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Environmental History and Historiography on South Asia: Context and some Recent Publications

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Introduction: Setting the Stage

Environment, like nature, is a human category. Throughout history sedentary people and in particular urban settlers distinguished (and still distinguish) between the settled and therefore 'civilised' and safe environs and the unsettled and therefore 'uncivilised' and dangerous world around them. The latter, however, is inhabited and cultivated by peasants, pastoralists and nomadic societies and is, for that reason, not at all uncivilised. Even remote and inhospitable areas like primary forests, mountains and deserts are regions of human interaction with nature, with societies permanently creating, shaping and transforming their environment. Environment, therefore, is a fluid category. Apart from being permanently transformed by human action it is natural disasters (also a human category) like earthquakes, volcanic eruptions, inundations and landslides, to mention just a few, which may alter local, regional and even global environments and ecosystems.

Consequently, there is no natural equilibrium since that would suggest a paradise-like and thus static state of nature which has only been disturbed by human (inter)action. On the contrary, human environment and nature[1] are, in the first place, ideologically and/or socially constructed spaces. Secondly, because nature is subject to permanent changes it causes continuous (dynamic) adjustment of new environmental and ecological conditions rather than their (static) balancing. Just as it does not make any sense to assume a natural equilibrium, it also makes no sense to presume that nature is a random and, for that reason, chaotic system. Also, it does not make any sense to claim an ecological baseline as a means to distinguish between the cultural and the natural.

More interesting are the qualitative changes with regard to the human environment – one may also speak of human environments in the

plural as environment is socially constructed and, therefore, by definition variable. It is, above all, an anthropocentric space. The relationship between humans and their environment is largely determined by the structure of their societies and, more recently, with an ever increasing demand for natural resources. However, the latter development must not be taken to imply that the rapid increase in human population in the last couple of centuries has caused the depletion of natural resources and the degeneration of the environment. That would be a too simplistic neo-Malthusian argument. Rather, it is a different approach to natural resources (and nature) accompanied by the claimed right to appropriate them until their complete depletion which is responsible (D'Souza 2003: 117-20). This different approach which claims unlimited growth and wealth for all humans can be explained by the development and transformations of a global capitalistic economic order supported by the nation-state, including the colonial state as its extra-territorial annex.

Public awareness regarding human environments and its changes (experienced as degradation, deterioration, depletion and destruction) came up in the 1970s, indicating what the Club of Rome in its famous report dating from 1974 entitled *The Limits of Growth*. At the same time in Europe and particularly in Germany the damage done to forests by industrial pollution created a specific awareness which soon had its own terminology: Waldsterben (the dying of forests). After more than a century of unprecedented industrial development in western Europe and northern America, environmentalists like Greenpeace (founded in Vancouver in 1971 as an NGO against industrial whaling and tests of nuclear devices) indicated the limits of such allegedly boundless growth and natural resources and furthermore pointed to the damage and destruction already done to what was then re-constructed as 'nature'.

It was the 1970s that shaped and determined worldwide awareness of a threatened global environment and human existence. After more than a decade of public agitation academics also discovered the subject as a field of research and established environmental studies as a university discipline. In many countries in Europe and America, as well as in South Asia and especially in India, public opinion on a changing environment deeply influenced the academic debate. The destruction of forests in the Himalaya became the most prominent target of environmentalists and their well-known movement Chipko Andolan (chipko = tree hugging) and, in due course, of environmental historians.

Taking the post-colonial state's forest policy as a starting point,

scientific research on colonial forest legislation, forest utilisation and forest destruction produced many valuable volumes on South Asia's environmental history. Yet, even before the academic discipline came into existence, Elizabeth Whitcombe's still seminal study on the agricultural history of northern India and the environmental-cum-ecological changes caused by the introduction of large scale canal irrigation set the standard for South Asia's environmental history (Whitcombe 1971). Since then, agrarian transformation under the colonial regime has been the subject of a few books that have come out during the last couple of decades (Satya 1997; Mann 1999; Bhargava 1999; Iqbal 2010).

Regarding time and space, South Asia's environmental historiography presently focuses on three fields and identifies three periods. With respect to the fields, the environmental landscape of the subcontinent is seen to be determined firstly by government forest policy, secondly by its irrigation policy (canal irrigation and large dam projects) and thirdly by its wildlife policy (control of carnivores, wildlife preservation) (Rangarajan 2009: 229-31). It seems that the research agenda is largely determined by the more or less easily accessible sources of the colonial archives.

As far as the periodisation goes, the historiography identifies firstly the pre-colonial period, secondly the colonial one, and thirdly the post-colonial phases, claiming that the colonial regime marks the watershed in South Asia's environmental and natural history. However, it seems questionable whether South Asian historiography's well-established three-partite periodisation is actually applicable for the writing of South Asia's environmental history. Forest destruction and canal irrigation was a feature of South Asian (environmental) history since, for example, the settlement of humans and the formation of states and societies in the Ganges Valley from the fist millennium BCE. Similarly, deforestation also took place during the Mughal period and continued well into the 18th century.

A fundamental change only took place at the end of the 19th century when scientific forestry introduced by the imperial British Indian forest legislation of 1878 declared the colonial state protector and proprietor of large parts of the Subcontinent's forest cover. Yet this kind of resource management is not restricted to colonial regimes but also took place, for example, in the US and in many of the European states, in particular in German states and in France during the 18th and 19th centuries, and in some post-colonial South Asian states. Resource and revenue man-

agement was part and parcel of modern, 18th century state-formation in Europe, America and South Asia. Across the board, an integral part of this policy was the criminalisation and eviction of local people, deprivation of rights and the transformation of primary forests or locally managed woods into scientifically managed and bureaucratically administered industrial forests. If the colonial forest policy represents a watershed in the South Asian environmental history the same would be true for the North American and European environmental history – which is not the case.

It seems that the British colonial state did by far not have the administrative means and executive power to implement its laws and regulations. What is rather interesting is the fact that it is the Indian nation-state that rigidly and ruthlessly implemented the colonial state's legislation. Additionally, recent experiments with the so-called social forestry have caused a further increase in the exploitation and destruction of India's forest resources. This is not to deny the colonial state's massive impact on India's forest management but it is to suggest that it might be the colonial state's legislation along with the recent legislation of the Indian state which actually causes an ever-growing transformation and deterioration of India's forest environment. Therefore it seems reasonable to take a fresh look at the colonial and the post-colonial state's role and ask whether it is the executive power and therefore quality of the Indian state which ultimately made the colonial legacy come true thus contrasting the neo-Malthusian claim to an ever increasing quantity.

A brief overview of major publications may highlight the historiography on South Asia's environmental history. So far, this history comprises two major streams. The first is on the dramatic changes and damages, or changes and benefits, caused by the British colonial regime. Elizabeth Whitcombe's study on the negative effects and Ian Stone's book on the positive outcome of canal irrigation belong to this early academic debate. Studies on the negative effects of canal irrigation in the Panjab and on the Godavery and Krishna deltas have to be read as complementary studies (Stone 1985; Ali 1997; Islam 1997; Gilmartin 1994, 1996; Rao 1988). With respect to colonial forest policy there has been a huge pile of publications mainly on its negative effects. The main subjects are, as mentioned above, the impact of colonial forest conservation policy on South Asia's forests, the destruction of eco-systems, the displacement of local societies, and the appropriation of local rights through the

colonial state. The majority of authors assumes a more or less peaceful pre-colonial equilibrium between humans and nature which is portrayed in sharp contrast to the violent politics and the destructive effects of the colonial regime (Guha 1991; Gadgil & Guha 1992; Damodaran 1992; Rangarajan 1996; Saberwal 1999).

The second stream is on the divergent interpretation of the efficiency of indigenous water technologies and colonial water engineering. Research in this field has shifted from the disastrous effects of colonial rule to a more nuanced narrative emphasising, for example, continuities between the pre-colonial and the colonial state in South Asia thus making the distinction between the phases partly irrelevant. In an excellent study on the small-scale water harvesting systems in Gujarat David Hardiman pointed out that commercialisation, indebtedness of peasants and agricultural change predated the colonial regime. He suggests that large dam projects of the colonial and the post-colonial state have transformed agriculture and the rural society to such an extent that a return to small scale dams does not seem viable Hardiman 1996: 185-209). In a similar way, David Mosse (2003) argues in favour of continuous developments suggesting that the construction and maintenance of tanks in South India underwent phases of expansion and intensification as well as decline prior to colonial rule. The same argument, namely that state-formation, commercialisation, agricultural transformation and environmental changes are intertwined is highlighted by R. Sivaramakrishnan (1999).

Apart from such seminal monographs some equally seminal edited volumes have been published during the last two decades. The beginning was made by two volumes. Firstly, the massive volume *Nature and the Orient* published in 1998 which was the outcome of the first conference on the environmental history of South Asia which took place in New Delhi in 1992. The book consists of 31 articles on various aspects of South Asia's environmental history. Most of the contributions deal with forests, deforestation and the displacement and deprivation of indigenous people. Secondly, we have the smaller volume on Nature, Culture, Imperialism, published in 1996 (Grove et al.: 1998; Arnold & Guha 1996). From here on the environmental history on South Asia seems to have been coupled with the history of agriculture, forestry, peasants and pastorals. So far, there is not a single book and only two articles on the environmental history of South Asian cities (Anderson 1996; Mann 2007; Das 2007). This is certainly a shortcoming of academic research

but is also a legacy of the history and historiography of British India. Industrialisation and urbanisation were of less importance to the colonial administration and, therefore, received less attention from it in comparison to agriculture and forestry. Scholarly research being heavily determined by the availability of sources seems to have become trapped in the shelf corridors and reading rooms of colonial archives, therefore discursively buttressing the perception of 'India' as a principally rural landscape.

This is not to say that environmental history on South Asia is hopelessly trapped. On the contrary, as will be demonstrated by the following review of recent publications, there are lively as well as innovative academic activities going on, setting new trends and tendencies. These make it worthwhile to take a closer look at recent publications on the field.

Book Reviews: Actors and Themes

1. Monographs

Recently published monographs and edited volumes on South Asia's environmental history basically contribute to the established discourse outlined in the preceding introduction. Exceptions, of course, prove the rule. A useful short textbook on the environmental history of South Asia is provided by Irfan Habib, *Man and Environment. The Ecological History of India* (2010). As the title indicates, environmental history deals with the relationship (and interference) of man, his environments, and the ecological consequences this interaction resulted in. The book is a fine textbook which introduces the reader to the various aspects of environmental and ecological history of South Asia since the Pleistocene (ca. 2.6 million years BCE until ca. 10,000 BCE). Special attention is given to the Neolithic Revolution which is when the interaction between man and environment began causing highly visible change for the first time. Somewhat disturbing however is the periodisation. The Middle Ages last from 700 CE to 1750 CE thus uncritically reflecting the British historiography on South Asia which places the beginning of the Modern Time with the establishment of colonial rule. Also the focus remains restricted to human interaction with nature, while not dealing with settlement, town development, and urbanisation.

Fairly useful are the many maps, tables and figures. In particular the maps that indicate the changing coastlines through the ages as well as the change of forest cover between 1500 and 1900 are good illustrations of a subject that is difficult to comprehend otherwise. Likewise the ample contemporary source material (text examples) given at the end of each chapter exemplifies the ways in which historians try to work with historical sources to find explanations for present-day situations. Students will find the cartographical, statistical and text material extremely helpful in understanding the continuous changes and transformations humans and environment are subjected to from the beginning of humankind.

At some points the book resembles outdated Marxism, for example, restricting the development of capitalism to England in the 18th century. Furthermore, with respect to forestry and forest management it would have been useful to point out the continuities from a pre-colonial to the post-colonial era thus indicating, as stated above, that the emergence of the modern state searching for natural resources (timber) and additional fiscal income was by no means restricted to Europe but took place in South Asia as well. Since the book does not cover the post-colonial period it also fails to explain the colonial legacy.

Although Neema Ambre Rao's book *Forest Ecology in India* (2008) uses a lot of hitherto unnoticed indigenous sources from the Peshwar Daftar (Maharashtra State Archives) and the National Archives, it contributes to the well-established discourse of a pre-colonial balanced environment between humans and nature, which was massively disrupted and ultimately destroyed by the legalistic-cum-bureaucratic impact of colonial rule. This is mirrored by the rather conventional concept of the book, starting with a short pre-colonial assessment, continuing with six chapters on the colonial impact, and followed by the somehow obligatory chapter on popular resistance. The book does not shed any new light on the established opposition between 'destruction' and 'conservation' within the conceptual framework of long-term ecological impacts of colonial rule. It would have been worthwhile to highlight an aspect which is mentioned only briefly by Rao, namely that it is perhaps not the colonial state as a monolithic powerful agency that is directly involved in the destruction of forests but the political and economic empowerment of local agencies through the colonial state which enabled them to exploit the natural resources and forest dependent communities of India's forests.

Following Mahesh Rangarajan's excellent suggestion, Richard Tucker compiled his many articles on forestry in South Asia in an extra volume called *A Forest History of India* (2012). Without doubt Richard Tucker belongs to the pioneers of South Asia's forest history. His famous article on the forest management in Thana District, Bombay, came out as early as 1979 thus establishing a new field in the historical research and, in the long run, in South Asian historiography. Tucker's next focus was on the western Himalayan forests covered in four articles, one of which compared Kumaon and Assam. Tucker's special interest was on colonial and imperial forest management. Deforestation and its consequences were the main objects of his research as, for example, indicated by his seminal article on the "Depletion of India's Forests under British Imperialism" published in 1989. Yet Tucker's interest went beyond timber resources and their exploitation as he also did some research on wildlife reserves and resident people as well as non-timber products in the western Himalayas. All articles united in one book will certainly promote the study of forestry and forest management under British colonial rule in South Asia.

Forest environments are followed by water environments. In his book *Drowned and Dammed* (2006) on dam construction in Orissa, Rohan D'Souza argues that due to the advance of colonial capitalism the water landscape of Orissa was dramatically transformed from the beginning of the 19th to the middle of the 20th century. He claims that whilst in all publications on environmental change and agricultural-cum-societal transformation the colonial environmental impact on the watercourses has been duly highlighted the colonial capitalist impact "has remained rather obscure and unexplored" (D'Souza 2006: 13). Yet D'Souza's concept of colonial capitalism remains equally obscure. He neither defines the asymmetrical economic relationship nor does his empirical study per se explains the specific relationship of colonial capitalism contrasting it, for example, with industrial capitalism. His working definition simply claims that "Colonial capitalism, I argue, therefore, had to effect social change and ecological impact as simultaneous and interrelated processes in South Asia" (ibid.: 13). The same however is true for many parts of the historical and present-day Europe and the US.

Despite this shortcoming the study is a wonderful example of the failed agency of the colonial state. D'Souza narrates the history of the Mahanadi River and its delta in Orissa that changed from a flood utilisation and flood dependent water regime at the beginning of the 19th

century to a devastating flood regime by its end. In Orissa, annexed by the British in 1803, most of the officials regarded the overflow irrigation practiced in the delta region as a backward mode of agriculture since it did not control the negative effects of the floods. Therefore administrators from the revenue department recommended and encouraged the damming of the Mahanadi River. Disputes on the responsibility of dam construction were resolved by the creation of private property which set in motion a chain of anarchic dam building along the river. Unsystematic damming soon aggravated the negative effects of the floods (ibid.: 51-96).

In the middle of the 19th century officers from the military department objected to the embankment policy of the revenue department. They regarded the dams counterproductive to revenue enhancement or to the prevention of inundations and recommended the destruction of most of the recently built dams (ibid.: 112-25). Apart from the soil becoming private property water was also turned into a commodity. Water rates however never proved sufficient as an income for constructing, maintaining and expanding the dams of the Mahanadi. The far reaching plans of Sir Arthur Cotton, crisscrossing the delta with a system of navigable and irrigation canals, failed utterly. Instead of the proposed extent of the irrigated area of some 2.5 million acres, merely 250,000 were realised by the late 1920s (ibid.: 147). Yet even the existing canals, dams and embankments deeply influenced the ecological conditions of the delta since the soil fertility diminished as did crop yields. Water-logging of low-lying lands became a serious problem as well (ibid.: 127-41).

The whole system collapsed at the turn of the 19th century. Works were too costly, inefficient, and unproductive. Government officials recommended a completely new approach to the water regime of the delta emphasising instead that government should move away from constructing or maintaining canals and dams. Moreover, at the end of the 1920s, a government committee pointed towards the negative effects of canal and dam construction. Surprisingly however it did not recommend immediate action and existing structures were not to be removed. What remained was a delta demarcated by protected, semi-protected and unprotected enclaves. Suggestions to abandon the whole canal-system remained unheard. To overcome the deadlock, government ultimately opted for the double embankment of the head of the Mahanadi since that would prevent floods pouring into the delta (ibid.: 157-81).

The last chapter of the story of the Mahanadi damming begins in the

1930s. Analogous to the Tennessee Valley Authority, the Mahanadi Valley Scheme was to combine environmental improvement, technological (hydrological) development, and economic growth with political power and national identification. Hirakud Dam became the core of the scheme and in the end the only major project that was realised. Planned and begun in the 1930s, the independent Indian government under Prime Minister Jawaharlal Nehru pursued the project with even more ambition. After 20 years of planning and construction the dam was opened in 1958 as one of Nehru's "Temples of Modernity" (ibid.: 182-214). It is this last chapter (of the story as well as of the book) which makes the tale of colonial control a very telling one. Firstly, massive hydrological projects are not bound to an autocratic colonial regime. Secondly, in modern democratic regimes (and in despotic regimes) capitalism and socialism depend on the same modernising discourse including the impetus to forge the nation via national projects. It is this nexus which D'Souza should have accentuated more clearly.

In *Land, Water, Language and Politics in Andhra* (2011), Brian Stoddart demonstrates that the dam projects along the Tungabhadra, Godaveri, Krishna and Kaveri caused a long-lasting transformation and ultimately a substantial change of the agrarian landscape. In the Krishna-Godaveri Delta alone, the agricultural area expanded from 24,500 acres in 1883 to 163,500 acres in 1897. To skim off the estimated agrarian increment, the colonial government changed the revenue settlement enhancing the amount of revenue and the water tax between 1850 and 1930. This, on the one hand, caused a fundamental change in property and tenure, and, on the other hand, a change in the cultivation methods. Canal water became too expensive for the peasants and was therefore not used by the majority of them. Irrigation turned into a means of rich farmer agriculture. The formation of new agricultural (economic) spaces also induced the formation of new social spaces. Small peasants, losers of the transformation, founded organisations and collectively resisted government policies. At the same time, common action led to an Andhra awareness, which, in 1956, resulted in the foundation of the Indian Union's federal state of Andhra Pradesh, with Hyderabad as its capital. Again, categorisation into colonial and post-colonial may not suffice to explain economic, political and societal change.

S. Abdul Thaha, in his book on *Forest Policy and Ecological Change* (2009), points out that in Hyderabad State (until 1951), state forest management as well as irrigation politics began in the second half of

the 19th century. It was the Nizam of Hyderabad's personal decision to promote irrigation schemes on different levels, i.e. local small scale and medium range irrigation facilities like tanks, canals, weirs and wells. To protect 'his people' from the consequences of drought and dearth, the arable area was to be extended and agrarian output enlarged. However after some initial success, the overall agrarian land fell from 267,000 acres to 237,000 acres between 1922 and 1951. During the same time, the irrigated area increased from four to six percent of the total arable land. In addition to the decreasing agricultural land, the food crop area also declined since more cash crops were grown on irrigated land due to their larger profitability. Despite a stately campaign in 1942 which encouraged the growth of food crops the area under cash crops continued to expand (Thaha 2009: 15-45).

The expansion of the arable land also had consequences for the forested area. During the first half of the 20th century it decreased from 15 percent to below 12 percent. In Hyderabad State the deciduous forests including valuable species like teak were located in the large valleys of the big rivers Godavari and Krishna. Forests were also to be found at the north-western fringes of the state territory. It was only in the second half of the 19th century that the Nizam's government decided in favour of an active forest management. Before that many forest areas were depleted to gain additional arable land and, after the middle of the 19th century, to supply the growing sleeper-demand of the British-Indian railway companies. This growing demand caused an increased and, at the same time, uncontrolled onslaught on the Hyderabad forests. The Hyderabad Forest Act of 1867 established a Forest Department which was headed by a British forester. However, as Thaha points out, neither that Forest Act nor the following ones of 1917 and 1947 which were more or less copies of British India's forest acts, were duly implemented. In fact, the 'open frontier' of the forests still existed in the middle of the 20th century as the above mentioned numbers indicate (Thaha 2009: 62-81).

Like in many other parts of India, the decreasing forest coverage caused environmental problems. Within a few years in some areas the fertile black soil was eroded due to the absence of protecting forests. Also, in some areas the water table sank. The British geologist Leonard Munn observed decreasing rainfall and rising temperature as well as an increasing velocity of wind at the end of the 19th century. He also opined that the drought and famine of 1876-8 was partly a natural dis-

aster but, at the same time, in its aggravated consequences the result of man-made changes in the environment, in particular the continuous felling of trees. Additionally, Thaha points at an increase of malaria and other diseases which he attributes to the changing environment (ibid.: 125-8).

Thaha's book enriches an established environmental narrative which emphasises the nexus of the expansion of arable land, deforestation, environmental changes, natural and man-made catastrophes, which took place under colonial rule, and, as he demonstrates, also in the Princely State of Hyderabad. However, the book is rather descriptive thus lacking overall in-depth analysis. Reference to existing publications would have made the book more solid. In particular Thaha fails to refer to Laxman D. Satya's study on Berar which neighbours Hyderabad. Looking at Berar, for example, would have provided Thaha with parallel developments with respect to environmental consequences. Apart from that the description of the environmental changes and the consequences for humans and nature is based solely on Leonard Munn's report. Cross-references would have been helpful to support Munn's assumptions and observations. Nevertheless Thaha's study makes a valuable contribution to the debate on environmental history with regard to changes caused by irrigation schemes, agricultural development and forest management.

This new trend among researchers working on South Asia's environmental history, namely the interdisciplinary approach with respect to agriculture, silviculture, and irrigation is also mirrored in recent publications on the Himalayan forests. The latest and most comprehensive contribution is by Dhirendra Datt Dangwal *Himalayan Degradation* (2009). Beginning with an excellent 'state of the art', Dangwal questions many of the currently established scholarly positions. According to him, scholars too often have believed in scientific forestry as the beginning of a fierce onslaught on the forests all over the subcontinent. Taking up some recent publications, Dangwal favours the position that the colonial state was rather weak in implementing a policy of strict forest management let alone of scientific forestry. Additionally – and this marks his central argument – research so far has shed far too little light on the connections between forest economy, husbandry, agriculture and pastoral economy. Yet, it is exactly the mixed economy which was so typical and essential for the region as well as for other landscapes of South Asia (Dangwal 2009: 19-51).

Himalayan hills are known for their terraced fields, irrigated by small water-canal systems, temporary cultivation in higher elevations and pastoralism practiced by almost every inhabitant of the region. Due to the many rivers and rivulets, fishing was an essential part of the local economy and diet. And since extensive forest areas are also the habitat of many wild animals, these were also part of the economy and nutrition. When the British annexed the territory in 1814, they improved the agriculture of the foothill Tarai as well as the Dun constructing numerous small-scale canals. Yet, only in the second half of the 19th century, did the irrigation system bear fruit. Additionally, roads were constructed to improve local agriculture, trade and extraction of forest products. In the 20th century, the Tarai was to become the granary of Uttarakhand after being transformed from a largely uninhabited and wild region into a well-cultivated strip of land (ibid.: 51-109, 128-60).

A similar development can be observed with regard to forests. Until the middle of the 19th century the British tried to make the forest products profitable by leasing out the right to collect taxes to the highest bidder. Timber extraction, for example, then became a purely private enterprise, the state only collecting duties. From the middle of the 19th century, the rising amount of railway sleepers made a different management of the region's forests necessary. The colonial state clearly asserted its right over the forest, especially as such rights had been highly contested by the local population. This assertion of claims on forests can be divided into five stages: First: between 1815 and 1878 when the submontane forests were largely controlled by local forest agents trying to open up the forests for commercial exploitation. Second: between 1878 and 1893, when most of the submontane forests were classified as reserved, backed by the Imperial Forest Act of 1878. Part of the new policy was road construction for the expansion of the timber trade.

In the third phase, 1893-1911, efforts were made to bring the inner forests of the mountains under the control of the colonial state. That process however was slow since these areas had a relatively dense population. After 1911, in the fourth phase, opposition to the hitherto practiced forest management came up as the Forest Department, in its effort to integrate the forests into a market economy, was now affecting everybody's life. In the 1920s, the first open resistance movements came into existence culminating in the Chipco-Movement of the 1970s and 80s. Along with the rights to forest products the colonial forest management tried to regulate the access to forests, i.e. who was allowed to

extract and thus benefit from forest products. Large areas were closed to grazing forcing a growing population and a growing number of cattle to graze on a decreasing area of land causing a massive deterioration of the remaining area due to overgrazing. The colonial state, however, additionally profiteered from that dire situation as it levied steadily growing taxes on grazing cattle (Dangwal 2009: 160-89)

On the one hand, the Forest Department had immense difficulties in its efforts to counteract the diminishing forest cover in the first half of the 20th century. On the other hand the amount of arable land stagnated. Even the reclamation of the commons had reached its climax by the 1950s. The most rapid expansion of the population which took place after Independence caused an overall and rapid decline of the hill economy. Between 1960 and 1980 the net sown area declined by about 25 percent whilst that of cultivable waste increased by almost 80 percent, fallow amounting to some 30 to 40 percent. With the soil fertility declining people no longer found it profitable to practice agriculture. Large emigration, mostly of the male members of families, took place, further aggravating the situation due to the rising shortage of labour (ibid.: 234-78).

It is in particular this aspect which makes Dangwal's study on Uttaranchal such a valuable contribution to the environmental history of South Asia since it stresses the continuities as well as the changes between the pre-colonial, the colonial and the post-colonial regimes. Again it seems that pre-, post- and colonial time categories do not always make sense because they obscure long-term developments. What seems obvious, however, is the acceleration of detriments in independent India, with the state adopting (to date) colonial forest management policies for commercialising forest products despite the needs of the local population. Apart from this it is most noteworthy that colonial and post-colonial scientific forest management meant more than the extraction of forest products and the prohibition of grazing cattle. Scientific forest management in British India and in the Indian Republic is not just an overall attack on the living conditions of local people, but on the flora, fauna and soil as well.

A second book on the environmental history of northern India is provided by Eric Strahorn called *An Environmental History of Postcolonial North India*, published in 2009. Basically, he covers the same time and the same area. However, in contrast to Dangwal, Strahorn emphasises the development of the Tarai's environment in independent India and

he includes the Tarai in present-day Uttar Pradesh, in particular the Pilibhit and Kheri Districts. A major shortcoming of the book is, to begin with, that Strahorn does not refer at all to Dangwal's study though it appeared in 2007. Many aspects, like for example wildlife conservation, is presented in a much more sophisticated way by Dangwal. Another shortcoming of the book is that its narration is confusing at many points. Changes in the chronology of events and many repetitions make the reading of the book difficult at times. Above all, being based on a PhD dissertation, the book lacks a clear thesis. Nevertheless, the book may be read as a complementary study enriching the data given by Dangwal.

Strahorn points out the fundamental change the Tarai experienced since India's independence in 1947. From then on the Indian central government as well as the government of Uttar Pradesh initiated a massive forest clearing in the Tarai for settling demobilised soldiers and refugees from Pakistan. As a preliminary measure, the government started a massive anti-Malaria campaign. During colonial times, the Tarai was regarded as a wilderness infested with wild animals, diseases and tribal people. According to the British, game hunting remained the only valuable contribution the Tarai was able to make to the colonial regime. It was new techniques and machines which ultimately made deforestation and land reclamation in the Tarai possible. US-American aid like the extensive spraying of DDT to combat Malaria, and the deployment of bulldozers to fell trees and to eradicate roots and grass, paved the way into the Tarai from the late 1940s. Officially, the settlement of the Kumaon Tarai ended in the middle of the 1950s whilst that of Pilibhit and Kheri just began in 1958 (Strahorn 2009: 43-83).

By the beginning of the 1970s, the landscape of the Tarai had utterly changed from an erstwhile dangerous wilderness into a well cultivated part of the country that looked similar to the rest of the settled landscape. Meanwhile, wildlife protection and conservation was on top of India's and the WWF's agenda to rescue the Indian tiger in particular. After the utter failure of the colonial Wildlife Protection Act of 1912, legislation in the 1970s bore fruit. Plenty of new villages close to wildlife sanctuaries were protected by buffer-zones and the number of tigers grew again. However, at the end of the millennium the landscape of the Tarai had again changed, now a patchwork of farms, forests, wildlife sanctuaries, jungle, reserved forests, cultivated land, as well as uncultivated land which, as Dangwal has shown, – something Strahorn fails

to do – lay fallow because poor peasants were migrating to the cities of northern India (ibid.: 101-33).

The most insightful part of Strahorn's book is that on the role the Green Revolution played in Kumaon and adjacent areas. Contrary to the claim of the Indian government, it was not the Green Revolution based on High Yielding Varieties, pesticides and technological implements which, for the first time, brought additional wealth to the region. Rather, this was due to agricultural improvement schemes that the colonial regime had established already in the 19th century to improve the region's agriculture. In the 1950s, the Ford Foundation as well as the Rockefeller Foundation – India's new cooperating partners with regard to development – continued the colonial rhetoric and ideology, maintaining that India's agriculture is utterly backward and static thus incapable of improvement. External help might secure otherwise predictable food shortages and, more importantly, revolutions, in particular, socialist and communist revolutions. It is against this background that the Green Revolution in India must be read, i.e. the prevention of 'Red Revolutions' through a 'Green Revolution' facilitated by US-American aid and implemented by Indian economic policy in the Cold War era. This global aspect could have been more emphasised (ibid.: 103-14).

In his *Forests and Ecological History of Assam*, 1826-2000 (2011), Arup Jyoti Saikia[2] demonstrates the continuities from the colonial state right into the post-colonial state with regard to the management of Assam's forests. Both regimes continued the agrarian policy of the pre-colonial Ahom rulers who continuously encouraged the expansion of the agricultural frontier. However, under the colonial regime the commercial exploitation increased. The set of actors involved in this exploitation is rather noteworthy since it consisted of the colonial state represented by the rivaling Forest and Revenue Departments, European and Indian planters claiming land for the establishment of plantations, and local and immigrating peasants looking for cultivable land and land speculators. The colonial and the post-colonial state had immense problems in trying to balance the interests of all parties involved in the distribution of land. Despite the demarcation of forest areas following the 1878 Indian Forest Act, the colonial state was not able to resist the growing pressure on Assam's forests from local and immigrating peasants. As one of the consequences of this uncoordinated settlement, neither the colonial nor the post-colonial state granted land titles to these peasants (Saikia 2011: 114-204).

Due to colonial legislation, all uncultivated land was declared wasteland including jungle and shrub areas. On these tracts as well as on the Reserved Forests pressure from peasants and planters increased from the end of the 19th century onwards. The rivalry between the Forest and the Revenue Departments added to this pressure, with the latter envisaging the 'forest frontier' as an 'agricultural frontier', thus, encouraging forests of minor value to be felled for land reclamation. Between 1870 and 1950, ongoing deforestation of about 700,000 hectares of woodland transformed forests into agricultural land of which immigrating peasants shared a sizeable portion with an increasing acreage of jute (a cash crop) cultivation. Like in other regions of British India, commercialisation of a capitalised world economy caused the impoverishment of peasants turning many of them into landless agricultural labourers. These findings point towards the shortcoming of the book by Neema Rao reviewed above, namely, the multifarious agencies empowered by the colonial state, although, also in Joshi's work the colonial state seems a bit too mighty. All in all, the findings point towards a research desideratum.

Saikia points towards the continuities in the middle of the 20th century when political regimes changed. Between 1948 and 1954, peasant movements in India aggravated the pressure on Assam's forests. After Nagaland became a separate federal state in 1963, a hitherto unprecedented onslaught on Assam's forests caused a further diminution of Assam's forest cover in the 1970s and 1980s. Rising population and immigration from neighbouring and newly independent Bangladesh increased the population pressure on the cultivable land. Additionally, the inter-state border conflicts between Assam and Nagaland turned violent in the middle of the 1980s. The Joint Forest Management Act of 1990, providing for the participatory management of India's forests, paradoxically stimulated deforestation, small farms now pushing the agricultural frontier into the remaining forests of Assam. Exploitation and deforestation are still going on in the 21st century including the fight for rights regarding the use of soil and wood (Saikia 2011: 214-35).

What is true for the forests of Assam is also true for the wildlife. The last chapter gives a deep insight into this rather unknown part of colonial environmental history. Game hunting was a matter of the colonial ruling elite. Local princes imitated the sport from the last quarter of the 19th century onwards whilst the local population went on hunting animals not as game but for their livelihood. Yet, wild animals also caused

severe damage to agriculture including the killing of peasants by tigers. This led to a systematic hunting down of the "man-eaters", enabled and actively supported by colonial legislation. Awareness and consciousness with respect to wildlife only developed at the turn of the 19th century, after thousands of elephants had been shot or exported, and tigers, cheetahs, rhinoceroses and monkeys being shot indiscriminately either for personal pleasure or for commercial purposes – in some cases almost to their extinction (ibid.: 245-59).

Shooting and hunting was prohibited in Reserved Forests in 1905 which was followed by the establishment of wildlife reserves and sanctuaries however, as has been mentioned, without any remarkable success. Yet it was only in 1963 that the Indian Board of Wildlife took up the matter of wildlife seriously. Still it seems difficult to protect endangered animals like tigers, rhinoceroses and cheetahs.[3] This new findings are confirmed and extended by various articles (Rangarajan 2012). The indiscriminate shooting of wild beasts parallels the perception of 'India' as the land of inexhaustible natural timber resources at the beginning of the 19th century to the land of limited resources and threatened species at its end. The new field of wildlife closes the gap between agrarian and forest history. Seen against this multi-facetted background this kind of environmental history has a lot of potential as it includes human, animal and natural and cultural habitats.

A fairly fresh light on the subject of environmental history is shed by the book of Iftekhar Iqbal: *The Bengal Delta* (2010). In the first paragraph of his introduction, Iftekhar Iqbal states that "this book argues that an understanding of the ecology of plains is essential for any analysis of the politics and society of colonial South Asia" (Iqbal 2010: 1). Iqbal's investigation and analysis starts with the early days of British colonial rule in Bengal in particular the Permanent Settlement of 1793 and its ecological as well as social consequences. Due to the ecological system of the Ganga-Brahmaputra delta, the infamous Permanent Settlement could not be implemented in large parts of the eastern delta as the permanently shifting river course made such a fixed revenue assessment impossible. Individual leasing of land on rather liberal conditions based on irregular and incomplete surveys became predominant in the region encouraging wasteland reclamation in riverine areas. When revenue income from the Permanent Settlement dwindled during the 19th century, the colonial state was compelled to further grant tenancy rights, which were given with the tenancy legislation of 1859 and 1885,

consolidating the agriculturists' occupancy rights and the state's revenue income. Rather than a decline which is part of the Indian "nationalist" historiography, an overall improvement of the agrarian conditions took place at least in the eastern part of the delta.

The stable agricultural conditions led to the in-migration of many settlers into the eastern parts of Bengal contributing to an overall agricultural improvement. This is the topic of the second chapter. The large and highly diversified fluvial system facilitated a dense exchange system, mainly based on boats, and guaranteed the delta's commercial and human communication. Bazaars and boats were the backbone of trade, commerce and communication. The eastern delta's economy was famous for its biologically highly diversified rice production. Land reclamation as well as the intense cultivation of alluvial lands by whole families (in contrast to the absentee zamindar landlord of the permanently settled western Bengal districts) led to a rather stable ecological regime. This stability also prevented the spreading of diseases like cholera and malaria which were proportionally higher in other parts of Bengal where reclamation and cultivation was less prevalent. Better nutrition and better health certainly contributed to the romantic image of the so called 'sonar bangla' (Golden Bengal), which was part of the national construction of Bengal at the turn of the 19th century.

Chapter six narrates the story of the railway-mania in Bengal. The building of the railways of the Raj started in Bengal in the 1850s. However, the Bengal delta was included in that network only from the 1870s onwards. Debates on the pros and cons of such an extensive network crossing the many waterways of the delta included the alternative or parallel development of a riverine canal system. However, it also delayed the beginning of the construction work. Due to the geological conditions almost all railway lines were built on artificially erected high embankments. As the embankments had too little and too few culverts and bridges, they caused many ecological problems like flooding, waterlogging, decreasing agricultural outputs and a substantial increase of diseases in otherwise, for example, malaria-free regions. Critique, particularly that of the local people, was dismissed because peasants were regarded as unable to understand and appreciate the benefits of modernisation. Three case studies exemplify the onslaught of modernisation on the highly diversified ecosystem of the Bengal delta. By the 1930s, as Iqbal convincingly demonstrates, the environment of the delta region had changed substantially.

The following chapter continues the story of the massive man-made onslaught on the ecosystem of Bengal. It was the spread of the water-hyacinth pest over an increasing amount of the water surface in the delta that soon caused severe problems in navigation, in the economy and in the environment at large. The origin of the water-hyacinth remains obscure, yet it is very likely that it was imported at the end of the 19th century because of its beautiful flower. Around 1900, the plant started to spread. Within less than four decades it covered an area of 4,000 square miles whilst the weed affected a total area of 35,000 square miles, which is equivalent to one-ninth of the delta's plain. Measures to stop the spreading of the weed concentrated on experiments for the economic utilisation of the plant rather than its eradication. Fodder, fuel and fertilizer were the options for the future use of the plant. Experiments, however, delayed effective measures to prevent the spreading of the water-hyacinth. Furthermore, the legislation of 1936 included the possibility of the weed's economic utilisation despite the fact that the weed indeed was strangulating the economy and ecology of the country.

This leads to the last chapter which analyses the origins of the Bengal famine of 1943 from an ecological perspective. All together, Iqbal makes out eight agents, which contributed decisively to this man-made disaster. First, despite the growth of the population the area under cultivation remained stagnant from the end of the 19th century onwards. Second, the average yield of food-grain, in particular rice, decreased. Third, the low agricultural productivity was, most likely, also caused by under-capitalisation. Fourth, in many districts of the eastern delta the water-hyacinth further reduced the amount of available food-crops. Apart from that, water-logging caused similar problems and, in addition, prepared the 'ground' for the further spreading of the weed. Fifth: This caused an overall pauperisation of peasants, who became landless labourers. This transformation accelerated from the beginning of the 20th century, when many of the peasants were already living below the poverty line and thus were the first ones struck by the scarcity of 1943.

Sixth, due to the water-logging, plants were increasingly attacked by various crop diseases. This was in particular true for 'urfa' and 'hispa', both of them ravaging the rice fields of eastern Bengal. Various other diseases also contaminated the paddy fields destroying many of the growing plants. One plant-disease severely struck the rice fields in 1942 thus additionally contributing to the food scarcity of the following year. Seventh, diseases contaminating humans like cholera, malaria

and smallpox also spread in the eastern delta infecting the weakened population during the famine. No wonder then that Bengal, known for the worst public health in British India and the latter known for its worst public health in Asia, was struck by famine disastrously in 1943, the worst affected area being in the eastern delta region. Finally, the eighth contributing agent that Iqbal identifies is that the construction of embankments as well as the effects of the water-hyacinth forced the local population to substitute less nutritious sorts of crops for high nutritious species. This further adulterated the health conditions of large parts of the rural population long before the famine.

'Sonar bangla' (Golden Bengal) may have been the romanticised idea of pre-colonial Bengal, yet, as Iqbal convincingly shows, 'sonar bangla' was a reality for large parts of the population in the eastern part of the Ganga-Brahmaputra delta until the end of the 19th century. During the first half of the following century, the environmental, ecological, economic and social conditions deteriorated affecting large parts of the rural population. Seen against this background, the human catastrophe of 1943 was the outcome of various long term developments including political decisions that culminated in the disastrous famine which was by far not caused by short term drought and dearth.

However, on a critical note, one wonders why Iftekhar Iqbal does not refer to the above mentioned work of Elizabeth Whitcombe dealing with the Ganga-Jamna Doab in the second half of the 19th century as well as the reviewer's book on the same region covering the first half of that century. Both books deal with riverine ecological systems and their change including the questions of man-made human catastrophes (famine and starvation to a large extent as consequences of environmental and ecological changes due to agrarian transformations). Both books would have served as a point of departure. Similarities of the ecological-cum-economical change in a highly diversified landscape are obvious enough to make any analogies between the regions rather plausible. And with respect to the lack of interest on ecology among the historians Iftekhar Iqbal could have mentioned his own publication in the reviewers edited issue of the *Internationales Asienforum*[4], which draws exactly this connection between environment and ecology in South Asia. Apart from these few shortcomings, Iftekhar Iqbal has written a highly sophisticated in-depth ecological-cum-social history of the Bengal delta which without doubt, deserves the utmost attention.

2. Edited Volumes

A few edited volumes have come out during the last years. They collect valuable contributions to new themes of South Asia's environmental history. Subjects range from water control, water management and water regimes to macro studies as well as international and transnational themes. In 2007, *Situating Environmental History* appeared, edited by Ranjan Chakrabarti. Three years later, in 2010, three eminent historians on South Asia, John McNeill, José Augusto Pádua, Mahesh Rangarajan, edited the volume *Environmental History. As if Nature Existed.* In 2011, further reputed historians edited the volume *The British Empire and the Natural World. Environmental Encounters in South Asia* (Deepak Kumar, Vinita Damodaran and Rohan D'Souza) to be followed by Mahesh Rangarajan's and K. Shivaramakrishnan's two-volume set *,India's Environmental History* (2012). In 2011, Nandini S. Kapur edited an important volume on the *Environmental History of Early India. A Reader.* Whilst the first three volumes reflect the latest contributions to the field, the latter two volumes reprint the most important contributions to the field from the last two decades. Additionally, Sumi Krishna's *Agriculture and a Changing Environment in Northeastern India* collected the latest articles on the north-eastern region of South Asia, formerly Assam.

A broad spectrum of contributions is assembled in Ranjan Chakraborti's edited volume. The first article by Karl Jacoby, "Classifying Nature", (In: Chakraborti 2007: 45-58) argues in favour of a closer and more systematic cooperation between social and environmental historians. Interestingly, he argues from a North American academic perspective, also taking into account social and environmental issues from Germany. Especially labour history and environmental history may contribute to a better understanding of the emerging modern economic capitalist system, its social implications and ecological transformations. In his contribution on State versus People (ibid.: 58-75), Alok K. Ghosh restricts his analysis, as the title of his article indicates, to a bipolar set of actors, the state on the one hand and the people on the other. This is highly problematic as disputes over the conservation and/or appropriation of natural resources imply a multitude of agencies. Arun Bandopadhyay's article on "Forest, Land Use and Water in Colonial South Asia" (ibid.: 77-101) debates the question whether the colonial regime was a watershed of South Asia's environment or not. He comes to the somewhat forced conclusion that the British were responsible for major environmental

changes which did not occur during preceding regimes.

Mahesh Rangarajan's and K. Sivaramakrishna's two-volume set unites the most important and most prominent articles on the environmental history of South Asia. The articles provide a representative cross-section of contributions which have come out during the last three decades. Among them, for example, Makhan Lal's work as well as Romila Thapar's seminal chapters on forests and forest clearance in early India (In: Rangarajan & Sivaramakrishna 2012: 65-79; 105-26). Or Jos Gomman's contribution to the silent frontier in medieval and early modern times (1100-1800 CE) highlighting the importance of arid zones like that, for example, in the westward hinterland of Delhi, for the political as well as economic development of Hindustan (ibid. 217-44). The article by Richard Grove places South Asia in a global context stressing the importance of intercontinental climatic factors like El Niño on the Monsoon in South and Southeast Asia as well as Eastern Africa. Environmental awareness, as Richard Grove points out, grew within the East India Company from at least the late 18th century which has been his great topic since his seminal Green Imperialism (1995). And I feel flattered that my contribution on the afforestation scheme in the Chambal-Jamna Doab demonstrating the rather limited results of stately afforestation programmes in colonial times also has been included in the volume (ibid. 431-64).

Whilst the first volume, with some exceptions, mainly concentrates on the ancient, medieval and early modern history, the second volume deals with the colonial and post-colonial periods. The great academic and intellectual value of the second volume is that it does not have a specific focus on forestry, forest management and forest rights. As the first section already indicates, the environment also extends to the transformation of agrarian relations. For example, Indu Agnihotri's seminal article on the Canal Colonies in the Panjab or, with a slightly shifted focus to that of his book, Rohan D'Souza's contribution on damming the Mahanadi River (ibid. 550-83). Also, animal life, wildlife and disease have become part of the compilation which makes clear that environmental history is much more that the history on humans acting in fields and forests. However, one misses an article on urban environmental history. Since the subtitle of the second volume mentions Modernity and the Nation, one would have expected an article on an urban modernity which is on the present-day agenda of India's environmentalists.

Equally important is the volume edited by Nandini Sinha Kapur on

the *Environmental History of Early India* (2011). Conceptualised as a reader, the volume brings together many of the articles which were published during the last four decades, most of them in the well-known journal Studies in History. The articles cover a wide variety of themes ranging from tribals, hunters and forests, the concept of wilderness in ancient texts, the meaning and importance of natural resources and medical plants in early South Asia, agriculture, settlements and irrigation, and last but not least pastoralism. The multitude of contributions united in the volume demonstrates the vivid academic debates on the early environmental history of 'India'. Contrary to what one may have expected, there are lots of ancient texts which provide ample material for the writing of early environmental histories. However, the academic community is still waiting for a similar edited volume on the early modern environmental history dating from 1500 to 1800.

The time frame as well as the objects of research has been widened by the volume edited by John McNeill, José Augusto Pádua and Mahesh Rangarajan on *Environmental History. As if Nature Existed* (2010). In this book, environmental history is not restricted to a colonial or post-colonial period or to a specific region or to a particular subject. What may be perceived as a random collection of various articles is in fact a valuable selection of relevant themes and subjects, partly closing a gap that prevails in environmental history. To start with, a more general approach towards environmental history sets the frame including social aspects of industrialisation, translocal and transnational themes as well as aspects of globalisation. Coming to the contributions, the ones on social implications and urban sanitation certainly widen the focus of historical environmentalists, as suggested in the introductory remarks of this research article. This general approach is reflected by the organisation of the book, starting with "Part I: Global Studies", followed by "Part II: Macro-Regional Studies" and lastly "Part III: Micro-Regional Studies".

"Part II: Macro-Regional Studies" includes articles that outline the impact of European colonialism and the onslaught on tropical forests in Brazil, environmental changes in China thus placing South Asia's environmental history in a comparative perspective. On the other hand, in Part III, the impact of globalisation is highlighted with respect to the tribal histories of Eastern India. Similarly, the article on the Green Revolution by Asmita Bhardwaj and the Gene Revolution stresses national consequences of national and international strategies for "developing"

seeds in the name of famine prevention and national progress (In: McNeill et al. 2010: 186-208). What remains unsolved is the tantalising subtitle of the book As if Nature Existed, which indeed points towards a central problem of present-day perception of human environment as mentioned in the introductory part of this essay. Nevertheless, the book deserves utmost attention as it opens new paths in exploring environmental history and environmental changes seen not solely from a national (Indian) perspective.

The British Empire and the Natural World. Environmental Encounters in South Asia, edited by Deepak Kumar, Vinita Damodaran and Rohan D'Souza in 2011, covers a wide range of themes organised rubric-wise beginning with imaginations of environments during colonial times, followed by the destruction of forests for colonial plantation economies, water control in the 19th and 20th centuries, and closed by another couple of articles on forest histories in Hyderabad State and Nepal. In his article, D. G. Donovan (In: Kumar et al 2011: 231-61) gives a short overview of the history of forests, forest products and forest policy in Nepal. Though the kingdom of Nepal never belonged to British India the effects of the neighbouring colonial regime were particularly strong in the second half of the 19th century. Yet, it is interesting to get to know that already in the 18th century the Gorkha rulers promoted some kind of active forest policy after they had defeated the British troops in 1768. It was said that the forest environment protected Nepal from invasion. Accordingly, many parts of the Tarai were afforested with thick jungle and forests providing a natural barrier. After the Gorkha army was defeated in 1814-16 it sought additional protection through forests.

With the rise of timber demand in British India for constructing the railway lines after the middle of the 19th century, timber exports from Nepal to India rose tremendously. Royalty on timber became the second most important revenue income of the state. In 1860s the Nepal government appointed several supervisors of forests. And it was in 1923 that a member of the Indian Forest Service was sent to Nepal for advising and supervising timber extraction. At the same time, he tried to establish cash crop agriculture such as cotton, jute and tea in formerly forested areas. The arm of the British Empire reached well into Nepal. All in all the contribution is rather confusing with regard to the chronology of events, themes and subjects. In fact, the topic of forests constitutes only some 20 percent of the article.

Peter L. Schmitthenner (ibid.: 181-201) makes an important con-

tribution to The British Empire and the Natural World. In his article he scrutinizes the early hydrological efforts of the British colonial state to control the Godavari, the Krishna and the Kaveri deltas on the Coromandel Coast. The author, firstly, points out that the effects of the British hydraulic measures in South India were by far not as extreme as they were in Northern (Ganga) and Western (Indus) India. Secondly, with respect to the Kaveri (Cauvery) delta, British hydrological engineers like Sir Arthur Cotton admitted that they learned a lot from the medieval South Indian engineers about the construction of dams and weirs across a river on loose sand. From the 1830s, the British extended the waterworks on the Kaveri, remodeling their own scheme between 1899 and 1902. As D'Souza has already pointed out it was the various early and modern states which prevented overall 'transnational' waterworks on the Godavari. Yet, it was also the ferocious nature of the river which prevented large scale projects.

The Godavari Anicut in the delta was completed in 1852, yet considerable work remained to be done to construct the additional dams, canals and embankments. In fact, this construction work took the rest of the century to complete. By the end of it, the agriculture of the delta had transformed considerably; from a largely subsistence-based multicrop economy to the commercial cultivation of wet crops like paddy (rice). In contrast to the Kaveri delta the environment of the Godavari changed dramatically. Apart from a specific cattle disease which spread, after the continuous expansion of the canal system and wet-cultivation, malaria also spread. Even today the Godavari delta is an area prone to malaria. Yet, on a whole, it seems that the riparian projects in the deltas of the Coromandel Coast proved not as environmentally and culturally disastrous as the many other large hydraulic projects in India and elsewhere in the world.

Thus, Peter L. Schmitthenner's contribution to the colonial hydraulic projects in South India points, on the one hand, towards environmental continuities in the wake of different (political) water regimes.[5] On the other hand, the author highlights that while many riparian projects around the world, that have been executed since the beginning of the 19th century, have been responsible for environmental and cultural destruction, the two examples from the early colonial projects in Kauveri and Godavery deltas seem to have meshed more with the local environmental and cultural landscape with fewer destructive consequences. These point towards another important aspect of environmental history,

namely, to keep a close eye not only on different categorisations of time (pre-colonial, colonial, post-colonial) but on space as well. Consequences of water control in northern India certainly differed from that in the southern part of the subcontinent (Manimohan 2013).

Finally, Sumi Krishna's edited volume on *Agriculture and a Changing Environment in Northeastern India* (2012) is a fine collection of articles written by different authors dealing with more current aspects of environmental change in a particular region of South Asia. Many of the articles have previously been published in scientific journals and edited volumes, but some of them were especially written for the book. The volume is organised in three parts. "Part I: Aspects of a Changing Environment", deals with selected aspects of agriculture and a changing environment, interweaving historical and socio-political trends with people's economic choices. "Part II: Gender Dimensions of Farming" uses a gender perspective to shed some fresh light onto farming, forests, conservation and livelihoods. "Part III: Search for Alternatives" includes grounded analyses of alternative income-generating interventions that women and men farmers are beginning to explore for improved livelihoods and conservation. Altogether the book comprises 14 articles with an introduction providing valuable background information.

Some general remarks may highlight the importance of the volume. To start with, the first part demonstrates the continuities between the colonial and the post-colonial regime, when, due to the unaltered forest legislation, the exploitation of Assam's forests continued. Forest degradation, as well as soil degradation on deforested areas, became one of the markers of the independent Indian state. Secondly, in the name of independent India's 'development' the rights of the local population, mostly Adivasis, were curbed as their semi-sedentary jhum cultivation was more than ever regarded as environmentally dangerous. Common rights in land were transformed into individual private property rights, thus, opening the forests for industrial enterprises, which started to exploit the forests. What was formerly a zone of livelihood for Adivasis was and continues to be turned into a zone of economic exploitation and capital accumulation (Krishna 2012: 27-134).

Adivasi women lost multi-fold during the process of forest commercialisation. First, their property rights decreased when women were disinherited from their ancestral land, which is commonly owned whilst the individual property rights are in most cases vested in men. At the same time, the work-burden of women increased during the process of liveli-

hood diversification as women find it increasingly difficult to get access to forest products. Finally, the last part provides small niches in which local people may find new ways of mastering their livelihood. Horticulture is certainly such a chance, growing certain crops another. And (re-) empowerment of women seems to be a solution to find a new economic and ecological equilibrium in the forested hills of eastern India.

Concluding Remarks for a Future Research Agenda

Let me briefly summarise the findings of this review article and point towards new aspects and fields of environmental research. First: With respect to time and space, recent findings on the environmental history of South Asia seem to indicate that well-established categories blur or disappear. In many instances, pre-colonial, colonial and post-colonial temporal categorisation hardly make any sense. Likewise, since South Asia's ecology and environment are highly diversified, different political regimes and (even) different authorities within the colonial state and its successor states act differently with regard to the control of forest, water and soil. Therefore, one should be careful to view the colonial state as the watershed of South Asia's environmental history. This may be true in some instances, but, seen generally, a revision in the sense of taking a fresh look at the problem may lead to different assessments.

This brings me to the second point. It is not only the sheer number of felled trees and the wasted cubic seconds of water which mark that watershed. Quantity is certainly one indicator for transformations and changes, including the deterioration and destruction of South Asia's environments (or for that matter, also positive developments for flora and fauna). However, one cannot understand transformation accurately without taking into account qualitative changes as well. In fact, these may ultimately carry more weight in terms of determining or defining. The sometimes immediate – more often, however, long-term – impact of colonial forest legislation was certainly felt in some regions of British India. Yet, in many if not most regions that impact only manifested in the second half of the 20th century. Nation-building programmes in India coupled with internationally cooperating trusts and firms (which can be understood as quantitative transformations) induced a probably much fiercer onslaught on India's natural resources than did the colonial state. The more than 3,000 hydraulic projects that have been realised

since 1950 and the extensive ore mining may serve as additional indicators. Yet, it was only the growing state power and international cartels (qualitative change) which actually enabled these enormous projects including massive transformations of the natural habitat thus inducing a fundamental qualitative change. A fresh look on this aspect may provide for new academic results.

Thirdly, national and international cooperation points towards another important aspect: agency. It is not merely about the agency of a pre-colonial or colonial regime as that would homogenise and harmonise the impetus of political actors. Rather, environmental history is made by the many individual persons, parties, communities, cartels and trusts, institutions and organisations, which are involved in the trans-local, and, in times of the nation-state, transnational and international exploitation, of natural resources. Even if it seems that, on the one hand, the agency of the state is omnipresent and all-mighty, on the other hand, throughout history, economic agencies may have had a larger impact on the exploitation of natural resources whilst resistance movements have certainly forced 'the state' and 'the economy' to partly correct their gigantic and/or destructive plans. Fresh investigation may shed some fresh light on this aspect as well.

And last but not least, the biggest desideratum in South Asia's environmental history remains urban environmental history from the 18th century onwards. City dwellers are massively consuming and wasting natural resources like water, soil, wood, fuel, edibles, and air. Cities transform not only the immediate built urban space, but also the peri-urban environments, as well as the agrarian hinterland which can, depending on the size of spatial expansion and pace of the demographic growth, reach out for many miles. In particular, industrialisation in the big South Asian cities like Bombay, Calcutta, Kanpur and Ahmedabad may provide a field for future research, encompassing town planning, sanitation, public and private health, green belts, parks, water schemes etc. This is the highly neglected field which should, like the recently discovered history of wildlife, be put on the agenda of South Asia's environmental history. The latter opens the field up to more than 'merely' addressing transformations and deteriorations of nature.

Endnotes

1 The denominations 'human environment' and 'nature' are mostly used synonymously.

2 It seems that the present book is an updated, re-worked, enriched and extended version of his former book *Jungles, Reserves, Wildlife. A History of Forests in Assam* (2005).

3 The reviewer has published on that aspect as well: Mann, Michael. 2005. *Jungles, Reserves, Wildlife: A History of Forests in Assam.* Guhawati: Wildlife Areas Development and Welfare Trust.

4 Mann, Michael. 2007. Environment and Ecology in South Asia Past and Present. *Internationales Asienforum*, 38 (3-4), pp. 305-98.

5 This is contradicted by a conventional depiction of the impact of colonial rule by the contribution of B. Eswara Rao, Taming 'Liquid Gold' and Dam Technology. A Study of the Godavari Anicut, in the same volume, pp. 145-59.

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