CHAPTER 5

A Tale of Two Cities: Similar Ecologies and Diverging Governance of Urban Fisheries in Kolkata and Colombo

Missaka Hettiarachchi^{1,2} & Tiffany H. Morrison²

Abstract In complex social-ecological systems, patterns of utilization of ecosystem services are a key factor that shapes both the society and the broader ecosystem. This paper investigates the links between urban environmental governance and fisheries in the urban wetlands of Kolkata (India) and Colombo (Sri Lanka). We argue that, despite the similar development of formal policy and institutions in both cases, the comparative success of the Kolkata fishery is mainly due to three factors: 1) diverse-ecosystem use, 2) urban ecological symbiosis, and 3) strong community collective action. We conclude that successful governance of the environment and ecosystem uses such as fisheries will depend on collective action and informal institutions as much as the formal means of governance. We call for further research on urban governance systems that can foster diversity in land-use and harmonized utilization of ecosystem services and livelihoods for building resilient urban communities in the globalizing cities of the Global South.

1. Introduction

In cities undergoing globalization, urban governance is shaped more by global politicaleconomic trends than by local resource limitations (Marcuse and Kempen 2004). However, globalizing cities are also situated social-ecological systems characterised by a complex web of interactions amongst "human" and "non-human" components (Swyngedouw 1996; Robbins 2007; Heynan 2014). In these systems, patterns of utilization of ecosystem services are a key factor that shape not only society but also the broader ecosystem itself. Thus, changes to the historical patterns of ecosystem use – such as in fisheries – may trigger socialecological dynamics that cannot be readily controlled within the realm of governance alone.

This paper investigates the links between urban environmental governance and ecosystem uses, such as fisheries, in the emerging cities of the Global South. We do so through a comparative case-study of fisheries in the urban wetlands of Colombo (Sri Lanka) and Kolkata (India). In pre-colonial times, wetlands around Colombo and Kolkata had similar

¹School of Geography Planning and Environmental Management, University of Queensland, Brisbane, Australia, m.hettiarachchi@uq.edu.au

²ARC Centre of Excellence in Coral Reef Studies, James Cook University, Townsville, Australia

ecologies and sustained similar ecosystem uses such as artisanal freshwater fisheries (Ghosh and Sen 1987; CEA 1994). However, the political and economic changes of colonial and postcolonial periods have not only engendered different governance systems related to wetlands and fisheries in the two cities, but have also produced very different ecosystem utilization patterns and ecological characteristics (Ghosh 2005; Smardon 2009; Hettiarachchi et al. 2012). While traditional subsistence freshwater capture fisheries disappeared gradually in both wetlands, a community-based wastewater fed pond fishery industry emerged in Kolkata in the late Colonial period which thrived through the Post-colonial period. Conversely in Colombo, despite the soaring prices of seafood, wetland fisheries were relegated to a parttime and quasi-legal industry. In this study we ask, 1) was this divergence in the two fishery systems caused by the trajectories of formal policy and institutional change? 2) if not, what other factors caused this divergence? 3) are there lessons to be learnt from the success and failures of the two cases that can be generalized for the emerging cities of the Global South?

In this paper, we understand governance to be both formal and informal and characterized by "diverse and networked policy-making and implementation arrangements over time and scale, diverse institutional actors and policy instruments, and both self-organized and centrally-steered choreography of actors" (Morrison 2014, p. 103). These governance actors and arrangements sit within a broader political environment which can be both sympathetic and unsympathetic to fisher communities (Morrison 2007). By studying formal policy changes and broader institutional changes over time, it is possible to draw lessons about the multiscale conditions which produce these arrangements and their outcomes.

First, we chronologically present the policy and institutional changes related to wetland and fisheries governance and their outcomes in the two cases. Second, we analyse the broader political, economic, social and ecological causes and consequences of transformations in the fisheries and synthesise the key factors for the relative success of the Kolkata wastewater fishery against the Colombo case. In conclusion we discuss the broader lessons from the two cases that can be generalized for urban environmental governance in the emerging cities of the Global South.

We argue that, despite the similarities in the historical trajectories of formal policy and institutional changes in both cities, the relative success of the Kolkata fishery compared to Colombo, was mainly due to three factors: 1) diverse-ecosystem use, 2) urban ecological symbiosis, and 3) strong community collective action. We conclude that successful governance of environment and ecosystem system uses such as fisheries in emerging cities of the Global South will depend on the ability to grasp the full complexities of their hybrid rural-urban landscapes and relationships between ecology and ecosystem uses, whereas community collective action and informal institutions will be as important as formal means of governance. We conclude by calling for further research on urban governance systems that can foster diversity in land-use, and utilization of ecosystem services and livelihoods, to build resilient urban communities in the globalizing cities of the Global South.

2. Methods

The city of Colombo (Sri Lanka) and the city of Kolkata (India) were selected as the two main case studies for this study for the following reasons (Figure 5.1). Colombo and Kolkata are major urban centres in South Asia, which are rapidly growing both in terms of population and economy. The region is expected to hold more that 35% of the world's urban population by 2025. Both cities are globalizing through service-oriented industries, and have experienced rapid foreign capital inflows into their respective urban real-estate markets. There are also major urban wetland systems used for freshwater fishing within the metropolitan areas of both Colombo and Kolkata.

The wetlands of Colombo and Kolkata face similar environmental pressures to other urban wetlands in fast expanding cities in South Asia and other developing regions. Both cities have a history of more than a century of wetland alteration, and currently face some severe social consequences of wetland loss and degradation. Therefore, Colombo and Kolkata are two critical and representative cases (Flyvbjerg 2006) for studying urban fisheries governance in emerging cities of the Global South. Both cases also have continuous historical records of wetland management from colonial times, and fairly consistent scientific data on ecological and hydrological characteristics of the wetlands.



Figure 5.1. Map of study areas.

The study was undertaken between 2010 and 2013 and involved key informant interviews, document analysis, field observations, ecological surveys, participant observation, and a review of the scientific literature. Thirty-three key informants (eleven in Kolkata and twenty-two in Colombo) were interviewed during the period 2010-2012 and interviewees included officials from the state agencies, local politicians, environmental activists, experts, and community leaders. Document analysis involved archival search at the National Library of Sri

Lanka, East Kolkata Wetlands Management Authority and content analysis of the most popular English Weekly of Sri Lanka between 1978 and 2010 (www.sundaytimes.lk). Community and decision-maker focus group discussions were also conducted in both cities. The Colombo case also involved additional ecological surveys to fill information gaps.

3. Results and Discussion

3.1. Ecological histories of the Colombo and Kolkata wetlands

3.1.1. Kolkata wetlands

The East Kolkata Wetlands are a vast network (12,500 ha) of ponds, marshes, and paddy lands located to the east of the Kolkata city in the Upper Gangetic Delta (Figure 5.1), which is hydraulically connected to the Bay of Bengal (Ghosh and Sen 1987). The wetlands were traditionally used for low-yield winter rice cultivation and brackish water fishing by the numerous peasant communities. In the late 1800s under colonial rule, combined stormwater and sewage from expanding Kolkata was channelled into the wetlands, causing irreversible pollution and silting. Facing this ecological threat, local peasant communities adopted a skilful use of sewage as a water and nutrient source for pisciculture and agriculture (Ghosh 2005). From the 1920s, the wetlands were transformed from a brackish tropical marsh to vast network of freshwater ponds and agricultural fields (see Photo 5.1). By 2010, the wetlands were receiving 0.7-1.0 million m^3 of wastewater from the city per day and produced 16,000 t of rice, 30,000-50,000 t of vegetable, and 8000 t of fish per annum (Kundu 2010). This protected the downstream ecosystems of the Ganges Delta from Kolkata's massive pollution loads (Saha 2011). Today, the wetland also provides broader ecosystem services of carbon sequestration, and recreation valued as 53 million and 43 million Indian rupees per year respectively (Sarkar 2002).



Photo 5.1. A traditional guard hut in a community owned fishpond in the eastern Kolkata wetlands.

However, rapid urbanization is putting immense pressure on this ecosystem (Hettiarachchi et al. 2015). The wetland area shrunk by 20% due to direct conversion between 1945 and 2003, with an exponential rise of unaccounted conversion of wetlands (and fishery ponds) for realestate purposes since the mid-1990s (Ghosh 2005; Kundu 2010). Water quality has deteriorated and silt influx to the wetland system has increased with this recent conversion trend (Saha 2011). 15.2% of the fish pond extent has been rendered unusable due to excessive siltation (Kundu 2010). Invasive fish species such as *Clarius gariepinus* and *Pangasius sutchi* are spreading in the wetland system. These environmental pressures are threatening the overall sustainability of the fishery system and the wetland ecosystem.

3.1.2. Colombo wetlands

The wetlands around the city of Colombo are a network (about 1,000 ha) of freshwater marshes, open waterways, estuaries, and paddy land scattered across metropolitan Colombo (Figure 5.1). The larger wetland area was traditionally used for rain-fed rice cultivation, capture fisheries, animal husbandry, and canal-based transport. Fishing was carried out both in the freshwater canals within the marshes and paddy land and in the estuarine areas towards the coast. The estuarine fishing was bigger in scale. The 1928 Colombo Flood Protection Plan changed the wetlands dramatically, resulting in both ecological and hydrological fragmentation (Hettiarachchi et al. 2012). Drainage and flood control functions became the primary use of the wetland as the city expanded, and the importance of all other ecosystem services waned by the early 1980s. Large swathes of paddy land became unsuitable for cultivation, and the fishing which was dependent on the same paddy cultivation system also deteriorated rapidly. While estuarine fishing by fulltime fishermen continued, it was at a much smaller scale.

From the early 1980s this ecosystem came under intense urbanization pressure. Investigating the central portion of the Colombo wetlands, Hettiarachchi et al. (2014) estimated that about 60% of the paddy lands were converted to built-up areas between 1981 and 2008 (see Photo 5.2), and 44% of the native grass-dominated marsh areas were transformed into a habitat dominated by shrubs and small trees such as *Annona glabra*, along with a rapid proliferation of invasive plants and fish. Today, this degradation is further threatening the wetland fishery which is already in rapid decline.

In summary, both wetlands underwent tremendous ecological transformation during the colonial period, with the most acute wetland degradation and loss of ecosystem services seen in the last three decades. However, despite these transformations, the Eastern Kolkata wetlands still largely retains wetlands characteristics, whereas the Colombo wetlands have transformed from marshes to shrub wetlands, which are increasingly losing wetland characteristics. Although a bifurcation of the ecological histories of the wetlands is clearly visible, it remains to be understood what changes in urban governance caused this divergence.



Photo 5.2. A wetland area being reclaimed using solid waste in Colombo.

3.2. Historical changes in urban governance and the fisheries industries in the two cities

Both Kolkata and Colombo have under gone complex political, economic, institutional changes during the study period (see Table 5.1 and Figure 5.2).

<u>Urban development</u>: Key urban development institutions emerged in two major fluxes; the first in the late Colonial period (1930-40s) and the second after the pro-capital economic restructuring of the mid 1980s and early 1990s (Shaw 2007; Hettiarachchi et al. 2015). Powerful urban development agencies emerged in both cities during the late post-Colonial period, such as the Colombo District Low Land Reclamation Board and Urban Development Authority in Colombo and Kolkata Metropolitan Development Authority in Kolkata. These organizations were strengthened through a series of amendment acts during and after the 1980s which allowed them to take over the wetlands with little resistance.

<u>Land reform and fisheries</u>: Both cases witnessed the strengthening of formal institutions of land-reform and fisheries cooperatives in the post-Colonial period. Large number of fisheries cooperatives were functioning in Kolkata even before the Cooperatives Act and the Inland Fisheries Act were introduced, and these formal institutions strengthened the legal position of the cooperatives. The land-reform act also provided legal protection for collectively held fish ponds. Conversely, despite similar cooperative and land-reform acts in Colombo, there was no evidence of wetland or estuarine fishermen collectivising in the Colombo Wetland area.

<u>Environment</u>: Formal environmental institutions emerged in both cases during the mid-1970s, closely shadowing global environmental treaties and initiatives. In both cases the Ramsar Convention had a clear influence on the wetland protection institutions that emerged from the late 1990s onwards. The East Kolkata Wetlands Management Act in Kolkata and the National Wetlands Management Policy were driven by Ramsar principles. However these institutions and the organizations they mandated had no legal or operational connection with the wetland communities, which drastically undermined their practical ability to protect the wetlands and their uses (Ghosh 2005; Hettiarachchi et al. 2015).

Table 5.1. Chronology of formal policy and governance changes related to urban development, urb	ban
environmental management and fisheries in the two cases.	

Kolkata	Colombo		
Urban development and flood control			
The West Bengal Slum Areas (Improvement and	Colombo Flood Protection Plan (1937);		
Clearance) Act (1972);	Colombo District Lowland Reclamation and		
The West Bengal Town and Country (Planning and	Development Board Act (1968);		
Development) Act, (1979);	Urban Development Authority Act and amendments		
The Kolkata Municipal Corporation Act (1980);	(1978);		
Jawaharlal Nehru National Urban Renewal Mission –	Colombo Master Plan (1978);		
Over View (2005)	Metro Colombo Development Plan (2010)		
Environmental management and wetland conservation			
Water (Prevention & Control of Pollution) Act, (1974);	National Environmental Act and amendments (1980,		
Environmental Protection Act –India (2004);	1988, 2000);		
East Kolkata Wetlands Management Act (2006);	Coast Conservation Act and amendments (1982,		
National Wetland Rules – India (2010)	1988);		
	National Wetlands Policy and Strategies (2005)		
Land reform and Inland fisheries			
Land Reforms Act – West Bengal (1956);	Paddyland Act (1958);		
Cooperatives Act and Rules–West Bengal (1978);	Cooperative Societies Act (1972);		
Inland Fisheries Act – West Bengal (1984);	National Aquaculture Development Authority Act		
	(1998);		

<u>Real-estate and investment</u>: Following the pro-capital economic restructuring in India and Sri Lanka during the 1980s (Kalegama 2004; Nagaraj 2006) both wetland systems came under intense urbanization pressure stimulated by speculative real-estate investment. As Hettiarachchi et al. (2015) demonstrate, the flow of international finance capital into the real estate sector in both cities put pressure on the city administrations to "open the wetlands for business". A similar scenario in Kolakata is described by Drubajyothi Ghosh (Sarkar 2016) as "wetlands are real estate in waiting". Photo 5.3 and 5.4 show how prime real-estate is taking over wetlands in Kolkata and Colombo. "Urban development" agencies in both cities facilitated this take-over, using not only their political clout, but also the legal mandate carefully crafted for this purpose.

The formal policy trajectories of the two cases are similar in many ways. However as many modern governance scholars claim, formal policy declarations or institutional change only play a partial and often less significant role in most complex governance systems (Bevir 2012; Morrison 2014). As Figure 5.2 illustrates there are many broad parallels in the political-economic history of the two cases as well. Therefore, it has to be understood what political-

economic idiosyncrasies, and other social and ecological factors caused the divergence of fishery and wetland governance in the two cases despite the many similarities.

Kolkata

Kolkata grows under British India	1850	Colombo becomes a commercial hub un-	
Population growth and city expansion		der British rule	
[Wetland Re-engineering projects]		Population growth and city expansion	
Continued monsoonal floods and Cholera Pan- demic	1900	Major floods - 1913, 1923	
Diverting the city sewage to the wetlands	1920	[Intense hydraulic modification under	
Sewage based pollution and eutrophication		1 st Colombo Flood Protection Plan (1928)]	
Emergence of wastewater fishery practices			
	1950		
City population expands with migration and		I and Reclamation Corporation Act (1968)	
relagee milax	1960	further strengthened 1982,2006)]	
[Calculta Metropolitan Planning Organization Established (1960)]		Wetland reclamation for urban housing	
Wastewater fishery industry thrives	1970	Rice cultivation and fishing industry in	
Wetland reclamation for urban housing		the wetland declines	
[Land reforms laws and pro-poor property rights changes]		Sri Lanka adopts economic deregulation	
	1980	[National Environmental Act (1980)]	
[Environmental management legislation and		[Major land acquisitions and wetland reclamation schemes]	
polices at federal level	1990	Acute wetland degradation and major urban floods—1992, 1994	
India adopts economic deregulation		[Wetland research and inventorying]	
Unplanned wetland reclamation		Further wetland conversion	
	2000		
[Ramsar designates Kolkata Wetlands]		[National Wetland Policy (Sri Lanka)]	
[East Kolkakta Wetlands Management Act (2005)]	2005	Major urban floods—2005	
[Federal Wetland Laws (2010)]			
	2010		

Colombo

Figure 5.2. Key political-economic and formal policy changes and related social-ecological outcomes. Formal policy changes are given with square brackets, political and economic changes are given in bold face, and social-ecological outcomes are in red italics.



Photo 5.3. A community owned fishpond in Kolkata with the booming salt-lake city IT zone in background.



Photo 5.4. Freshwater marsh turned into a recreational reservoir and prime real-estate in Colombo.

4. Synthesis

4.1. What strengthened the wastewater fisheries in Kolkata?

Our results show that both the Colombo and Kolkata wetlands had similar fishery systems in the Colonial times where numerous interconnected communities depended on mixed fishing and farming livelihoods. The turning point of the divergence between the two fishery systems occurred when the Kolkata wetland and its fishery communities faced an existential threat due to sewage based pollution. It is reasonable to assume that Kolkata wetland communities were historically more dependent on fishing than farming and due to the distance from the sea the city itself provided a stable market for freshwater and brackish-water fish. Therefore, the emergence of a wastewater fishery in Kolkata transformed what were scattered feudal fishery practices into an organized commercial aquaculture industry. In addition to retaining most of the wetland fish varieties, the new system also introduced new productive fish varieties to the local fish market.

Because the wastewater fishery system replaced the need for a mechanized wastewater treatment plant for Kolkata it was welcomed and facilitated by a certain section of the city's bureaucracy during the late Colonial and post-Colonial times. A small but significant fraction of the bureaucrats understood the connection of fishing to the wetland ecology and how the city and the wastewater fishery were two ecosystems in symbiotic relationship (Ghosh and Sen 1987). They lobbied vociferously for the conservation of this fishery system amid the city's rapid expansion from the early 1990s.

However, the foremost factor that ensured the survival of the wastewater fishery system was the organized fisher community, who had transformed from peasant fisher folk into an urban working class. From the initial feudal (landlord based) property rights scheme, fishery ponds were rapidly taken over by capitalist private ventures or fisher cooperatives. Even under the private pond owners, fishermen were organized as a working class and unionized. The land-reform laws and Cooperatives Act of early 1970, brought under mounting public pressure, were seized by the cooperatives to consolidate their position over private owners and in some cases forcibly take over un-operational private ponds and resume production.

The Kolkata fishery system thus forged a self-consolidating triangle of: 1) diverseecosystem use, 2) urban ecological symbiosis, and 3) strong community collective action. First, "diverse ecosystem uses" ensured the continuation of what Ghosh (2005) defined as 'keystone' ecosystem uses (e.g., fishing, wetland cultivations), which had been essential processes of the human dominated wetland ecosystem for centuries. Second, "urban ecological symbiosis", where the fishery system functions as a receptor of wastewater from the city (on which it is entirely dependent for nutrient needs) and in turn produced a large proportion of the city's fish requirement. Third, "community collective action" provided the social and political base for the continuation of this system, especially in the nationalist welfare-state policy environment of the post-colonial period.

4.2. Causes and consequences of the collapse of the fishery industry in the Colombo wetlands

Conversely in the Colombo wetlands, the fishery system remained scattered. Fishermen mostly operated individually, while the fishing grounds remained as commons. With the advancement of technology and facilities for seagoing fishermen, more sea fish entered the market, which undermined the competitiveness of the stagnant wetland fishing industry. On the one hand, the popularity of native wetland fish varieties were overshadowed by the common availability of sea fish, and on the other, pollution, habitat change and invasive fish have dwindled the native fish stock (Hettiarachchi et al. 2014).

Apart from a few full time fishermen in the estuarine areas in the southern periphery of the Colombo wetlands, wetland fishing has entirely vanished or has become a part-time occupation that caters to cheap eateries or illegal clients such as moonshine bars.

Disappearance of the 'keystone' ecosystem uses such as fishing, has removed the essential management practices that maintained the wetland under human dominance. This along with intense hydraulic modification has caused an overall ecological transformation of the wetland. Wetland farmers and fishermen who were not organized as a working class like in Kolkata had no political wherewithal to counter the attack on their livelihoods through hydraulic modification and wetland reclamation schemes, and had no option other than to seek alternate livelihoods in the city.

Although the city administrations (from the colonial time to present) saw the need to maintain part of the wetlands for flood control purposes (a form of urban symbiosis) they failed to make the connection between diverse wetland uses such as fishing and paddy cultivation and the health of the wetland. Their narrow planning regime, which considered the wetlands as an inert piece of infrastructure in the flood control system, not only destroyed the community uses such as fishing, but also eventually reduced its flood retention capacity.

5. Conclusion

Our analysis demonstrates that trajectories of formal policy and institutional change in urban governance in Kolkata and Colombo had many similarities. The political-economic histories of the two cases had many parallels, but also significant differences. The actual developments in the wetlands fisheries were also mediated by some factors beyond the control of formal policy. Three key factors made the Kolkata wastewater fishery comparatively more resilient than the wetland fishery in Colombo. First, the symbiotic relationship between the city and wastewater fishery made the wetland an important part of the urban ecology. Second, the continuation of diverse wetland use sustained the basic wetland ecological processes. Third, the collective nature of the Kolkata fisher communities and various informal institutions within the fishery system allowed them to organize against the attacks of capital on their livelihoods.

Kolkata's example provides some important lessons for governing the urban environment and ecosystem uses such as fishing in the emerging cites of the Global South. First, it empirically confirms theoretical assertions on the importance of facilitating rural-urban mixed land-use and economic regimes within emerging urban agglomerates (Ghosh 2005; Yokohari et al. 2008). This encourages diverse ecosystem use. In Kolkata's case, having a wetland wastewater fishery system within provided the city with multiple benefits for wastewater management and food security. Such mixed land-use regimes and diverse ecosystem uses can also help sustain other ecosystem services such as flood retention, carbon sequestration and aesthetic services, as we have witnessed in Kolkata.

The comparative resilience of Kolkata's wastewater fishery system and the failure of the fishery in the Colombo wetlands also remind us that certain industries like small-scale fisheries are inextricably bound with the rights of communities to land, livelihoods and ecosystem services. The sustainability of such industries can be ensured only by protecting those rights through strong collective action supported by both formal and informal

institutions. Those who envision urban resilience should identify such strong community practices and informal social institutions that form a backbone; such as the fisher cooperative system of East Kolkata Wetlands. They should strive to integrate them into urban governance and planning at all scales. Strengthening the scientific knowledge, technical capacity, and political clout of these communities is essential to this process.

Both the Colombo and Kolkata wetland fishery systems are under unprecedented threat due to the expansion of speculative real-estate investments. As the Colombo case illustrates, failing to protect community driven ecosystem based industries like wetland fisheries in the emerging cities from the pressures of capital, will not only cause a social injustice for those communities but also will have far reaching economic, social and environmental consequences that will endanger the wellbeing of a much larger urban population. We conclude by calling for further research on urban governance systems that can foster diversity in land-use and utilization of ecosystem services and livelihoods, in order to build resilient urban communities in the urbanizing cities of the Global South.

References

Bevir, M. (2012). Governance: A Very Short Introduction. Oxford University Press, Oxford, UK.

- CEA (Central Environment Authority) (1994). *Wetland site report and conservation management plan: Colombo Flood Detention Areas*. Central Environmental Authority of Sri Lanka, Colombo.
- Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry* 12(2), 219-245.
- Ghosh, D., & Sen, S. (1987). Ecological history of Calcutta wetland conversion. *Environmental Conservation* 14(3), 219-226.
- Ghosh, D. (2005). *Ecology and traditional wetlands practice, lessons from the wastewater utilization in the east Calcutta wetlands*. Worldview, Kolkata.
- Hettiarachchi, M., Athukorala, K., Peiris R., & Alwis, A.P. (2012). Recent changes in policy, institutions and ecosystem services in Colombo wetlands. In N. Gunawardane, B. Gopal and H. Kotagama (Eds.), *Ecosystems and Integrated Water Resources Management in South Asia*, pp. 254-273. New Delhi: Routledge India.
- Hettiarachchi, M., Morrison, T.H., Wickramasinghe, D., Mapa, R., de Alwis A.P., & McAlpine C. (2014). The eco-social transformation of urban wetlands: a case study of Colombo, Sri Lanka. *Landscape and Urban Planning* 132, 55-68.
- Hettiarachchi, M., Morrison, T.H., & McAlpine, C. (2015). Forty three years of Ramsar and urban wetlands. *Global Environmental Change* 32, 57-66.
- Heynan, N. (2014). Urban political ecology I: the urban century. *Progress in Human Geography* 38(4), 598-604.
- Kalegama, S. (2004). Introduction. In S. Kalegama (Ed.), *Economic Policy in Sri Lanka: Issues and Debates*, pp. 15-34. New Delhi: Sage.

- Kundu, N. (2010). East Kolkata wetlands: an introduction. In *East Kolkata wetlands: Newsletter, 1-7.* Kolkata, India: East Kolkata Wetlands Management Authority, Wetlands International South Asia.
- Marcuse, P., & Kempen, R.V. (2000). Conclusion: a changed spatial order. In P. Marcuse and R.V. Kempen (Eds.), *Globalizing cities: a new spatial order?*, pp. 249-275. Oxford, UK: Blackwell Publications.
- Morrison, T.H. (2007). Multiscalar governance and regional environmental management in Australia. *Space and Polity* 11(3), 227-241.
- Morrison, T.H. (2014). Developing a regional governance index: the institutional potential of rural regions. *Journal of Rural Studies* 35, 101-111.
- Nagaraj, R. (2006). Aspects of India's growth and reforms. New Delhi: Academic Forum.
- Robbins, P. (2007). *Lawn people: how grasses, weeds and chemicals makes us who we are.* Temple University Press, Philadelphia.
- Saha, T. (2011). *Wise use of wetlands: East Kolkata wetlands case study*. Kolkata: Institute of Environmental Studies and Wetland Management.
- Sarkar, R. (2002). Valuing the ecosystem benefits of manmade wetlands using conventional economic indicators a case study of the East Calcutta wetlands, Occasional Papers No. 01/2002.
- Sarkar, R. (2016). Greed, apathy destroying east Kolkata wetlands. Retrieved from http://www.thethirdpole.net/2016/04/06/greed-apathy-destroying-east-kolkata-wetlands/.
- Shaw, A. (2007). Introduction. In A. Shaw (Ed.), *Indian cities in transition*, pp. pp. xxiii-1. Chennai: Orient Longman.,
- Smardon, R.C. (2009). Sustaining the world's wetlands. London: Springer.
- Swyngedouw, E. (1996). The city as a hybrid: on nature, society and cyborg urbanization. *Capitalism Nature Socialism* 7(2), 65-80.
- Yokohari, M., Takeuchi, K., Watanabe, T., & Yokata, S. (2008). Beyond greenbelts and zoning:
 a new planning concept for the environment of Asian mega-cities. In J.M. Marzluff, E.
 Shulenberger, W. Endlicher, M. Alberti, G. Bradley, C. Ryan, U. Simon, & C. ZumBrunnen (Eds.), *Urban Ecology*, pp. 783-797. New York: Springer.