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An environmental history of land in Colonial Eastern India

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Drainage, River Erosion, and *Chaurs*
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What do the people, i.e., primarily the peasantry, want? The peasants want the land. Everybody knows that. The peasants are demanding that all the land in the country should belong to them.

V.I. Lenin
Volna, No. 15, May 12, 1906.
Lenin Collected Works,
Progress Publishers, 1965,
Moscow, Volume 10, p. 414.

Abstract

This paper will discuss how land as private property was constituted as the conceptual opposite of rivers-as-flow in colonial Eastern India. It will discuss how colonial notions about landed property were treated as the legal terrain of ownership, while river flow regimes became the subject of technical intervention. The Eastern deltas' through the course of the nineteenth century were re-plumbed by the colonial dispensation through a combination of irrigation, drainage and flood control practices. Alongside or paralleling this reworking of the region's fluvial pattern was the simultaneous production of an entirely new set of conceptions about the delta as a hydraulic phenomenon. In the colonial land-centred imagination, I argue, the delta now appeared as a collection of isolated fluvial elements rather than as a dynamic organic process. In sum, this paper suggests the possibility for an environmental history of the Permanent Settlement Regulations of 1793.

Perhaps, in any discussion about land today a certain awkwardness could creep in if one simply or somewhat plainly recalled the above quote of V. I. Lenin (1870-1924) ─ revolutionary leader and leading architect of the Great October Revolution of 1917. This awkwardness of ours, however, is not a response to the unruffled clarity that Lenin conveys in his pamphlet *The Land Question in the Duma*, which was printed and circulated in 1906. Nor is there any academic or political unease about digesting the fact that the peasants really 'want land'. Rather, the claim here is that the idea of land in the backdrop of today's environmental question calls for an altogether different order of

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political understanding. In the 'epoch of the Anthropocene', it can be argued that it is conceptually harder, if not entirely disingenuous, to keep unconnected issues of justice, agrarian production, ownership and even a full blown revolution from the larger challenge of meaningfully grappling with the idea of land as an ecological substance. Putting land back into discussions about nature via environmental history, as pointed out in this paper, would be critical to helping us develop a more attentive sense of politics and power. The craft of environmental history writing, in other words, helps us explore the ecological qualities of land in order to then set the stage, I argue, to grasp the latter's many dimensions as a political quantity.

Attempts to understand and debate the land question in India, interestingly enough, continues to remain a profoundly historical project. Not only for explaining agrarian complexities, stretching across centuries, but critically as well, for exploring profound ruptures in land management strategies in the subcontinent. One such defining ruptural moment in India, was undoubtedly the introduction of the Permanent Settlement by the East India Company, which was implemented in colonial Bengal (Eastern India) in 1793. In the words of the historian S. Gopal, the Permanent Settlement was 'a landmark (*no pun intended here*) in the history not merely of the province but of India as a whole'. [2] These Regulations were meant to unambiguously inaugurate a radical social and legal departure in British India. And at the heart of which lay efforts to institute the 'improving landlord' ─ the *zamindar*. This Company zamindar, as entrepreneur and rural magnate, would then, it was presumed, inevitably define the new agrarian order by affirming exclusive property, generating economic surpluses and ensuring political stability. [3]

Unsurprisingly, the quest to produce the triumphant company zamindar, in such short order, was closely followed up with efforts to debunk and delegitimize all revenue practices of the pre-1793 phase; notably what the British called farming of revenue. This impatience within the ranks of the company officialdom for previous taxing regimes is roundly summed up by Philip Francis—one of the important dramatis personae in the making of the Permanent Settlement regulations—who coldly averred that "…what they call local knowledge, is nothing but tyranny and prostitution".[4] The historiography on the Permanent Settlement, its many vicissitudes and its equally wide ranging political and social implications have been richly discussed with great nuance and sophistication by some of the best scholars on colonial India. It would be unwise, therefore, for me to rehearse those many arguments and insights. Instead, for the purposes of my claims here, I redirect attention to some of the striking unsolved puzzles that continue to haunt the otherwise absorbing literature on the Permanent Settlement. For one, the very same administrative and legal seeds that were sowed by the Company with which to grow the improving

[2] S. Gopal, *The Permanent Settlement in Bengal and its Results*, London: George Allen & Unwin Ltd: Ruskin House, Museum Street, 1949. p. 7.
[3] Rohan D'Souza, 'Rigidity and the Affliction of Capitalist Property: Colonial Land Revenue and the Recasting of Nature' *Studies in History*, 20 (2), 2004. pp. 237–72.
[4] Quoted in S. Gopal, *The Permanent Settlement*, p. 13.

landlord on the soils of Bengal actually ended up sprouting instead a rapacious, extractive, and parasitic feudal lord who in every possible manner became the opposite of the enlightened entrepreneur and innovator. To make sense of how such a sociological and economic back flip could result from what appeared to be a forward looking revenue policy has thus far been pursued along two lines of explanations.

The first being that the Company government in ruthlessly forcing their still fledgling landowners to be 'punctual' in revenue payments ended up actually wrecking the system itself. Failure to meet the government's demand meant that these landholders suffered an almost instantaneous loss of their land titles and a sudden and steep fall into the swarming numbers of the landless. The consequences from a ferocious churning of these land rights moreover caused not only the zamindars to become ruthless extractors of rent but inevitably also told disastrously on overall agricultural output.

The second reasoning for the failure of the Permanent Settlement is the argument that the Company zamindars were in actual fact 'divorced by and large from possessory dominion'. Put differently, '…these landlords had received in effect a property right in revenue collection or in the rental of the land rather than in land itself.'[5] This intended improving landlord, thus, was not meaningfully linked to the production process and therefore ended up simply becoming parasitic over the peasant cultivator; and hence the zamindar was a mere egregious extractor of revenue. Feudalism and its variant of subinfeudation, in other words, resulted from a script that was meant to celebrate the productive efficacy of private property. Underlying these writings, however, is the treatment of the idea of land as a passive stage upon which the drama of bourgeois property unfolds and stomps about. The raucous and bloody struggles over ownership, rent, revenue, tenancy, subinfeudation and the pursuit of the often times elusive agricultural surplus are all made to act out their parts as abstract meanings which possessed the sole agency to determine, classify, and settle land.

But was land as a 'factor of production' simply a mute prop to the labours of political economy and many betrayals of the East India Company? That is, could nature have been but a trivial outlier to the tectonic rumblings brought on by the social, economic and political transformations which followed in the wake of company rule in Bengal? Oddly enough, even within the writings that serve as the canon on the Permanent Settlement, mention is often made of the disquiet by the zamindars over the British policy on 'remissions'—a waiver on the revenue demand due to an extreme weather event such as floods or droughts. Through article VI, Section 7, the Regulations for 1793 emphatically and sternly made it known that the landholders would have '…no right to claim for

[5] Sugata Bose, *Peasant labour and colonial capital: rural Bengal since 1770*, Cambridge; New York: Cambridge University Press, 1993. p. 73.

suspension or remission on account of drought, inundations, or other natural calamities'. [6] In effect, the company zamindar in deltaic Bengal—a region wrapped up as it was by rivers, streams, wetlands, rivulets, marshes, estuaries, drainage lines and prone to regular inundations and ferocious monsoonal downpours—were treated as acting independent of their ecological contexts that materially determined agricultural output.

And even when swollen rivers periodically inundated lands and expectedly enough led to severe crop losses, an unshaken and resolute Charles Cornwallis (1738-1805)—the main author and architect of the Permanent Settlement ─maintained that since the zamindars would derive immense profits from the stability and predictability of the new revenue system, '…the deficiencies of bad seasons [would] on the whole be more than counterbalanced by the fruits of favourable years'.[7] This unshakeable insistence by the British Company administrators that land as private property was the fixed unchanging opposite to the volatile impermanence of the flow of rivers, in fact, conceptually informed much of the weighty articles, clauses and rules that made up the Permanent Settlement regulations of 1793.

For all the perceived fiscal conveniences and administrative clarity that the Permanent Settlement was assumed to have given the East India Company, deltaic Bengal, however, was hardly an environment that could be neatly separated into distinct soil and water domains. If anything, the voluminous and immense *Ganges–Padma* river system was a soil-water admixture: a whirling broth of land and river in which soils were churned by the force of flows and the flows in turn could become leaden currents which sluggishly settled down for a while as spits of land (chaurs) or marshy earth only to be rendered soluble again with rain and inundation.

If anything the land-centered imaginations that were embedded in the Permanent Settlement Regulations, I argue, ended up turning the East India Company administrators and later on the colonial officers of British India into sorcerers of sorts: men who were caught up in trying to transform water into soils by endlessly trying to split the deltaic admixtures into neat separations of immiscible units of land and flows. To understand these many onerous efforts in Bengal in the early colonial period, not as the arts of alchemy, but as an environmental history of the Permanent Settlement requires us to pose our problems differently. Not centrally as the drama involving the introduction of bourgeois property but, instead, as the desperate and difficult battles and struggles against rivers and their irascible flows. Four snap shot moments will help us point to a different history in which the quest for a steady, stable and standardized revenue collection strategy ultimately found itself repeatedly brought to grief by the disorder, instabilities, and chaos inherent to the delta's peculiar ecological context.

[6] Sirajul Islam, *The Permanent Settlement in Bengal: A Study of its Operation 1790–1819*, Bangla Academy: Dacca, 1979, p.15.
[7] Ibid., pp. 18–20 for the discussion on the Company's debate over the remission policy.

1. Shifting heads and 'all season' navigation

Our first snapshot concerns the East India Company's troubled preoccupations with rivers in the district of *Nadia,* which they noted was crisscrossed by several fluvial arms that erupted directly from the main stem of the Ganges [8] (notably the *Bhagirathi*, *Jalangi*, and *Mathabanga*).[9] In one of the first references in 1813, it was recorded that the company administration had entrusted the 'improvement' of the Mathabanga to the offices of the Collector and the local police department. And by way of improvement, the administration urged for a regular clearing of the bed of the river channel from sunken boats, loose timber, and large trees. [10] Such clearances, it was reckoned, would make the river safe for navigation. In 1818, however, the 'obstructions' were deemed to have become so dangerous that a large number of boats were being regularly damaged or wrecked as they sought to cross the channels. This inability to create safe passage, in turn, meant that the cargo laden ships often had to be detained for prolonged periods of time with costs dramatically spiraling, in particular, from demurrage. Things had deteriorated to such an extent that the merchants of Calcutta, in that year, even loudly petitioned government for steps to remedy the 'evil from which commercial interests suffered so severely'.[11]

In the winter season of 1819–20, as anger and anxiety rose, one Mr. C.K. Robinson was appointed as the Superintendent (Spdt.) and Collector of the Mathabhanga. Amongst his immediate tasks was the need to rescue the navigation establishment itself, which was tottering in imminent financial collapse. In January of 1820 a toll office was quickly established at Kissenganj to generate funds and meet mounting working expenses. Whilst finding the finances in such ways for keeping the waters navigable was understandable and urgent, the very notion of river improvement, however, was also getting complicated. In the initial years, it was believed that the channels could be kept passable by simply clearing their beds from obstructive logs and capsized boats, but increasingly the officials now found themselves dragged into also pursuing larger technical questions. In particular, they became convinced that it was critical to maintain a steady flow regime within the channel to create standard conditions for navigation. In effect, that meant trying to turn the river's many capricious currents into stable and predictable flows. Convinced by this new engineering

[8] For convenience, the orthography and the spelling of river names are retained as noted in colonial reports and documents. Hence, for example, I have chosen to use the spelling Ganges instead of the contemporary and official Ganga.

[9] *Selections from the Records of the Government of Bengal Relating to the Nadia Rivers (From 1848 to1926)*, Calcutta: Bengal Secretariat Press, 1931. (Henceforth *Nadia Rivers (From 1848–1926).*)

[10] 'Notes on the changes of the heads of the Mathabanga river since 1825 compiled by Mr. S. C. Sur, Executive Engineer, Nadia Rivers Division', in, *Nadia Rivers (From 1848–1926),* p. 35.

[11] Report on the Nuddea Rivers and the advantages derived from the measures annually adopted for facilitating their navigation. No. 89, dated Kishnaghur, the 14th July 1848. From Captain John Lang, 36th Regiment, Bengal N.I, Officiating Superintendent, Nuddea Rivers. To The Officiating Superintending Engineer, Lower Provinces, in *Nadia Rivers (From 1848-1926),* pp. 72–89.

vision, Spdt. Robinson set about having an embankment constructed across the *Como* (*katcheekatta*) in order to turn its flows via a canal into the Mathabhanga river. In all probability, this was amongst the first attempts in colonial Bengal to transfer flows from a smaller stream to stabilize a larger channel. [12] The embankment, unfortunately, immediately gave way and was followed soon enough with Spdt. Robinson also being unceremoniously dismissed, with the position of superintendent now falling on the shoulders of Mr. May in June of 1820. [13]

For the next two decades, Supdt. May (1820-1840) grimly wrestled with the moody Nadia rivers, which he discovered to being volatile and fickle with an intemperate ability to wax and wane across seasons. To add to the exasperation, the 'heads'—the point at which the rivers drew their waters from the Ganges—often silted up or erupted with new openings. With their supplies thus erratically pinched off, enervated, or dramatically increased, the channels could thus often times alter their volumes rather abruptly. In 1823 a series of shoals [14] rapidly emerged at the head of the Mathabhanga and threatened to disrupt navigation. In an attempt to speedily remove the shoals, Spdt. May spent a reasonably royal sum of £1,040 to employ a set of oxen driven dredging machines. Amidst the arduous efforts, however, the Ganges suddenly 'flexed' and went on to dump 'masses of sand' onto the Mathabhanga's head and forcibly brought the dredging machines to a complete halt. Having thus suffered a complete rout, Spdt. May was compelled to wearily acknowledge '…that the constant changes in the course of the Ganges rendered it almost impossible to keep the heads of the Mathabhanga and Jalangi fixed'.[15] In fact, in no two seasons, he further lamented, were the openings or entrances of the rivers ever found to be in the same position or point.

Besides carrying out regular dredging operations aimed at flushing shoals by physically stirring the muddy waters, the navigation establishment also pursued *bandalling*. As a device, the *bandal* was ingenious: comprising in essence a simple set of fixed vertical screens mounted on a frame. Typically, the screens were made of bamboo mats and the frames consisted of bamboos driven into the river bed. These bandals were placed at an angle to flowing currents so that the water near the surface got deflected on hitting the screens. The heavier sediment-laden water moving in the depths of the channel, on the other hand, ended up now passing more or less perpendicularly under the screens.[16] The intended result

[12] Ibid., p. 73.
[13] 'Notes on the changes of the heads of the Mathabanga river since 1825', pp. 34–38.
[14] Shoals: sandy elevation that arises within the channel and becomes a hazard for navigation.
[15] Notes on the changes of the heads of the Mathabanga river since 1825, p. 35.
[16] L. van Bendegom Jansen, J. van den Berg, M. de Vries & A. Zanen, *Principles of River Engineering: The non-tidal alluvial river*. Pitman, London,1979. Also see C.V.J. Varma, K.R. Saxena & M.K. Rao, eds., *River Behaviour, Management and Training*, Central Board of Irrigation and Power, Publ. No. 204, Vol. I, New Delhi, 1989.

from the bandal, thus, was at first to increase the velocity of the current within the channel and then secondly guiding the flows to carry the heavier sediment elsewhere.[17]

The Nadia rivers' navigation establishment also constructed minor dams and carried out cuts into the banks of rivers in order to move waters between channels: all efforts intended in the final scheme of things to enable the river bed to carry enough draught for shipping. Many of these efforts, however, as pointed out earlier, repeatedly came to grief. The Bhagirathi river, for example, despite many such physical and technical interventions, was observed to have upwards of 23 shoals developing near its entrance in 1830 while between 1826–27 to 1830–31 was declared as being unfit for navigation in the dry season.[18] But paralleling the perplexing concern with maintaining the river's depth and volume for navigation was the equally troubling consequences when these fluvial forces began to 'encroach' upon the land. In particular, noted Spdt. May, the 'mischief' arising when trees were allowed to stand precipitously along the edges of the banks. When these rivers, as was becoming typical of their behavior, gobbled up the surrounding plains these trees were simply dragged by raging torrents and then dangerously lodged into the new bed of the channel. Much of these obstructions, in the opinion of Spdt. May, could have actually been stopped by the early cutting and disposal of the trees. Given, however the 'aversion of the Hindoos to cut the Peepul and Bur (Banyan)', he irately recorded, meant that these large trees were simply left perilously holding on to fast eroding banks before they were ultimately gulped by the dreary current with damaging consequences.[19]

The trying and watchful requirements for keeping the Nadia rivers navigable is amply indicated in the statement of accounts that were sent to the Military Board. In one such submission in early 1833, Spdt May lists expenses and efforts involved in a three year period:

Bandhals constructed …….359
Sunken Boats removed ……..118
Ditto trees and timbers ditto…… 219
Pucca [permanent]
Buildings pulled down ……..... 12
Trees cut down on the banks ……...1,731

[17] 'Report on the state of the Bhaugirutty and Jellinghee Rivers between the Ganges and Nuddea, with the result of the means used to improve Navigation during the dry season of 1847–48' in *Nadia Rivers (From 1848–1926)*, p. 90.

[18] 'History of the Bhagirathi river compiled by B.R. Haldar, Executive Engineer, Nadia Rivers Division' [6th September, 1925], in *Nadia Rivers (From 1848–1926)*, p. 2.

[19] 'Report on the Nuddea Rivers and the advantages derived from the measures annually adopted for facilitating their navigation. No. 89, dated Kishnaghur, the 14th July 1848. From Captain John Lang, 36th Regiment, Bengal N.I, Officiating Superintendent, Nuddea Rivers. To the Officiating Superintending Engineer, Lower Provinces', in *Nadia Rivers (From 1848 to1926)*, p. 72.

While the above list gives the impression that the navigation establishment had concluded on a set of technical routines and responses to manage the rivers , Spdt. May was quick to also clarify that '…it was impossible to lay down any fixed rules of guidance or plan of operations; by which the navigation of the Nuddea rivers could be permanently maintained'. [20] Put differently, steadying the rivers for keeping them passable through the year still remained unclear and based on methods involving trial and error. A view that continued to persist with Spdt. May's successor, Major Smyth of the Engineers who, after seven years of supervision, also came around to arguing that it was impossible to keep the channels permanently navigable.[21] Nevertheless, all were not equally deterred or intimidated by the prospect of eventually straightening out the rivers and keeping their flows constant. Colonel Arthur Cotton, for one, already some sort of a celebrity amongst the colonial engineering fraternity, confidently advocated a solution that he somewhat immodestly termed as the 'Colonel Cotton Plan'. The plan involved throwing an *anicut* (a dam) across the Ganges system 'at the head of one of the Nuddea (Nadia) rivers. [22] This anicut, in Cotton's opinion, would then be used to redirect flows from the Ganges into a canal which would then serve as a permanent steam navigation line running all the way up to Calcutta.

The response in Bengal to the Colonel Cotton Plan was immediate and dismissive. Major J. Lang in a carefully worded report, titled *Memorandum on the Ganges and the Nadia Rivers,* submitted in 1854, not only pointed out that the Nadia rivers were capable of dramatic alterations but even chose to end his conclusions with a touch of obvious sarcasm:

> I fear Colonel Cotton may have formed his opinion of the Ganges from descriptions that were applicable only to parts of its course above Rajmahal. I am therefore desirous that he should know as much of its character below the head of the delta.[23]

Besides questioning Colonel Cotton's understanding of the hydraulic peculiarities of the Ganges system, Major Lang, also sought to finish the Cotton Plan with a decisive conceptual upper cut. The claim here was that Cotton's experiences with the *Godavari* river in South India would not prepare him to deal with the 'the vast disproportion [in the Ganges] between the supply of the inundation and that of the dry season'. Consequently, in Major Lang's opinion, the enormity of the water flowing down the Ganges system and it sharp variability meant that any attempt to adjust the supplies between the rivers would invariably also lead to the deleterious shuffling of the enormous sediment as well. The danger of messing around with how the Ganges moved huge amounts of silt through its currents, in other words, could open the disastrous possibility of obstructing many of the approach routes to the port of Calcutta.[24]

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[20] Ibid., pp. 75–80.
[21] 'Memorandum on the Ganges and the entrance of the Nuddea Rivers by Major J. Lang, Superintendent, Nuddea Rivers, 1854', *Nadia Rivers (From 1848–1926),* p. 109.
[22] Ibid., pp. 117–18.
[23] Ibid., p. 118.
[24] Ibid., pp. 118–123.

Two aspects in this snapshot help us recall our main argument. First, in the technical pursuit for hydraulic stability and permanence, the Gangetic system was not viewed as a deltaic process but rather had its feature of recurring inundations reduced to the problem of being an 'aberration' of nature. The second, equally telling aspect was that underlying the efforts to achieve these standard and consistent volumes in the river's channels, the colonial officials ended up pursuing navigation as being principally about sustaining the neat divide between land and water. All season navigation, in other words, had no place for soil-water admixtures: flows and land had to be kept firmly apart.

2. Revenue and the 'craze' for embankments

The second snapshot, reviews the Company's responses to recurring inundations and its links to revenue collection. Early on in deltaic Bengal, Company administrators concluded that preventing inundations could help maximize revenue realization. Lands adjoining active deltaic rivers, they learnt, were particularly vulnerable to being soaked by onrushing currents causing severe crops losses. Not unexpectedly, these regular inundations upset the Company's 'rigid' revenue calculations.[25]

In the course of formulating the revenue demand for Bengal, as part of the exercise for the Permanent Settlement elaborated in 1793, the incipient Company administration declared that certain estates were to be granted allowances on the revenue demand (*Jama*) as compensation for maintaining their *bunds* (flood control embankment).[26] In 1796, the Board of Revenue received a report that the neglect of the bunds by the zamindars of Kasijorah *pargana* in the district of Midnapore had resulted in 'serious inundation'. After another report of allegedly similar zamindari laxity and indifference in the pargana of Mynachour, the Company administration concluded that embankment repair and maintenance had become a source of considerable contention and required a far more forceful administrative approach.

In March 1798, the Board of Revenue authorized the collector of Midnapore to undertake embankment repairs in the parganas of Kasijorah and Shahpore, and recover the expenses from the zamindars in 'proportion to the interest which they respectively possess[ed] in the bunds.' The decision immediately drew the ire of several zamindars, who insisted that rather than pay potentially higher costs to the Company for repairs that the latter might carry out, the estate owners should be allowed to do it themselves. Some zamindars, however, refused to undertake any repairs altogether. This caused the Board of Revenue to extend an order passed earlier in January 1798 to the parganas, specifying that if the

[25] Rohan D'Souza, 'Rigidity and the Affliction of Capitalist Property: Colonial Land Revenue and the Recasting of Nature' in *Studies in History*, 20 (2), 2004, pp. 237–272.
[26] H.L. Harrison, Collector Midnapore, to the Officiating Commissioner of the Burdwan Division, 3rd December 1877, *Cossye and Seyle Floods, May 1860 to September1893, vol. I*, (Calcutta, 1928). p. 331. (Henceforth Harrison, *Cossye and Seyle Floods).*

zamindars failed to repair their bunds the Company administration would then carry them out on its own initiative and forcibly recover the expenses from the intractable landlords.[27]

The Company found itself 'habitually compelled' to carry out repairs because of what was perceived to be zamindari recalcitrance in the adjoining district of Murshidabad as well. In 1800, for example, the Collector of Mushidabad was directed by the Board of Revenue to spend Rs. 32,788 on the bunds in the district and was authorized to put up for sale the lands of the 'defaulting' zamindars in order to recover the costs of the repairs.[28] The Company's sale laws brought into effect in the Permanent Settlement territories, however, further frustrated the administration as frequent changes in estate ownership and regular dismemberment of large holdings into smaller plots confused their attempts at clarifying responsibilities for bund maintenance [29]

Throughout the early tumultuous years of rule, in fact, Company officials found themselves increasingly, on the one hand, being entangled in the fairly sordid task of ascertaining and recovering from the concerned zamindars the costs for restoring the 'protective' works, while, on the other, forced to maintain many of the embankments in working order. Unsurprisingly, in the subsequent enactment of Embankment Regulation VI of 1806 ─ probably the Company's first directive on the subject of flood control in Bengal ─ the administration sought to officially enforce private responsibility for bund repair and upkeep.[30] Embankment Committees were also now set up under the new regulations and empowered to act:

> … if the zemindars neglected their duty, the Embankment Committees had to call upon them to make the repairs, and, if they still persisted in their neglect, to submit an estimate to Government, and after approval to carry out the repairs, and recover the amounts from the zemindars (sic) or farmer bound to keep the embankments in a proper state of repair.[31]

But in attempting to compel the zamindars to bear the financial costs for protecting their estates, the Company inadvertently also devolved onto itself the task for monitoring and ascertaining the nature of the supposed threat posed by the deltaic rivers. In effect, the incipient Company bureaucracy through the Embankment Committees and armed with

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[27] Harrison, *Cossye and Seyle Floods*, p. 331.

[28] Embankments in Murshidabad, *Selection from the Records of the Government of Bengal Relating to the Nadia Rivers, 1848 to 1926* (Calcutta, 1931), p. 53.

[29]The Company administration in a bid to maximize its income and enforce its new proprietary laws initiated the sale of any estate whose owner had defaulted on the revenue installments. In both Orissa and Bengal an innumerable number of such defaulting zamindaris were sold in the first two decades of colonial rule. See B.B. Chaudhuri, 'Agrarian Relations: Eastern India' in Dharma Kumar (ed.) *The Cambridge Economic History of India 1757-1970*, vol. II (Delhi, 1982), pp. 91–98.

[30] Regulation XXXII of 1793 was the first directive on the embankments, followed by the appointment of local Committees in 1801 to supervise the embankments. Regulation VI of 1806, in fact, superseded the previous two rulings. See *Embankments in Bengal*, pp. 131–132.

[31] *Cossye and Seyle Floods*, p. 331.

Regulation VI of 1806 ended up acquiring the exhausting responsibility for enforcing the separation between land and rivers . Urged thus by the need to secure property , the colonial authorities increasingly felt compelled to encourage the construction of permanent flood control embankments—structures designed to insulate lands comprehensively from inundation. Inevitably, to the official colonial mind, separating cultivated tracts from inundations assumed an overwhelming administrative imperative in which the interests on land became dependent on containing the rivers within their respective channels.

The earliest colonial observations — on structures that were presumed to be flood control embankments — were made as references to the term 'pool bundy'. These small dams that were thrown across river beds or alongside (at various angles) flowing channels were interpreted as structures 'for the protection of the tract of country, against the irruption of waters'. [32] To the Company's consternation, however, the native embankments turned out to be not only constructed in several shapes and sizes but appeared to have been deployed for functions other than for exclusively insulating lands from seasonal inundation. In an 1838 report on the status of the embankments in the adjoining district of Cuttack (Orissa), an enquiry committee chose to classify the innumerable types of structures under eight broad groups, based largely on the latter's location and presumed functions.[33] According to the Committee, the embankments or bunds served a number of purposes such as: a) excluding salt water during spring tides, b) damming mouths of hollows (*khalls*) in order to retain fresh water, c) diverting water for irrigation d) leading excess water into drainage channels and e) protecting lands that adjoined river channels from flood spill. Many of these structures, they further surmised, were intended to perform different functions in different seasons or situations. A protective structure for excluding the salt water of spring tides, for example, was often also used to retain fresh water for irrigation. Cultivators, furthermore, often made 'cuts' into the bunds to allow or quicken the passage of water for drainage or irrigation and in certain circumstances they were not averse to either abandoning some embankments altogether or constructing a bund or two for a single season. Lastly, the colonial authorities noticed that these 'native' bunds were more like a patchwork of haphazard constructions that often ran perpendicular to the river rather than parallel to it and did not comprise a 'uniform' or 'continuous' system. [34] This virtual kaleidoscope in bund types and innumerable functions, now strongly appeared to have been harmonized by the cultivators to complement an intricate system for irrigation and drainage.[35] Clearly, the colonial view that the native

[32] *Report on the Embankments of the Rivers of Bengal*, Bengal Military Orphan Press, Calcutta, 1846. V/27/732/36 Oriental and India Office Collection, (OIOC, the British Library,) London**,** p. 2.
[33] *Gungoareah Bundee, Bahar Bundee, Hussea Bundee, Khall Bundee, Khall Kundee, Falni Kassie, Bheera Bundee* and *Bheree Bundee* See *Embankments in Bengal: Note on their Origin, Development and Utility (1772-1850),* p. 33, Land Revenue Records (28 March 1851), in Index to Land Revenue Records (1838–59), vol. II. NAI. (Henceforth *Embankments in Bengal*.)
[34] *Embankments in Bengal*, pp.33-38.
[35] Embankment Committees Reports (Calcutta, 1901), pp. 36-40, V/27/730/7. . OIOC (The British Library)

bunds were exclusively part of a system of permanent structures for insulating lands from floods was not the shared view on the ground. [36]

The debate on the 'native bunds' clearly suggest that two significant changes in hydraulic management were initiated by the Company. First, that revenue claims stemmed from a strong notion of property and hence the latter had to be secured from seasonal inundations. Second, sustaining flood control structures as a uniform and consistent barrier meant that complicated local arrangements for drainage and irrigation through bunds had to be dismantled. Hence, flood control embankments were meant to singularly secure lands from river inundation by eliminating other types of hydraulic relationships.

3. Plugging leaks and Shoring up the Land: drainage conundrums

The third snapshot concerns the Company administration's many dilemmas over drainage. The Bengal delta was riven by a network of drainage lines that crisscrossed and connected rivulets, streams and even large channels. This lattice of flows inevitably trickled and wound their way to the grand basin, the Bay of Bengal. Prior to colonial rule, it appears, that 'natural drainage' in the deltaic tracts was crucial to possibilities for habitation and agrarian production. Some indication of which is given in an account on the 'general system' of village drainage in Bengal noted in the *Bengal Drainage Committee Report* of 1907 (quoted in turn from the *Epidemic Commission Report of 1864*):

> The drainage of all villages…in Lower Bengal is effected by the water first running into the nearest paddy-fields lying in the direction of their slope, thence it collects in the *bheels* (ponds) from which it rushes through *khals* (drainage lines) into larger streams, which again communicate with navigable rivers.[37]

The above description suggests that villages and their production contexts in the delta were strategically situated with regard to drainage. Drainage, in effect, connected different depressions, wetlands and basins with flowing streams or rivers. Such circulation, however, was a fragile one, as a single disturbance or obstruction could upset an entire dendritic fluvial equation. Despite the delicate nature of the drainage pattern, colonial rule, had during the course of the nineteenth century, inaugurated a number of projects for road, railway and embankment construction in the region. These modes of transport with their emphasis on permanent all weather structures and mostly built in unrelentingly straight lines marked a break of sorts from earlier patterns which were often times based on circuitous rough paths

[36] 'Embankments in Bengal: Note on their Origin Development and Utility (1772-1850)', Land Revenue Records (28 March 1851), in *Index to Land Revenue Records 1838-1859, Vol. II,* [National Archive of India].

[37] *Report of the Drainage Committee, Bengal (Presidency Division),* The Bengal Secretariat Press, Calcutta, 1907, pp. 20-21.

and 'crooked' routes.[38] The colonial transport network in Bengal radiated along the East-West axis, while the region's natural drainage lines, in contrast dropped from North to South.

By the second half of the nineteenth century, official concern built up over what was widely discussed as the 'problem of obstructed drainage'. Several enquiry committees were established and tasked to deliberate on issues of water-logging, stagnant water bodies, malaria, and the impacts of railways and roads on drainage. Amongst the first, was the Epidemic Commission of 1864 set up to investigate the causes for the growing menace of malaria. In 1867 and 1868 another set of elaborate enquiries were on the same subject and their conclusions were summed up by Colonel Nicolls, then Chief Engineer of Bengal, in a Note of 4th March 1869:

> …roads and railways in Bengal have not obstructed the drainage of the country so far As to cause or to aggravate sickness. But some obstruction is inevitable and should be remedied as soon as possible.[39]

Colonel Nicoll's assessment could not escape being contradictory. While firmly dismissing claims that linked roads with malaria, there was an admission, in the same breath, that drainage congestion did result from obstructions brought on by roads. Clearly, there was no going around the fact that all weather transport structures would logically interrupt and disturb drainage. It was precisely over this mixed conclusion, in fact, that two sharply opposed ideas on the issue of drainage began to take shape. On one side, formulated chiefly by Raja Digamber Mitter, it was argued that Bengal's drainage problems were 'entirely man-made', in that the 'natural drainage system' had been systematically interrupted by obstructions. The solution, according to this view, was to restore the 'natural' pattern by reconnecting the fluvial circuits. Flows had to follow a route in which drainage moved from 'villages to the arable lands, from paddy fields to *beels* and from the beels through *khals* and water courses to the navigable rivers'.[40] In effect, a call for restoring a complex land-water tapestry made up of localities and places, threaded and held through fluvial linkages.

On the other side of the fence were those who argued the opposite. Drainage congestion, they claimed, was intrinsic to the delta and that only 'man-made interventions' such as artificial drainage schemes could relieve it from the scourge of stagnant malarial swamps. Thus, in this latter assessment, the deltaic tract could not be perceived as a single organic bloc made up of intricate patterns of drainage but instead appeared as a disconnected aggregation of marshes, wetlands and waterlogged sites. This divide over the question of drainage — between those arguing for the restoration of natural drainage circuits against the insistence that the delta had to be cured of its naturalness — was dramatically played as

[38] See Jean Deloche, *Transport and Communication in India: Prior to Steam Locomotion*, vol. I & II, Oxford University Press, New Delhi, 1993 &1994

[39] *Report of the Drainage Committee, Bengal (Presidency Division),* The Bengal Secretariat Press, Calcutta, 1907, p. 33.

[40] W. A. Inglis, *A Review of the Legislation in Bengal*, Bengal Secretariat Press, Calcutta, 1911, p. 69.

intense discussions over the Bengal Sanitary Drainage Act, which was introduced at the Governor's Council meeting on 9th February of 1894.

One of the Council members, L. Ghosh brought to the fore the sharp divide. For Ghosh, solutions lay in schemes that facilitated 'surface drainage' in the villages, which he contrasted with 'subsoil drainage'—the draining of *maidans* (open lands), paddy-fields and beels. [41] The differences between the proponents of surface and sub soil drainage respectively, in fact, mirrored the build up towards larger disagreements over the root causes of 'unsanitary conditions' in the delta. While those advocating surface schemes believed that the restoration of natural drainage would be vital, those arguing for subsoil interventions, in contrast, campaigned for purging the delta of its naturalness. Amidst the din and vitriolic exchanges, however, was the other fear that the Bengal Sanitary Bill was too narrowly designed for propertied interests. According to the format specified in the Bill, the government would act on a 'drainage complaint' through a Drainage Commissioner, who would only respond to persons at the local level with 'interests in the land'. The Drainage Commissioner was then expected to conduct a survey of the affected locale and submit a report based not only on the physical nature of the undertaking but, more specifically, with an eye towards the 'particulars as to the estate and tenure holders and cultivating raiyats (peasants) of the local area …' .[42] That is, drainage was essentially an adjunct to the land question and its imperative defined by the urgency of the revenue demand.

The Bengal Sanitary Drainage Act was finally passed in late 1895. In the last instance, however, Section 3 which allowed for the drainage of marshy lands and even rice lands was deleted. But in tying drainage critically to the land question, the technical orientation was aimed at works that drained and dried soils in the pursuit of cultivation. An investigation of schemes such as the Magra Hat Drainage Scheme, Dankuni Drainage works, and Rajapur Drainage scheme would, in fact, clearly indicate that drainage was defined as an adjunct to the productivity of land rather than an element that continually adjusted the shifts between soils and flows in the delta. [43] In effect, sustaining the divide between land as ownership and water as technical detail essentially served as the overriding framework for organizing the Sanitary Drainage Bill. Critically as well, colonial drainage interventions recast the idea of the locality as defined by ownership in land rather than as a fluvial tapestry comprising admixtures of soils and flows. In a sense, therefore, for the colonial authorities

[41] Ibid., p. 68.
[42] Ibid., p. 67.
[43] Some of the excellent debates around the issue of drainage are available in the following sources: W.A. Inglis, *The Canals and Flood Banks of Bengal*, Calcutta, Bengal Secretariat Press, 1909.pp.465-561; *Papers from 16th March 1901 to 14th April 1914 Relating to the Magra Hate Drainage Scheme in the 24 Parganna District*, Selections from the Records of the Bengal Government, Calcutta, The Bengal Secretariat Press, 1915; G.C. Machnonchy, Superintending Engineer, Public Works Department, *Problems Regarding Flood Drainage*, Calcutta, The Bengal Secretariat Book Depot, 1905; C. Addams-Williams, Executive Engineers, Public Works Department, Bengal, *History of the Rivers in the Gangetic Delta 1750-1918*, Calcutta, Bengal Secretariat Press, 1919.

the local context was a homogenous collation of propertied interests instead of a collection of varied translations between land and rivers.

4. **Inundation Irrigation: mixing water and soil**

The fourth and final snapshot deals with the concept of inundation irrigation. A notion that draws upon the hugely controversial claims made by William Willcocks (1852-1932), arguably amongst the most celebrated engineers of the British Empire. Born in India and having survived the events of the 'Indian Sepoy Mutiny' of 1857, Willcocks launched himself through the Indian Irrigation Service and acquired a considerable reputation for his services in Egypt and Mesopotamia (modern day Iraq).[44] In March 1930, in the twilight years of his career, he delivered four lectures at Calcutta University, which were subsequently published in June of that year. Oddly enough, for one who had spent a lifetime espousing the ideals and virtues of modern canal irrigation, Willcocks chose to deliberate instead on what he claimed was the physical erasure by colonial rule of a once vibrant tradition of inundation irrigation in the Bengal region. According to him, a large network of 'overflow canals' traversed the deltas of the Ganges and Damodar basins and irrigated almost 7,000,000 acres of land, all this much prior to the great civilizing and modernizing impetus of British rule.

These broad and shallow inundation canals were designed, in Willcock's opinion, to tap the silt laden crest waters of the flooding rivers that also carried rich fine clay. These canals were, furthermore, long and continuous and ran almost parallel to each other. The most striking feature of flood or overflow irrigation, however, was its importance as a fertilizing agent and not merely as a source for water. Willcocks argued that the 'rich red water of the river and the poor white water of the rainfall' had to in fact be made to combine in order for agrarian production to be sustainable and successful.

> … if your rice fields have been irrigated by rain water alone, they are weak and cry for irrigation in October with excessive and costly supplies of poor river water … . If however you have irrigated your rice fields with rain and river water mixed together in the early months of the monsoon when the river water is rich and full of mud, you so strengthen the plants of rice that they resist the hard condition of an early failure of the monsoon in a way rice irrigated by rain water along has no knowledge of. River water in the early months of the floods is gold.[45]

On these muddy waters, moreover, bobbed a multitude of fish eggs which then floated into subsidiary channels, tanks and rice fields. These eggs, according to Willcocks

[44] For a brief account of Willcocks' experiences in Egypt, especially his bitter fight with Sir Murdoch Macdonald on the question of the flow data records of the Nile river see Herbert Addison, *Sun and Shadow at Aswan*, (London, 1959), pp.69–78. For an autobiographical sketch see Sir William Willcocks, *Sixty Years in the East*, (London, 1935). Also see Canay Ozden, 'The Pontifex Minimus: William Willcocks and Engineering British Colonialism', *Annals of Science*, 71(2), 2014, pp. 183–205.

[45] Sir William Willcocks, *Ancient System of Irrigation in Bengal*, (Delhi,1984), p. 32

soon hatched into young fish, who then instantly fell on the larvae of the mosquitoes and 'lived on them', thereby eliminating malaria.[46] The other significance of overflow irrigation, he claimed, was that it did not obstruct the build-up of the delta. By widely diffusing silt over the alluvial plains it allowed the annual inundations to actively function as geomorphologic agents, which in time raised the land and thereby blunted the ferocity of flood currents.[47] Cultivators who harnessed overflow irrigation, moreover, did not view inundations as natural calamities that needed to be shutout from productive lands; rather the inundations carried red silt and fish eggs that checked malaria while building lands and fertilizing fields. In effect, inundation irrigation did not recognize a hard separation between land and water. Rather, flooding lands was about acknowledging the productive possibilities of flows.

Perennial canal irrigation, on the other hand, rested on opposite principles to that of overflow irrigation. Permanent headworks such as barrages or weirs (with shutters or gates) were erected across the beds of rivers, notably in the north western semi-arid regions in colonial India.[48] These constructions, in turn, were intended to regulate flows: during lean periods water would be impounded behind the headwork and then diverted into a canal system. The reverse would hold during high flows when the 'excess waters' would be discharged along the river channel after the 'required' amount was diverted to the canals. By such a seemingly simple and elegant use of technology, it was contended that the river's flow regimes could be manipulated to ensure a near perennial supply of irrigation water. Unlike inundation irrigation—which depended on harnessing flood pulses—perennial irrigation canals sought to divert stable and controlled flows onto fields. Secondly, instead of using essentially local experiences and tacit skills to replenish soils with silt-bearing flows, modern irrigation was elaborated as a centralized technical and bureaucratic project aimed at delivering precise volumes of water. Hence, for modern irrigation enthusiasts land and water appear as separate domains, which are linked through technical arrangements and economic calculations.

In the course of the nineteenth century, several colonial modern irrigation initiatives were attempted in the Bengal delta. Notably, the Orissa canals, the Midnapore canals, Eden

[46] Ibid., p. 60.

[47] 'The ancients by increasing the supplies of muddy water, steadily improved the lands as time went on, and also decreased the danger of an inundation.' See Willcocks, *Ancient System of Irrigation in Bengal*, pp. 35-36.

[48] Following the 'sepoy mutiny' of 1857, the Indus river system was over-run by a series of irrigation schemes. Beginning with the Bari Doab canal (1859) and the Sirhind system (1882), the drive climaxed with the 'most ambitious' irrigation project of the colonial period- the Triple Canal Project (1916). For studies on colonial irrigation history in the Punjab see Imran Ali, *The Punjab Under Imperialism (1885-1947)*, Oxford University Press: New Delhi. 1988, and for a broad overview of irrigation in the colonial period see Elizabeth Whitcombe, (reprint,1984), 'Irrigation', in Dharma Kumar (ed.), *The Cambridge Economic History of India, C.1757 - C.1970*, vol. II, Orient Longman, Hyderabad. pp. 677–732.

canals and several other minor schemes.[49] To highlight, however, the consequences brought on by modern irrigation I will briefly dwell on some of the experiences that the British experienced in the Orissa canal tracts. In August 1862, a design for the Orissa scheme to be built across the Mahanadi river in the lower provinces of Bengal (now in the state of Orissa) was completed. The actual work on the canals commenced in November 1863 and water was made available by the end of 1865. The scheme as realized, after a fairly staggered construction schedule, consisted of seven weirs with an aggregate length of 3½ miles.[50]

On 20th April 1866, the first irrigation lease was signed for an area of 3½ acres. At the end of February 1867, the area irrigated amounted to approximately 6,675 acres, at a time when water sufficient for 60,000 acres was meant to be available. In effect, at the height of the great Orissa famine of 1866-67, which had overwhelmed 3 million inhabitants in the coastal districts, the canal system was barely functioning.[51] In November of 1884 widespread disaffection spread across the canal tracts. Two major protests against the Orissa Canal took place. The first, in 1881, occurred when cultivators of 61 *mouzah*s [villages] in pargana Sasungara resigned their leases and made petitions to the Collector against the canals.[52] The second, of a more determined nature, took place in April 1884, when,

> The [raiyats, cultivators] met in large bodies at different places resolved never again to apply for water under any circumstances…the cultivators have struck to the determination not-withstanding the occurrence of a drought during the past summer.[53]

In great measure, the cultivators (*raiyats*) in the irrigated tracts complained that their lands were actually experiencing a decline in yields. Such complaints are, in fact, palpably evident in a large number of petitions submitted to the Balasore National Society and the Canal Commission of 1884. Many cultivators repeatedly claimed that their lands suffered a steep loss in fertility, caused by the canal's physical obstruction to low intensity inundation which deprived the soil of the river's nourishing silt. A petition from several villages in the parganas of Sungda, Mathanagar, and Asureswar (Cuttack district) points to this:

> Since the excavation of the canal there has been no good out-turn of the crop in our fields. Owing to the embankments no silt is deposited in our fields, caused by the overflow of rivers, therefore the out-turn has fallen off. Still we are paying the land revenue, the Road and Public work cess, the zemindaree dak-cess, bribe and other cesses for which we have become poor and involved in debt.[54]

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[49] A review of the 'performances' of these projects are available in W. A. Inglis, *The Canals and Flood Banks of Bengal,* The Bengal Secretariat Press: Calcutta, 1909, pp. 1–198.
[50] L.S.S.O 'Malley, *Cuttack Gazetteer* (Patna, 1933), pp. 106–108.
[51] Patnaik, *The Famine and some Aspects*, pp. 16–53.
[52] *Canal Commission 1885*, Questions put to and Answers given by Baboo Gauree Shanker Roy, Honorary Secretary, Orissa Association, Appendix C, p. 49.
[53] *Canal Commission 1885*, p. 129.
[54] Balasore National Society, p. 49.

Another petition from the raiyats of Nalia Killah Darpan, echoed a similar claim— that their crop output actually declined after their traditional irrigation sources were interrupted by the canal.

> …the land in question is fertilised by the water from the seven ponds, spring water from the majhar [spring], and the muddy water coming from the hills, jungles and village…For the presence of the canal the water from the above sources have been stopped, so the produce has been reduced…[55]

Though accurate estimates of the gross average decline in yields or net reduction in total output are unavailable and make for hazardous speculation, the above petitions, can nonetheless be broadly surmised as being indicative of trends that may have been widespread in the irrigated tracts. Even if one were to acknowledge that the raiyats or cultivators had stakes in understating the benefits from canal irrigation and were therefore prone to undue exaggeration about its negative impacts, there is still need to account for a fairly wide and consistent reportage by cultivators across the delta that their yields tended to decline. This loss in output, moreover, was repeatedly attributed by the cultivators to the introduction of the Orissa canals, which was also held for the destruction of other irrigation sources such as springs, tanks, bunds, drainage channels etc.[56] Allegedly, besides depleting the fertility of the land by preventing silt deposition, the canal water also waterlogged the low-lying lands (the *pats*). The Orissa Irrigation Scheme, in other words, by seeking to separate land and water as discrete entities came to grief as a project. The colonial administration found itself in a double bind. On the one hand, the new irrigation regime could not successfully harness the fertilizing impacts of the inundations; on the other, the canals tended to destroy a vast number of non-canal sources for irrigation.[57]

Perennial irrigation, hence, unlike inundation irrigation was based not only on a different notion of the relationship between land and flows but, importantly as well, was premised in terms of hydraulic principle on the strong and unwavering separation of land as property, irrigation water as a technical input and inundations as calamitous events.

Concluding Remarks

Initiated as a radical land policy in deltaic Bengal, the Permanent Settlement of 1793 was intended to create an 'improving landlord', who would stabilize an anti-feudal bourgeois political order in the Indian countryside, based on juridically enforceable exclusive title to land. In effect, the Permanent Settlement has been posed as a question of land and framed in terms of the political economy of the soil. This seemingly confident

[55] *Canal Commission 1885*, Petition 13, p. 32.
[56] *Canal Commission 1885*, See Appendix B, petitions 10, 11, 12, and 16, pp. 31–32.
[57] For a full discussion on the impacts of the Orissa Canals see 'Rigidity and the Affliction of Capitalist Property: Colonial Land Revenue and the Recasting of Nature' in *Studies in History*, 20 (2), 2004. pp. 237–272.

script for positive modern transformation, however, played out in an almost opposite way by perversely collapsing instead into the crisis of subinfeudation, dispirited tenants, rack renting, and an almost diabolical turn towards parasitic landlordism.

Even though the Permanent Settlement for Ranajit Guha drew its intellectual force from a range of relatively coherent anti-feudal European ideologies—such as French physiocracy, mercantilism, Scottish enlightenment political economy, and Lockean liberalism—on the ground in Bengal, however, such a notion of property remained deeply riven and contested.

> [Alexander] Dow wanted private property to be made secure because, this, he thought, would strengthen the pillars of society. [Phillip] Francis also shared his social attitudes, but, like [Henry] Patullo, he regarded property primarily as a stimulus to agriculture. [Charles] Cornwallis, going further, visualized it as the spring of all economic improvement. For [Thomas] Law, it was important above all as the most effective method of creating a land-market.[58]

Despite such strong willed disagreements which indicated sharp divergences, there still endured amongst all the protagonists, as noted by Guha, a 'common veneration for property'. [59] The argument that actually made the deepest cut into the idea of 'permanence', however, turned out to be those by Governor-General John Shore(1793–97), the immediate successor to Cornwallis. Shore believed that the Company still lacked enough administrative 'experience' in the region to allow it to adopt general principles for collecting revenue. More significantly, Shore also remained unconvinced that Bengal's past under the Mughals and governments before, were simply reducible to feudalism, despotism or ruthless revenue farming. He summed up some of his reservations thus:

> The relation of a zemindar to government, and of a ryot [cultivator] to a zemindar, is neither that of a proprietor nor a vassal; but a compound of both. The former performs acts of authority unconnected with proprietary right; the latter has rights without real property; and the property of the one and the rights of the other are, in a great measure, held at discretion. Such was the system which we found…Much time will, I fear, elapse before we can establish a system perfectly consistent in all parts; and before we can reduce the compound relation of a zemindar to government, and of a ryot to a zemindar, to the simple principles of landlord and tenant.[60]

Put differently, John Shore suspected that the social and political arrangements that underlay the agrarian world of Bengal were far more complex and remained little understood by the incipient Company administration. And even though his 'first doubts' were not intended to press for scuttling the very idea of permanence, his caution sprung

[58] Ranajit Guha, *A Rule of Property for Bengal: An essay on the idea of Permanent Settlement,* Paris Mouton & Co: La Haye, 1963. p. 18.

[59] Ibid., p. 10.
[60] Ibid., p. 193.

from the awareness that the Company was too poorly informed either about the actual 'resources' of Bengal or the real 'value' of the land. In effect, the pursuit of legal and administrative elegance did not provide clarity for handling the complicated ecological and social contexts on the ground.

In a recent reconsideration of the Permanent Settlement, Jon Wilson in an insightful monograph titled *The Domination of Strangers,* stretches Shore's many instinctive doubts by arguing that what 'bedeviled the eighteenth century official' was actually a deeper 'crisis of meaning'; a sort of baffling gap between the 'abstract categories that were available to them and the practices they encountered'. That is, for Jon Wilson, there remained a glaring lack of conceptual fit between the neatly specified notion of the company zamindar and the ryot (tenant cultivator) in the Regulations of 1793 and the messy realities on the ground in Bengal. The dramatic revenue transformations of Bengal, in other words, was being effected amidst a confusion of terms and the Company's relative incomprehension of the political and social forces that they were dealing with.

Could, however, a lack of understanding about Bengal's many perplexing realities lead not only to the defeat of European enlightenment thought and its implementation but its actual reversal on the fecund soils of Bengal? On the other hand, could it be argued that this debate has been too focused and limited by the idea of treating land as a mere factor of agricultural production ? Put differently, a meaningful writing of the environmental history of the region, does not allow us to disconnect the fracas around the Permanent Settlement from the British colonial projects endless Sisyphean task of carrying out river control. These two narratives—turning land into property and rivers into resource—once linked could provide us a fresh template to once again reconsider the consequences of the Regulations of 1793.

It is well understood now that deltaic Bengal is a dynamic and volatile environment, involving not just regular inundations but frequent upheavals on a geomorphologic scale. Often within the sweep of a single season, lands could be thrown up with the flushing action of leaden currents or large chunks of the flood plains could be gobbled up in the sudden oscillating swing of a fluvial channel. It is amidst this regular churning of soil and water and the constant production of their innumerable admixtures that the advocates for the Permanent Settlement not only got their sociology mostly wrong but added to their veil of ignorance was the profound, if not fatal at times, miscalculations about the delta's ecological world. Recurring inundations, in the Company's administrative lexicon were declared as 'calamitous events' and all too rarely grasped as integral geomorphologic process. In other words, what was an environment in interminable flux was sought to be ordered instead as stable revenue yielding land that adjoined contained rivers.

But could the Company's double failure in Bengal necessarily have led to the triumph of the parasitic landlord? Put differently, did the production of a new type of Socio-Nature under British colonial conditions bring about a type of feudal landlordism? Clearly, the

rigid and punctual realization of the demand opened up the zamindars to an unprecedented level of vulnerabilities. A fact amply noted and discussed by many writers on the Permanent Settlement. To take but one, the esteemed historian Sirajul Islam in his authoritative study *The Permanent Settlement in Bengal: A Study of its Operation 1790-1819,* in fact, fleshes out in considerable detail how zamindars in the Chittagong and 24 Pargannas repeatedly tried to persuade the colonial authorities that 'natural conditions would make such a rigid system unworkable'.[61] I have also discussed elsewhere that the Company's commitment to a 'punctual' realization of revenue in deltaic Orissa inaugurated a distinct shift in the nature and content of power that the company zamindar now held.

In the pre-colonial Mughal and Maratha formations in Orissa, the layer of intermediaries could draw upon and digest agrarian surpluses in uneven waves. This, however, is not to suggest that these pre-colonial ruling elites were in any way benign or less exploitative. Rather, I sought to emphasize that the Mughal and Maratha revenue demand was chiefly a political claim, oriented towards sustaining a system of social alliances on the ground. For them, assessing and appropriating the cultivator's agricultural surplus was based on an oppressive non-economic demand, which took on the character of being relatively flexible and negotiable. This revenue strategy, I suggest, could be far more supple in tackling hydraulic volatility, by forgoing demands during crop losses caused by recurring inundations, while intensifying collections during seasons of relative abundance.

For the British East India Company in Orissa, however, land was legible only as an economic form, a rent-seeking alienable commodity and a monopolized means of production. This compelled them to adopt formal and rigid administrative practices for assessing and extracting revenue. Here it is important to reiterate that capitalist property in land was not merely about instituting exclusive owner- ship, but more significantly, required the enforcement of new routines for assessing, monitoring and evaluating the lands productive and surplus yielding potential. In other words, for the Company, the need to enforce a standardized rental instalment required land to be decisively insulated from the inevitable variability brought on by recurring hydraulic action. Consequently, an extremely rigid and inflexible revenue collection strategy was locked into the colonial administrative design, marking a disjunction between landed property and the delta's fluvial process. [62]

To conclude, by seeking to disconnect land from the rivers, by preferring fluvial event to geomorphologic process and by collecting an economic surplus rather than a political claim, the company administration through the Regulations of 1793 turned its landed zamindar into a despotic oppressive lord, who now more than ever became vulnerable to the depredations of the deltas many unforgiving rivers.

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[61] Sirajul Islam, *The Permanent Settlement in Bengal: A Study of its Operation 1790-1819,* Bangla Academy: Dacca, 1979, p. 20.

[62] Rohan D'Souza, 'Rigidity and the Affliction of Capitalist Property: Colonial Land Revenue and the Recasting of Nature' in *Studies in History,* 20 (2), 2004, pp. 237–272.