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The colonial state, zamindars and the politics of flood control in north Bihar (1850–1945)*

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The colonial dispensation in north Bihar believed that the rivers of the flood plains needed to be controlled. The zamindar became the pivot around which the implementation of these flood control efforts revolved. Along with the railways and roads, the uncontrolled manner in which many zamindary embankments were built led to a deterioration in the flood situation. By the 1930s, there was a strong view among engineers that rivers should not be controlled and embankments should be removed wherever possible. However, in contrast to the new official technical doctrine on flood control, a slew of powerful social and economic interests argued for retaining the 'protected areas' through embankments. Exploring the tensions that played out between the colonial engineering establishment, the revenue administrators and the zamindars over the question of river control in north Bihar, this article argues for an emphasis on environmental change as a critical dimension for understanding the colonial rule in the region.

Introduction

North Bihar has been known to be one of the most flood-prone regions in the world, and its 'backwardness' has allegedly been a result of the annual ravages caused by river spill. Standing crops are destroyed, habitations are submerged under water

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for days (sometimes even months), communication links are cut off, and inhabitants are often forced into distress migration. The debate over the flood problem in the region has centred mostly around technological choices and engineering solutions. Both these dominantly technical points of view have, however, tended to ignore north Bihar's complex environmental history, in particular the great hydraulic transformations brought about by colonial rule.

On the other hand, historical accounts of north Bihar have tended to largely limit themselves to situating its unique agro-ecological setting within a broader political or economic analysis. For example, agrarian and revenue historiographies of the region have assiduously focused mainly on the impacts of British land revenue policies on the agrarian social structure, and its varied economic ramifications.[1] Even the numerous studies on the history of peasant and national movements in the region mention only briefly certain aspects of the region's unique agro-ecology. For instance, while discussing the Santhal rebellion in the Kosi diara, Anand Chakraborti and Vinita Damodaran confine their discussion to processes of land reclamation and social upheaval after the 1940s.[2] That is to say, the Kosi diara appears merely as some sort of frozen physical backdrop to the dramatic and furious pace of political events. Even Pouchepadass'[3] exhaustive study on the agrarian conditions in Champaran district ignores the floods and flood control measures that took place/set up during the colonial period. This is surprising, given that of all the rivers of north Bihar, the river Gandak, so central to his narrative, was the first to be embanked completely during the colonial period. Thus, despite Pouchepadass' otherwise rich and detailed descriptions, we are left with an incomplete analysis of how the region's agro-ecology is situated within the larger political, economic and social processes of north Bihar.[4]

At another remove, environmental histories of India have also tended to focus, till quite recently, on mountains, forests, and semi-arid and tribal inhabited pockets. Interestingly, the editor of the special volume of *Studies in History* that dealt with environmental history raised concerns about the way the environment was ignored in agrarian historiography, and vice versa.[5] Till recently, these two histories have stood apart. In other words, agrarian historiography has remained mostly confined to studying agriculturally dynamic regions and agrarian social relations. In recent

[1] Some of the more prominent among these studies are Anand Yang, *The Limited Raj*; Ram Narayan Sinha, *Bihar Tenantry*; Girish Mishra, *Agrarian Problems of Permanent Settlement*; S. Henningham, *A Great Estate and its Landlords in Colonial India*; Arvind N. Das, 'Changel: Three Centuries of an Indian Village', and *Agrarian Unrest and Socio-Economic Change in Bihar*; and B.B. Chaudhuri, 'Agrarian Relations: Eastern India', pp. 86–177.

[2] Anand Chakraborti, 'The Unfinished Struggle of Santhal Bataidars in Purnea District, 1838–1942'; Vinita Damodaran, *Broken Promises*, pp. 75–89.

[3] Jacque Pouchepadass, *Land, Power and Market*.

[4] *Ibid*., pp. 164–70.

[5] Neeladri Bhattacharya, 'Introduction'.

times, some scholars have argued for a need to situate environmental history within the wider process of land settlement, and as a part of social and economic history,[6] notably contemporary efforts to map the agrarian and non-agrarian as a hybrid domain.[7] Nevertheless, despite the substantial theoretical repositioning of the nature of environmental concerns, flood plains as a specific ecological setting have largely been ignored, even though colonial rulers and irrigation engineers have left a weighty technical, environmental and political imprint on such landscapes.

In recent times, a few scholars have begun to explore the historical dimension of the phenomenon of floods, particularly in terms of the level and scale of colonial intervention in flood control efforts. Dinesh K. Mishra has written extensively on policies related to floods in north Bihar, and the impact they have had in aggravating the flood situation.[8] Mishra's study, though fairly detailed, does not contextualise his findings within the specific circumstances of colonialism. Further, his work remains centred around the contemporary problems associated with floods. Rohan D'Souza, on the other hand, views the idea and practice of flood control in the Mahanadi delta as a 'political project', in which attempts to tame the natural world went in tandem with larger attempts to forge specific economic and social relations.[9] He goes on to trace the complementary and close relationship that existed between the agrarian rhythm of the delta and the pre-colonial revenue policy, and argues that the colonial land revenue and water policy was part of the larger design of colonial capitalism. Christopher Hill[10] brings the ecological setting to the centre of his analysis to understand the society and agricultural economy of the Kosi diara region in north Bihar. His study focuses more on the colonial state's social and revenue policies, which were based on the principle of 'ecological paternalism' and its impact on the 'social ecology' of the Kosi. He also looks at how the environment places limits on the extent of state control in the region, and how local-level actors were much more important and influential in the emergence of an independent system of agrarian control.

None of these studies, however, look at how colonial policies played out at the ground level: *a social, economic and ecological layer that was immediately below, but not outside, that of the workings of the colonial state*. An attempt will be made in this article to bring out the role of the colonial zamindars in the varied initiatives undertaken by the colonial administration vis-à-vis flood control in north Bihar. The zamindars in permanently settled regions were the ones expected to invest in

[6] *Ibid.*

[7] For an excellent collection of work on this subject, see Arun Agarwal and K. Sivaramakrishnan, *Social Nature*.

[8] Dinesh K. Mishra, 'The Bihar Flood Story', pp. 2206–17, *Badh Se Trast, Sinchai Se Past, Bandini Mahananda*, and *Living with the Politics of Floods*.

[9] Rohan D'Souza, *Drowned and Dammed*.

[10] Christopher V. Hill, *Rivers of Sorrow*.

agricultural improvement,[11] and, as will be shown, they took an active part in embanking north Bihar's many rivers. These zamindars seemed to have recovered, after the initial few years of misfortune in the late eighteenth century, from the after effects of the permanent settlement, and gradually appeared to be improving their economic and social position in rural society. They began to function as 'efficient rent collectors', able to harness the opportunities presented by an increasingly commercialised economy. Some of these larger zamindaries rose to prominence because of the support offered by the British. For instance, the institution of the Court of Wards, while constituted to offer managerial support to estates with minor heirs, helped infuse professionalism in estate management.[12] It has also been shown that in Bengal, there was negligible churning in the composition of landed elites; the older and larger zamindars retained their position of pre-eminence in rural society.[13]

Some historians have highlighted the growing strength of zamindars vis-à-vis the state, and have challenged the assumptions about the power and reach of the latter in rural society.[14] Sivaramakrishnan, for example, in his study of colonial Bengal, has argued that the colonial state was relatively limited in its success at asserting centralised control over natural resources.[15]

While such excellent studies have enriched our understanding of the tapestry of relations of dominance and resistance, which connected the state with the different levels of rural society, they fail to underline the fact that though these elites may not have been a formal part of the colonial state, they did serve as 'cogs in the wheels' or 'bulwarks of the empire'. Thus, as I will argue, while colonial power may have been exercised 'indirectly' through local intermediaries in the rural hinterland of eastern India, this layer of colonial collaborators at the ground level did not lead to the Empire being 'limited'. Rather, through examining how environmental policies for flood control played out on the ground in north Bihar, I suggest that the colonial state retained its overwhelming social and economic presence, despite the many troubled challenges that were posed to the logic of colonialism.

[11] It was believed that the Permanent Settlement would restore confidence in property, and induce a large investment of capital in agriculture. B.B. Chaudhuri, 'Agrarian Relations: Eastern India', p. 90; Ranajit Guha, *A Rule of Property in Bengal*.

[12] Anand Yang, 'An Institutional Shelter'; S. Henningham, 'Bureaucracy and Control in India's Great Landed Estates'.

[13] B.B. Chaudhuri, 'Agrarian Relations: Eastern India', pp. 93–98. The survival of old landed proprietors in the colonial period does not necessarily imply that they represented the same structure of economic relations as in pre-colonial India. Rohan D'Souza has very convincingly shown how the introduction of the idea of bourgeois landed property in Bengal overwhelmed and changed pre-colonial agrarian society in unprecedented ways; see D'Souza, 'Rigidity and the Affliction of Capitalist Property', pp. 237–72.

[14] Yang, *The Limited Raj*; Hill, *Rivers of Sorrow*.

[15] K. Sivaramakrishnan, *Modern Forests*.

However, though the zamindars might have been responsible for building flood control structures, the article will also show that the colonial state and its various agencies were just as responsible for changing the agro-ecological setting of the region. These agencies of the state, and even provincial governments, became significant partners in the whole flood control drama being played out in north Bihar.

In the first part of this article we will look at policy changes in Bengal on flood control, and the context in which these policies were made. In the second part, the discussion will focus on some specific instances of conflict around flood control in north Bihar so as to illustrate the impact of the colonial policies, and show the working of these policies as they played out on the ground. This article will also highlight the various macro and local-level actors who were involved in this process. The attempt here is to illustrate the diversity of interests that derived their strength from colonialism, and the way these interests and groups influenced the policies and decisions, and finally the outcomes, of the engagement between these different groups and actors.

Floods and Flood Control—The Early Years of Confusion

Flood control was a major preoccupation of the colonial state in north Bihar. Due to the occurrence of frequent floods and the resultant damage to crops, the attention of the government was forced on a number of issues related to embankments and drainage. The region was characterised by constantly shifting rivers and changing agro-ecological setting. This meant having to constantly keep pace with the shifting (revenue and administrative) boundaries and changing conditions, and having long-term, flexible and adjustable policies for the region. Instead, the colonial state in Bengal opted for permanence in not only its administrative and revenue policies, partners in ruling over the region, but also in providing permanence to the ecological setting. To ensure the latter, it encouraged the construction of *bandh*s (embankments). Initially, it began with the restoration and extension of dilapidated zamindary embankments, and the construction of new ones to protect important colonial establishments. In the first few years, there was an indiscriminate construction of embankments. During this period, whenever a flood problem arose, the answer was: 'let us build a *bandh*'.[16] Along with the construction of 'public' embankments, European planters, indigo factories and big zamindars also constructed many private, marginal embankments. In the beginning the embankments did provide some temporary respite from annual floods; however, in the long run they created a number of environmental problems.[17] As the deterioration caused by these embankments to the river channels and the drainage system took several years to

[16] P.C. Ghosh, *A Comprehensive Treatise on North Bihar Flood Problems,* p. ii. [*RRI*].

[17] The entire north Bihar was characterized as an 'inland delta. The process of delta building towards the Ganges was going on for centuries and the whole of it was built by the process of land building activity of the perennial Himalayan rivers. In this process of land building these rivers

manifest itself, embankments were universally accepted till the 1870s as the most effective protection against floods. It was only in the last quarter of that century that its role in controlling flood began to be critically examined. This section will examine the early experiences of the colonial state in dealing with this question.

Initially, the primary concern of the government was with finding out who was responsible for the construction and maintenance of embankments. Through the passing of various regulations,[18] the government tried to fix the responsibility for constructing and maintaining embankments. According to the Permanent Settlement, the government, recognised its obligation to repair certain embankments; however, it was mentioned that the zamindars had agreed to maintain embankments according to custom, and if they neglected these works, the loss would be theirs.[19] Also, while it was agreed that large works were to be the responsibility of the colonial state, there was no specification made about which works fell under this category. In the years to come, the government passed legislations that successfully transferred the burden of embankment construction to the zamindars, despite the latter resisting these moves. The logic behind this is evident from the statement of Harrison, author of the *Embankment Manual of Bengal*, who argued that 'as the demand of the State, being limited by the Permanent Settlement, the benefit of any improvement (in agricultural conditions) passes into the hands of those who have not in any manner limited their claims ...'.[20]

Destruction of crops due to floods led to difficulties in the collection of revenue. The colonial state believed that this difficulty could be avoided if the zamindars built embankments. The terms of the Permanent Settlement of 1793 stated that while the public demand was on no account to be increased, no remission was to be claimed or granted on the claim of loss from inundation. However, some revenue officials argued that '... in frequent instances the state was compelled to forego its share of revenue altogether, or to receive payment of its revenue in distant installments. It was therefore considered equitable that the zamindars be required to

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frequently shifted their courses several miles. Embankments by confining the floods within the narrow river channel did not allow the silt to be deposited uniformly over the floodplains and consequently all the silt was deposited on the river bed itself, raising it. This resulted in the increase in the relative level of the river bed and the countryside and low lying areas remaining waterlogged. Drainage network of the region was destroyed, and it took longer time to drain the lowlands. The nature of floods in these 'protected' areas changed with floods of higher level and longer duration becoming a norm. Embankments also were not effective against the natural actions of the rivers and constantly breached, and the floods thus caused by the concentrated discharge of water were disastrous. For details see Praveen Singh, 'Colonising the Rivers: Colonial Technology, Irrigation and Flood Control in North Bihar, 1850–1950', Ph.D. thesis, Centre for Historical Studies, Jawaharlal Nehru University, 2003, pp. 183–90.

[18] There were three major Acts passed, the Act of 1855, the Act of 1873 and the Act of 1882.

[19] Henry L. Harrison, *The Bengal Embankment Manual*, p. 3. (Record Room of the Irrigation Department, Patna [hereafter RRI]).

[20] *Ibid.,* pp. 13–14.

defray the cost of protection from such calamities ...'.[21] There seems to have been an implicit compulsion or incentive leading the zamindars to carry out flood control measures to protect existing agricultural lands and bring new areas under cultivation, which they began doing enthusiastically.

Provisions were also made in these legislative measures to better apportion expenses among all persons benefiting from any flood control works. This encouraged the irrigation department to take over many zamindary embankments that it considered indispensable, but not built in a 'scientific' manner. So these legislative measures served two purposes—first, allowing for embankments that the engineers thought were necessary to be built along 'scientific lines', and second, allowing these embankments to be built without placing any burden on the state exchequer.

By the middle of the nineteenth century, British officials had begun noticing the negative effects of all the embankments constructed in previous years. Concerns were being raised at the 'haphazard and unscientific' way in which embankments were being constructed by private parties. The administrators were also worried about the zamindars mismanaging the upkeep of the embankments. For instance, the Collector of Midnapur spoke in 1851 of the 'incompleteness' of the system of proper maintenance and repairs of embankments. Several tricky situations arose regarding the drainage congestion caused by the embankments put up by some zamindars, about which the government could do little as there was no legal provision for intervention. Arguing for greater government interference in individual action, Harrison pointed out that:

> ... landed property cannot anywhere be so isolated from its surroundings as to make it a matter of individual liberty for its owners to make what embankment he likes on it, or leave what he likes unmade, irrespective of the effect of his action on his neighbours. Most emphatically is this the case in dealing with the deltaic rivers and water-courses of Bengal .... In the ever-changing circumstances of the Bengal rivers a new embankment may often be necessary, or the enlargement of an old embankment, which is in principle scarcely distinguishable from the construction of a new embankment, be imperatively called for .... In organising the embanking and drainage of a large tract of country, what is needed is unity of design and control; some guarantee that all the individual works are parts of the whole, subsidiary to one another, or at least not militating against each other.[22]

The passing of the Act II (B.C.) of 1882 allowed the government to prevent the unauthorised construction of, or addition to, an embankment in a notified area.

[21] 'Embankments in Bengal: Note on their origin, development and utility, 1772–1850', *Land Revenue Records,* 28 Mar. 1851, [hereafter *Embankments in Bengal*], pp. 106–7. (National Archives of India, New Delhi [hereafter *NAI*]).

[22] Henry L. Harrison, *The Bengal Embankment Manual,* pp. 12–13.

The government could notify the whole stretch or part of the river, whereby nobody could tamper with the natural working of the river without the permission of the required authorities. Taking a broader view of the interconnectedness of floods and drainage, this Act took away the powers vested earlier in the Collector. The Collector was not allowed to exercise this power without first obtaining the approval of the provincial government. This stemmed from the realisation that measures taken locally in a district had ramifications at the larger level too.[23] This was a tacit acceptance of the fact that local officers were getting embroiled in the competitive construction of embankments. Thus, we see the beginnings of a 'scientific' flood control policy in India.

Another area of concern was the growing tension between the civil bureaucracy and irrigation engineers on the issue of control over the management of embankments. Control over the embankments and drainage works was transferred several times from one to the other, causing some heartburn in the ranks. While discussing the draft of the said Act, it was argued that the 'Collector, unlike the Superintending Engineer, *would not be led away by professional feeling*'.[24] On the other hand, one Superintending Engineer later criticised the Act of 1882 because it did not make the seeking of expert opinion while building new embankments obligatory.

> Very few people outside the Engineering profession think that there is the least difficulty in understanding a river or any danger in embanking it or cutting across a loop so as to short circuit it. In fact, either of these measures appeals to almost anyone who is not an Engineer .... I do not wish to take away any of the Collector's power under the Act but that the necessity of obtaining and acting in accordance with expert opinion in such matters is made imperative and obligatory on that officer in every case of this kind before anything is done. The absence of such a provision in the rules under discussion has been a source of considerable damage to life and property and fertile land has been rendered unfit for cultivation as the inevitable result of heavy floods, aggravated by obstructing embankments .... In none of the sections of the said Act is the opinion of the Superintending Engineer made binding on the Collector. I am sure that a provision like this will go far towards checking the *unscientific handling of rivers and embankments*.[25]

Clearly, there was a difference of opinion (on how to tackle floods) between the engineers, who had now become quite cautious about constructing embankments, and were increasingly becoming aware of the negative effects of the existing

[23] W.A. Inglis, *A Review of the Legislation in Bengal*, p. 45 [*RRI*].

[24] Henry L. Harrison, *The Bengal Embankment Manual,* p. 20 (emphasis mine).

[25] Superintending Engineer, Gandak Circle, to Chief Engineer, dated 13 Jan. 1919, F. No. XVIR-2/1919, *B progs., Public Works Department, Irrigation Branch* [hereafter *PWD(I)*], Government of Bihar and Orissa (hereafter GoB&O), pp. 4–6 [*RRI*].

ones, and the revenue officers who, equipped with the new Act (Act II of 1882), entered into agreements with zamindars to erect embankments.[26] These were not the only instances of differing opinions. Opposing interests were being formed, and groups were engaging with each other to safeguard their own interests, in the process changing the complexion of the agro-ecology of the region.

Interest Groups, Conflicts and Deterioration of the Flood Problem

From the late nineteenth century onwards, a number of conflicts started rearing their heads. The Bengal and North Western Railway Company (B&NWR) was involved in some of them, while most were between zamindars, and from the 1920s between neighbouring provinces. During the 1930s, considerable opinion was building up among at least the irrigation engineers against embankments in particular, and tampering with rivers in the plains in general.[27] While the government had armed itself with legislative sanctions to deal with the worsening flood situation, it felt helpless when it came to resolving these conflicts. This was evident from the many instances of conflict that came up in the early twentieth century.

Apart from the legislative measure, the colonial state used other measures to coordinate flood control between neighbouring zamindars, as well as between neighbouring districts, departments and provinces. This led to the formation of various bodies and committees. Embankment Committees, comprising several contiguous districts, and other advisory bodies were constituted to advise the engineers and other authorities directly involved in the building and upkeep of embankments. This was a significant step, as earlier district authorities had a very local and narrow view of the flood problem, leading to a lot of complication. Further, the Government of Bihar and Orissa appointed two standing Flood Committees in 1925, one for the area affected by the Son and upper Ganges, and the other for that affected by the Kosi and the lower half of the Ganges. The second committee was later split in two, one for the Gandak and middle Ganges, and the other for the lower Ganges and Kosi. These three Advisory Committees were to advise the government on the problems connected with floods.[28]

[26] Gilmartin describes a similar situation in the canal colonies of Punjab, where the canal administration sometimes worked at cross purposes with (and was also constrained by) the ideology of a 'scientific empire'; the latter was much more sensitive to the scientific knowledge it had gathered about local society, and found it in its interest to sustain the social and political hierarchies. David Gilmartin, 'Scientific Empire and Imperial Science', pp. 1127–40.

[27] This becomes evident from the various official reports of the period, viz., *Report of the Orissa Flood Committee 1928*, Patna, 1929; 'Proceedings of the Patna Flood Conference 1937', File # IV F 19/38, C Prog., Irrigation Department, Government of Bihar (hereafter GoB), 1938 [*RRI*].

[28] File No. XVIIIC-10/1936, B Progs., *PWD (I)*, GoB, p. 4.

In addition, a temporary Waterways Division under the Executive Engineer was formed in north Bihar after the earthquake of 1934. This organisation carried out flood observations in the districts of Muzaffarpur, Darbhanga and Champaran, and also surveyed the area affected by the Kosi floods. The Executive Engineer submitted detailed north Bihar flood reports for 1934 and 1935.[29] Apart from these attempts to deal with floods in a comprehensive manner, Inter-Provincial Flood Conferences were also organised between the Governments of Bihar and the United Provinces in order to devise means to tackle the Ghaghra floods, and resolve their respective conflicting interests.

This article will show that despite such measures, the flood situation only worsened in areas where embankments had been in place for some time. Considerable interests had developed in these so-called 'flood protected' regions, which did not allow for any positive intervention. The administrators, some of whom at times sided with interest groups to continue with flood control measures, found themselves helpless under such circumstances. They also had to contend with demands for the construction of new embankments in places that saw an increased intensity in floods, caused by the tampering of the river regime elsewhere.

Competitive Construction of Embankments by Zamindars

Despite the various actions taken by the colonial government to coordinate and manage flood control meaures, private embankments continued to be constructed, flouting all norms, rules and regulations. There was growing competition among zamindars for constructing embankments to safeguard their lands and crops from inundations. Although an understanding of the inefficacy of attempts to control the rivers was gaining ground among bureaucrats and engineers, it was not shared by the zamindars. The process was contagious. The construction of one embankment by a zamindar in a stretch of the river was met with embankments in the remaining stretch put up by another zamindar, because the first embankment would have increased the flood levels in the rest of the river. These zamindars also wanted to reclaim lands that were temporarily uncultivable. This also demonstrated how ineffective and inefficient the local administration was in meeting these breaches of law. Moreover, even the district and provincial governments hesitated to deal firmly with big and powerful zamindaries like the Darbhanga Raj. In this section, the much quoted example of the Tiljuga embankments is discussed to show how zamindars were equally responsible for the proliferation of embankments in north Bihar.

The river Tiljuga formed the boundary between the districts of Bhagalpur (on the east) and Darbhanga (on the west), and in its lower reaches, the boundary between the Darbhanga Raj and Banaili Raj. Tiljuga was subject to violent and

[29] *Ibid*., p. 6.

heavy floods, and before an embankment was built along its course, it used to flow to a width of about six miles during floods. The Darbhanga or the western side was lower than Bhagalpur or the eastern side of the river, with the low-lying areas of the west consisting mainly of grassy swamps. The Darbhanga Raj constructed marginal embankments on the very banks of the rivers Tiljuga and Balan in 1871, and in 1893–94 these were raised and strengthened and made into a continuous embankment.[30]

Before the construction of the western embankment, a good paddy crop used to be grown on the eastern side of the river; however, the erection of the Darbhanga embankment close to the river resulted in displacing the entire burden of the Tiljuga flood on to the eastern side. So, even during ordinary floods the eastern area was severely inundated, and crops on comparatively high ground were destroyed. This situation reached a crisis point during the floods of 1905 and 1906. Not only were the standing crops completely destroyed, but villages were wrecked, stored grains swept away, and cattle washed away. The ryots of the flooded villages on the eastern side then approached the district authorities of Bhagalpur for protection, and the Collector encouraged the managers of the Banaili and Srinagar estates to agree to pay for the construction of a protective embankment in order to prevent that portion of their estate from being turned into a wasteland. However, before he undertook to get the work done, Darbhanga Raj was informed about this construction, and was requested to construct the embankment on his side on a retired line so as to leave a waterway of half a mile for the river. The Darbhanga Raj did not accede to this request, and continued to repair its embankment on the western side. The Banaili-Srinagar embankment, measuring 20 miles, was completed in 1910 at the cost of Rs 2 lakh (US$ 200,000) supplied by the Banaili and Srinagar estates. This embankment had an immediate positive effect, as reported by the Collector of the district in his Famine Report of 1908:

> There used to occur a more or less destructive flood which led to the pauperization of a once prosperous community ... . These embankments (Banaili-Srinagar) have already been the cause of saving the whole area affected ... and are designed to protect some 70 square miles of country ... . A number of raiyats had left the place for good leaving their homes and all. Many of them have already come back ....[31]

Another Bhagalpur Collector reported that applications were beginning to come in for fresh settlements, and the Rs 2,376 that the villagers of the area owed in taccavi loans had all been paid back.

[30] File No. IIE-5/1933, B Progs, PWD (I), GoB&O, 1933, p. 1.
[31] B Progs., PWD (I), GoB&O, Sept. 1914, Vol. IV, p. 4.

However, this positive situation was short-lived. The construction of the eastern embankment had caused an enormous afflux to come into play. While the Darbhanga embankment must originally have caused some afflux, it was not all that prominently till the erection of the Banaili embankment, when the two together restricted the waterway of the river. The Darbhanga embankment, by virtue of its being in close proximity to the river, obstructed the direct current of the river during floods at all the turns and bends. Embanking the river on both sides proved disastrous. The extraordinary floods of the Tiljuga could not pass between the two embankments without breaching one of them, as demonstrated clearly during the flood of 1913. In 1913, while passing between the two embankments, the flood level rose high and eventually breached the Darbhanga embankment at several places. The water of Tiljuga, gushing out of these breaches, flooded the low-lying areas. The paddy crop sustained considerable damage and was entirely washed off.[32]

Meanwhile, the government was getting worried about the effects this embankment construction spree would have on the overall flood situation in the area. In 1911, the Embankment Act[33] was declared on the Darbhanga side, and the Darbhanga Raj was prevented from raising the height of its embankment. The same Act was put into force on the Bhagalpur side in 1912. The government deputed an Assistant Engineer to make a thorough investigation into the matter. The latter suggested escapes (or sluice gates) on both embankments to drain off the excess waters of the Tiljuga into the natural drainage channels or *dhar*s. Alternatively, his suggestion was to leave the Banaili embankment intact and construct the Darbhanga embankment at least half a mile away from the river. The Chief Engineer accepted the second proposal, but the Darbhanga Raj rejected it. Another Assistant Engineer was deputed to make further enquiries, and he too recommended the retirement of the Darbhanga embankment as the best solution, which was accepted by the Chief Engineer. The Darbhanga Raj did not accept any of the government's proposals and stuck to the non-retirement of its embankments. Consequently, Banaili Raj was prevented from following the Chief Engineer's recommendations and carrying out any work on its side.[34]

During this time the Darbhanga Raj had been pressing to have the mouth of the Sati *dhar* (spill-channel) cut or opened by providing an escape on the Banaili-Srinagar embankment. Before the erection of the latter embankment, the Sati *dhar* used to receive the bulk of the Tiljuga flood. However, the eastern embankment had cut off the supply of the Sati *dhar*, thus putting the pressure of the entire

[32] 'Report on the Survey of the Tiljuga river, by K.K. Chatterjee, Assistant Engineer', 18 Apr. 1914; *Ibid.,* p. 4.

[33] Under the Embankment Act II (B.C.) of 1882, the government had the power to prevent the unauthorized construction of, or addition to, an embankment in a notified area.

[34] B progs., PWD (I), GoB&O, Sept. 1914, Vol. IV, pp. 6–7.

waters of the Tiljuga on the Darbhanga embankment. But since the reopening of the Sati *dhar* would have the same effect as the complete removal of the Banaili-Srinagar embankment, this request was not accepted.[35]

Having failed to realise his objective of getting the Banaili-Srinagar embankment demolished through the executive department, the Raja of Darbhanga turned to the civil courts and got a suit instituted in 1916 through some of his tenants, and later brought out a suit himself in 1918 claiming damages, and for opening the mouth of the Sati *dhar* and the demolition of the eastern embankment. Both the suits were tried together, and after a protracted litigation were dismissed by the District Judge of Darbhanga at the beginning of 1923. The Raja made an appeal to the High Court, but this was also dismissed in 1928. Then there came a Letter Patent Appeal, and at this stage the Raja entered into a compromise with the Banaili and Srinagar proprietors. A few points of difference were referred for arbitration to the Chief Engineer, who awarded the retirement of the Darbhanga embankment. The Darbhanga Raj, not satisfied with the award, ultimately withdrew the appeal altogether.[36]

This competitive construction of embankments also saw violent repercussions, with contending parties trying to breach the others' embankments while at the same time protecting their own. Incidents of violence increased during floods, when people were willing to go to any lengths to save themselves and their homes and crops from floods. During the rest of the year they would try and strengthen their respective embankments. Geoffrey Allen, assistant manager in the Darbhanga Raj at Gondwara in 1935, was witness to many such conflicts. He remarked:

> There were great armies of *lathials* to guard the bandhs in each side of the Kosi, to make sure that no one from the other side would break the bandh on your side to cause flooding to your side. Every year the bandhs rose higher and higher, and so the river did also. The Tiljuga bandh was well known for riots.[37]

In December 1931 the Darbhanga Raj was sanctioned to repair the breaches in its embankment on the Tiljuga privately, and under this pretext illegally increased the height and breadth of this embankment and also constructed some new ones despite protests from the Bhagalpur district authorities. The latter received a lukewarm response from the Darbhanga district authorities, and the Darbhanga Raj completed its embankment without taking any notice of the Embankment Deputy Collector's order to stop work till the disposal of the objection put forward by the Bhagalpur district. To counteract the effect of the Darbhanga embankment, repairs were carried out on the Banaili-Srinagar embankment, sanctioned by the

[35] *Ibid*., p. 4.
[36] File No. IIE-5/1933, B progs., PWD(I), GoB&O, p. 7.
[37] Quoted in Hill, *Rivers of Sorrow*, p. 15.

Collector of Bhagalpur.[38] During these years damages due to flooding caused by the breaching of the embankments soared. Darbhanga Raj continued to repair the breaches that occurred on its embankments in subsequent years. During the 1940 floods, the Banaili Raj embankment crumbled almost entirely due to the Kosi floods, and no longer served as a barrier to the free flow of flood-spills. The Darbhanga Raj embankment, on the contrary, was in fair condition, and served as a great obstruction to the westerly diverted Kosi spill, on account of which the flood heights on the east of this embankment increased. As a result, the area on the eastern side was subjected to severe floods which lasting for long periods.[39]

The Superintending Engineer, North Bihar Circle, warned in 1942 that the measures of the Darbhanga Raj were short-sighted, and would lead to a further deterioration in the flood situation in the future.

> ... the Darbhanga Raj are adopting a very shortsighted policy, and *at least the junior officers of the local administration do not seem to appreciate the true situation* ... . The Tiljuga river is now very definitely the Kosi and it is useless for the Raj or for the local administration to refuse to face the fact ... . Silt must be deposited over the Darbhanga district west of the Tiljuga bandh of the Kosi. If it is not and the Tiljuga embankment breaks, as it must in the future, people will be drowned not by tens or by hundreds, but by thousands ... . In the meantime, to prevent future great loss of life by drowning it appears necessary for the repairs to the embankment to be forbidden ....[40]

The most important reason for the Darbhanga Raj to control the Tiljuga (which was increasingly bearing the load of the Kosi spill) was the threat of a vast area of its estate turning into wasteland. The devastation caused by the Kosi in British India (in 1942) extended on the east up to the Bhagalpur boundary, on the west five to seven miles beyond the Darbhanga district boundary, and on the south up to the railway line between Khagaria and Kursela. The approximate area of this tract was 2,700 square miles, out of which 1,500 square miles, from where the Kosi had receded, had been under reclamation in the 1930s. The remaining 1,200 square miles which, before the advent of Kosi, had been comparatively free from devastation, was in the 1930s being rapidly converted into wasteland denuded of all cultivation and human habitation.[41]

Thus, a variety of vested interests—zamindars, local civil and revenue officials, irrigation engineers and the courts—were involved in the building of embankments,

[38] File No. IIE-5/1933, B progs., PWD(I), GoB&O, p. 9.

[39] *Ibid.*

[40] Superintending Engineer, North Bihar Circle, to the Deputy Chief Engineer, Irrigation, dated 6 Feb. 1942; *Ibid.,* p. 96 (emphasis mine).

[41] Ghosh, *A Comprehensive Treatise on North Bihar Flood Problems*, p. 118.

leading to disastrous floods in north Bihar. Further, we also clearly witness a conflict between the scientific engineering values of the irrigation engineers and those of the civil-revenue officials, the latter being appreciative of the political imperatives of working closely with the indigenous elites.[42]

Railways and Floods

A new actor in the entire flood control drama was the B&NWR. At the same time that the government was coming up with arguments to evade all its responsibilities when it came to investing in public works (like embankments and canals) in permanently settled estates, it went about investing heavily in the railways and roads in the region. In the last quarter of the nineteenth century, there was a large-scale construction of railways and roads in north Bihar. It was precisely in this period that the Irrigation Department was trying to control and regularise the construction of any new embankments, and the repairs of old ones.

In north Bihar, 'railways and roads with inadequate waterways could be considered as bandhs'.[43] The way they were built created a lot of problems for the already grave flood situation. As will be discussed later in this section, they were often the worst offenders in obstructing the drainage of the country. Ironically, most of these railways and roads were constructed on the recommendation of the successive famine commissions as measures to protect the areas through which they passed from food shortages and famine.[44]

The alignment of most of these railways and roads (in most cases in an east-west direction) was across the drainage line of the region, the latter being in the north-south direction.[45] The obstruction to the free flow of floods and spill along the natural drainage line, 'even if provided with adequate waterways, aggravated the floods'.[46] In reality, though, inadequate and insufficient waterways had been provided. The demands of the ryots and planters for more waterways were stonewalled by B&NWR engineers. The B&NWR argued that from a purely engineering point of view, and for the safety of the line, it was best to concentrate the discharge of the whole area into as few channels as practicable.[47] By cutting off the flood spill from the direction of their natural flow, the Railways and District Boards,

[42] David Gilmartin, in 'Scientific Empire and Imperial Science', has brought out the political problematic or antagonism between the 'science of empire' and 'imperial science' in the context of the canal colonies of west Punjab.

[43] Ghosh, *A Comprehensive Treatise on North Bihar Flood Problems,* p. ii.

[44] *Report of the Indian Famine Commission*, 1880, p. 67 [*NAI*].

[45] 'Extract from the proceedings of the District Board Meeting held on the 6th April 1896', *Selections from the Records of the Bengal Government, Railway Department*, [hereafter *Selections (Railways)*], p. 1 [*RRI*].

[46] Report by District Engineer of Purnea on the Garhara Katihar Railway Project, *ibid.*, p. 13.

[47] Superintending Engineer, Northern Circle, to Commissioner, Bhagalpur Division, dated 6 Apr. 1897, *ibid*., p. 16.

keeping in mind their own pecuniary and technical interests, brought about a complete change in the condition of these lands. The results were detrimental to property, agricultural interests and sanitation. The interests of the engineers designing the necessary works and the revenue officers of the local government, who were under pressure to guard the rights of the landlords and ryots occupying lands in the affected area, were not identical. The result was often a protracted debate between the two over the role of the railways in aggravating the flood problem, and how best to minimise the damage along a railway line.

There were instances of the Railways being taken to the courts, and in some cases they even had to pay compensation to those ryots whose lands had been damaged by Railway embankments. For instance, compensation had to be paid by the B&NWR to some peasants of Saran district for damage to crops caused by the construction of an embankment across the Banwari Chuck valley in 1886, which had resulted in loss of standing crops drowned by blocked drainage.[48] However, the role of the Railways in aggravating the flood situation could not always be proved in a court of law. In most cases the Railways denied that embankments were responsible for the damage caused to lands by floods, arguing that since the railway embankment obstructed the spill on both sides, it not make any overall difference to the flood situation in the area.

Another practice of the B&NWR—safeguarding the existing waterways by closing them temporarily during the flood season—harmed the surrounding lands. There were many instances of villagers cutting the railway embankments to ease the drainage congestion. This was considered an unlawful act, and the Railway and district authorities kept guard on the embankments during floods. While the B&NWR expected the local administration to prevent any damage to the embankments, the latter had to carry on a fine balancing act between the interests and demands of the B&NWR on the one hand, and the peasants on the other. In some cases the flood situation aggravated to such an extent that local officials contemplated cutting the line themselves.[49] The differences in opinion between the two agencies of the government becomes obvious from the statement of the local SDO, who added that the

> railway authorities have no right to go on appealing every year to the district authorities to protect them on the score that the cutting of the bank may cause a stoppage of the traffic or even a railway disaster, just because they are too niggardly to provide proper waterway. *The Bengal and North-Western Railway are notorious in this respect*.[50]

[48] *Report of the Administration of Bengal*, Calcutta, 1895–96, pp. 224–25 [*RRI*].

[49] Commissioner, Bhagalpur, to Chief Secretary, GoB&O, dated 20 Sept. 1918, VIIE-1/1919, A progs., PWD(I), GoB&O, p. 3.

[50] *Ibid.*, p. 4 (emphasis mine).

Thus, it was not only the embankments built by the zamindars that were causing drainage problems, but the communication infrastructures as well. The extension of railways in the region was very much part of the agenda of the colonial state, but its development does not seem to have been in sync with the 'scientific flood control' policy that emerged at the same time that railways were introduced in the region. The next section will discuss how even provincial governments were sucked into the complex interplay of interests, which resulted in competition in embankment construction.

Ghaghra Floods and the Inter-provincial Flood Conference

The role of the Ballia-Chapra Railway line in aggravating the floods in the Ghaghra valley in Saran district was a subject of a long and heated debate between the Railway and Civil authorities in Saran on the one hand, and between the officials of Bihar and the United Provinces (U.P.) on the other in the 1930s.

The river Ghaghra had been shifting its course and over 50 years, from 1839 onwards, its junction with the Ganges had shifted 23 miles eastward.[51] During this time a number of spill channels were formed on the upstream of this junction, channelling most of the discharge of the Ghaghra into the Ganges before the junction in Saran district. One of the bigger spill channels was the Kol nala, which flowed in the Ballia district of U.P. and crossed the Ballia-Chapra section of the railway line.[52] Initially, a culvert had been provided in this railway line to pass the Kol nala, but this was closed with the help of sluice gates during the entire monsoon period. The construction of this un-pierced railway line in 1903 and the Inchcape Bridge in 1908 obstructed the spilling of the Ghaghra floods in Ballia. The Ghaghra flood had an empty valley to discharge the water into, but it could only be reached via the Inchcape Bridge. The entire burden of the flood waters was directed towards the Saran district of Bihar.[53] It took a longer time for the Ghaghra flood waters to drain into the Ganges, and as a result there were heavy floods in Saran district in 1921, 1923, 1934, 1936 and 1938.

The Flood Conferences in Patna and Lucknow between 1939 and 1940 were held mainly to devise ways and means to resolve the dispute between Bihar and the United Provinces on the question of controlling the floods of the river Ghaghra. The Government of Bihar complained that the actions of the B&NWR had led to increased and abnormal floods in the Ghaghra valley in Bihar, and stated that it wanted to erect some embankments in its Province to safeguard its own interests. The Government of U.P. wanted to stall the Bihar government's proposal to construct embankments, as that would have increased the flooding in the Ghaghra

[51] 'Wattal's Report', File No. VIIID-5/1939, C progs., PWD(I), GoB, p. 10 [hereafter Wattal's Report].
[52] Ghosh, *A Comprehensive Treatise on North Bihar Flood Problems,* p. 4.
[53] 'Wattal's Report', p. 9.

valley in U.P. The alternative proposed by the Bihar engineers—that is, enlarging the existing waterways on the railway line—was vehemently opposed by the B&NWR on the grounds that it was unnecessary, although in reality the latter's concerns were mainly financial. A number of technical studies were also conducted on this issue to understand the complexities of river regimes and floods, and these studies were then used by the three main actors to strengthen their own arguments. The proceedings of the conferences and the various technical studies done on this issue clearly reveal that the Bihar part of the Ghaghra basin was subjected to increased flooding because of developments made upstream. No consensus was reached on this, and a decision on the issue was postponed on the grounds that more 'scientific studies' needed to be done.[54]

Despite the fact that the two provincial governments were in the process of chalking out a 'mutually beneficial' programme of flood control in the Ghaghra valley, the Bihar government went ahead with repairs to some of the zamindary embankments on the left bank of the Ghaghra, which had been breached during the flood of 1938.[55]

Ironically, the debate between the government of Bihar on the one side and the Government of U.P. and B&NWR on the other was actually not on the question of the efficacy of embankments as an effective solution for floods, as it was made out to be. The former wanted to build some embankments on its side of the Ghaghra valley, while the latter, though arguing against embankments in general and Bihar's proposals in particular, was refusing to either remove the existing Railway embankment or provide adequate waterways on them. The Government of U.P. was supporting B&NWR because the Ballia-Chapra Railway embankment prevented the floods of the Ganges from entering Ballia district, and also helped to prevent the Doaba pargana in Ballia from being flooded by the spill of Ghaghra. Thus, while the inter-provincial conferences and consultations were a positive step, it was evident that embankments had created strong vested interests, which even state agencies and provincial governments were being sucked into. The financial and political implications of dismantling embankments that had been in existence for a long time were too alarming for the respective governments. On the contrary, as has been discussed above, the colonial government was under pressure to provide new embankments to protect areas adversely affected by older embankments.

So, while the engineers were giving up on their earlier faith in embankments and arguing for dealing with floods in a 'scientific and coordinated' manner, they still believed that rivers needed to be controlled, if not in the plains, then certainly

[54] For details of the case, see 'Note on the Lucknow Conference, J.B. Sen', File No. VIIID-5/1939, C progs., PWD(I), GoB, p. K.W.; Ghosh, *A Comprehensive Treatise on North Bihar Flood Problems*.

[55] Ghosh, *A Comprehensive Treatise on North Bihar Flood Problems*, pp. 9–10.

in the hills.[56] A window of opportunity had appeared with the rising popularity of dams, and the debate moved away from embankments, albeit only for a short while.[57] The civil bureaucracy, on the other hand, was unable to wrest free from the varied and spiralling interests that demanded a continuation of embankments.

Conclusion

It is clear that in the Permanently Settled estates, the colonial government was not very eager to invest in public works. The argument was that since it had fixed its share of the land revenue, any investment in public works had to be borne by the zamindars who benefited from it. In devolving the responsibility for constructing and maintaining these structures upon the zamindars, the government also appeared to suggest their conviction that embankments were effective means of controlling floods. The colonial administration was in effect insistent on treating the zamindars as some sort of partners in 'development and rule'. Subsequently, several legislations were geared towards achieving this balance—*effective intervention without cost responsibilities*. As the Tiljuga case demonstrates, the zamindars on their part enthusiastically took to building embankments for obvious reasons—maximising profits and reducing the damages caused by floods, so much so that the officials became worried at the complex problems that resulted from this. The flood situation appeared to be worsening even further. The colonial government's control through indirect supervision at the local level faltered repeatedly. In the latter years the introduction of legal measures to implement a policy of 'scientific flood control' also proved ineffective.

This did not mean that the government's intervention in flood control and its impact in north Bihar was minimal. At the ground level, as this article showed, the flood control picture remained a complicated one. The various agencies/departments of the colonial state, revenue and district officials, the irrigation engineers, the railways and the zamindars, all directly or indirectly part of the colonial state structure, often found themselves in various situations of conflict with each other, and vis-à-vis the colonial state, despite being committed to implementing the larger agenda of colonial rule. The interaction between these different social, economic and technical forces created its own distinct ecological footprint in the region. A study of these local-level interactions and conflicts also brings out another aspect of colonialism, which often functioned indirectly. It is not often possible to identify the government's direct involvement in any given situation at the local level. However, the complex network of interests that colonialism brought about in the countryside played a crucial role in the events.

[56] The urge to control nature had not died down, and it received a further fillip with the awareness of the success of multi-purpose river valley projects in the USA. It was during the Patna Flood Conference in 1937 that the proposal to dam the river Kosi in the hills of Nepal came up for the first time.

[57] This needs a more detailed examination, which is not possible in this article.

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