



When Urbanization Leads to Governance Beyond the State: Network of Actors Along an Urbanization Gradient in Bengaluru, India

RESEARCH ARTICLE

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ABSTRACT

The rapid growth and expansion of cities in the global South has altered the values, perceptions, actor groups and thus dominant institutional and governance structures influencing management and access of local common pool resources. In this paper, we explore how urban transformation and changes in governance have influenced interactions of actors involved in commons (lake) management, with selected cases along an rural-urban gradient in the Greater Bengaluru Metropolitan Region (GBMR). We map the actors, actively and directly involved in lake management, and the interactions between them along an interconnected series of lakes, to identify five broad types of interactions: cooperation, conflict, competition, resistance and passive acceptance. Visualising the network of actors along the gradient, we highlight that the actor networks are fragmented based on municipal boundaries. We find that there is an increase in the non-state actors as we move along the rural-urban gradient highlighting diverse forms of polycentric governance arrangement with urbanisation. We find passive acceptance and resistance as predominant forms of interactions in rural areas and cooperation in urban areas. We find that with an increase in non-state actors there has been a shift from a state of dependence to a state of engagement between communities and the state actors leading to governance beyond the state.

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1. INTRODUCTION

We are in an era of rapid urbanisation, especially in the global South, where there is an extraordinary growth of cities at an unprecedented scale (Nagendra & Unnikrishnan, 2019). Urbanisation in the global South is typically associated with rural-urban transformation involving extensive modification of land-use coupled with ecological degradation, especially of common-pool resources such as forests, lakes and wetlands which provide critical ecosystem services especially for marginalized communities (McPhearson et al., 2022; Sun et al., 2020; Garcia-Nieto et al., 2018). Urbanisation is both form and process as it includes transformation of identity, disposition, psychology, culture and lifestyle, thus altering the governance of urban commons such as lakes (Lefebvre, 2003). Urban growth often leads to alterations in the institutional landscape governing commons, not just in the city core, but also the immediate rural areas (Hutchings et al., 2022; Bryson et al., 2021). Thus, it is crucial to understand how urban development leads to changes in the actor networks governing the commons not just in the urban core but also in surrounding rural areas, especially in the case of an interconnected system such as lakes. In this paper, we aim to understand how network of actors and their interactions differ across the rural-urban gradient.

Scholarship on urban governance has seen a shift in recent years from focusing on economic effectiveness, competition and development (Recio, 2020) and the role of state governance structures to include the role of [non-state] actors beyond formal governments (Sareen & Waagsaether, 2022). That is, there is increasing recognition of the *de facto* role played by private and community actors when considering urban development and change (Krueger et al., 2022). This highlights the polycentric nature of urban governance. A polycentric governance system is defined as a system, which includes multiple overlapping decision centres with some degree of autonomy, who choose to act in ways taking others into consideration through processes of cooperation, competition, conflict and conflict resolution (Thiel et al., 2019). Decision centres or actors take each other into account through interactions leading them to communicate and adjust their use of resources to benefit the system as a whole (Mudliar & O'Brien, 2021).

In this paper, we use the case of the Greater Bengaluru Metropolitan Region (GBMR) to examine polycentric urban governance in the global South context. The metropolitan region, with an estimated population of 13.6 million in 2023 (World Population Review, 2023), now constitutes one of the five megacities of India. Urban transformation

of land cover in Bengaluru has led to the loss of freshwater lakes, which are a critical source of drinking water, fish and irrigation in the landscape, as well as important heritage sites with significant cultural value, concomitant with changes in governance arrangements (Enqvist et al., 2016; Mundoli et al., 2014; Murphy et al., 2019).

There has been an increase in citizen-led initiatives to curb this destruction and protect lakes in the region over the past several years, with a visible increase since 2005, largely concentrated in the urban core. Citizen participation especially in managing and maintaining lakes has been promoted by both citizens (bottom-up) through regular interactions and the government authorities (top-down) through decentralised governance, leading to diverse polycentric governance arrangements. Previous studies on lakes in Bangalore, have focused on changing socio-ecological systems and their impacts on ecosystem services, however the interactions between actors involved in lake management have been less explored. This is crucial, as effective polycentric governance depends upon the relationships between actors (Nagendra & Ostrom, 2014), which are based on interactions especially in areas under transformation.

Therefore, in this paper we aim to identify and map various forms of interactions among actors involved in managing lakes along a rural-urban gradient. We examine cases of lake governance across a rural-urban gradient with an objective to understand the diverse polycentric arrangements that arise due to urbanisation and presence of non-state actors, the types of interactions that arise between network of actors, and the impact on the relationship with the state – whether of dependence or of engagement – based on the interactions within the network.

2. THEORETICAL FRAMEWORK

Polycentric governance framework is best suited to understand why commons (lakes) are governed differently along a rural-urban gradient. The polycentric governance framework by Thiel & Moser, (2019) ascribes the difference in governance arrangements to three main “foundational components”. First, overarching rules, which legitimise self-organisation of actors. Second, social problem characteristics, which highlight the difference in identifying the problems based on societal perceptions and experiences which shape decision-making and finally, heterogeneity, highlighting the socio-economic characteristics, values and preferences associated with actors and groups. These three components affect the interactions between actors and thus the structure of polycentricity.

2.1 INTERACTIONS IN A POLYCENTRIC GOVERNANCE SYSTEM

As highlighted by Mudliar & O'Brien (2021) and Andersson & Ostrom (2008), actor interactions in a polycentric governance system depends on various factors such as access to resources, shared understanding or the objectives of collaboration, institutional capabilities and structures. cooperation, conflicts and competition are identified as the three main forms of interactions between actors in a polycentric governance system (Ostrom et al., 1961).

Cooperation involves multiple centres working together to advance common goals by sharing resources and funding (Mudliar & O'Brien, 2021; Koontz, 2019). Cooperation between actors is a prominent form of interaction in a polycentric system and it requires high levels of trust built on shared values, goals and interests (Innes & Booher, 2018).

Conflict is defined as disputes or disagreements between actors due to incompatibilities among two or more actors (Heikkila, 2019). Incompatibility refers to the mutually exclusive or competing interests in goals, values, or beliefs (Heikkila, 2019). Mikolajczak et al., (2022); Ocaklı et al., (2020) highlight that conflicts and incompatibilities are rooted in perceptions and local cultures, highlighting that actors may hold compatible goals, but they do not necessarily see them as congruent.

Competition, the third form of interaction is a very distinctive feature of polycentric governance, where the actors produce and provide public goods and services efficiently as well as appropriate common-pool sources (Garrick & Villamayor-Tomás, 2019). Competition might lead to duplication and overlapping services leading to the 'race to the bottom' where competitors undercut each other and compromise the quality of goods and services creating conflict (da Silveira & Richards, 2013). Competition occurs

when there is a different attitude towards the resource such as appropriation versus conservation or over channelling resources for different sectors (e.g., irrigation versus recreation versus drinking needs) (Garrick & Villamayor-Tomás, 2019).

In addition to the above three, there are other forms of interaction which are highlighted such as resistance and passive acceptance. Resistance focuses on the collective dissent towards a dominating factor and can be considered as a reaction against power (Lilja, 2022). It is important to understand which actor resists and why do they resist and what is the intention behind resistance (Johansson & Vinthagen, 2019; Chandra, 2015). Thus, we define resistance as "to endure or withstand conditions in everyday life, and to act with sufficient intention and purpose to negotiate power relations from below in order to rework them in a more favourable or emancipatory direction" (Chandra, 2015, p 565).

Acceptance refers to the position of actors as a degree to which an action is taken up. Acceptance depends on the actor characteristics such as education, socio-economic factors including economic security, social isolation, community tensions and changing values (Anderson et al., 2012); and historical, cultural, institutional, geographical and infrastructural characteristics of a community (Heiskanen et al., 2006). Acceptance is understood to imply a passive stance by the community towards an activity and does not reflect community approval or support (Anderson et al., 2012; Barben, 2010). The interactions between actors, especially in a polycentric governance system are yet to be explained or empirically analysed (Jordan et al., 2018; Mudliar & O'Brien, 2021). Thus, we map and investigate the types of interactions between state and non-state actors involved in lake management based on the typology of interactions collated from literature review in Table 1.

INTERACTION	DESCRIPTION	REFERENCE
Cooperation	Multiple actors work together pursuing a common goal which would not be achieved individually	Koontz, 2019; Ostrom, 1961
Conflict	Dispute or disagreement between actors due to incompatibility regarding rules, policies or institutions for addressing an issue of governance	Weible & Heikkila, 2017; Heikkila, 2019
Competition	Ways in which multiple actors produce, provide public goods and services efficiently and/ or appropriate CPRs, including duplication of activities and overlapping jurisdiction	Carlisle & Gruby, 2019; Garrick & Villamayor-Tomás, 2019; Koontz, 2019; Mudliar & O'Brien, 2021
Resistance	An intentional act of organised opposition as a reaction to domination by negotiating power relations from below by realising creative responses and rework relations in a more favourable or emancipatory direction	Ortner, 1995; Lilja, 2022; Chandra, 2015;
Passive Acceptance	Passive stance towards the existing conditions. This is based on socio-economic conditions and refers to relationships between individuals and organisations	Anderson et al., 2012; Wolsink, 2018; Busse & Siebert, 2018

Table 1 Typology of Interactions.

3. STUDY AREA: GREATER BENGALURU METROPOLITAN REGION (GBMR)

The metropolitan region is spread over an area of 8005 sq. km and is the fifth most populous urban agglomeration within India. The region, located in the rain shadow areas of the Deccan hills; has depended on natural and human made lakes to fulfil its water needs (Enqvist et al., 2016; Nagendra, 2016). The undulating topography of the region supports small streams which have been dammed to form a series of freshwater reservoirs or tanks (henceforth referred to as lakes) varying in size and use from provision of drinking water, fishing and irrigation, besides as spaces of social and cultural importance (Mundoli et al., 2014, 2017). The local communities dependent on the lakes were responsible for its maintenance, including repairs, desilting of lakebeds, ensuring the catchment areas were free of encroachment (Enqvist et al., 2016).

Rapid urbanisation coupled with economic reforms and growing employment opportunities has transformed the region from a quaint agrarian economy to an urban service-based economy in the last four decades. This rapid transformation, with an increase in urban population from 44.4% in 1901 to 90.9% in 2011 (Puttalingaiah et al., 2020), has severely impacted the local ecosystem (Sudhira & Nagendra, 2013). A spatial analysis of the urban dynamics between 1973–2017 has highlighted a decline in 88% of the tree cover and 79% decline in waterbodies (Ramachandra et al., 2020). The loss of water bodies and lakes is of particular concern for the region as there are no major rivers around the metropolis (Enqvist, 2017). The rate of urbanisation has posed a serious challenge to urban planners, leaving a lasting impact on lakes, which began losing its defining characteristics mainly because of blockage or destruction of water channels leading to drying of lakes which were encroached.

4. METHODOLOGY: DATA COLLECTION AND ANALYSIS

The study uses qualitative network analysis approach, applying a micro perspective, taking an insider view as the networks focuses on personal and social networks (Ahrens, 2018). Following the approach of Vij (2023), this paper does not capture, network measures such as network density, centralisation and other parameters, but contribute qualitatively and theoretically by showing how polycentricity helps in characterising management of lakes along a rural-urban gradient. We apply a qualitative case study approach to examine the interactions between actors in lake management along a rural-urban gradient to

cover diverse stages of urbanisation, providing us a spatial comparison (George & Bennett, 2005).

In this paper, we use insights from 8 lakes spread across the urban, periurban and rural areas within the region. We use a contrasting case study approach to study the interactions between the actors involved in lake management. The contrasting features of the selected lakes are described in Table 2.

Data was collected through semi-structured interviews in 2023. Purposive sampling based on the approach of attributes and relations was used to identify actors within the network (Stein et al., 2011). Following the two criteria listed in Stein et al. (2011), we focus on attributes of actors who influence (directly and indirectly) lake management. Direct influence means actors who directly use or modify the flow of water and indirect influence indicates actors such as funding agencies, researchers who do not directly influence the flow, but provide funds and information on how the lake should be managed. This was followed by the relational criteria, which focuses on actors who have regular interactions with at least one other actor regularly. Application of the above criteria establishing the network boundary led to the identification of main actors (n = 30) involved in lake management. This included government custodians (local government), community members including grazers and staff, community associations, elected representatives and local leaders, NGOs, private organisations, research and academia, and finally industrial associations.

Data was collected from the 30 main actors identified, of whom 19 in-person interviews (45 to 120 minutes) were conducted with local government officials (n = 5), elected representatives (n = 3) and local leaders (n = 1) across in rural, peri-urban and urban areas; non-governmental organisations (n = 2), community associations (n = 4) and community members (n = 4) including grazers and maintenance staff active in urban and peri-urban lakes; across urban, peri-urban and rural lakes.

We identified and interviewed government officials by visiting local government offices. It was identified that two lakes in rural areas (Lake 1 and Lake 2) are under the jurisdiction of the same local government. This was true for the two peri-urban lakes (lake 5 and Lake 6) and the urban lakes (lake 7 and lake 8) are under the jurisdiction of a single local government respectively. Thus, the number of interviews with local government officials are limited, as the officials spoke about both the lakes under their jurisdiction, during the interviews.

We identified non-governmental actors during an exploratory visit to the lakes and corroborated by a screening of media articles (social and print) to identify non-governmental organisations actively involved in managing

	GEOGRAPHIC LOCATION OF THE LAKE	STATUS OF THE LAKE	INVOLVEMENT OF LOCAL COMMUNITY	DOMINANT LIVELIHOOD OPTIONS	ECOSYSTEM SERVICES DERIVED	ACTORS INTERVIEWED¹
Lake 1	Rural	Filled with water/wastewater	No Involvement	Agriculture	Provisioning – agriculture use	Local government official (n = 1)* Elected representative (n = 1) Community members (n = 1)
Lake 2	Rural	Filled with water/wastewater	No Involvement	Agriculture	Provisioning – agriculture use	Local government official (n = 1)* Elected representative (n = 1) Community members (n = 1)
Lake 3	Rural	Inflow of wastewater is being diverted	Involved	Agriculture	Production and provisioning	Local government official (n = 1) Elected representative (n = 1) Local leaders (n = 1)
Lake 4	Peri-urban	Filled with wastewater	No Involvement	Mixed – agriculture and urban livelihoods	Production and provisioning	Local government official (n = 1) Elected representative (n = 1)
Lake 5	Peri-urban	Under rejuvenation	No Involvement	Mixed – agriculture and urban livelihoods	Production – mainly by grazers. There are no other services derived at present	Local government official (n = 1) ^x Grazers (n = 2)
Lake 6	Peri-urban	Rejuvenation process has started	Involved	Mixed – agriculture and urban livelihoods	None- as the lake is being restored	Local government official (n = 1) ^x Community association (n = 1) NGO (n = 1)
Lake 7	Urban	Rejuvenated	Involved	Urban livelihoods	Cultural and recreational	Local government official (n = 1) ^o Community association (n = 2) NGO (n = 1) ^o Community members (n = 1)
Lake 8	Urban	Rejuvenated	Involved	Urban livelihoods	Cultural and recreational	Local government official (n = 1) ^o Community association (n = 1) NGO (n = 1) ^o Community members (n = 1)

Table 2 Tables describing the contrasting features of the selected lakes in GBMR (including the actors interviewed).

urban and peri-urban lakes. In the urban lakes, the same NGO was involved in managing both the urban lakes and we gathered information about both the lakes in a single interview. Interviews with the representatives of the industrial associations in rural and peri-urban areas could not be undertaken because of their non-responsiveness.

Interviews (except government officials) were recorded and then transcribed for analysis. Qualitative interviews are used to extract information regarding the actors and their corresponding linkages with others to map the network of actors and the types of interactions between actors involved in lake management. GEPHI, an open-source network analysis and visualization software package, was used to visualise these networks of actors and their interactions across cases, as shown in Figure 1.

5. RESULTS

In this section we map and describe the types of interaction between actors across the eight lakes along the rural-urban gradient. We understand how actor interactions vary across the lakes, due to changes in the three foundational components of polycentric governance system. We first describe these foundational components before detailing the interactions between actors.

5.1 OVERARCHING RULES

Lakes in Bengaluru were managed as common pool resources and, over the years have transformed into common property resources where they are now entrusted to the state under the public trust doctrine as per the

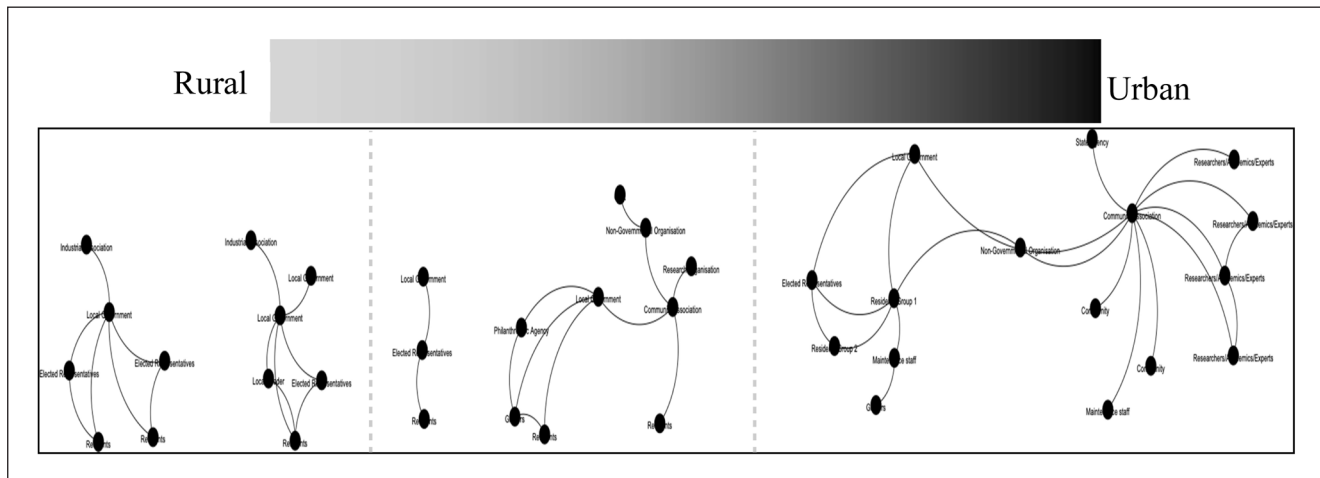


Figure 1 Networks of actors involved in lake management along a rural-urban gradient. Visualization using Gephi.

Constitution of India. These lakes were declared to be under state ownership with the passing of the Karnataka land revenues Act 1964, which declared all land not owned by anyone to become state property. Thus, commons such as lakes are now considered state property. This major land reform led to alienation of local communities, as they were no longer maintained by the local community as a common property resource governed by traditional village offices, headed and comprising community members. With this transfer of common pool resource to state actors, the authority to manage commons are shared among various government departments, with local administration (city administration in urban and Gram panchayats² in rural areas) responsible for managing them (Meinzen-Dick et al., 2021; Nagendra, 2016). In addition, several state agencies provide resources—both human and financial- and are responsible for the management of public commons, specifically lakes. For example, the minor irrigation department funds activities, such as ensuring inflow and outflow of water, while the fisheries department is responsible for auctioning fishing rights within lakes. Thus, there has been a shift in lake management from community to state management.

5.2 SOCIAL PROBLEM CHARACTERISTICS

Urban transformation in GBMR, has led to changes in ecosystem services derived from the lake by communities and thus their dependence and the values associated with the lake. The ecosystem services derived from the lakes has been listed in Table 2. The change in the ecosystem services has altered the dependence of communities on the lake, from production and provisioning services in rural areas to being considered a social space in the urban areas. This change is attributable to the changing community dependence on the lake, affecting the decision-making process.

5.3 HETEROGENEITY

There has been an increase in the number of government actors since the ownership of lakes was vested with the government in the 1960s, as highlighted in the overarching rules. In addition to the government agencies and organisation, there are local communities and residents, non-governmental, community-based organisations, and private companies who play active roles in the management of commons, such as lakes, in their neighbourhoods. This mosaic of actors and institutions, coupled with issues in differences in administrative and ecological boundaries (Nagendra & Ostrom, 2014), has created diverse values, perceptions, and knowledge among actor groups. This diversity is mainly attributed to differences in “*practices, interests, values and management structures*” (Rathwell & Peterson, 2012). Thus, highlighting heterogeneity of actors involved in lake management.

5.4 INTERACTIONS BETWEEN ACTORS

5.4.1 Rural lakes

Interactions between the network of actors for rural lakes

1 and 2: The main actors involved in lake management are the local government (LG), elected representatives (Erep), residents (Res) and the industrial association (IndAss). Two types of interactions are highlighted in this network passive acceptance and conflict (Figure 2). Conflictual interaction exists between the local government and industrial association, due to incompatibility of goals for lake management. This is highlighted during interviews with elected representatives of the gram panchayat “... several companies approach us, but they are inclined towards building Anganwadi, hospital, and school building rather than improve the lake...” Members of the local government reflected that representatives of industrial associations never attend meetings organised by the panchayat. Conflict is further enhanced by non-responsiveness of the

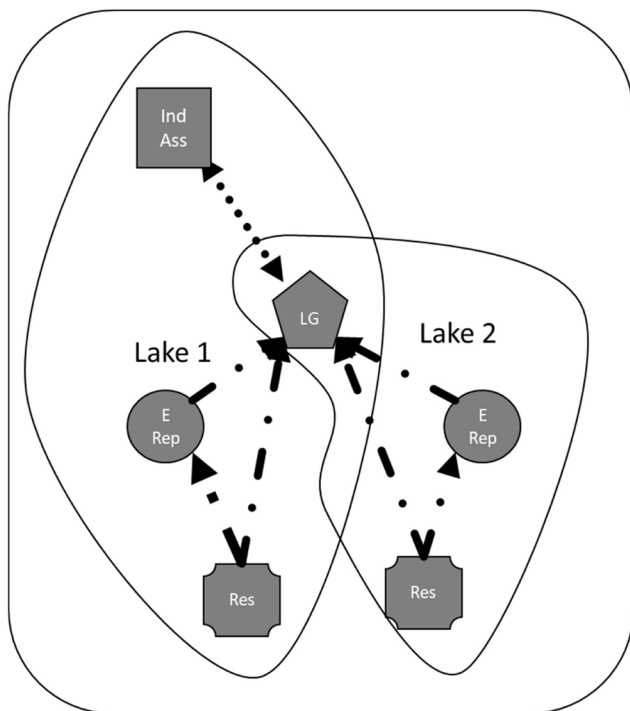


Figure 2 Network of actors for rural Lake 1 and Lake 2. The main actors involved are local government (LG), elected representatives (Erep), residents (Res) and the industrial association (IndAss).

industrial association towards the goal of local government for lake conservation.

Passive acceptance is observed between residents, elected representatives, and local government. This can be attributed to a declining dependence of the community on the lake. This is due to the inflow of upstream wastewater and the decreasing use of the lake for irrigation. This was emphasized during interviews the “inflow of wastewater from urban areas has created a feeling that the community will not be able to solve the issue of wastewater”. There has been an increase in the conversion of land from agricultural uses to residential plots because of proximity to the city, further altering community perceptions as they are alienated from the lake, leading to greater resignation among them to work towards lake management. This was indicated by an elected representative during interview that residents are “not interested in attending village meetings when discussions are on common pool resources such as lakes and water streams, but when there is a discussion on sale of land, they come in large groups.”

The interactions between the network of actors indicate that there is no shared understanding of the importance of the lake among the network of actors. The communities are dependent on the local government and in turn on industrial association for managing the lakes.

Interactions between the network of actors for rural lake 3: The main actors within this network are the local government (LG), elected representatives (ERep),

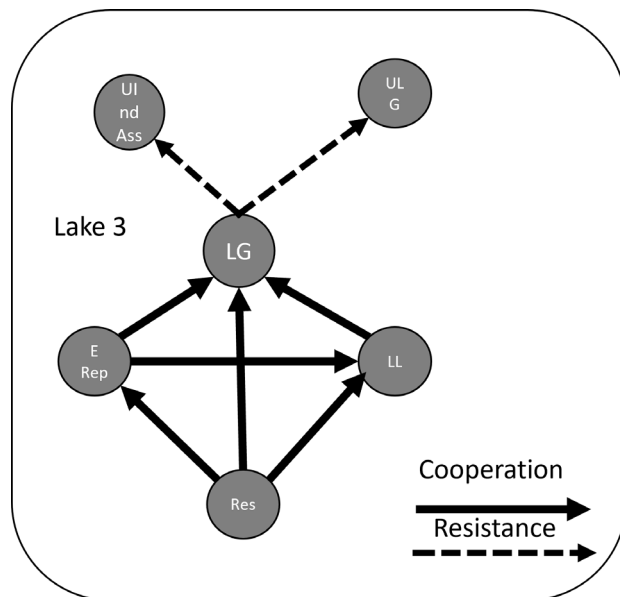


Figure 3 Network of actors for rural Lake 3. The main actors involved are local government (LG), local leaders (LL), elected representatives (Erep), Upstream local government (ULG) and Upstream industrial association (UIndAss).

community/residents (Res) and local leaders (LL) within the village. The local governments of neighbouring upstream area (ULG) and upstream industrial association (UIndAss) who are responsible release of wastewater into the channels are also considered to be part of the network (Figure 3).

The interactions between the actors within the network are diverse and differ from cooperation between community and local government to resistance between the community and upstream actors. Cooperation between actors is enabled by local leaders based on the common goal of lake conservation. The community members were concerned about the lake as they had seen the lake fall from grace, from being a social and cultural space to its present derelict condition. This was indicated during interviews by local leaders “the lake was a very beautiful space, in the last 5 years, the water turned red, the fish died, we were worried that our cattle drank this water, and the stench was unbearable...” This has motivated the community to do something about the lake. The local leaders working closely with elected representatives and other “educated members” of the community, were also able to create awareness about the ill-effects of water pollution and develop of a common goal for lake conservation leading to cooperation between the community and the elected representatives.

Resistance in the form of organised opposition is led by the local leaders against upstream actors, to stop the inflow of wastewater into the lake. The organised opposition is mainly in terms of large-scale non-violent protests and judicial recourse against upstream actors. This has led to favourable legal outcomes for conservation of the lake,

by redirecting the inflow of wastewater out of the lake. As indicated by a member of the panchayat, “... we have been protesting since last 5 years, local leaders took up the issue through our elected representatives and the matter was raised all the way to Delhi (National government).”

The interactions between the network of actors indicate that there is a shared understanding of the importance of the lake among the network of actors. This is created by the local leaders and personal experiences of the residents. This has led to actors working with local government to protect their lake. Thus, creating a space of dependence among the actors.

5.4.2 Peri-urban lakes

Interactions between actors: for the peri-urban lakes, there are two distinct networks (as seen in Figure 1).

Interactions between the network of actors for (peri-urban) lake 4: Figure 4 shows the hierarchical network of actors comprising local government (LG), elected representatives (ERep) and community/residents (Res). Cooperation is the only form of interaction we observe between the actors.

During interviews, all actors highlighted that they are satisfied with the present status of lake management, as the lake is filled with (waste)water, which is used for irrigation. Further, the members of the community also highlighted that any concerns raised with their elected representatives,

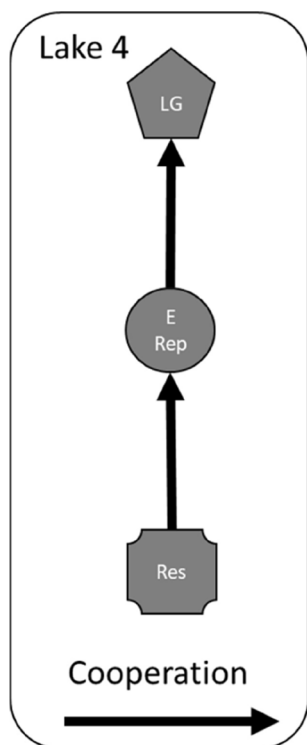


Figure 4 Network of actors for Lake 4. Main actors are local government (LG), elected representatives (ERep) and residents (Res).

are resolved immediately. Thus, highlighting a state of dependence of the community on the local government for managing the lake.

Interactions between the network of actors for (peri-urban) lakes 5 and 6: The network of actors for lakes 5 and 6, are considered as a single network as they are managed by the same local government. This network is distinct from peri-urban network 1, as there is an increase in the number of actors involved in lake management. The two lakes under this network are under different levels of lake rejuvenation: lake 5 has undergone a transformation with construction of bunds, and the lake boundary is being fenced. Rejuvenation of lake 6 is led by the local community association in cooperation with an NGO and the local government. The actor network shows that, though both the lakes fall under the jurisdiction of the same local government, the actors involved in funding and management are different (refer Figure 5).

The main actors for lake 5 are the community/residents (Res) and grazers (Gra), local government (LG), and philanthropic agency (Phil). Passive acceptance is the main form of interaction between actors, mainly residents (incl. grazers) towards the local government and the philanthropic agency undertaking lake restoration. This can be attributed to subaltern feelings among residents and grazers, that “they are people without means (financially well off), and no one listens to them and their needs”. Interviewees also emphasized that although the local community was consulted at the beginning of the process, the philanthropic agency had not kept their word of creating an inclusive space. This was reflected during the interviews with grazers, who highlighted that “...people (from the philanthropic agency) had come here, they spoke to us and said, they would provide space for our cattle to drink water and graze here, but look at the place now, there is a steep bund, how will the cattle go down this bund to drink water...”

The philanthropic agency is undertaking lake rejuvenation as the dried lakebed was used as an illegal dumping ground, and the waste dumped would be burnt by the villagers. This burning of waste affected the air quality of the surrounding area, which is home to a number of high-income gated communities. A resident of this gated community took the initiative of funding lake restoration through their personal philanthropic agency. The interaction between the philanthropic agency and the local government is that of cooperation based on resource sharing. The local government is pleased to have an external agency take on the responsibility to fund and undertake rejuvenation.

Diverse actors are involved in the management of lake 6 (Figure 5), including research organisations (RO), non-

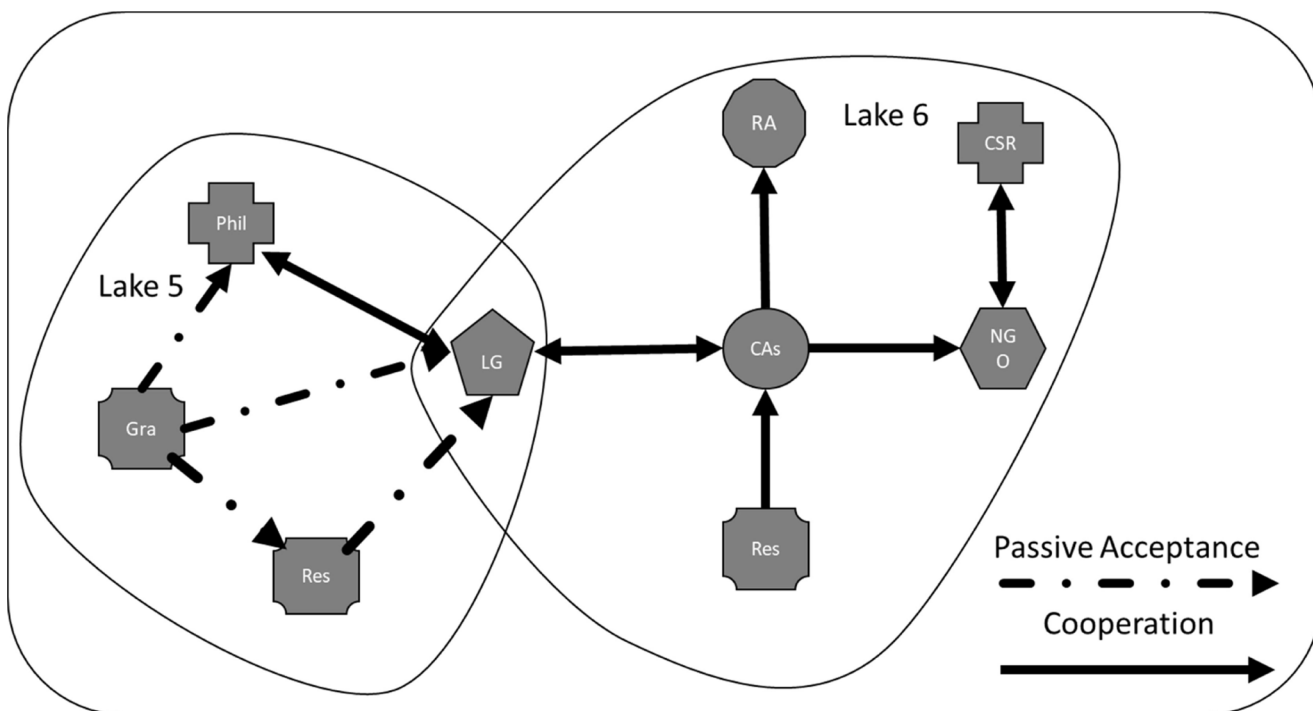


Figure 5 Networks of actors for Lake 5 and 6. The main actors are local government (LG), residents (Res) and grazers (Gra), local government (LG), and philanthropic agency (Phil), research and academia (RA), non-governmental organisation (NGO) and CSR initiatives (CSR), community associations (CAs).

governmental organisation (NGO) and Corporate Social Responsibility initiatives (CSR), besides residents (Res), community association (CAs) and the local government (LG). Cooperation is the main form of interactions, with sharing of information, knowledge and resources. The community association links actors across the network.

The community association comprises of members from the newly built apartments. Over the years, the association has built trust among the older residents and the local government. The older residents of the village trust and cooperate with members of the community association, as they have over the last decade seen how the community association has worked with the local government to solve local issues including provision of basic amenities such as streetlights. The older residents mentioned that they were “consulted and a place within the rejuvenated lake is earmarked for grazing their cattle, hence they are happy to cooperate with the community association for lake rejuvenation”. The same was highlighted during our discussions with the community association who indicated “while preparing the detailed project report for developing the lake, we deliberated with residents, communities and we planned the process in such a way that we included not just people with white-collared jobs, but also those who have been living with this lake for years and years...” However, we found no direct interaction between the older residents and the local government regarding lake management.

Further, the community association, through their personal connections has secured funding through CSR with the help of an NGO. CSR initiatives provide funding to the NGO who undertakes activities in consultation with the community association. Thus, there is cooperation based on the sharing of resources towards the shared goal of lake conservation among the three actors.

There is a difference in the way communities in lake 5 and 6 interact with the state. The community in lake 5 are mainly dependent on the local government and the philanthropic agency for their lake. The community through the community association in lake 6 has engaged with not just the local government but with other non-state actors as well. The presence of the community association and their continued engagement with the local government building trust has led to the creation of a state of engagement between actors within this network.

5.4.3 Urban lakes

Interactions between the network of actors for (urban) lakes 7 and 8: We consider two lakes (lake 7 and 8) within this network as both these lakes are managed by an NGO working on them. They also fall under the jurisdiction of the city local government (LG). Both urban lakes are rejuvenated by the local government and are handed over to third-sector organisations (NGO and community associations) for day-to-day management. Figure 6 shows the networks

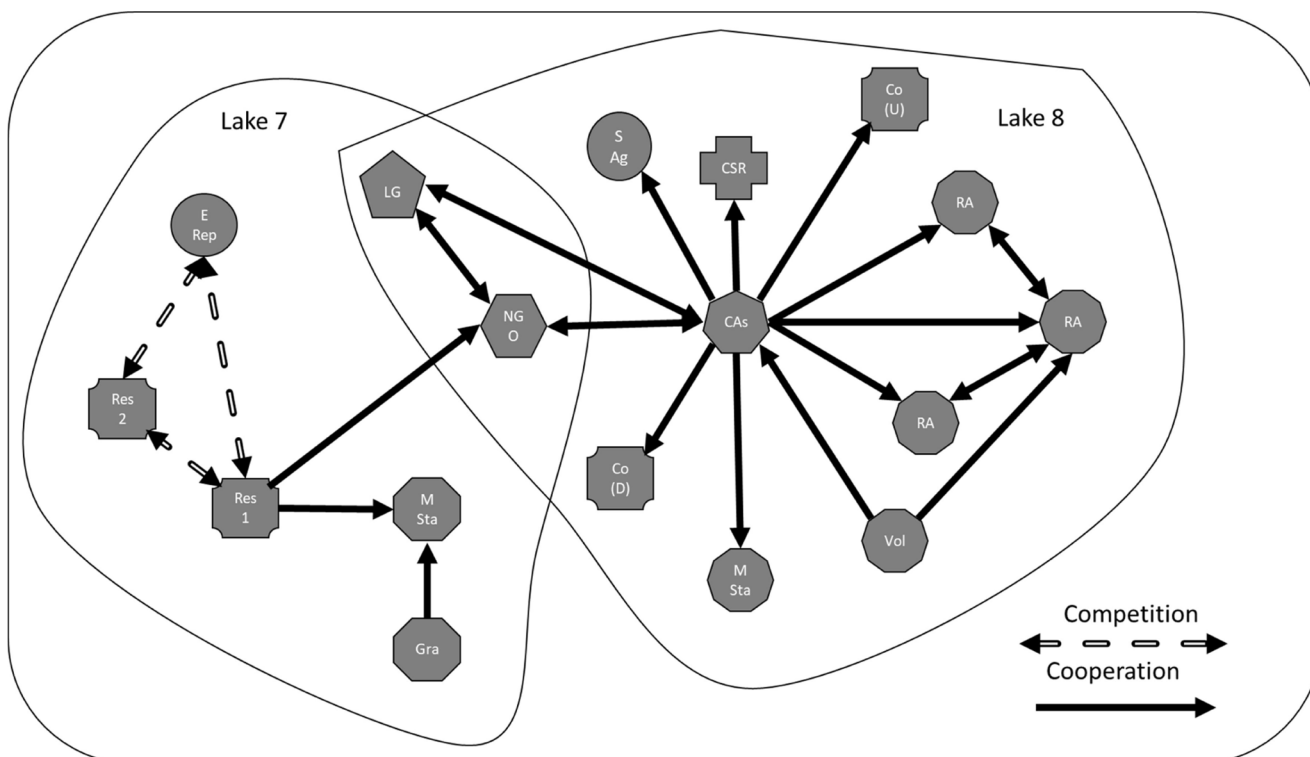


Figure 6 Networks of actors for Lakes 7 and 8. Main actors are local government (LG), residents (Res) and grazers (Gra), local government (LG), and philanthropic agency (Phil), research organisations and academia (RA), non-governmental organisation (NGO) and CSR initiatives (CSR), community association (CAs), upstream communities (Co(U)), communities located downstream (Co(D)), volunteers (Vol), and maintenance staff (Msta).

of actors for these two lakes. Besides residents (Res) and local government (LG), community associations (CAs), non-governmental organisation (NGO) and researchers and academics (RA) are involved in lake management. Though both these lakes were rejuvenated by the local government, there is a difference in their management.

Lake 7 has two resident groups (Res1 and Res2), belonging to nearby apartments. Both these groups have diverging views on lake management leading to duplication of activities and overlapping actions. This has led to competition between the two resident groups. The duplication of activities by resident groups is furthered fuelled by political ideologies and supported by local elected representatives (ERep). This was highlighted during the interview with a resident group member “... when news of the lake being rejuvenated spread among members, people were excited and had their own personal needs and requirements based on their own perceptions leading to formation of multiple groups...” Some groups came forward and worked for some time and “...relinquished their responsibility because they did not like it” (personal interview, representative of resident association1, 2023). Repeated discussions between resident groups, has over a period of time led to identification of individuals who shared a common interest in lake conservation to come together.

The local government has handed over management rights to resident association 1, who manage the day-to-day activities. This group engages with the local government and NGO to gather funds through CSR initiatives for the upkeep of the lake. The lake has been fenced to restrict encroachment, and the group has hired security guards and maintenance staff (MSta) for the lake. The maintenance staff reported that they allowed the local grazers (Gra) inside the lake to graze their animals during afternoons, when the lake is closed for visitors. They indicated they allow this because “these grazers are from around the lake, they have been living here for a long time. We know each other and, based on kinship, we allow them to enter and graze the area...” Thus, highlighting cooperation between the maintenance staff and grazers.

The network of actors (shown in Figure 6) around lake 8 is highly diverse and includes various actors connected through the community association. The community association (CAs) is composed of residents and was officially registered and signed a tripartite agreement with the local city government legitimising themselves to manage the lake. The citizen association cooperates with other actors including researchers, academics and community volunteers (Vol) who provide specific inputs to protect and enhance biodiversity, besides ensuring aesthetics

of an urban lake. As highlighted during an interview with members of the citizen association “we got in touch with person A, who was our scientific base, they connected us to person B, who had knowledge about maps and related stuff... we got connected with person C, an ornithologist and person D who was a herpetologist and we got them on board... that’s how we connected with people from different fields interested in conserving the lake... and our networks grew...” (personal interview CAs1 2023).

The community association connected to an NGO to raise financial resources from CSR initiatives. They seek funding under CSR as the “local government does not have a budget for undertaking day-to-day activities” (personal interview, LG2 2023). Further, the community association cooperates not just with the local residents but both upstream (Co(U)) and downstream (Co(D)) residents. This was indicated during interviews with a member of the community association “lakes in Bengaluru are in a chain... our lake is connected to the upstream lake from which the water flows into our lake, and from our lake it flows to others downstream... these lakes need to be managed interdependently to ensure proper management...”

The two lakes (7 and 8), form a single network as they are managed by the same NGO and fall under the jurisprudence of a single local government. There is a state of engagement between communities and the local government in both these lakes. This can be attributed to the presence of the NGO, which has developed a shared understanding of the importance of lake management and built a process of engagement with not just the state actors but non-state actors such as experts from research and academia, as well as connections with corporate groups providing funding through CSR initiatives, in addition to connecting upstream and downstream communities.

6. DISCUSSION

In this paper, we set out to identify and map the various forms of interactions among actors involved in lake management in GBMR. We examine eight lakes along a rural-urban gradient to understand the diverse polycentric arrangements that arise due to urbanisation and presence of non-state actors.

We find that, though the eight considered lakes form an interconnected series within a single watershed, the actors managing these lakes have limited interactions between them. The network of actors (Figure 1), highlights the increase in the number of actors as we move from rural to urban lakes, indicating that the number of actors involved in polycentric arrangements of lake management increases as we move from the rural to urban areas. The increase in

the number of actors is attributed to the presence of non-state actors, mainly community associations and NGOs. These non-state actors champion collective action through self-organisation, and social campaigns in collaboration with local governments as a movement to conserve and protect lakes in urban areas. In rural locations, there is limited involvement of non-state actors, and consequently limited capacity for resistance or challenge to the dominant relations, except in one case – lake 3, thus, leading to the continuation of the status quo and a lack of management of lakes. In peri-urban lakes, we see a mix of hierarchical networks (lake 4, 5 and 6), and we also note an increase in non-state actors in urban settings (lakes 7 & 8).

6.1 DIVERSE FORMS OF INTERACTION: PASSIVE ACCEPTANCE TO COOPERATION

The network of actors involved in lake management along the rural-urban gradient, interact differently based on their biophysical and socio-economic conditions in addition and the three fundamental components of polycentric governance arrangement. Cooperation between actors is attributed to shared understanding of lake conservation and preservation and is bolstered by an increase in information sharing, accessibility to resources under corporate social responsibility initiatives as shown by Koontz, (2019) and Innes & Booher, (2018).

We find that local communities cooperate with academics, researchers and private companies, mainly to gather scientific knowledge and financial resources respectively, for maintenance and upkeep of lakes (seen in lakes 6, 7 and 8). Local governments cooperate with other actors by signing tri-partite agreements providing legitimacy to non-state actors, mainly to supplement their financial and human resources. This is also in accordance with regime theory, which states that “actors collaborate and cooperate with others who can supplement resources/information which is not available within themselves” (Stoker, 1995). Non-governmental actors are key in creating conditions to facilitate such cooperative interactions.

Passive acceptance is the most dominant form of interaction in rural networks and can be attributed to lack of willingness among communities, which has led to a greater role of the state actors in lake management. As indicated by Van Der Jagt et al. (2023), greater role of the state in lake management has led to hierarchical governance. Socio-economic factors coupled with changing values imbibed by urban development in the vicinity has led to reduced dependence on the lake has alienated communities (Anderson et al., 2012). This can be seen rural lakes 1 and 2, where there is a perception that the community themselves cannot do anything about the lake, and it is the responsibility of the state to manage

commons such as lakes. The lack of willingness among community members for conserving the lake has led the community to passively accept the status quo of the lake, but does not reflect community approval or support for the same – as also indicated by Anderson et al. (2012).

Resistance and conflict are two other forms of interactions observed in rural lakes. Resistance is mainly in the form of organised opposition (seen in rural network 2), led by local leaders in collaboration with both local government (state) and the community (non-state). As indicated by Lilja (2022), resistance towards upstream actors is based on personal experience of the local community regarding the negative effects of wastewater inflow and changes in ecosystem (social and cultural) services derived from the lake. Further, resistance is an intentional act, in response to the dominant (financial) power of upstream actors as highlighted by Chandra (2015) and Johansson & Vinthagen (2019) and has led to judicial recourse by the community. In this paper, we do not consider resistance and passive acceptance to be a sub-set of conflictual interactions, as it is beyond the scope of this paper. It would be interesting to investigate the relationship between passive acceptance, resistance and conflicts in future research.

Competition is seen only in lake 7 (urban network 1), where there is duplication of conservation efforts by multiple community groups. There is a cycle where competition between groups fizzles off and is rekindled based on factors described in the section of urban network 1. This has created a continued pressure on the community associations to get everyone on board to work towards conserving and protecting the lake. This is in line with Gibson et al. (2023) and Monstadt et al. (2022) who indicate that not all interactions among actors are cooperative.

6.2 SHIFT IN GOVERNANCE: FROM DEPENDENCE TO ENGAGEMENT

We observe a shift in governance arrangement as we move along the rural-urban gradient from a state of dependence to a state of engagement among actors. The rural lake 3 (Rural network 2) is a special case as there is an engagement between actors because of the presence of local leaders who have organized the community. Engagement based on shared understanding between actors is pronounced in peri-urban network 2 and the urban network 1, attributed to shared values and common interests. Non-governmental actors, in peri-urban and urban areas have created spaces of engagement for themselves through repeated deliberations, exchange of information and resources. Further, networks of actors have influenced state actors, both by deliberation and judicial recourse. As indicated by Minnery (2007), it can be highlighted that as we move along a rural-urban gradient,

the role of the state shifts from that of a supreme actor to that of a key player.

This has great implications to urban governance especially from an urban policy perspective as there are numerous actors who are involved in managing commons leading to sustainable urban development (Mikelson et al., 2021). This also advocates the recent scholarship within the urban governance literature in shifting the focus from economic effectiveness, competition and development (Recio, 2020) and as a role reserved for formal governments to include the role of [non-state] actors beyond formal governments (Sareen & Waagsaether, 2022). Urban governance has come to incorporate the role of formal government (local–regional–national scales) and also considers private and community actors when considering urban development and change (Krueger et al., 2022). Thus, it can be illustrated that with urbanisation, certain roles of state can be handled by non-state actors leading to “governance beyond the state” as suggested in the urban governance literature by Swyngedouw (2005).

7. CONCLUSION

In this paper, we have identified the network of actors involved in lake management across eight lakes, along a rural-urban gradient in the metropolitan region of Bengaluru. Although lakes in Bengaluru are hydrologically interconnected, there are limited interactions between networks of actors involved in managing different lakes. This highlights one of the reasons for institutional failure of lake management in the region as noted by Ostrom and Ostrom (1977, p. 46) “A highly fragmented political system without substantial overlap among the many jurisdictions is especially vulnerable to institutional failure”. As other scholars point out, polycentric governance systems which have dysfunctional overlaps between jurisdiction and actors demand deeper investigation (Mudliar & O'Brien, 2021; Carlisle & Gruby, 2019).

We focus on two relatively under-studied interactions—“resistance” (as indicated by Mudliar & O'Brien, 2021) and “passive acceptance”. Resistance is mainly observed between downstream communities and their upstream counterparts. We identify a new form of interaction, passive acceptance by local communities of the role played (or abdicated) by local state government, shaped by changing cultural values and decreasing dependence on the lake by the rural communities. Horizontal cooperative linkages are active and encouraged by higher state agencies (as also shown by Mudliar & O'Brien, 2021) in urban settings, to overcome their paucity of human and financial resources. Further, we find that there is a consolidation of power with

just one or two non-state actors (NGOs) when it comes to lake management, especially in the case of urban lakes – this requires greater investigation.

One of the main contributions of this paper is to highlight the shift in interaction from dependence to engagement between communities and state actors. As we move from rural to urban lakes we find an increase in the number of actors, with the addition of non-governmental organisation researchers, academics, and CSR agencies in urban settings, to assist in providing information and finance. This increase in actors has also led to a shift in actor relationships from a space of community dependence on the state actors for lake management in rural settings, to a space where communities have created a space for networked engagement between themselves and the state in urban settings. Thus, it can be said that with urbanisation, the role of the state in managing commons such as lakes has changed from that of a supreme actor to that of a key player. This is due to the handing over of certain roles of the state especially maintenance, monitoring and certain times funding to non-state actors, leading to a governance-beyond-the-state, as defined by Swyngedouw (2005).

In this paper, we do not investigate outcomes of lake management – and therefore do not get into questions of whether better management is because of involvement of non-state actors or other factors. Testing outcomes of management would require long-term studies that involve ecological and environmental analysis and socio-economic analysis, which would take us well beyond the scope of this paper – this is nevertheless an important area of investigation for future study.

The findings of this paper have implications on not just decision making, but also policy formulation and implementation. In rapidly urbanizing global South cities, existing forms of local commons governance of ecosystems in the rural periphery of cities are taken over by formal urban governance structures that are templated, which local communities find difficult to engage with. In such contexts, given the vacuum in functioning governance structures, NGOs, community groups, corporate CSR and other types of actors become involved in ecosystem governance, taking commons governance beyond the state. The role of the state in commons governance needs to be re-examined, to assess whether non-state actors can have a positive impact on lake governance, while ensuring that important considerations of state institutions such as equity and social justice are upheld, and that urban commons are not captured by interests of elite corporate groups or wealthy community resident groups. The findings of this paper represent an important area for urban commons governance that requires further study and elaboration in diverse contexts in the global South.

NOTES

- 1 *rural lakes 1 and 2 are governed by the same local government; *peri-urban lakes 5 and 6 are governed by the same local government; ° urban lakes 7 and 8 are governed by the same local government and are catered by the same NGO.
- 2 Gram Panchayats are the local self-government organisation at the village level in India.

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COMPETING INTERESTS

The authors have no competing interests to declare.

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