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# Fighting With a Weed: Water Hyacinth and the State in Colonial Bengal, c. 1910–1947

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## ABSTRACT

The water hyacinth occupied a dominant space in the public sphere of Bengal during the last three decades of British colonial era. The remarkable spread of this Amazonian aquatic weed contributed to agrarian decline and distress, and divided the government and the public on the question of whether the pest should be completely eradicated or be subject to scientific research for profitable utilisation. The idea of complete eradication was gradually replaced by efforts towards utilisation. In the end, however, neither complete eradication nor fruitful utilisation was possible. This essay explores the dynamics of failure to strike a solution to the problem of invasive species in the form of water hyacinth through an examination of the competing domains of bureaucracy, science and private commercial interests in a colonial context.

## KEYWORDS

Bengal, water hyacinth, agrarian decline, waterways, utilisation, legislation

The expanding field of modern India's environmental history has so far given rise to two broad categories of investigations. One relates to colonial policies and their ecological implications, particularly regarding the uses, destruction and conservation of the forest, which has drawn the attention of the majority of environmental historians.<sup>1</sup> Although water regimes of India have received relatively less attention, a number of important works have dealt with the political, economic and ecological implications of irrigation and dams.<sup>2</sup> Another spectrum of debates, informed by a broader postcolonial critique, focuses on the ranges and patterns of the state's coercion into the ecological regimes in different regions of India and corresponding resistance from below.<sup>3</sup> Within both categories of investigations, the colonial state is perceived to play a key role in mediating the relationship between ecology and the public sphere; and, not surprisingly, studies in these areas are mostly conducted from the perspective of state-formation and development processes in both colonial and postcolonial times. Far less focus has been paid to the environmental issues that are outside the realm of grand policies and which are informed neither by the direct 'autonomous' power of the state or its stubborn opponents, but by a host of contending forces within and beyond the state. The state perhaps remains a central player, but its position is never settled in the complex relationship between ecology and economic and social forces.

The story of the water hyacinth, which at the height of its global reach in the early twentieth century was present across four continents, provides insights into the way in which the colonial state in India found itself in its encounter with a biologically alien waterweed.<sup>4</sup> Such a study is necessary in the broader field of environmental history because, following Alfred Crosby's seminal work on biological exchange, a lot more focus has been placed on the relationship between plant transfer and imperial expansion than on the actual encounter between a secure colonial state and an invasive plant which has already established itself in local ecological system. In this context, this paper, with its focus on East Bengal which approximates to present day Bangladesh, examines four sets of issues: the impact of the water hyacinth on agriculture and health; ambivalent position of the state regarding the destruction or scientific exploitation of the water hyacinth; the government's predicaments in its quest for legislations to contain the weed; and the complications and failures of legislative means of fighting the weed. In examining these issues, the paper focuses on how different bureaucracies and different realms of science as well as private commercial interests imagine, construct and represent the problem of species invasion in a colonial context. In such a context, a wealth of competing players are at work, contradicting one another, struggling over bureaucratic power and funding, and attempting to further and extend their administrative reach. The hyacinth becomes caught up in these machinations in interesting ways, though it is never tamed by the state. This paper attempts to capture these complex and fluid scenarios that centred on an alien aquatic weed in late colonial India.

THE GROWTH OF THE WATER HYACINTH AND THE BENGAL DELTA

The water hyacinth was introduced in East Bengal by George Morgan, a Scottish migrant and jute merchant of Narayanganj, an industrial district in Dhaka, sometime around the turn of the twentieth century. Morgan was impressed

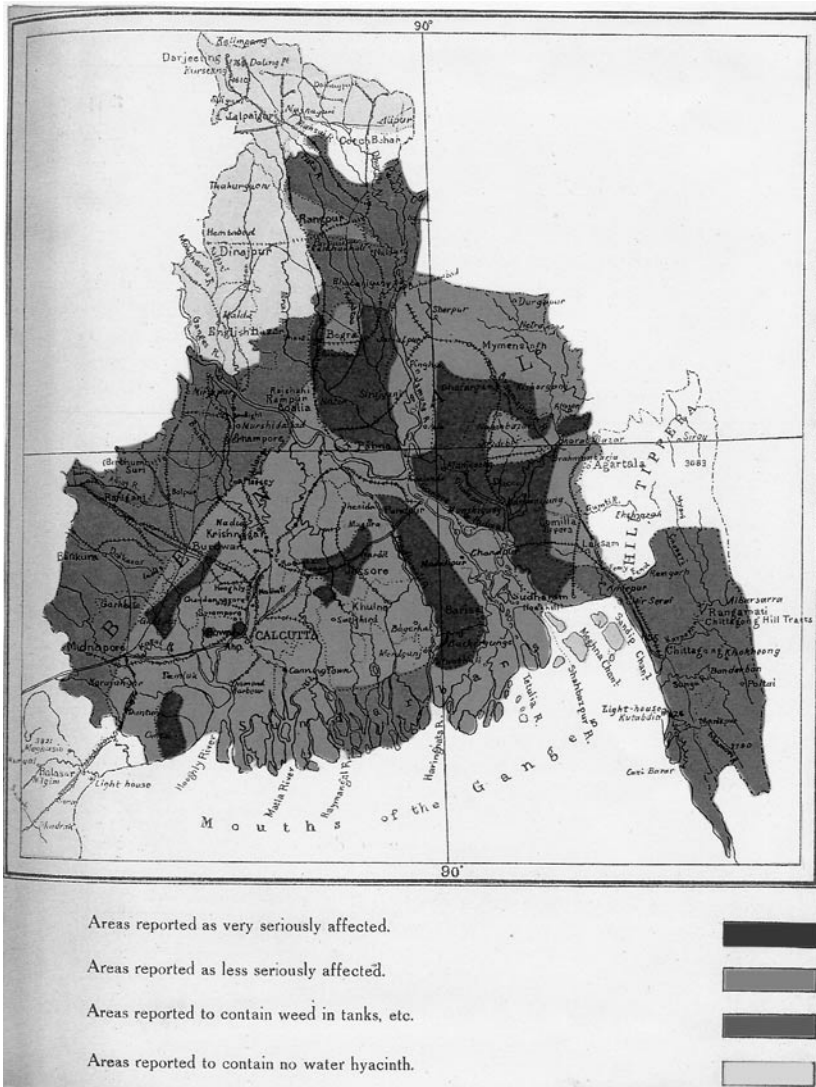


FIGURE 1. A map of Bengal showing areas affected by water hyacinth.  
 Source: Kenneth McLean, 'Water Hyacinth. A Serious Problem in Bengal',  
*Agricultural Journal of India* XVII (1922).

by the beauty of the flowers and leaves of the plant and brought it on his way back from Australia.<sup>5</sup> Another narrative relates that the hyacinth was brought to Calcutta Botanic Garden from Brazil in the 1890s and at a later date some ladies, being attracted by its flower, collected and transplanted these weeds to their gardens in Dhaka.<sup>6</sup> Some believe that the weed made its way to the Delta through the river Brahmaputra from Assam upstream.<sup>7</sup> The rapid spread of this weed in Bengal at the outset of the First World War has also been credited to the Germans, who wanted to weaken the British by ‘killing their Indian subjects’, hence it became known as the *German pana* or German weed.<sup>8</sup> As implied later in this article, a transnational company might also have introduced this plant intentionally.<sup>9</sup>

In 1914, the Narayanganj Chamber of Commerce considered the menace of the weed as one of ‘sufficient importance’ to bring it before the government’s attention. By 1920, it was acknowledged by both government and non-government agencies that the water hyacinth had been ‘choking up the natural arteries of trade, impeding agricultural operations and menacing the health of the people’ in most parts of East Bengal.<sup>10</sup> In the 1920s, while a Bengali journalist compared the weed with malaria epidemics, which were a formidable cause of mortality in contemporary Bengal, a colonial official considered the weed the most pressing problem after the anti-colonial terrorist movement.<sup>11</sup> A conservative estimate revealed that in 1936 the hyacinth covered an area of over four thousand square miles.<sup>12</sup> The weed was mostly prevalent in the active Delta of

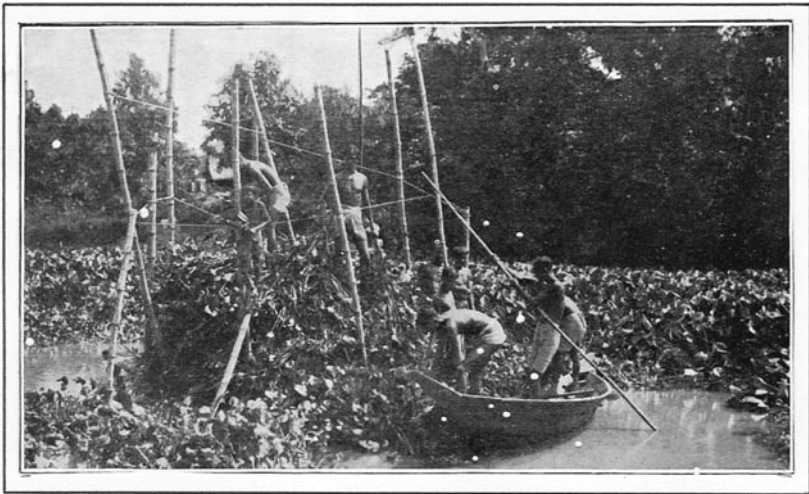


FIGURE 2. Villagers fighting water hyacinth sometime in the early twentieth century. Source: *A Short Survey of the Work Achievements and Needs of the Bengal Agricultural Department, 1906–1936* (Government of Bengal, 1937).

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East Bengal, which comprised an area of about 35,000 square miles – implying that the hyacinth covered a ninth of the total deltaic plain. If the lands covered by homesteads, office buildings, temples and mosques are excluded and only water-bodies and agricultural lands adjacent to them are considered, the coverage would have been proportionately higher.<sup>13</sup>

As the spread of the water hyacinth was left largely unchallenged, the devastation it caused to crops and cultivation processes remained unchecked. In the district of Mymensingh, it was reported that the cultivators gave up producing any crop over an area of a hundred square miles, owing to the extensive damage caused by the water hyacinth year by year. In Khulna *beel* (marshy low land) areas, paddy cultivation was rendered difficult, and low-lying paddy suffered damage from the encroachment of the plant.<sup>14</sup> The people of Nasirnagar sub-district of Comilla District petitioned the Government alleging that crops of a very large tract of their area had been destroyed since 1915 by flooding and the water hyacinth.<sup>15</sup> A large quantity of paddy grown in the *Arial beel* of Munshiganj of Dhaka District was reported to have been destroyed by the weed.<sup>16</sup> The hyacinth from the Kumar river destroyed paddy and jute plants across an area of more than 174 square miles each year. It was also alleged that inland navigation and the cultivation of paddy of *aman* variety and jute became difficult due to the pervasive presence of the water hyacinth. It was reported in 1926 that 15 to 20 per cent of the *aman* paddy were being damaged ‘year after year’.<sup>17</sup> The mover of the Bengal Water Hyacinth Bill (1933) reported that some time ago the annual damage done by the water hyacinth in Bengal was estimated at about six crore rupees (1 crore = 10 millions) and at the time of his speaking it was ‘very much more’.<sup>18</sup> This was not an exaggeration since the water hyacinth was particularly damaging for *beel* (marsh) paddy which grew in abundance in the Delta.<sup>19</sup> In a region which mostly comprised deltaic low lands, being uniquely fit for a range of rice species, the chronic challenge from the water hyacinth contributed to what has recently been termed as an ‘economic depression’.<sup>20</sup>

The problem with the weed became complicated because of an insufficient flow of water in the region. Where embankments, both protective and railway, were erected and only few outlays were given, currents of water were blocked or reduced. In places where canal mouths or smaller streams were blocked by pillars and plates of locks and sluice gates, siltation took place and the water hyacinth found congenial home to stay and multiply in such places. Ditches alongside railways and roads under district authorities were also thought to be places of ‘infection’.<sup>21</sup> During the months of *Falgun* and *Chaitra* (roughly in spring) poor cultivators used to destroy all the hyacinths which grew or accumulated on their land; but the hyacinths which grew and accumulated on the *khas* (private) lands of the landlords and of the Government remained intact, and that with the arrival of the rainy season the weed ‘grew far and wide and destroyed the crops of the poor cultivators’.<sup>22</sup> In 1946, it was estimated that crops and fish worth at least 10 million rupees were being destroyed by the hyacinth every year.<sup>23</sup>

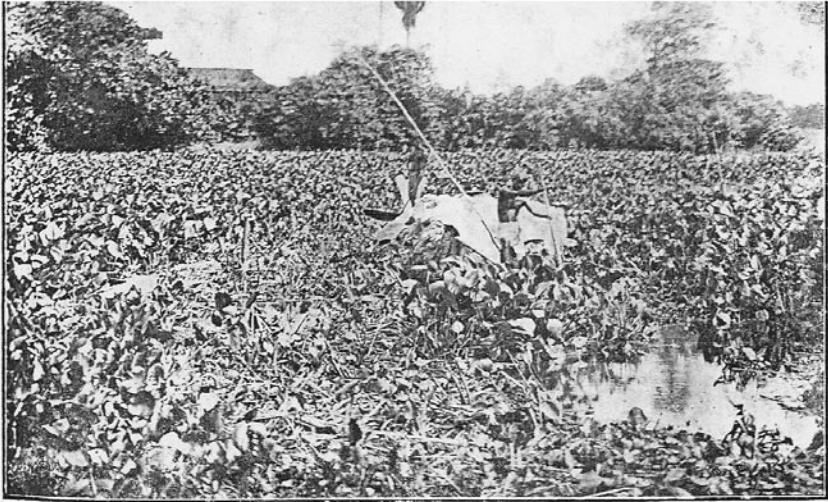


FIGURE 3. Navigation of a load of jute through water hyacinth.

In the field of public health, the water hyacinth was accused of causing influenza and other water-related diseases.<sup>24</sup> In response to the suggestion that the hyacinth contributed to cholera, C.A. Bentley, the Sanitary Commissioner of Bengal, thought that the hyacinth could not have contributed to the spread of cholera unless its presence encouraged the pollution of water with human excrement, which he doubted. Bentley thought that the only possible indirect way in which it could cause cholera would be by shading polluted water from the action of the sun and, therefore, interfering with the natural process of purification, which took place in a few days in the case of water exposed to sunlight and air. But Bentley thought it to be ‘purely hypothetical’ and though he admitted that the weed was a ‘great nuisance’ which needed to be dealt with, he failed to condemn it on sanitary grounds.<sup>25</sup> As far as the relationship between the water hyacinth and malaria was concerned, Bentley noted that water thickly covered with hyacinth rarely showed any evidence of the presence of any anopheles mosquito larvae.<sup>26</sup> However, a report by S.N. Sur, a field-level Public Health official in the Malaria Research Unit in Bengal, contradicted Bentley’s assumptions. He observed that the prevailing malarial condition was mainly due to the stagnation of water hosting the water hyacinth which favoured the growth of mosquito larvae by ‘reducing the temperature of the water as well as giving shelter against their natural enemies’.<sup>27</sup> In addition to having considerable negative impact on the health, the water hyacinth seemed to have affected public nutrition that was obtained through the consumption of fish. By thriving in the *pukurs* (tanks or ponds) of the countryside during the rainy seasons, it not only polluted drinking water but posed a danger to the culture of fish. This

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was considered one of the reasons why the production of fish in Bengal rapidly diminished.<sup>28</sup> Along with human health, the health of cattle, which provided the backbone of agriculture in Bengal, appeared to have been affected as they ate the water hyacinth. J. Donovan, a district magistrate in Bakarganj, noted that he had never seen more miserable cattle than those of East Bengal. He learnt from the veterinary officer of the district that due to little or no grazing, the cows were suffering indigestion as a result of eating the water hyacinth.<sup>29</sup> The link between the water hyacinth and decline in agricultural production and health was graphically described by a local witness in these words:

The inroads of savage army, through the frontiers, the incursions of a Timurlane, carrying fire and sword into the country, were nothing compared to the inroads of those tiny plants, floating down the East Bengal rivers ... creeks, canals and small rivulets had been clogged and choking up ... even costly careful clearance, twice a year, was not able to arrest its growth ... during flood tides, these plants get into fields and within a few days, by first multiplication, cover them entirely to the destruction of rice and other crops rooted on the earth ... Eastern Bengal, the granary of the Province and hitherto the healthiest portion of it, is being rendered desolate by the bringing of malaria by this plant ...<sup>30</sup>

The official perception of the speedy growth of the weed was that deltaic East Bengal provided a congenial physical environment for it. In an attempt to examine the capacity of the weed to grow in different environments, its seeds

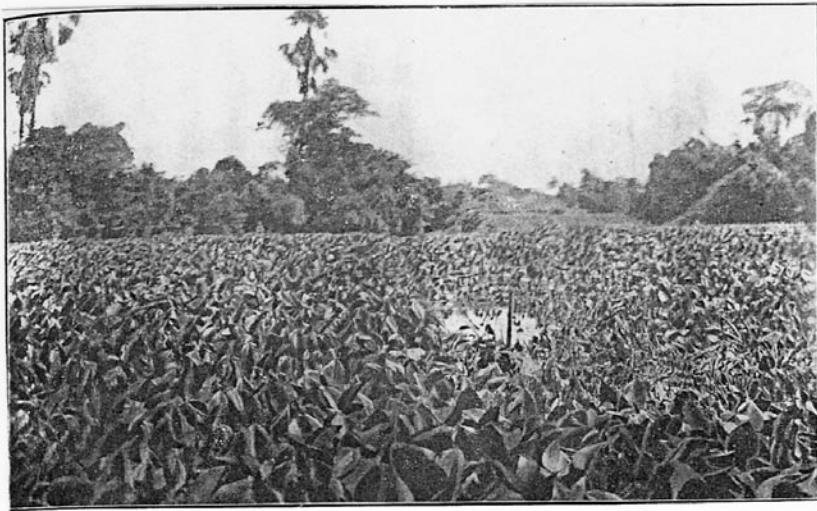


FIGURE 4. Canal choked with water hyacinth. Source: Kenneth McLean, 'Water Hyacinth. A Serious Problem in Bengal', *Agricultural Journal of India* XVII (1922).



were tested in a government laboratory in 1920 for germination on dampened blotting paper, in water, in mud, and in damp soil. The seeds were kept under observation for one month during February and the tests were made both under ordinary atmospheric conditions and in the incubator at a temperature of 86°F. The hyacinth germinated in 'all conditions' and it appeared to be 'perfectly formed and healthy'. As the weed was able to germinate in different environment, so was it able to spread itself by virtue of its bladder-like leaf stalk and sail-like leaves, since the former enabled it to float and the latter, with the help of wind, enabled it to travel into new areas. An observation team made up of officials and local people found in their experiment in the Turag river in Dhaka that the weed could travel at the rate of three miles per hour. Apparently, a single root of the hyacinth could cover an area of more than six hundred square yards in a few months' time. In fact, it was observed in a government report that if there were any case of death of the water hyacinth, it appeared to be due to its being overgrown and submerged by its progeny. Nothing except severe frost could weaken and destroy the weed, and frost was exactly what was wanting in this tropical delta.<sup>31</sup> Such official representation of the 'extraordinary biological strength' of the water hyacinth did not come as a surprise since this was one of the ways to cloak the government's vulnerability in containing the weed effectively.

Though the above discussion indicates the range of predicaments to which East Bengal was exposed because of the water hyacinth, it would perhaps never be known to what extent the water hyacinth was responsible for bringing about the decline in agriculture. This was particularly because officially the weed was either perceived as a harmless nuisance or a potentially profitable plant, rather than a contributing factor to declining agrarian production. Probably on these grounds no comprehensive effort was made to monitor the statistics of the growth and impact of the weed. It is easy to investigate, for instance, the amount of rice or jute production from well preserved government statistics, but it is not so easy to gain an accurate picture on the impact of the weed, even though it had already become a public issue in the 1910s. Fortunately, however, it is possible to obtain information regarding various efforts to combat the weed in the records relating to government policies and actions and relevant responses from the wider public sphere. We will now turn to these issues.

## ERADICATION OR UTILISATION?

From the very beginning of its fight against the water hyacinth, the Government of Bengal had to cope with the dilemma of whether the weed should be completely eradicated or be fruitfully utilised. The first working proposal towards utilisation came in 1914 when a Government Fibre Expert, Robert Finlow, suggested that the weed should be dragged out of the rivers and put into heaps for subsequently using it as manure. However, the government was not sure at

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that time how far that was an economical proposition and it seemed convinced that 'little impression would there be on the weed unless a river or *khal* (canal) was cleared thoroughly and the weed removed entirely'.<sup>32</sup> The Government of India also observed that the hyacinth grew so fast that once it got a start it was almost impossible to stop it and in this connection the government advised that whatever chance there might be of eradicating the weed lay in prompt action, and that when it made its first appearance in a locality it should be dealt with immediately. 'In view of the danger both to material prosperity and to general health which the spread of the plant would cause', the Government of India invited everyone, officials and non-officials alike, to co-operate in eradicating the pest.<sup>33</sup>

In spite of the desire of the government to destroy the hyacinth outright, the Fibre Expert retained his plan of utilisation and he, along with Kenneth McLean, Deputy Director of Agriculture, East Bengal, came forward with proposals for making financial gain for the Government by commercial utilisation of the weed. After conducting experiments in the Dhaka Agricultural Farm in 1916, they suggested that apart from high potash content, the water hyacinth was at least as rich as farm-yard manure in respect of both nitrogen and phosphoric acid. In a more specific analysis, the experts-cum-bureaucrats found that the nitrogen content of the dry material was as high as 2.24 per cent; in the damp state (containing 67.8 per cent of water) it was only 0.72 per cent. Of the 850 *maunds* (about 30 tons) of fresh green plants that were brought for experiment, about 499 *maunds* were heaped and allowed to rot, while the remainder was spread out to dry and afterwards burnt. The experts observed that owing to the high water content the rotting process involved a considerable loss of nutrients. It was found that 'by drying and burning the plant the ash obtained from 300 *maunds* of green plant gave a larger quantity of potash than was obtained from 1000 *maunds* of similar plants after rotting'. The experts noted that the rotting process involved a loss of about 70 per cent of the available potash, and 60 per cent of nitrogen. In other words, the key finding of the research was that burning water hyacinth to ash was much better than rotting it in terms of nutrient value. The experts also observed that since the fresh plant contained about 95 per cent water it could not be transported economically over any distance. The rotted plant containing about 60 per cent of water was comparable with cow-dung and it was likely that the use of the rotted material would be confined to the immediate neighbourhood of its production. But, according to these experts, the dried material was only about one twentieth of the weight of the green plant, and was thus in a much more convenient form for transport than either the green plant or the rotted material.

Such was the spirit of commerce that the water hyacinth began to be represented as something which must be reared in earnest let alone be destroyed. The experts reminded rural people that it was 'unwise to mix earth with the ash' and advised 'not to make ash in the rainy season, but to do in the dry weather

after the middle of *kartik* [around Autumn]' so that the plant could be 'dried for burning without fear of rain'. It was further advised that the plant should be collected from the water before it dried up in the winter; otherwise, a lot of earth would 'stick to the roots and make the ash much less valuable'.<sup>34</sup>

Incidentally, a multi-national company, Messers Shaw and Wallace & Co., showed great interest in hyacinth-ash at about the same time.<sup>35</sup> The company offered Government of Bengal Rs.4 per full unit of potash free on rail or on board to Kolkata. The company suggested that if the ash reached them in good condition and was not adulterated, they were ready to pay between Rs. 84 and Rs. 112 per ton. Referring to the ground reality of World War One which restricted global access to potash, the company urged the Government of Bengal to 'make it known among the agriculturists and those who can promote the scheme' and it hoped to hear from the government how the matter was received by them, and later on what progress was being made.<sup>36</sup> The Shaw Wallace Company, however, was not satisfied by the quality of the hyacinth supplied in the early phases of the transaction. In 1918, the Company directors informed the Government of India that in future they would not buy ash containing less than 15 per cent of potash, which was worth less than Rs. 2.4 per *maund* after reaching Kolkata. In this context, the Government of India advised the people: 'Do not collect any and every hyacinth that you can get hold of: but carefully select the plant. Tall, well grown plant gives rich ash and this will only be found in water so deep that its roots cannot touch the bottom such as is found in water-ways. Short leaf stalks with bulbs on them indicate hyacinth which gives poor ash and this latter plant should never be collected for making ash for sale'.<sup>37</sup>

While the Government of India appeared to be informed by the demand from Shaw and Wallace in favouring the cultivation of the water hyacinth, the Government of Bengal intervened strongly at this juncture as it understood the danger of sustaining a policy of selective utilisation of the weed. It reiterated the idea of complete destruction and felt that although there was a possibility of using the hyacinth as fodder, fuel, fertiliser, ash or sale for the extraction of potash, the slow pace of experiments meant these alternatives remained unattained and were not worth waiting for, since the agriculture of Bengal as a whole was in danger. Accordingly, the Governor of Bengal emphasised that the danger from its growth was such that prompt extermination seemed to be 'the first consideration and that the question of its utilisation ... must give place to that of its complete extinction'. He suggested that it was the duty of the local bodies (District Boards, Local Boards, Union Committees and the Municipalities) to eradicate the pest by all means in their power 'whether or not arrangements could be made to use the plant profitably'.<sup>38</sup>

It was about this time when the seven-member Water Hyacinth Committee was appointed by the Government of Bengal with Sir Jagadish Chandra Bose, a renowned Bengali botanist, as President. The Committee held seven meetings between 16 August 1921 and 8 August 1922 before publishing its report. The

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Committee observed that the districts of East Bengal, except Chittagong and the Chittagong Hill Tracts, were 'all badly infested'. Considering the extraordinary rapidity at which it had been spreading in places the report termed it a 'public menace'.<sup>39</sup> The Committee, however, seemed to be afflicted by the ongoing dilemma of whether to destroy or utilise the weed, which was reflected in their two main recommendations: firstly, it suggested the undertaking of a scientific investigation 'first into the life history of the plant and its mode of propagation, and later on into the practical methods for its check, and the economic utilisation of the hyacinth in various ways so that the cost of operations may, to a certain extent, be recovered'. For this purpose, it was recommended that a plant physiologist, a subordinate officer of the Agricultural Department and an agricultural chemist be appointed for three years. As a whole, it seemed that the Committee took the water hyacinth mainly as an object of scientific experiment for an indefinite period of time and to recover the cost thereof from the commercial utilisation of the same.

It was no wonder that scientific research tended to concentrate more on inventing methods of fruitful utilisation of the weed than on finding ways to challenge its growth. By the time the debates about scientific means of dealing with the weed – for instance, whether the growth of the water hyacinth took place through the seeds or stem – faded in the 1920s, H.K. Sen, Ghose Professor of Applied Chemistry in the University of Calcutta, had started experimenting on the utilisation of the same. Around 1930, Sen claimed that, as with maize-stalks (Mazolith) and waste chips of wood which served a functional use in America, forming solid blocks of materials out of the hyacinth might actually similarly prove productive. Sen envisioned that before the air-dried weed was brought to the plant for converting into manufactured products, over 150 genuine agriculturists and peasants could find work for every 100 *maund*-a-day plant. At a later stage of fabrication at each such factory, 50 young men could find employment. Considering that about 4269 square miles were covered with the water hyacinth, quite a large industry might be established. According to Sen, it was possible to remove the plant to different areas from time to time and the rate of Rs. 1.8 per *maund* should be sufficiently attractive for the cultivator, with his present low wages. He also suggested that alcohol could be made out of this weed.<sup>40</sup>

Meanwhile, B.K. Banerjee, a contemporary commentator, identified available methods of eradication of the hyacinth, namely 'biological', 'mechanical', and 'chemical or thermal'. Banerjee did not favour the biological method on the ground that it had not been possible for biologists anywhere in the world to discover either a fungus or suitable bacterium or an animal or a plant which could destroy or at least contain the water hyacinth. With respect to mechanical method, Banerjee calculated that a labourer could destroy the weed covering an area of 800 to 1000 square feet per day, the daily wage being between six to eight *annas* [1 *anna* equals one-sixteenth of a rupee]. Thus, to clear an area of about 800 to 1000 square feet from the water hyacinth, the minimum

cost would have been between six to eight *annas*. Banerjee also noted that the mechanical solution might lead to coercing the labouring class into clearance activities, depriving them of their daily earning from their own agricultural work. In comparison to the first two options, Banerjee found the chemical or thermal method more satisfactory on economic grounds as effectiveness. He referred to one Subimal Bose who had invented a 'spraying solution' that killed not only floating vegetative parts of the weed but also the stem which remained beneath the surface of water. According to Banerjee, Bose's spraying solution was about two *annas* per gallon—possibly less, if large scale production were arranged. Since one gallon was 'sufficient to destroy completely the weeds covering an area of 300 to 350 square feet', the cost of clearing of 900 square feet came to be about six *annas* only. Keeping all these factors in mind, Banerjee found the spraying solution a 'most satisfactory way of grappling with the problem of eradication'.<sup>41</sup>

In spite of several attempts, informed either by honest intention to deal with the weed or by a desire to make profit out of it, there was neither a breakthrough in scientific means of destruction nor in industrial or other forms of utilisation of the water hyacinth by the middle of the 1930s. In the face of the claims that several chemical sprays had the power to destroy the weed, some of these chemical materials were examined by the Water Hyacinth Committee, which notably included Griffiths, a South African scientist, and another Bengali chemist; but none of the claims of effectiveness of the sprays could be substantiated. At the same time, an institutional incapacity also surfaced. At the conference of the Union Boards of Dhaka in July 1933, the Governor of Bengal, Sir John Anderson, conceded that it was 'abundantly clear' that eradication could only be achieved by 'simultaneous attack over the whole field of operations'. But he noted that the Department of Agriculture and Industries, under whose purview the issue of the water hyacinth lay, had not the machinery, even if a method could be agreed upon, to carry out a local campaign against the hyacinth throughout the province.<sup>42</sup>

After 1936, with the introduction of Water Hyacinth Act, an opportunity arose for legal efforts in getting rid of the weed. However, twenty long years lapsed between the first initiation of the debate of destruction/utilisation and the formal legislation to combat the hyacinth in Bengal. There were instances of legislation in Cochin China (1908), in Burma (Water Hyacinth Act of 1917), in Madras (Agricultural Pests and Diseases Act of 1919), and in Assam (Water-Hyacinth Act of 1926). The question, therefore, arises as to why did it take such a long time to undertake a legislative course of action in order to fight the water hyacinth and how the legislation, when introduced, impacted on agrarian Bengal Delta. The following sections focus on these issues.

## TOWARDS LEGISLATION

In 1919 the Government of Bengal made queries about the legislation on the water hyacinth that had been introduced in Burma, with a view to adopting a similar legislative measures in Bengal. After analyzing the reply from Burma, McAlpin, Secretary to the Department of Agriculture in Bengal, found that the Burmese government had dropped measures for total eradication and had confined their action to keeping open the main water-ways. In private circles McAlpin termed the letter from Burma a 'blow', felt that the Burma Water Hyacinth Act was a failure and suggested that they 'had, therefore, better say nothing about it'. McAlpin in this connection doubted that whereas an Act for total eradication had been a failure in a province where the government had greater executive powers than in Bengal, such an Act would 'most probably be quite useless' in Bengal. He, therefore, suggested dropping the question of legislation. The file was then sent to the Governor for cancellation of the programme, when the Personal Secretary to the Governor, referring to probable consequence of the development, noted: 'I am afraid this is going to be worse even than the rabbits in Australia!'<sup>43</sup>

While the first attempt to introduce legislation on the water hyacinth was thus dropped, a by-law was framed and was approved at a conference held in Dhaka in January 1921. The Dhaka conference resolved that legislation was the only way to contain the water hyacinth. It was nevertheless found that a similar by-law was not introduced in other districts, except sparingly in a few sub-districts; nor was the government ready to legislate the issue of eradication of the water hyacinth on a comprehensive scale all over the province. It was reported that the government was awaiting the result of the working of the Dhaka by-law before committing itself to any form of legislation.<sup>44</sup> But the Dhaka by-law itself was far from being operationally perfect. Apart from being localised in nature, the by-law was weak as it did not provide for notices for clearing to be issued more than once a year. The Water Hyacinth Committee itself reported that the Dhaka by-law failed in that it only stipulated clearance of the weed once a year though experiments had shown at least two clearings were necessary within a short interval as there were generally a number of plants missed in the first clearing. It appeared, however, that even if there were clearing operations more than once a year or even once a month, the situation probably would not have improved as reflected in the statement of some of the delegates of the Dhaka conference who were against the very idea of local legislation. They argued that each district was affected differently by the hyacinth, and it was difficult to impose penalties on individuals who claimed that the land was invaded by the hyacinth from upstream in another district. It was agreed by the delegates that District Boards were powerless unless an Act was introduced and applied all over India.<sup>45</sup>

The Water Hyacinth Committee prescribed that 'some form of legislation should be adopted which will ensure that concerted action is taken when applying methods designed to destroy the weed'. While these recommendations were placed, it became apparent, from the minutes of the meetings of the Committee, that it was not easy to translate them into reality. The wording of the recommendations was such that legislation would follow the invention of scientific methods of eradication. There was also the question of political correctness in that, as argued by Sir Jagadish Bose himself, any kind of legislation could be misunderstood and antagonise the people and create trouble, while owing to the poor state of funding, the government would not be able to aid the people. Another member of the Committee, S.N. Sufi, remarked that they could not penalise people unless they [the Committee on the Hyacinth] could tell the sufferers the best way of eliminating the weed. He warned that their best intention might be thwarted by the fear that they were simply going to introduce a new mode of taxation without doing any appreciable good.<sup>46</sup> Though the committee members felt legislation would be politically incorrect, they nevertheless recommended 'some form of legislation', not a legislation of a comprehensive kind. This of course was a wrong line of action since, given the pattern of spreading of the hyacinth, no agenda could have been successful in eradicating the weed without a comprehensive inter-district and inter-provincial effort. At the same time, the Committee, though aware of its practicality, did not recommend frequent and regular cycle of destruction of the weed. For instance, in the case of French Cochin China it was made obligatory for the landlords and tenants to clear the weed during the first three days of every month. Though authorities in French Cochin China failed to apply the regulations rigorously, it was nevertheless found that the very idea of monthly clearings was never taken up in the by-laws and regulations in Bengal. The question of legislation was further held up in the wake of the economic depression of early 1930s.<sup>47</sup>

The debate about the ways and means of dealing with the hyacinth continued anyway, particularly in relation to the recommendation of the Royal Commission on Agriculture in India. In their report, the Commission recommended that the problem of the water hyacinth in Bengal should be dealt with by legislation similar to that which had been enacted in Assam, Burma and Madras. It doubted, however, whether legislation prescribing the destruction of the hyacinth, or measures to prevent its spread such as the construction of storage pounds or floating fences, would prove more than palliative. The Commission, therefore, recommended that the formulation of a programme for research on this weed should be one of the first questions to be taken up by the proposed Council of Agricultural Research. The Government of India favoured the second of these recommendations.<sup>48</sup>

While the question of legislation was shelved as a matter of secondary importance, the prioritised scheme of research on the destruction of the weed surprisingly failed to include Bengal whereas Bihar and Orissa, where the problem

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was much less acute than in Bengal, was given more attention. After examining the papers sent from the above three provinces, the Council felt deeply about the situation in Bihar and Orissa, but with respect to Bengal it came to the conclusion that 'no action was required on the part of the Council'.<sup>49</sup> The Bengal Waterways Act which was passed a few years later, in 1934, made only a passing reference to the problem of the hyacinth. The Act suggested the formation of a Waterways Board which could clear or destroy the weed in any district where there were 'navigable channels under the control and administration of the Board'. This meant that the water hyacinth of only the large 'navigable channels' came under the jurisdiction of the Board.<sup>50</sup>

At last, the first all-Bengal legislation was passed in 1936. The Act provided for some tough measures in the case of failure to eradicate the weed. In some ways, the legislation appeared to be too tough and difficult to sustain for ordinary people. By this Act, the collector of a district was empowered, if he failed to recover the cost of eradication, to enter on and take possession of any land or water at his discretion. He could do so when costs were due and he had the power to retain possession of the land and 'turn the same to profitable account until the said costs together with interest thereon' could be realised from the profits or paid by the occupier. The ceiling of the interest rate was fixed at 6.25 per cent.<sup>51</sup> The Act of 1936 also stipulated that the amount so spent by the Collector in the course of eradication of the weed would be 'recovered from the persons benefited with interest'. Beside the vexed question of interest this legislation made one thing clear: the Government took no responsibility which now rested entirely on the occupiers of land affected by the weed,<sup>52</sup> although the Water Hyacinth Committee of 1921 had warned against such a measure, i.e., legislating without instructing how to eradicate the weed. The Act of 1936 neither specifically stated when and how many times a year/month clearing operations had to be undertaken. Then there was the problem of infringement on private areas. By this Act, the Collector of a district gained the power to use land for the destruction of the water hyacinth for six months. For compensation, it was provided that if any material damage or injury was caused thereby to the occupier of such land, the Collector shall 'pay to him such compensation as shall be agreed upon in writing between the Collector and such occupier; provided that in assessing such compensation the manorial value of water hyacinth destroyed thereon shall be taken into account'. In addition, the very idea of eradication, as envisioned in the legislation, was defeated in that the provision of the possibility of commercial uses of the weed were left intact. In Clause 18, it was stated that notwithstanding anything contained elsewhere in this Act, any person or class of persons, authorised by the Local Government, might 'sell, remove or keep water hyacinth for a prescribed purpose'.<sup>53</sup>



## LEGISLATION AND BEYOND

It seems that even if the 1936 Act had been better crafted, drives for eradication of the water hyacinth could probably not have been successful, particularly because the government failed to prioritise the issue of containing the weed within its general schema of governance. For instance, before launching an inside-out drive against the hyacinth following the legislation, the government decided to wait until the results of the research on the weed, which was being carried out in Orissa under the auspices of the newly formed Council of Agricultural Research, had been received. The Government hoped that the research in the Council would produce sufficient new materials to justify a re-examination of the whole water hyacinth problem.<sup>54</sup> In June 1938, the Minister in Charge of the Agriculture Department, Tamizuddin Khan, informed the Legislative Council that an accurate estimate of the area covered by the hyacinth throughout the province of Bengal would require considerable time and expenditure and a comprehensive drive for eradication was not considered necessary.<sup>55</sup>

In the last week of April in 1939 a 'Water Hyacinth Week' was launched by the government to start a 'concerted and simultaneous drive' all over the Province in order to eradicate the weed. This appeared to be the best possible effort on the part of the Muslim League-Krishak Praja coalition government to meet its election pledges, which had included an assurance of eradication of the water hyacinth. The Week brought a mood of enlightened festivity: civil servants were mobilised, ministers moved into every corner in the countryside, and people in general joined hands – all in the name of eradicating the water hyacinth. Students were advised to form boat racing clubs in the hope that once established, members of the club would have the 'double enjoyment' in not only participating in boat races but clearing the weed wherever they appeared. In some areas, boys were encouraged to kill as many snakes as possible since these snakes often hid in the thick mat of the water hyacinth. In Dhaka, a 17-year old boy was promised a gold medal for bagging most of the 64 snakes killed during Water Hyacinth Week. The girls did not lag behind the race and the Chief Minister of Bengal, H.S. Suhrawardy, himself acknowledged that the work done by some of the school girls in Bogra District was 'even better than the results achieved by the boys'.<sup>56</sup> Observing the enthusiasm of the Scouts, school boys, pundits, maulovis, peasants, landlords and lawyers in Kishorganj, Suhrawardy hoped that in 'fighting common enemies like water hyacinth, there should be no difference between the different communities' and that the 'healthy teamwork was bound to destroy all Hindu Muslim quarrels'.<sup>57</sup>

At the end of the Week, however, it was found that apart from one English civil servant having 'sun-stroke' and another being 'stuck in the mud',<sup>58</sup> no long-lasting solutions to the problem beyond political show-downs were in the sight. No doubt considerable areas were cleared of the weed, but as the Week ended, the orchestrated enthusiasm also faded away: the ministers returned to

Kolkata, the officials to their sub-divisional headquarters and the school-goers to the classrooms. Those peasants and villagers who had been in the actual field of agrarian activities before the Hyacinth Week continued to face the same water hyacinth, which apparently survived the Week. To celebrate a Water Hyacinth Week might have been a politically correct move from a ruling party, but its failure was equally inevitable precisely because the problem was also biological and environmental in nature, which demanded an examination of the changes in the ecological system that encouraged the growth of the plant. These issues were indeed raised. Two weeks before the Water Hyacinth Week was launched, Sudhir Chandar Sur opposed the idea of such a Week which he thought was intended to remove the water hyacinth without treating the causes of its growth. Sur attributed the growth of the weed to the obstacles to the current of rivers and other water courses posed by cross roadways, railway embankments and the feet of pillars of railway bridges. Sur argued that due to obstacles, different waterways failed to perform their natural function of clearing away large amounts of organic matter to the sea via bigger rivers. This resulted in the deposition of this organic matter in the beds of the watercourses and the water hyacinth found a congenial environment there. But Sur felt that compared to the long-term implications of the blockage of water currents, the effect of the water hyacinth was minimal. Sur even suggested that the water hyacinth was better for the time being since it consumed organic matter, preventing many parts of the Delta being transformed into marshes charged with animal organic matter. In this context, Sur thought that he would welcome the water hyacinth for some time until the weed itself threatened to choke up the already dying water courses of Bengal. He suggested that the water hyacinth itself should not be tackled unless the artificial agencies which had reduced the water currents in big rivers had been tackled first, since development in this direction would automatically lead to the clearance of the weed.<sup>59</sup>

There is no denying that Water Hyacinth Act of 1936 reflected a growing consensus on the importance of getting rid of the weed and concern for the agro-ecological future of East Bengal. What seems important in this context is to examine how this consensus was informed and articulated by different agencies in the society and the state. In many cases local efforts were frustrated by lack of cooperation and coordination between the government and common people as well as between different government departments. For instance, it was alleged that in the *Arial beel* areas in Munshiganj of Dhaka, about fifty thousand flood-stricken cultivators had cultivated their lands having invested substantial borrowed capital with the encouragement of a certain local government officer. But the cultivators were at the brink of disaster as no initiatives to implement a promised Water Control Scheme had taken place. When this was referred to in the Legislative Assembly, the Minister for Agriculture noted that it was not a government scheme but was 'suggested, worked and paid for by the local people with the assistance of a Special Officer'. The scheme was specifically

aimed at constructing a barricade across the waterways surrounding the low lands of the *beel* in order to check the spread of the hyacinth, but the Speaker of the Assembly categorically denied any government responsibility regarding this and remarked that the construction of a barricade rested entirely on the local people. However, the Speaker did not elaborate why in such circumstance the peasants would resort to agitation.<sup>60</sup> In another instance, while it was claimed by the provincial government of Bengal that the Act of 1936 was introduced to empower the district authorities, land belonging to railway authorities were not covered by the Act as this was under the control of the Government of India.<sup>61</sup> Since railway and roadside ditches and waterways blocked by railway embankments were places of regeneration and growth of the hyacinth, the exclusion of these lands from the jurisdiction covered by the Act of 1936 amounted to a technical farce as far as the programme of eradication of the water hyacinth was concerned.

An amended Bengal Water Hyacinth (Amendment) Act, 1940, empowered an authorised officer to prepare a scheme of any work relating to the water hyacinth and to realise the cost for such scheme proportionately from the persons benefitting from this scheme. There was, however, no provision empowering the authorised officer to realise the cost of the removal and destruction of the water hyacinth which could be intercepted in any common flowing channel as a result of the execution of such a scheme. Therefore, instructions were given to the authorised officer to be 'so good as to take every care in the execution of schemes under section 3 of the Amendment Act so that no water hyacinth is intercepted in any flowing channel'.<sup>62</sup> Then there was the problem of co-ordination in the whole project of combating the water hyacinth. A special officer, who was appointed to deal with the water haycinth, noted that work against the weed, including local clearance and the setting up of barriers in key positions, could not be implemented properly because of differential administrative arrangements. For instance, the officer observed that government works relating to water supply or setting up of dispensaries were done more or less by respective decentralised departments, but this was not the case with the water hyacinth. This meant that, in terms of dealing with the water hyacinth problem, there was no contractor to take over the work and carry this out in anticipation of payment and that there was no organised agency to help.<sup>63</sup>

Given the varied and often self-seeking response to the problem of the water hyacinth by different agencies within the society and the government, the legislation and apparent consensus to destroy the weed was found to be ineffective in many ways. The lack of genuine efforts to tackle the problem was amply matched by the lack of focus on the problem of the hyacinth within the policies and programmes of local political groups. Referring to the fact that there was an unthinkable *hahakar* [widespread hopelessness] and tremendous poverty in Bengal due to the growth of the 'bloody plant', a Bengali newspaper commented:

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The rural inhabitants of Bengal have gradually become sick and idle. There is no enthusiasm, nor encouragement or initiative among them. They don't try to destroy this enemy [hyacinth]. They are sitting idle thinking that this is a curse from God. If some day God himself withdraws the weed, only then their lands would be free and the mouths of the rivers be opened. This class of fatalist cowards even dreams of *swaraj* [self-rule, as opposed to British colonial rule]! <sup>64</sup>

Thus, the water hyacinth survived the wrath of the Bengal Chamber of Commerce in the 1910s, the scientist's chemical spray in the 1920s, and electoral commitment, legislation and above all a historic 'water hyacinth week' in the 1930s – all aiming toward its destruction. Ultimately, it also survived in two consecutive post-colonial states, Pakistan and Bangladesh. Indeed, it still occupies a major portion of the water bodies in Bangladesh. For a tiny, relatively weak aquatic weed, ninety per cent of which comprised harmless water with a tinge of 'feminine' beauty, this has been no mean achievement.

## CONCLUSION

In the wake of the weakening struggle against the water hyacinth in late colonial Bengal, one commentator noted, as quoted above, that if the nationalists who wanted independence from British colonial rule were not even successful in fighting a water weed, then how would they be able to run a nation? But, as we see today, the problem of invasive species as well as other environmental issues cannot be simply tagged with post-colonial promises. Perhaps the strongest threads that connect the colonial state to post-colonial state are the varied ways in which the forces, agencies and ideas shape the unstable parameters of governance. The dilemma of pursuing simultaneous programmes in development and conservation persists today in an even more complex form. For the specific case of the water hyacinth, in Bangladesh as well as in other developing countries, the debate continues whether to completely eradicate the weed or utilise it for profit and development. Those who are in favour of complete eradication of the hyacinth refer to its link with cholera, malaria, dengue, depletion of fish resources and even climatic change. Considering the predicament of the water hyacinth in developing countries, S. Gopal, an authority on this plant, has cautioned against its utilisation. He notes: 'Developing countries should not encourage the propagation of this weed for utilisation. The interests of humanity can only be safeguarded by seeking effective long-term control of water hyacinth, rather than by its utilisation.'<sup>65</sup> But there are others who enthusiastically favour the utilisation of the weed, for example, in the form of making paper or toys, using it in the biogas plants and removing arsenic from water. The hyacinth has even been used to explain cultural politics of feminism in Bangladesh by a feminist group which think that the water hyacinth is a beautiful plant with attractive flowers, but as a weed it represents the peripheral condition of women in the

male-dominated society and, therefore, it 'challenges this concept as the women's movement does to the patriarchal notions'!<sup>66</sup>

What can the state do? There is hardly any doubt that the water hyacinth is a serious invasive species that has settled in at least 50 countries in the southern hemisphere; but it is also true the state has gained some power with its significant control over science and technology.<sup>67</sup> Researchers have identified and developed many useful biological and chemical means of fighting invasive species, but the water hyacinth, in particular, remains a problem because there persists lack of political will as well as consensus among private business concerns and the people at large in a given multitude of interests, ideas and forces. Without finding a solution to the myriad of social and economic problems, scientific feats alone may not be helpful in finding a working solution to the problem of invasive species in general.<sup>68</sup> Therefore, unless the state is able to sponsor a balanced relationship between science and human psychological and material orientations, the water hyacinth is going to stay with us.



FIGURE 5. A tank choked with hyacinth in Comilla town in central Bangladesh.  
Photo taken by the author in Autumn 2003.

## NOTES

An earlier version of the essay was read by Professors Christopher Bayly, David Arnold and Alfred Crosby whose comments were greatly helpful and much appreciated. I am indebted to anonymous reviewers whose critical interventions made it possible to put my arguments into proper perspective.

<sup>1</sup> Some representative works include Richard Tucker, 'Dimensions of Deforestation in Himalaya: The Historical Setting', *Mountain Research and Development* VII, 3 (1987): 328–31; M. Rangarajan, 'Production, Desiccation and Forest Management in the Central Provinces, 1850–1930', *Indian Economic and Social History Review* 31 (1994): 147–67; Richard Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens, and the Origins of Environmentalism, 1600–1800* (Cambridge: Cambridge University Press, 1995); *Environment and History* 2, 2 (1996: Special issue on South Asia).

<sup>2</sup> For studies on water, see Ian Stone, *Canal Irrigation in British India: Perspectives on Technological Change in a Peasant Society* (Cambridge: Cambridge University Press, 1984); Rohan D'Souza, *Drowned and Dammed* (Delhi: Oxford University Press, 2006). An assessment of water-related works in colonial India can be found in Rohan D'Souza, 'Water in British India: The Making of a "Colonial Hydrology"', *History Compass* 4, 4 (2006): 621–28; For a collection of useful essays on both forest and water history in India, see David Arnold and Ramachandra Guha (eds.), *Nature, Culture, Imperialism: Essays on the Environmental History of South Asia* (Delhi: Oxford University Press, 1995).

<sup>3</sup> Ramachandra Guha, *The Unquiet Woods: Ecological Change and Peasant Resistance in the Himalaya* (Berkeley: University of California Press, 1990); Ramachandra Guha and Madhav Gadgil, 'State Forestry and Social Conflict in British India', *Past and Present*, 123 (May, 1989): 141–77; Arun Agrawal, *Environmentalism: Technologies of Government and the Making of Subjects* (Durham, N.C.: Duke University Press, 2005); David Hardiman, 'Power in the Forest: the Dang 1820–1920', in *Subaltern Studies VIII*, (New Delhi, 1994); Ajay Skaria, *Hybrid Histories. Forests, Frontiers and Wilderness in Western India* (New Delhi, 1999).

<sup>4</sup> The presence of the plant was first considerably felt in Florida in the 1890s, in Queensland of Australia in 1895, in South Africa in 1900, in Cochin China in 1908, and in Myanmar in about 1913. By this time, it had invaded most of Southern and northern Africa.

<sup>5</sup> Kabita Ray, *History of Public Health. Colonial Bengal 1921–1947* (Calcutta: K. P. Bagchi and Company, 1998), 284; See also Seith Drucquer, 'On the Rivers of East Bengal', *The Geographical Magazine* XII (March 1941): 150–51.

<sup>6</sup> Drucquer, 'On the Rivers of East Bengal', 350; This theory seems quite plausible since there is evidence that towards the end of the nineteenth century the number of visitors to Calcutta Botanic Garden increased to such an extent that the authorities found it difficult to deal with cases of violation of the garden rules. This had made it necessary to request the government to sanction certain additional rules. See *Annual Report of the Royal Botanic Garden* (Calcutta: Government of Bengal [hereafter, GoB], 1897–8), 1.

<sup>7</sup> 'Council Question', March 1921, Agriculture and Industries Department [hereafter, AID] (Agriculture Branch), bundle 34, list 14, file 6, National Archives of Bangladesh, Dhaka [hereafter, NAB].

<sup>8</sup> About the German 'conspiracy', see Kabita Ray, *History of Public Health*, 284–5.

<sup>9</sup> For a note on plant research and plant migration at the hands of private companies, see William Neinary and Karen Middleton, 'Plant Transfers in Historical Perspective: A Review Article', *Environment and History* 10 (2004): 3–29, p. 13.

<sup>10</sup> AIB (Agriculture Branch), 1921, 'A' Proceedings, bundle 34, list 14, file 32, NAB.

<sup>11</sup> *Amrita Bazar Patrika* (Hereafter *ABP*), 26 March 1926, 4.

<sup>12</sup> J. Chaudhuri, 'Agrarian Problems of Bengal-1', *The Bengal Cooperative Journal* [hereafter, *BCJ*] XXI (January–March 1936): 117.

<sup>13</sup> Radhakamal Mukerjee noted in the early 1930s that a 'few prickly pears introduced into Eastern Australia and water hyacinth into the delta of Eastern Bengal – both as botanic curiosities – have now covered thousands of miles and become a serious menace to agriculture, and communications'. See Radhakamal Mukerjee, 'An Ecological Approach to Sociology', in Ramachandra Guha (ed.), *Social Ecology* (Delhi: Oxford University Press, 1994), 25.

<sup>14</sup> *Bengal Legislative Assembly Proceedings* (Hereafter *BLAP*) LIII (1938): 224–5.

<sup>15</sup> *BLAP* LIV (1939): 93; also see *BLAP* LV (1940): 273–4.

<sup>16</sup> *BLAP* LIV (1939): 32–3

<sup>17</sup> 'Lilac Devil in Bengal', *ABP*, 21 August 1928, 12.

<sup>18</sup> Benoydranath Banerjee, 'Some Economic Problems of Bengal—1: The water hyacinth', *BCJ* XIX (1933): 32, 35.

<sup>19</sup> J. Chaudhuri, 'Agrarian Problems of Bengal-1'.

<sup>20</sup> Mostopha Kamal Pasha, 'Water Hyacinth', *Banglapedia. National Encyclopaedia of Bangladesh* (Dhaka: Asiatic Society of Bangladesh, 2002).

<sup>21</sup> 'A Note on the Water Hyacinth', by Kenneth McLean, Secretary to Water Hyacinth Committee, in *Report of Water Hyacinth Committee* (Calcutta, 1922), (hereafter, *RWHC*), XVI; See also M.C. McAlpin's note of 16 April 1919, in Revenue Department (Agriculture), 'A' Proceedings, nos. 24–27, July 1919, NAB.

<sup>22</sup> *BLAP* LIV (1939): 458–60; *BLAP* LIII (1938): 378–80.

<sup>23</sup> 'Geographical Records', *Geographical Review* 36, 2 (1946): 329.

<sup>24</sup> Babu Nibaran Chandra Das Gupta, *Bengal Legislative Council Proceedings* (hereafter, *BLCP*) I, 3 (1921): 76–7.

<sup>25</sup> Recent researches, however, have proved that *V. cholerae* are found to concentrate on the surface of the water packed with the water hyacinth. See W.M. Spira et al., 'Uptake of *V. cholerae* Biotype El Tor from Contaminated Water by Water Hyacinth (*Eichornia crassipes*)', *Applied Environmental Microbiology* 42 (1981): 550–3.

<sup>26</sup> C.A. Bentley's note on 15 February 1921, AID (Agriculture Branch), bundle 34, list 14, file 10, NAB.

<sup>27</sup> Report by S.N. Sur, Assistant Director of Public Health, Malaria Research Unit, Bengal, 24 September 1926, NAB; The debates whether mosquitoes could thrive with the water hyacinth was going on also in the US about this time. In response to the suggestion by a biologist that the growth of water hyacinth over the surface of a body of water was immediately followed by the destruction of mosquito larvae in that water, another biologist, Alfred Weed, referring to the result of his research, noted that the growth of water hyacinth over the water was 'followed by a great increase in the mosquito population'. See Alfred C. Weed, 'Another Factor in Mosquito Control', *Ecology* 5 (January 1924): 110–11.

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- <sup>28</sup> Benoyendranath Banerjee, 'Some Economic Problems of Bengal—1'.
- <sup>29</sup> 'Tour diaries of the Collector of Bakarganj', J.T. Donovan Papers, file I: Bengal 1927–1931, Centre of South Asian Studies, Cambridge, UK (Hereafter, CSAS).
- <sup>30</sup> Babu Nibaran Chandra Das Gupta, in *BLCP*, 1, 3 (1921): 76–7; for other references to the devastation caused by the water hyacinth in Bengal see *BLAP*, LIX, 4: 159; LIV, 2: 138; XXXIV, 3: 632. See also M. Azizul Huque, *The Man Behind the Plough* (Calcutta, 1939), 16; L.S.S. O'Malley, *Bengal District Gazetteers: Faridpur* (Calcutta, 1925), 8.
- <sup>31</sup> *RWHC*, 2, xv–xvii.
- <sup>32</sup> J.R. Blackwood, Director of Agriculture, Bengal to Secretary to GoB, Revenue Department, 2 September 1915, bundle 34, list 14, file 202, NAB.
- <sup>33</sup> 'Water Hyacinth', Communiqué of the Government of India, Revenue Department (Agriculture Branch), Proceedings nos. 24–27, July 1919, file, 9-M-1, NAB (hereafter 'Communiqué')
- <sup>34</sup> Robert S. Finlow, 'Water Hyacinth (kachuri, Tagoi, or Bilati Pana)', 9 November 1917, in 'Communiqué'.
- <sup>35</sup> Since its birth in 1886, the Shaw Wallace Company dealt in different businesses including tea, Bengal silk, oil, tinplates, shipping of jute and gunnies, flour mills, coal mining, Swiss dyes and chemicals, and from 1944 to 1947 as one of the Bengal Government's chief rice and paddy procurement agencies. In 1914, the Company started operations in the business of fertiliser 'specializing in organic and inorganic mixtures for plantation and ryot crops'. It is not clear though whether the Shaw Wallace had a hand in introducing the water hyacinth in East Bengal or whether the water hyacinth dragged Shaw Wallace into East Bengal. But it is probable that the Company's turning to the Bengal water hyacinth may have been informed by the introduction, in 1917, of the Water Hyacinth Act in Burma, where the Company had business concern. For a profile of the Shaw Wallace Company see 'The Varied Activities of Shaw Wallace', in the Bengal Chambers of Commerce Centenary Supplement, *ABP*, 24 March 1946, 26.
- <sup>36</sup> Messrs Shaw Wallace & Co., Calcutta to Fibre Expert to GoB, 12 August 1916, Revenue Department (Agriculture Branch), in 'Communiqué'.
- <sup>37</sup> Notice no. 2, in 'Communiqué'.
- <sup>38</sup> M.C. McAlpin, Secretary to GoB, Revenue Department, to All Commissioners of Divisions, 3 July 1919, AID (Agriculture Branch), 'A' Proceedings nos. 26–27, bundle 34, list 14, file 9-M-11 (5), NAB.
- <sup>39</sup> *RWHC*, 2.
- <sup>40</sup> 'Agrarian problems of Bengal', *BCJ* XXI (1936): 118; See also Benoyendranath Banerjee, 'Some economic problems of Bengal—1': 34.
- <sup>41</sup> B.K. Banerjee, 'Water Hyacinth', *ABP*, 25 September 1935, 8. It may be noted that this argument was taken up in spite of the fact that Sir Jagadish Chandra Bose himself objected to any chemical option as he feared that it could lead to water pollution affecting both humans and fish.
- <sup>42</sup> Banerjee, 'Some Economic Problems of Bengal—1': 34–5.
- <sup>43</sup> 'Extracts from notes and orders in Agriculture', Revenue Department (Agriculture Branch), 'A' Proceedings for July 1919, nos. 24–27, file 9-M—11, NAB; The metaphor of the 'Rabbits of Australia' appears pertinent from the following fact: 'Sometime in the 1850's a man was charged at the Colac (Victoria) Police Court with having shot a rabbit,



the property of John Robertson of Glen Alvie. He was fined 10 pounds. A few years later, Robertson's son spent 5000 pounds a year in an attempt to control rabbits.' By 1869 it was estimated that 2,033,000 rabbits had been destroyed on his property and that they were as thick as ever. <http://rubens.anu.edu.au/student.projects/rabbits/history.html>, last accessed 2 April 2005.

<sup>44</sup> AID (Agriculture Branch), bundle 34, list 14, file 6, 1921, NAB; See also G.P. Hogg, Secretary to GoB, to the Secretary to Government of India, Department of Education, Health and Lands, 3 August 1929, AID (Agriculture Branch), bundle 34, list 14, file b155, NAB.

<sup>45</sup> *RWHC*, XXIX–XXX

<sup>46</sup> *RWHC*, III, VI.

<sup>47</sup> G.P. Hogg, Secretary to GoB, to the Secretary to Government of India, Department of Education, Health and Lands, 3 August 1929, AID (Agriculture Branch), bundle 34, list 14, file b155, NAB.

<sup>48</sup> A.B. Reid, Joint Secretary to Government of India, Department of Education, Health and Lands, to Secretary to GoB, AID, 22 May 1929, AID (Agriculture Branch), bundle 34, list 14, file 155, NAB.

<sup>49</sup> (Second) Report showing the progress made in giving effect to the recommendations of the Royal Commission on Agriculture in India. Part I—Central Government, for the period 1st November 1929 to 31st December 1930', Public Health Department, 'B' Proceedings, nos. 110–115, list 14, bundle 15, file P.H. 2C-2, NAB.

<sup>50</sup> Bengal Act XII of 1934: The Bengal Waterways Act, 1934, section 41 (5); 'navigable channel' meant 'any channel which is navigable during the whole or a part of the year by a vessel of two-foot draught or over'; this approach to selective means to tackle the weed came at a time when all discussions of getting rid of the plant seemed to end in 'nothing but a tacit admission that it was too costly and altogether too vast an undertaking'. See 'Personal Reminiscence', E.W. Holland Papers, p. 32, CSAS.

<sup>51</sup> Bengal Act XIII of 1936: The Bengal Water Hyacinth Act 1936 and the Rules Thereunder, Clause 12.

<sup>52</sup> Kabita Ray, *History of Public Health*, 295.

<sup>53</sup> Bengal Act XIII of 1936.

<sup>54</sup> Answer by Nawab K.G.M Faruqui to the question by Maharaja Giris Chandra Nandi, *BLCP XLV*, 342

<sup>55</sup> *Bengal Legislative Debates* (1939): 970–2.

<sup>56</sup> *ABP*, 5 May 1939, 8.

<sup>57</sup> *ABP*, 4 May 1939, 4.

<sup>58</sup> Most of the English civil servants apparently enjoyed the occasional drives for dealing with the water hyacinth as these provided a break from routine office work. O.M. Martin recollected that 'in order to encourage this movement, my wife and I would don bathing costumes and do manual labour along with the villagers. Some of the villagers took up the work with great enthusiasm, and I could easily have made every villager join in the work, if I had allowed the vigorous minority to coerce the lazy majority. Sometimes the volunteers begged me for permission to take sticks in their hands, and drive the lazy ones to the work. I did not dare to give this permission, without any legal authority to do so; but at times I was sorely tempted to let the enthusiasts have their way. It was not a job

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that everybody liked, as the water-hyacinth was full of curious repulsive-looking creatures like snakes and crabs. But it was a healthy change from scribbling notes on office files.' See 'Memoirs of O.M. Martin, part II', O.M. Martin Papers, p, 308, CSAS.

<sup>59</sup> Sudhir Chundar Sur, *ABP*, 14 April 1939, 16.

<sup>60</sup> *BLAP* LIV (1939): 87–8.

<sup>61</sup> *BLAP* LII (1938): 378–80.

<sup>62</sup> K.C. Basak, Secretary to GoB, AID, to Collector, Faridpur, 7 June 1941, Faridpur Files, General Department (Revenue), Collection no. 3A, File 20, NAB.

<sup>63</sup> Special Officer, Water-Hyacinth, to District Magistrate, Faridpur, 17 February 1941, Faridpur Files, General Department (Revenue), Collection no. 3A, File 20, NAB.

<sup>64</sup> 'Attempts to Destroy the Water Hyacinth', *Dacca Prakash*, 3 March 1935, 5.

<sup>65</sup> Quoted in <http://www.fao.org/docrep/006/y5031e/y5031e0c.htm#bm12>, last accessed 8 October 2007.

<sup>66</sup> See <http://membres.lycos.fr/ubinig/eventboimela.htm>, last accessed 8 October 2007.

<sup>67</sup> Raymond L. Bryant and Sinead Bailey, *Third World Political Ecology* (London: Routledge, 1997), 53.

<sup>68</sup> Philip E. Hulme, 'Biological Invasions: Winning the Science Battles but Losing the Conservation War', *Oryx* 37, 2 (2003): 178–93.

