENA region) face severe water stress. Lack of public participation in the water governance and in compliance to the rules and ethics established

by Islam are identified to be some of the main reasons behind increasing water stress in these regions.

Chapter 5 is an interesting attempt to explore how water is valued by Shintoism. Shintoism, primarily followed by Japanese people, is an indigenous religion of Japan. Shintoism emphasizes on maintaining a harmony between nature and human and has several gods and goddesses who act as guardians of different earthly components like fire, water, forests, mountains, children, marriage, etc. This chapter is significant as there lies a significant gap in knowing as well as understanding how Shintoism values water and how those values are practiced by the modern Japanese society through different rituals. In this chapter, the authors conduct extensive literature review and provides a detailed account of Shintoism and the various rituals followed that demonstrate the importance of water under belief. This chapter makes an important contribution to the not-so-known field of Shintoism and water and shares the knowledge to the outside world.

In Chap. 7, the author discussed the cultural value of water in India, especially in the northern hilly areas of India. The author delineated different water harvesting structures built high up in these mountainous areas which are also closely intertwined with the religious and cultural values of the population in this area. Age-old water harvesting structures like *Naula*, *Dhara*, and *Chuptaula* mainly focused on storing safe and sufficient water for household use, and many of these structures have faces of gods and/or myths attached to them that prevents exploitation or pollution of these water storage structures. The author very well explained how water is used and valued in different rituals, for instance, the tradition of *Naula Bhetna* when the newlywed bride is introduced to the *Naula* (water source) in the area. The newlywed bride must worship the *Naula* and bring water from it which is distributed in the village as an offering. Water plays an important role in this old tradition, and this practice is considered to bring happiness and prosperity in the life of the newlywed couple. The rituals, cultural practices, and myths associated with the water sources, streams, wetlands, and rivers in this part of India are presumed to imbibe the significance of water among the local people which in turn ensures the supply of clean, safe, and sufficient water for daily use.

Chapters 8–18, included in the second section of the book, include various case studies from different countries across the world like Iran, Bangladesh, Taiwan, the Philippines, Zimbabwe, Sri Lanka, and India.

To begin with, Chap. 8 authors provide an insightful account of evolution of water sources and harvesting structures in Delhi. Traditional water-holding structures like step wells were also found in New Delhi showing their usefulness in storing water for domestic use. However, with time and urbanization, advancement in water management practices was adopted, and technological interventions started to replace the age-old traditions. Yet, the water stress condition still prevails in several part of the megacity, and continuous 24x7 water supply is still a distant dream for the population. The traditional water-holding structures and the knowledge behind their construction and design of the city are under the verge of extinction. The authors emphasize to look beyond technological interventions and propose the water managers to visit the traditional water harvesting structures and

cultural landscapes across the city to understand the indigenous knowledge involved in the construction of these structures. This may help in designing more sustainable water sources across the megacity and meet the increasing water demand of the urban inhabitants. While Chap. 8 discusses about integrated urban water management (IUWM), Chap. 9 presents a case study from Iran where lake Urmia, one of the largest natural permanent hypersaline lakes in the world, shrunk down due to prolonged drought and unregulated overexploitation of water. The shrinking and drying up of the lake are primarily due to the destruction of Zagros forests and diversion of water from the lake basin to powerful agricultural land users. Unlike other indigenous communities in Iran who adopt different indigenous practices like water sharing to curb the effects of water crisis, farmers from Lake Urmia Basin have never adopted any indigenous or local practice to adapt to water-scarce conditions, mainly due to sufficient supply of water from the lake. Lack of reliance on indigenous and local practices and overexploitation of the lake ecosystem are presumed to be few of the reasons behind the drying up of lake Urmia. Hence, the chapter authors emphasize on the adoption of indigenous knowledge which are practiced in other parts of Iran like water sharing practices in the Lake Urmia Basin for long-term sustainability across multi-generational timeframes.

Indigenous peoples around the world have been governing the waters and lands within their territories since time immemorial, and indigenous water governance is closely linked to understanding water as a living entity who must be respected (Daigle, 2018; Wilson & Inkster, 2018; Yates et al., 2017). Zimbabwean communities have a long history of indigenous water governance as discussed in Chap. 10 of this volume. Traditional leaders play an important role in water management systems at the local level as they implement traditional norms, beliefs, and performances. Mythological and religious beliefs also play an important in indigenous water governance in Zimbabwe. Religious beliefs impose rules and moral codes that local people have to comply while governing water, and myths regulate access and ensure sustainable utilization of water resources. The author gives examples of taboos believed by different indigenous communities that govern the fair use of water resources. However, the author also highlights the conflict between the traditional and the formal water governance system and the reliance of local communities over traditional water governance as it is capable to address their needs and challenges. It is recognized that management of water by any one system or only by local communities is not a feasible option. An integration of formal and traditional water governance system with effective public participation can lead to sustainable water management.

Chapters 11 and 15 examined various indigenous water conservation structures and practices across the red lateritic belt of Southwest Bengal in India. This area is dominantly inhabited by different tribal communities including *Santhals*, *Munda*, *Kol*, *Sabar*, *Lohar*, etc. This belt is also frequented by droughts and chronic water stress conditions. The authors provide a detailed account of different water storage and harvesting structures like ponds, *happas*, dug wells, contour bunding, dew irrigation, etc. that provide water not only for domestic use but also for irrigation purposes. The need to integrate this traditional water conservation and harvesting

structures into village-level water management plans is identified by all the authors. Chapter 12 elucidates the local knowledge on water ecosystem services across villages located in different altitudes in Mindanao, Philippines. Traditional knowledge is place-specific which is well articulated in this chapter. Though the studied villages are in the same watershed, knowledge on water management and water ecosystem services were distinct for villages under different elevation. For instance, the lowland village inhabitants possess a unique local knowledge of water use for aquaculture production, while the upland villagers considered the river and springs to possess healing properties and that a healing bath could cure ailments. The chapter illustrates the traditional knowledge associated not only with water management but also with water ecosystem services including the biodiversity of water ecosystems. Similar to the indigenous knowledge possessed by indigenous communities of Southwest Bengal (Chaps. 11 and 15), *Munda* community from the Satkhira district of Bangladesh practice different indigenous water use and conservation practices to deal with their daily struggle with saline water around them. Authors from Chap. 13 identified several water-related issues faced by the *Munda* community and the water filtering techniques adopted by the community as they lack the access to safe drinking water. Several programs and/or approaches are adopted that aims to integrate local knowledge with formal water institution. One such initiative is the Basin School Network in Taiwan. However, the Basin School Network under study adopted a three-way cultural approach to involve grassroots communities into basin conservation. Chapter 14 authors reinforce the fact the adopting the cultural approach ensured increased participation of local communities in the conservation of waterscapes. Involving communities through various events conducted by the riverbank or involving them in various activities not only increased their awareness about the waterscapes but also imbibed a sense of ownership in them toward the maintenance of the waterscapes. The Basin School Network in Taiwan could be an example to adopt in other river basins to ensure effective grassroots involvement and maintain the water resources sustainably.

Due to the traditional roles associated with men and women in most societies, gender continues to be a significant factor in the stratification of the use and access of indigenous knowledge. Women are known to have a wide grasp of indigenous and local knowledge due to their exposure to daily activities and alongside seniors and traditional leaders, who are regarded as custodians of the knowledge system. Women are the principal users of water in a household and the main bearers of indigenous knowledge. Yet, the traditional knowledge held by women often get unnoticed and subsequently lost. In the study presented in Chap. 16, the authors attempted to conduct interviews with elderly village women in Sri Lanka and enquire their perception about the value of water and traditional knowledge they hold. Unanimously, all the elderly village women valued water as the other form of life. However, the village women agreed to the fact that with the installation of piped water supply, the indigenous knowledge held by local people are getting lost as they do not have the need to practice that knowledge. This is an ideal example showing how technological advancement makes life easier while, on the other hand, leading to the loss of traditional knowledge. This could pose serious threat to future

communities as with the loss of indigenous knowledge, they are solely dependent on technology which can fail to function in case of any uncertainty. Chapter 17 discusses the role of ponds, a common tradition water conservation practice, in livelihood development in Indian Sundarbans. Due to increased salinity intrusion in the Sundarbans area, most of the agricultural lands are unsuitable for cultivation. Pond-based farming helps to sustain livelihoods of local communities. In addition, it provides freshwater for domestic use. These traditional water harvesting structures are a sustainable alternative for the coastal communities facing frequent storm surge, increasing salinity, and looking for water sources. The final case study comes full circle back to India. In Chapter 18, the authors provide a critical account of cultural discourses and conservation practices of water in India.

19.3 Concluding Statement

Integration of indigenous water knowledge, values, and practices is increasingly considered to be inevitable in combination with formal scientific and technological advancements for a sustainable water future. Western water management regimes commonly fail to include local communities and the knowledge they possess in developing water governance systems. Through 17 case studies from South Asia, Africa, the Middle East, East Asia, and Southeast Asia, this book volume demonstrates the existing indigenous knowledge repository in the Global South of which very few people are aware of. The examples of traditional and local water practices cited in the volume show the expanse of place-specific indigenous knowledge that needs to be identified, documented, and mainstreamed in the policymaking. It is urgent for scientists, academicians, and policymakers across the world to acknowledge the significance of indigenous water knowledge and integrate them into the decision-making process irrespective of the geographical location or context. In conclusion, some of the common learnings from the 17 chapters, challenges, and research gaps are identified. In terms of shared learning, the following points briefly highlight the research outcomes and key learnings from this book volume:

- Indigenous knowledge systems are dynamically regulated systems and are context-specific, place-based, and long-tenured. Indigenous water knowledge, water values, and practices are dynamic in nature and have distinct characteristics based on the context.
- The traditional water practices are comparatively easy to implement, and local communities connect to these practices more closely than to formal water management practices. This is one of the main drawbacks behind the failure of various technology-based water management systems as local communities fail to connect to these systems.
- The key defining characteristic of indigenous and local knowledge is that it is at least constituted, and often both controlled and managed by, indigenous peoples and local communities through formal and informal institutions. Indigenous

methodologies are approaches undertaken by the knowledge holders themselves and thus firmly embedded in their worldviews, reflecting their reality, history, and lived experiences. Knowledge sharing and learning within can also strengthen indigenous institutions.

- Almost every religion and spiritual belief put utmost importance to water and have given directives on how to use and conserve water. The spiritual and religious representation of water helps to develop moral codes and ethics which the followers should follow for sustainable use and conservation of water. The religion and spiritual beliefs aware the local communities of the significance of water and its purification properties and make them aware about the judicious use of water.
- Because people connect to religious and spiritual beliefs easily, integration of these values into formal water management plans will increase their acceptability among local people and will ensure more public participation in the decision-making process.
- Traditional water harvesting and conservation structures are highly durable and resistant to changes over time. This again reinforces the need of understanding the traditional engineering designs to develop sturdy and sustainable modern water sources.
- Mainstreaming of the indigenous water knowledge in the formal water management system is the main challenge, as identified by all the authors. Over-reliance on western theory of water management has shifted the focus away from indigenous knowledge systems. Hence, the current decision-making process relies on technological interventions, scientific evidence, and engineering skills. Though these are equally essential for sustainable water management, participation of local communities and inclusion of their skills and knowledge ensure sustainable water management and governance that meets the demands of the beneficiaries equally.

References

- Agrawal, A. (1995). Dismantling the divide between indigenous and scientific knowledge. *Development and Change*, 26(3), 413–439.
- Allan, W. (1965). In R. N. Farmer, J. D. Long, & G. J. London (Eds.), *The African husbandman* (pp. 227–251). Oliver & Boyd Stolnitz.
- Barker, D. (1979). Appropriate methodology: An example using a traditional African board game to measure Farmers' attitudes and environmental images 1. *The IDS Bulletin*, 10(2), 37–40.
- Barrera-Bassols, N., Zinck, J. A., & van Ranst, E. (2006). Symbolism, knowledge and management of soil and land resources in indigenous communities: Ethnopedology at global, regional and local scales. *Catena*, 65, 118–137.
- Blanckaert, I., Vancraeynest, K., Swennen, R., Espinosa-Garcia, F., Pinero, D., & Lira-Saade, R. (2007). Non-crop resources and the role of indigenous knowledge in semi-arid production of Mexico. *Agriculture, Ecosystems and Environment*, 119, 39–48.
- Briggs, J. (2005). The use of indigenous knowledge in development: Problems and challenges. *Progress in Development Studies*, 5(2), 99–114.

- Briggs, J. (2013). Indigenous knowledge: A false dawn for development theory and practice? *Progress in Development Studies*, 13(3), 231–243.
- Briggs, J., & Sharp, J. (2004). Indigenous knowledges and development: A postcolonial caution. *Third World Quarterly*, 25(4), 661–676.
- Brokensha, D., Warren, D., & Werner, O. (Eds.). (1980). *Indigenous knowledge systems and development*. University Press of America.
- Busingye, J., & Keim, W. (2009). The political battlefield: Negotiating space to protect indigenous and traditional knowledge under capitalism. *International Social Science Journal*, 60(195), 37–54.
- Daigle, M. (2018). Resurging through Kishiichiwan: The spatial politics of indigenous water relations. *Decolonization: Indigeneity, Education and Society*, 7, 159–172.
- Eyzaguirre, P. B. (2001). Global recognition of indigenous knowledge: Is this the latest phase of 'globalization'? *Indigenous Knowledge and Development Monitor*, 9.
- Homann, S., Rischkowsky, B., & Steinbach, J. (2008). The effect of development interventions on the use of indigenous range management strategies in the Borana lowlands of Ethiopia. *Land Degradation and Development*, 19, 368–387.
- Howes, M. (1979). The uses of indigenous technical knowledge in development. *The IDS Bulletin*, 10(2), 12–23.
- Lado, C. (2004). Sustainable environmental resource utilisation: A case study of farmers' ethno-botanical knowledge and rural change in Bungoma district, Kenya. *Applied Geography*, 24, 281–302.
- Laurie, N., Andolina, R., & Radcliffe, S. (2005). Ethnodevelopment: Social movements, creating experts and professionalising indigenous knowledge in Ecuador. *Antipode*, 37(3), 470–496.
- Liwenga, E. (2008). Adaptive livelihood strategies for coping with water scarcity in the drylands of Central Tanzania. *Physics and Chemistry of the Earth*, 33, 775–779.
- Scoones, I., & Thompson, J. (Eds.). (1994). *Beyond farmer first: Rural people's knowledge, agricultural research and extension practice*. Intermediate Technology Publications.
- Sillitoe, P. (2010). Trust in development: Some implications of knowing in indigenous knowledge. *Journal of the Royal Anthropological Institute*, 16, 12–30.
- Thomas, D., & Twyman, C. (2004). Good or bad rangeland? Hybrid knowledge, science and local understandings of vegetation dynamics in the Kalahari. *Land Degradation and Development*, 15, 215–231.
- Wilson, N. J., & Inkster, J. (2018). Respecting water: indigenous water governance, ontologies, and the politics of kinship on the ground. *Environment and Planning E: Nature and Space*, 1–23. <https://doi.org/10.1177/2514848618789378>
- World Bank. (1998). *Indigenous knowledge systems in sub-Saharan Africa: An overview*. IK Notes. Retrieved 23 September, 2022, from <http://www.worldbank.org/afr/ik>
- World Bank. (2007). *World development report 2008: Agriculture for development*. Retrieved 23 September, 2022, from <http://econ.worldbank.org>
- Yates, J. S., Harris, L. M., & Wilson, N. J. (2017). Multiple ontologies of water: Politics, conflict and implications for governance. *Environment and Planning D: Society and Space*, 35, 797–815. <https://doi.org/10.1177/0263775817700395>

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