



Water in British India: The Making of a 'Colonial Hydrology'

Rohan D. Mazumdar*

Jawaharlal Nehru University, New Delhi

Abstract

The environmental history of India has moved on and considerably broadened since the first studies of Indian forestry were published. This essay surveys studies on water in British India, which it has clustered into three themes. While providing a rough description of some of the most important debates and discussions on the issue of colonial rule and its hydraulic interventions, the essay argues that interest on the subject must now attempt to pursue grand questions as well. Towards to this end, it is argued that much insight and theoretical traction may be gained from pursuing the conceptual notion of a 'colonial hydrology': the attempt to characterise the British experience as comprising an altogether distinct paradigm for hydraulic interventions.

Water in British India can be discussed in three overlapping but discrete clusters of concerns. The first and most substantially engaged debates have situated colonial irrigation strategies in terms of their environmental, political and economic contexts. The second cluster, closely shadowing the first, has explored aspects of 'decline', elimination and sometimes appropriation of a slew of 'traditional' water harvesting technologies. The third cluster of concerns, that is yet to achieve visibility, has aimed at identifying definitive patterns in colonial strategies towards hydraulic endowments. Put differently, the attempt is to characterise the British experience as comprising an altogether distinct paradigm for hydraulic interventions in South Asia; explanations that can perhaps be encapsulated under the broad rubric of 'colonial hydrology'. Part of this as yet incipient exercise involves, in my opinion, a departure from the emphasis on irrigation. In turn, this third cluster will explore colonial experiences with floods, drainage, wetlands, lakes, in-land river navigation, traditional fisher

gries on 'river-improvement' and Multi-purpose River Valley development. In several ways, these themes listed above (indicative and not exhaustive), could then, presumably, help fill in many existing empirical gaps and thereby craft a rigorous theoretical approach to explore the relationship between colonialism and water. By a theoretical approach, I suggest that the subject of water in British India should, similar to works on forests or land policies, be able to shed light on

the broader dynamics of colonial rule. Thus, while this essay is centrally aimed at providing a general introduction to the main themes on water in British India, it will nevertheless also attempt to argue a case for the term 'colonial hydrology'; the claim being that much like 'scientific forestry' or the zamindari system on land, colonial economic and political imperatives defined and impacted the region's fluvial endowments in specific and

lively debates on colonial irrigation in British India have been concentrated on the semi arid interfluvies of the north-west. On the other hand, studies on canal irrigation impacts in the south and the eastern deltas have as yet remained shy of taking on polarised positions. Studies on these regions have essentially looked at two aspects of the canal experience; a) productivity and the transition to commercial agriculture;⁵ b) failures of private irrigation companies in the Madras and Bengal Presidencies.⁶

Studies on colonial canal irrigation, as surveyed above, however, still lacks a credible comparative analysis. In particular, a comparative exercise could throw light on why certain irrigation precepts were persisted with and how colonial irrigation practices were shaped by a cross pollination of ideas, evolved from varied ecological zones.

Water Traditions and Colonial Technology

The second cluster of concerns have largely dealt with the schism between 'traditional' or indigenous water technologies and colonial hydraulic engineering endeavours, termed as modern systems.⁷ Attention to pre-British irrigation organisation, design and operations, in terms of their relationships and status in a colonial context, was arguably first explored in an article by Nirmal Sengupta, in 1980. Sengupta primarily sought to explore the reasons for the 'decline' of the traditional *ahar* (tank) and *pyne* (channel) irrigation system in colonial South Bihar. According to Sengupta, the *ahar* and *pyne* network began to breakdown following the introduction of new revenue routines by the colonial administration. In particular, by facilitating and encouraging a shift from 'produce' to 'fixed' and then to cash rents, the colonial administration invariably upset an entire rhythm of procedures, protocols and duties between tenants and landlords over the question of the maintenance and servicing of the *ahar-pyne* system. In effect, while the rent burden historically for the indigenous irrigation system was factored as a 'land-water combine', the colonial revenue format realised claims only from 'land'.⁸ In several ways, Sengupta set the tenor for subsequent works on the subject. In 1997, the Centre for Science and Environment, a Delhi-based non-governmental organisation, released a report titled *Dying Wisdom*, which had then put forward the most exhaustive survey on traditional or pre-British water harvesting systems in India.⁹ Besides describing the functional details and varied operational aspects of these water structures and situating them in their regional and ecological setting, *Dying Wisdom* also sought to advance a larger historical claim; that traditional water harvesting systems in India declined or were substantially degraded by a range of colonial actions for rule and profit. Colonialism, in other words, by instituting private property

Debating 'Colonial Hydrology'

Central to the third cluster of concerns on water is the attempt, in my opinion, to explore the possibility for outlining a grand theme approach such as the concept of 'colonial hydrology'. In other words, being able to characterise the colonial interventions in water as comprising a cogent and distinct hydraulic paradigm. A paradigm which involved fundamentally realigning land and water in new sets of social, political and ecological relationships.

At the level of technology, the British transformed many of the flood plains from previously being watered by seasonal or inundation canals to becoming sites for perennial irrigation works; involving the construction of permanent headworks across river beds with barrages and weirs.¹⁶ These perennial canal systems were technologically unprecedented for harnessing of fluvial environments and were operated through a corpus of social rules, economic practices, rationalities about property and colonial administrative disciplines. These perennial canals, however, were assembled not merely as channels commandeering river flow but more significantly ended up fundamentally reorienting ecological relations between land and water, notably through 'irrigation science'. That is, the canal schemes represented not merely the commercial and revenue calculations for colonialism but were interventions that worked to order distinct social and physical colonial contexts. Involving, in the main, to paraphrase David Gilmartin, the historically unprecedented attempted creation of the 'colonial resource regime' through an admixture of irrigation engineering science, routines of land revenue and by the intended colonial 'control' of society and nature.¹⁷ Thus, I would argue, the term colonial hydrology could perhaps best encapsulate the varied hydraulic interventions of colonialism to simultaneously alter South Asia's fluvial and social worlds.¹⁸

Along a similar plane, the second possibility that has hitherto not been substantially dealt with, in terms of a grand theme is the question of the dramatic alteration of British India's great drainage network.¹⁹ The nineteenth century witnessed the systematic proliferation of flood control embankments, intended to contain rivers within their main channels. In addition, the colonial administration also constructed a vast number of roads, railway lines and bridges.²⁰ These structures had several consequences for drainage and epidemiology. While in Bengal and the second poss4t82onsequ523 Tw1 0 0 1D1 Tn

themes such as 'colonial hydrology' will yield and formulate the next crop of important and significant questions.

Short Biography

Rohan D'Souza is Assistant Professor at the Centre for Studies in Science Policy, Jawaharlal Nehru University, New Delhi.

Notes

* Correspondence address: Rohan D'Souza, Centre for Studies in Science Policy, School of Social Sciences, Jawaharlal Nehru University, New Delhi-110067, India.

¹ Elizabeth Whitcombe, *Agrarian Conditions in Northern India: The United Provinces Under British Rule, 1860–1900*, vol. 1 (Berkeley: California University Press, 1972).

² Ian Stone, *Canal Irrigation in British India: Perspectives on Technological Change in a Peasant Economy* (Cambridge: Cambridge University Press, 1985).

³ Imran Ali, *The Punjab Under Imperialism, 1885–1947* (New Delhi: Oxford University Press, 1987). Also see M. Mufakharul Islam, *Irrigation, Agriculture and the Raj: Punjab, 1887–1947* (New Delhi: Manohar, 1997).

⁴ David Gilmartin, 'Scientific Empire and Imperial Science: Colonialism and Irrigation Technology in the Indus Basin', *The Journal of Asian Studies*, 53/4 (1994): 1127–48.

⁵ G. N. Rao, 'Transition from Subsistence to Commercialised Agriculture: A Study of Krishna District in Andhra, 1850–1890', *Economic and Political Weekly*, 20/25–26 (1985): A-60-9. Also see G. N. Rao, 'Canal Irrigation and Agrarian Change in Colonial Andhra: A Study of Godavari district, c.1850–1890', *Indian Economic and Social History Review*, 25/1 (1988): 25–60.

⁶ M. Atchi Reddy, 'Travails of an Irrigation Canal Company in South India, 1857–1882', *Economic and Political Weekly*, 25/12 (1990): 619–28; Pradipta Chaudhuri, 'Peasants and British Rule in Orissa', *Social Scientist*, 19/7 (1991): 36–42; Rohan D'Souza 'Canal Irrigation and the Conundrum of Flood Protection: The Failure of the Orissa Scheme of 1863 in Eastern India', *Studies in History*, 19/1 (2003): 41–68.

⁷ Nirmal Sengupta argues that traditional or indigenous can be separated from modern irrigation systems by the difference in their participatory character. While traditional systems require extensive participation and cooperation amongst its users, modern systems are governed by formal and centralised bureaucratic management. This distinction, however, tends to convey the impression that systems prior to British rule were rooted in democratic decision making and principles of equity. A claim that ignores caste practices in water distribution or the use of forced labour in repair and maintenance. Secondly, it is sometimes difficult to draw a hard and fast line between 'traditional' and 'modern' irrigation technologies as several modern schemes have incorporated aspects from pre-existing structures. For our purposes, therefore, traditional will refer broadly to the systems that prevailed prior to British intervention. See Nirmal Sengupta, *User Friendly Irrigation Designs* (New Delhi: Sage, 1993), 10. Sandra Postel argues that irrigation's modern moment found expression in the nineteenth century in British India. See Sandra Postel's *Pillar of Sand: Can the Irrigation Miracle Last?* (New York: W.W. Norton & Company, 1999), 40–64.

⁸ Nirmal Sengupta, 'The Indigenous Irrigation Organisation in South Bihar', *The Indian Economic and Social History Review*, New Delhi, 37/2 (1980), 157–87.

⁹ Anil Agraw1 0 0 1e7oned5.0 1 2121 0 0 1 119.256 342.Can 1(Ag)Tj1 0 0Dy1 0 201.804 390.25 T68(Ag)Tj1

¹⁴ Indu Agnihotri, 'Ecology, Land Use and Colonisation: The Canal Colonies of Punjab', *Indian Economic and Social History Review*, 33/1 (1996): 37–58.

¹⁵ *Report of the Committee Appointed to Enquire into the Administration of the Sone Canals*, vol. 1 (Calcutta: Bengal Secretariat Press, 1888), 12–20.

¹⁶ Herbert M. Wilson, *Irrigation in India* (Delhi: Daya Publishing House, 1989 [1903]), 78–81; D. G. Harris, *Irrigation in India* (London: Oxford Uni

- Postel, S., *Pillar of Sand: Can the Irrigation Miracle Last?* (New York: W. W. Norton & Company, 1999).
- Rao, G. N., 'Transition from Subsistence to Commercialised Agriculture: A Study of Krishna District in Andhra, 1850–1890', *Economic and Political Weekly*, 20/25–26 (June 22–29, 1985): A-60–9.
- Rao, G. N., 'Canal Irrigation and Agrarian Change in Colonial Andhra: A Study of Godavari District, c.1850–1890', *Indian Economic and Social History Review*, 25/1 (1988): 25–60.
- Reddy, M. A., 'Travails of an Irrigation Canal Company in South India, 1857–1882', *Economic and Political Weekly*, 25/12 (March 24, 1990): 619–28.
- Report of the Committee Appointed to Enquire into the Administration of the Sone Canals*, vol. 1 (Calcutta: Bengal Secretariat Press, 1888).
- Report of the Drainage Committee, Bengal (Presidency Division)* (Calcutta: The Bengal Secretariat Press, 1907).
- Rosin, R. T., 'The Tradition of Groundwater Irrigation in Northwestern India', *Human Ecology*, 21/1 (1993): 51–83.
- Singh, Praveen, '"Colonising the Rivers": Colonial Technology, Irrigation and Flood Control in North Bihar, 1850–1950', Ph.D. Thesis (New Delhi: Centre for Historical Studies, Jawaharlal Nehru University, 2003).
- Sengupta, N., 'The Indigenous Irrigation Organisation in South Bihar', *The Indian Economic and Social History Review*, 37/2 (1980): 157–87.
- Sengupta, N., *User Friendly Irrigation Designs* (New Delhi: Sage, 1993).
- Stone, I., *Canal Irrigation in British India: Perspectives on Technological Change in a Peasant Economy* (Cambridge: Cambridge University Press, 1985).
- Whitcombe, E., *Agrarian Conditions in Northern India: The United Provinces Under British Rule, 1860–1900*, vol. 1 (Berkeley: California University Press, 1972).
- Wilson, H. M., *Irrigation in India* (Delhi: Daya Publishing House, 1989 [1903]).