Rachel Carson Center

Perspectives

Asian Environments

Connections across Borders, Landscapes, and Times

Edited by

URSULA MÜNSTER
SHIHO SATSUKA
GUNNEL CEDERLÖF

2014 / 3

SPONSORED BY THE

Federal Ministry
of Education
and Research

RCC Perspectives

Asian Environments

Connections across Borders, Landscapes, and Times

Edited by

Ursula Münster,
Shiho Satsuka,
and Gunnel Cederlöf

2014 / 3

Contents

Entangled Environments

Uncertain Environments

Ursula Münster, Shiho Satsuka, and Gunnel Cederlöf

Introduction

This volume is a call for reaching a more integrated environmental history of Asia that speaks across political boundaries, draws new connections between regions and time periods, and tells unexpected stories about the manifold relationships between nations, people, and their environment. The essays presented here are the outcome of an interdisciplinary workshop held at the Rachel Carson Center that brought together scholarship in the environmental humanities and social sciences on two large regions that rarely meet: South and East Asia. Political analysis of the two giants, India and China, is certainly a rich field of research. Recent scholarly debates have particularly highlighted the two countries as showcase examples of rapid economic growth leading to severe environmental crisis. Yet, linkages within the larger Asian region have been widely ignored in the past.

At our lively workshop, we had the opportunity to draw into conversation scholars from diverse regional and disciplinary backgrounds: environmental historians of China and India, firmly trained in the traditions of subaltern studies and social history, held engaging discussions with anthropologists and geographers; and scholars of China, South Korea, and Japan working in North America shared their research and findings with colleagues from India and Europe. In our debates, unusual stories of Asia's environmental history emerged that are often overheard in writings that focus on national political economies.

This volume of *RCC Perspectives* discloses surprising connections across South and East Asia. We offer insights into similarities and differences in the ways people in Asia have tried to master and control the often unpredictable and volatile environments of which they were part. Cultural perceptions of landscapes and of what colonial powers, modern states, and scientific experts considered valuable and worthy of protection, or useless "wastelands," deeply influenced the ways people interacted with their environments. Taken together, the essays present new narratives of colonial desires, government ambitions, and commercial interests over nature, as reflected in various policies and environmental regulations.

At the same time, the articles invigorate Asian environmental history by drawing attention to subaltern perspectives, presenting voices "from below." The volume enables

us to compare stories of people's everyday experiences in different Asian regions and times. They demonstrate how farmers, peasants, indigenous people, and colonial officials have perceived the nonhuman world, how different groups experienced environmental change, and how local actors resisted colonial governance and fought out resource conflicts in their day-to-day lives. We learn about the difficult compromises, adjustments, and decisions people in Asia faced when pollution, conservation, and culture were negotiated in a constantly changing environment. This may include creating commons in landscapes where grazing animals belong to the past, or idealized visions of a rural society, long gone, as a solution for a future post-growth society.

Connecting ecologies, nations, and times, the essays in this volume also highlight the role of the nonhuman world in shaping Asian environmental history. We hear about societies that face an overwhelmingly powerful nature. Trajectories of environmental governance took unprecedented turns through the powerful play of capricious rivers, fluid delta regions, monsoon rains, and wild animals. In some instances, the power of nature facilitated colonial rule and exploitation; in others, it helped to subvert political control. Large river systems, such as the Yellow River, the Brahmaputra, the Ganges, and the Barak, played a major role in restraining, steering and in thwarting human societies and livelihoods over millennia. Human attempts at taming and turning their immense powers to their own advantage have mostly yielded to the force of the mega-rivers. The narratives help us understand the complex entanglements between human and nonhuman actors and actants. Even wildlife can thrive as a result of what one could call "conservation by default."

The essays gathered here present new environmental scholarship that communicates across political boundaries and academic disciplines and seeks to achieve historical depth and integrated analyses of the changing human-nature relations in Asia. There can be no doubt that taking into account the long-term past of these diverse Asian regions brings alternative developments into focus, envisions different opportunities, and may very well help to tackle some of the contemporary ecological predicaments, many of which are similar across the whole region of East and Southeast Asia.

We would like to express our cordial gratitude to the Rachel Carson Center for giving us the opportunity to conduct such an inspiring workshop that served as the foundation for this volume, in particular for its generous financial, administrative, and intellectual sup-

port. Special thanks also go to the participants of the workshop for their engagement, for traveling long distances to share their ideas and time with us, and for making this such a special event. Finally, we express our heartfelt thanks to Christof Mauch, Katie Ritson, and the creative and inspired *Perspectives* editing team for their perennial patience and valuable support.

Unstable Environments

Ling Zhang

The Journey of Sand: How the Yellow River Has Shaped Lankao County

Land desertification and sandification have become a major environmental problem in the world. The problem is particularly severe in China. According to the statistics from China's State Forestry Administration, by the end of 2009, China had a desertified land area of 2,623,700 square kilometers (27.33 percent of the total national territory) and a sandified land area of 1,731,100 square kilometers (18.03 percent of the total national territory). Given the country's 1.4 billion, ever-enlarging population, the increasing loss of habitable and cultivable land to encroaching deserts and sand seriously threatens China's land productivity, food security, and its long-term social, strategic, and ecological sustainability. The urgency of this problem has driven Chinese environmental scientists to carry out extensive studies on land degradation. It has urged the state to legislate for land protection and prompted the government and society, as well as various NGO groups, to make efforts in reforesting China's denuded land.

As significant as it is, the desertification and sandification issue has not attracted much scholarly attention among Chinese historians. How did so much land become sandified over time? What caused the process? What roles did human activities play during the course of sandification? How has such land degradation affected the social, economic, and political life of people in China? These questions, which environmental historian Donald Worster investigated in *Dust Bowl* (1979) to understand the sandification of the Great Plains in the US in the early twentieth century, offer profound insights into the understanding and handling of land degradation. They should be raised and examined in the heavily desertified China.

As a preliminary effort to approach the Chinese history of desertification and sandification, I am introducing a peculiar kind of sandification—the historical interactions between the environmental degradation in the upper stream areas of the Yellow River drainage and the gradual sandification of many parts of the North China Plain along the river's lower stream. The Yellow River has extraordinarily high silt contents, which serve as the main source of incoming sand in north China. While other sources of sandification (e.g., the Gobi in Inner Mongolia and Xinjiang) deliver sand across northern China by wind, the Yellow River transports sand by water in the form of silt during its

frequent floods and changes in course. Previous historical studies of the Yellow River usually see the flooding water as the river's major disastrous phenomenon. However, I argue that most disasters bring about a cluster of side effects—other forms of disaster. In the Yellow River's case, its water not only floods the land, causing damage to the livelihoods of local people, but also enables the movement and accumulation of sand, thereby initiating and sustaining the process of sandification. Localities and their inhabitants are doubly affected by the Yellow River: first by water and then, in the long run, by silt-turned-sand. Unlike most cases in the world, where desertification and sandification occur mainly because of the shortage of water, the sandification associated with the Yellow River in the North China Plain results from the complex hydrodynamics between water and sand, and sometimes from too much water.

This paper approaches the history of the Yellow River-produced sandification by focusing on a specific locale that has been seriously affected by sandification and, from this locale, tracing the journey of the sand's movement. It starts in Lankao County, where an enormous amount of sandy material has been deposited after traveling thousands of kilometers through the Yellow River. Located in northern Henan Province, Lankao presently covers an area of 1,116 square kilometers. The land is low-lying and flat, and the soil has long been known for its heavy sandy cover, for constantly provoking sandstorms, for its high saline content, and for its sterile quality. On account of these factors, agriculture failed constantly and the population kept shrinking. This unfortunate situation worsened in the early years of the present communist regime and prompted the local leadership to launch a campaign to "manage sand" as a part of the nationwide economic campaign: the Great Leap Forward. The severe environmental conditions and the county's pressing need to cure the problems gave rise to the sand-managing hero Jiao Yülu, who was the county magistrate in the early 1960s. Jiao died from liver cancer during his short tenure as the leader of the campaign. His tragic death has gained him posthumous fame for his revolutionary spirit in battling the hostile environment, which makes him an icon not only in Lankao but also across China. His death also seems to have bound Lankao and sand together eternally.

In the early 1980s, even after two decades of the campaign and intensive reforestation efforts, Lankao still had a large number of sandy areas (37.6 percent of its entire area). In 2006, the situation became worse: 62 percent of its land was reported to be sandified. Without land survey records, the situation in Jiao Yülu's time cannot be quantified.

Dried silt on the bank of the Yellow River. (Courtesy of the author.)

I suspect it must have been worse before the sand-managing campaign showed results. My questions are: Where did the sand come from and what effect did it have on the landscape of Lankao? Research shows that most of the sand came from the Loess Plateau in the northwest, thousands of kilometers away from Lankao, and traveled through the stream of the Yellow River. This journey of sand spanned not only a vast distance but also a long time—about nine centuries. Today, the lower reaches of the Yellow River flow through the northern part of the county. But before the twelfth century, the river barely touched this land. From the mid-twelfth century, the river shifted and began penetrating the territory of Lankao County. Records show 120 cases of river flooding from the late thirteenth century until 1949, when the People's Republic of China was established. These floods were disasters for local people, damaging their fields and buildings, and even causing the drowning and abandonment of whole areas. On many of these occasions the river shifted around, creating multiple river courses or leaving behind dry, abandoned riverbeds on the land surface. Known as "China's sorrow," the Yellow River was truly a chronic pain for Lankao.

Water, indeed, is the major component of a river and the major force causing flooding disasters. But in the Yellow River's case, water is not the sole troublemaker. Silt carried

by the river's water usually leads to long-lasting, even permanent destruction. The Yellow River has been known for its heavy silt content and muddy flow for 2,000 years. In recent decades, it has carried 1.6 billion tons of silt annually, at a rate of 34.8 kg per cubic meter of water. This is in sharp contrast to rates of other rivers with heavy silt loads, such as the Ganges at 3.9 kg/m^3 and the Colorado at 27.5 kg/m^3. At the peak of its flood and silt discharge, the Yellow River's silt-water rate may surge to 900 kg/m^3. Ninety percent of this silt comes from its middle reaches, where the river courses through southern Inner Mongolia and the Loess Plateau, and forms the "Great Bend." This area features an enormous plateau formed by loose, porous loess, sandy gravels, and deserts of various sizes. Its loess and sand are easily washed down by rain or blown by wind into the Yellow River, thus filling the water with silt.

A survey of the river's history shows that the environmental conditions in the river's middle reaches have affected the river's silt load. The increase in population, the expansion of agricultural colonies, the surge in deforestation, the changes in climate, and the advancement of deserts have accelerated soil erosion in this area and thereby the siltation problem in the river. These problems have rapidly become more acute since the seventh century; as a result, the river's lower reaches became more and more turbulent, and its course shifts and flooding have increased since the tenth century. It also explains why parts of the river shifted into the territory of Lankao in the twelfth century and triggered the long-term process of sandification.

From the Loess Plateau and the river's Great Bend, sandy silt begins its long journey toward the North China Plain. It winds through the earthen gullies in northern Shaanxi and rushes down to the south through the rocky mountains between Shaanxi and Shanxi. After bursting out from the mountains in central China, it enters north China's vast, flat plain. Here, the riverbed opens up widely. Its water flow slows down and so does the pace of silt, which starts to be deposited along the next 800 kilometers of the river's course. About 40 percent of the river's silt load does not enter the sea, but rather is unevenly deposited in the riverbed and spread over the river's floodplains, including places like Lankao. Over centuries, silt keeps building up in the riverbed, forcing the water to rise. As a result, the riverbed is elevated above the surrounding land, causing it to become a "suspended river" or "raised river bed." Throughout history, the Chinese responded to this problem by building dykes (today there are 1,370 kilometers of dykes along the river's 768-kilometer-long lower reaches), which confined both water

and silt within the limited space and prevented them from spreading freely towards the surrounding plains. This particular technical solution has had negative consequences—siltation in the riverbed has worsened and flooding has increased. If any section of the dykes fails, the bank ruptures and flooding instantly occurs, pouring torrents of water, together with heavy silt, into the surrounding lowlands.

Flood water penetrates the ground or, given some time, evaporates. Silt, however, has nowhere to go and has to settle on the land surface. In the Yellow River's case, its silt consists of fine sand, coarse sand, and rocky, stony debris. These sandy materials cover the ground, replace the topsoil of arable land, and bury buildings and roads. In serious circumstances, a single flood may end in the immediate deposit of silt up to one meter high, which can ruin an entire city or village. In Lankao, the Yellow River's activities over the past nine centuries have produced numerous sandy patches, multiple dry riverbeds, and sandy bars. Long-standing human activities (such as farming and cutting down trees and grass for fuel) have not helped to retain the moisture in the soil needed to allow the sandy materials to decompose and gain nutrients, or to allow the sand to be shielded by plants and fastened by their roots. According to historical sources, including various accounts by local gazetteers, Lankao began to witness sandification as early as the fourteenth century. By the mid-twentieth century, the landscape in this area appeared so desolate that meters-high sand dunes spread throughout the land and, given a little wind, loose sand was blown away and whirled about in the air.

Lankao is certainly not the only destination where the Yellow River's sandy silt stops and settles. Wherever the river passes by, we shall find its silt and its effects on the land. This brief case study brings to our attention the historical evolution of the association between the Yellow River and sandification, one of the most alarming environmental problems in north China. It suggests that such an environmental problem is neither a modern issue nor a local one.

Further Reading

Elvin, Mark, and Su Ninghu. 1998. "Action at a Distance: The Influence of the Yellow River on Hangzhou Bay since A.D. 1000." In *Sediments of Time: Environment and Society in Chinese History*, edited by Mark Elvin and Liu Ts'ui-jung. Cambridge: Cambridge University Press, 344–407.

State Forestry Administration, China. 2011. *A Bulletin of Status Quo of Desertification and Sandification in China.*

Worster, Donald. 1979. *Dust Bowl: The Southern Plains in the 1930s.* New York: Oxford University Press.

Zhang, Ling. 2009. "Changing with the Yellow River: An Environmental History of Hebei 1048–1128." *Harvard Journal of Asiatic Studies* 69 (1): 1–36.

———. 2012. "Harmony or Disharmony: Traditional Chinese and Their Natural Environment." In *Demystifying China: New Understandings of Chinese History*, edited by Naomi Standen, 79–88. Boulder: Rowman & Littlefield.

Kuntala Lahiri-Dutt

Commodified Land, Dangerous Water: Colonial Perceptions of Riverine Bengal

Most books on the Bengal delta begin by describing it as "riverine," implying that the land is the product of fluvial action, which shapes the physical, social, and cultural attributes of the landscape. Yet, in thinking about Bengal, one tends to imagine the rice-paddy fields where peasants make a living off the land. It was not so all the time; Bengal was never really a land of farming and farming was, at best, a secondary occupation. Traveling through Bengal in the eighteenth century, the French traveler Orme saw a highly sophisticated water-based economy—the blessing of rivers—irrigated naturally by the monsoon rains and annual flooding. Even in the early colonial period, Sir Francis Buchanan observed in 1798 that many inhabitants of the more densely-populated parts of Bengal treated agriculture as a subsidiary occupation: "In this part of the country, there is hardly such a thing as a farmer" (7). In this water-based artisan economy, the countryside was dotted with dispersed local markets attesting to a highly commercialized economy that boasted impressive industries. The rivers were not just channels of water; they carried a thriving trade, transporting people and goods from one part of the delta to another.

Today, Bengal is generally seen as comprising lush green rice paddies where farmers have toiled for generations on the land. Not only that, the capricious rivers of Bengal with their shifting courses and monsoon floods have come to be closely associated with destruction of life and property. Rivers are often presented as causing immense grief to the rural peasantry. Clearly, there is a mismatch here. A part of my research takes a step back and asks: How (and when) did Bengal's social milieu transform from water-based to land-based?[1] This is the specific question I address in this paper.

Bengal's essential character as a fluid landscape was changed during the colonial times through legal interventions that were aimed at stabilizing lands and waters, at creating permanent boundaries between them, and at privileging land over water, in a land of shifting river courses, inundated irrigation, and river-based life. Such a separation of

1 This question is explored in detail in my recent book (see Lahiri-Dutt and Samanta 2013).

land and water was made possible not just by physical constructions but first and foremost by engineering a legal framework that gradually entered the popular vocabulary. As an example, I present BADA, which stands for the Bengal Alluvion and Diluvion Act, a law passed by the colonial British rulers in 1825, following the Permanent Settlement of 1793. Over the years, BADA has become a Bangla term referring to the muddy wetlands that characterize this part of South Asia. The splitting up of land from rivers marked the beginning of other, more physically oriented interventions, to protect the lands from being over-run by the rivers. The environment of Bengal can be described as hybrid, where the demarcation between land and water is neither well-defined nor permanent. Nature here represents a borderless world, or at best one in which borders are not fixed lines on the ground demarcating a territory, but are negotiated spaces or zones. Such "liminal spaces" comprise "not [only] lines of separation but zones of interaction…transformation, transgression, and possibility" (Howitt 2001, 240).

Current boundaries of land and water are as much products of history as nature and the colonial rule of Bengal played a key role in changing the ideas and valuations of both. Bengal, a quintessential hybrid environment located on the border of land and water, is neither the product of "immaculate linguistic conception" (Demeritt 1994) nor does it represent an absolute real world entity that is completely separate from human interventions. A starting point to understand the hybridity of Bengal could be the environmental historians' perspective, in which the role of the British Empire is critical, marking an exceptional global ecological moment in world history. Of particular interest here are the laws that were meant to tame the ferocity of the utterly strange nature of the delta.

Bengal's mighty rivers carry enormous amounts of silt and flow sluggishly over near-perfect flat plains for most of the year, only to rise during the monsoons and metamorphose into devastating torrents. As the roaring rivers descend from the Himalayas during the monsoons, they almost choke with the enormous body of sand and other sediments carried in their waters, causing them to shift their courses frequently. The capricious rivers of Bengal, flowing only seasonally and through whimsical and fluctuating courses, seemed quite different to what the British colonialists thought "nature" should be. The idea that the lands traversed by the rivers were underutilized and in need of being put to better use led to legal measures to initiate more intensive cultivation, to raise agricultural productivity, and to increase trade, transforming the hybrid world of land and water in the process.

The debate on what constituted productive and unproductive uses of land preceded the application of English property law not only to establish permanent *zamindari* (a common term for the system of landlordism) settlement of land tenure in India, but also to valorize land in what had essentially been a land-water hybrid environment. The colonial land revenue system, by seeing land as more productive (being able to yield revenue) and useful, began the long historical process of branding the rivers of Bengal as uncivil and in need of control. As the lands were in need of protection from the unpredictable rivers that changed their courses without notice, they were walled-in by embankments and dikes, encouraging the rivers to stay within fixed courses and thus making the lands more stable.

The problem with deltaic land is its non-permanent nature, as silt is stored by rivers: rivers do not always flow along a certain route, nor is the land fixed and permanent. The laws that the colonial British brought to Bengal, however, were founded upon the thinking of land as being fixed in place. Two land-based laws, the Permanent Settlement and BADA, played crucial roles in the process of presenting land as fixed, productive through intensive farming, and separate from and more valuable than water. If Bengal was to be made productive, the lands needed to be stabilized so that a systematic revenue collection could begin. Experiments to fine-tune the land-based economy began in 1760 when Bengal, and its ceded territories, came under the East India Company rule. This land-based polity presented the rivers only as instrumental because it was land that yielded revenue and, hence, riches. Whoever could own more land, had more riches, and the less they had to pay to the Company as rent, the better.

To entrench the system, the Permanent Settlement of 1793 created zamindars (or landlords) "in perpetuity"—meaning for good. The system was aimed at reducing the complexities of revenue collection due to erratically shifting lands and unpredictable harvests in a monsoon-dependent area. Defaulting on revenue payment would mean losing all or parts of the landlords' estates. Alarmed at the possibility of dismemberment of their estates, the zamindars decided to bind tenants to the same conditions to which they themselves were bound by the colonial government, and one of their actions was to create *patni* tenures or perpetual leases. One can say that the new tenure system was essentially a hypothecation of the land as security to ensure the punctual payment of the rent. It also meant that the right to collect rent from the tenants, often through the use of force, devolved to the lower layers, making the upper-layer zamindars more of a

juridical rather than a real social entity in the eyes of the peasants. The patnidars, finding how much trouble this arrangement took off their own back, created *dar-patnis* or patnis of the second degree, upon the same terms and with the same rights over the land as they themselves had. The dar-patnis created *se-patnis* or patnis of the third degree. The East India Company, therefore, had to legalize, through Regulation VIII of 1819, the creation of such formations, thus giving a *de jure* recognition *post facto* (Bhattacharyya 1985). The regulation, although innocuous and simple, was of great historical potency: it became the key that unlocked the door to environmental and socio-economic changes of unparalleled magnitude. From a riverine community, within a hundred years, Bengal was transformed into a land-based community. This was associated with the gradual decay of the rivers and meant that river-borne livelihoods, trade, and transport became secondary to land-based ways of life. Such a transformation had unforeseen impacts in shaping the meaning of place and landscapes in Bengal.

The meaning of property also changed as a result of this law: the cultivators began to lose the right to occupy the land that they had enjoyed since ancient times because the colonial British had enumerated the characteristics of the zamindari property as an absolute right of proprietorship in the soil, subject to the payment of a fixed amount of revenue to the government. This absolute right helped the colonizers by allowing them to accumulate primary capital through land taxation, to determine the agrarian relations as well as the relations between land and the waters, and alter the meanings that these elements of nature held to local residents. As embankments were constructed to protect revenue-yielding land from the rivers, the silt these rivers carried accumulated within the riverbanks and gave rise to chars or river islands. Silt accumulation on the riverbed caused further decay to the rivers and to the traditional overflow irrigation system, causing the crumbling fluvial systems to desperately increase the shifting of their courses. As such movements became more unpredictable, those settlements that began with the blessing of the river now needed protection from it.

With the Permanent Settlement established, the Company then began to contemplate the problematic issue of legalizing the fictional entities of chars and attempted to resolve the maze of problems associated with accretional lands and the erosion of existing lands by the rivers. The law that was created for this purpose— and still rules the rights of ownership of charlands—is the Bengal Alluvion and Diluvion Regulation Act (BADA) of 1825. BADA was meant to establish a set of rules to guide the courts to determine the

Char people catching fish. (Courtesy of the author.)

claims to land "gained by alluvion" or accretion, and the resurfaced land previously lost by diluvion or erosion. Even if one takes it for granted that chars are technically non-land in the sense that they exist within river banks, the difficulty remains that when a piece of land is lost to bank erosion, it may not arise in exactly the same location or arise at all within the foreseeable future. This means the owner has no certainty that they will get it back when it resurfaces or when another char rises nearby. BADA considers two main categories of charlands rising within the riverbanks: those rising in situ and new accretions. For the right to land that once existed, but was diluviated, and subsequently resurfaced in the old site, BADA considers that right to be incidental to one's title to a tangible property, derived from the principle of justice and equity. The right to property is not affected only because that property has been submerged under water, and the owner is deemed to be in "constructive possession" of the land during the time of its submergence and can be claimed back when it reappears out of water and can be identified as land. For this, however, the owner must continue to pay rent for the diluviated land. BADA ensures that when new land rises within a river, it should be considered as "an increment to the tenure of the person" to whose land it is contiguous to, subject to the payments of revenues assessed by the state. Thus, the key to establishing land rights in the court of law remained the payment of rent, even on diluviated land.

Such a rule will, however, not be applicable if a river suddenly changes its course and separates a considerable piece of land from one to join it with another farm, but without

destroying the identity of the land so removed—thus preventing legal recognition,. New accretions in large navigable rivers would be the property of the state, but if the channel between the island and the shore is fordable at any season of the year, it shall be considered an accession to the land tenure of the person who is "most contiguous to it." The changes, in response to these laws, in social relations of production in agrarian Bengal are well documented; what is less so is how the ecology was transformed and how the values of land and water changed in response to these laws. The laws unleashed a cycle of change in which one thing led to another—interventions on land and water changed production relations and exacerbated power inequalities within communities. Even the spatial layout of agrarian Bengal was changed. Villages that originally stood next to the river gradually moved away from it as dependence on its water and use of the river as a means of transport lessened. One sees, therefore, an alteration of the environment that is much more than a purely natural process: deltaic Bengal was also being shaped by the colonial government's official processes and directives.

References

Bhattacharyya, Harasankar. 1985. *Zamindars and Patnidars: Study of Subinfeudation under Permanent Settlement*. Burdwan: University of Burdwan.

Buchanan, Francis. H. 1798. *An Account of the Journey Undertaken by Order of the Board of Trade through the Province of Chittagong and Tiperah, in order to Look Out for the Places Most Proper for the Cultivation of Spices*. London: India Office Records.

Demeritt, David. 1994. "The Nature of Metaphors in Cultural Geography and Environmental History." *Progress in Human Geography* 18 (2): 163–85.

Howitt, Richie. 2001. "Frontiers, Borders, Edges: Liminal Challenges to the Hegemony of Exclusion." *Australian Geographical Studies* 39 (2): 233–45.

Lahiri-Dutt, Kuntala, and Gopa Samanta. 2013. *Dancing with the River: People and Lives on the Chars in South Asia*. New Haven: Yale University Press.

Vipul Singh

Gangetic Floods: Landscape Transformation, Embankments, and Clay Brick-Making

Introduction

The Gangetic basin, traditionally famous for large-scale crop production and rice farming, has witnessed gradual alteration in its land-use pattern over the last hundred years. Shifting of the Ganges riverbed and deterioration of both surface and ground water quality are now serious concerns in the Gangetic basin—the Patna district being one such region facing this problem.

In his *An Account of the Districts of Behar and Patna in 1811–12*, Francis Buchanan mentioned the changing courses of the rivers and their tributaries and branches in Bihar. Since then, many of the channels mentioned in this survey have become dead, dry, and extinct, and the Ganges has continued to shift in a northward direction near Patna. Geologists have been looking at the long-term dynamics of the change in the course of the river Ganges and they have attributed these changes to "geomorphic diversity (linked especially to precipitation gradients) and tectonic history in the frontal orogenic areas which, in turn, impact sediment supply into the basin" (Sinha et al. 2005). The river basin geomorphology is undoubtedly an important causative factor for the "hydrological response of a basin," but other human-induced factors cannot be considered insignificant. The annual flooding in the Gangetic basin is an age-old phenomenon, and historical documents indicate that attempts to control the devastation of the flooding have long been made through structural means like bunds and embankments. These structures acted as levees or artificial banks that were raised along the immediately surrounding land to prevent it from flooding. Based on the study of the archival records in coordination with fieldwork on the implications of these flood-control attempts, my proposition is that these efforts have had grave implications for the ecology of the region.

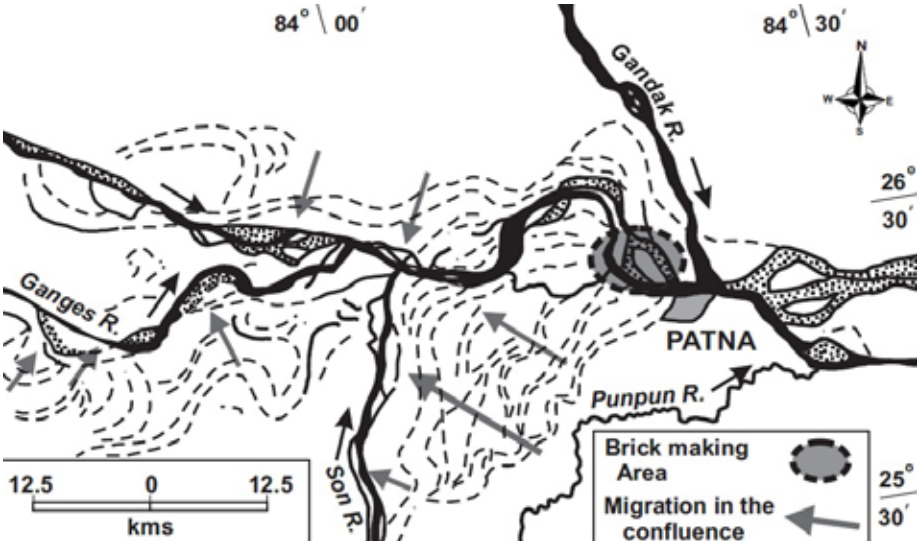
Embanking the Ganges

During the seventeenth and eighteenth centuries Patna, Bankipore, and Dinapur—now known as Danapur—emerged as major military bases for the colonial government

(in the form of the East India Company). Patna also emerged as a major hub for global trade after the British East India Company established a factory for calico and silk there in 1620. Later it became an important trading center for saltpeter. Bankipore became the site of the houses and offices of the English officials, which were constructed on high platforms along the banks of the Ganges. The second neighboring township, Danapur, was built as a cantonment (military base) on the confluence of the banks of the Son and the Ganges rivers at Digha. Physiographical analysis of the region would indicate that it is "a typical doab area" (that is, a strip of land lying between two confluent rivers) and also a "flood prone" area. The entire region is surrounded by the river system, with the Ganges flowing from northwest to southeast and the Punpun River flowing from west to east.

Before the East India Company rule, *zamindars* (big landholders) and local rulers used their own resources to try and control rivers locally, typically in the form of embankments. However, the colonial government believed that embankments on a heavily silt-laden river not only prevented river water from spilling over, but also, by trapping the silt and sand within, slowly raised the riverbed. Therefore, in the long run, this would require them to increase the height of the embankments accordingly. Despite this, they still gave preference to construction of bunds or embankments.

The East India Company needed a public works infrastructure for its own survival and to enforce its government. Since they had to face a lot of resistance from the native rulers, they desperately needed roads, bridges, canals, embankments, barracks, and cantonments to facilitate the movement of their troops. Such infrastructure was also needed for the consolidation of their rule and for penetration further into the interior for revenue. In fact, a bill to promote the construction of lines of communication as feeders to railways, high roads, navigable rivers, and canals was presented in 1863. On account of this, the construction of a new railway line between Howrah and Mirzapur was planned. But the tragedy was that it was designed parallel to the Ganges, which created an obstruction to the natural flow of the flooding river. Correspondence related to the administration of the Ferry Funds of Bengal of the 1850s and 1860s indicates that the collected funds were used to make new embankments along the southern side of the Ganges. The idea was not only to protect the new settlement but also to provide "roads as feeders" in connection with the railways.



Shift in confluence of the Ganges and other rivers in the Gangetic basin around Patna. (Map designed by Vipul Singh. After Matra and Ghose 1992, 28.)

At that time, nobody cared that all three rivers surrounding Patna—the Ganges, the Son, and the Punpun—had had a long history of shifts in their river channels. Today we can identify the ancient channels of the rivers using Indian remote sensing satellites. These images indicate that the modern township of Patna lies in the historic floodplain.

The physical shape of Patna was gradually transformed by the East India Company as per its immediate requirements and also because of the fact that company employees did not want to live in the old town, preferring to maintain a distance from the local population. However, the utmost consideration for "erecting cantonment and establishing headquarters at Patna" was the "greater security of the provinces" and the facilitating of the "dispatch of soldiers to assist in collections" (Srinivasachari 1962, 372). The year 1770 was the turning point for the changing landscape of Patna, when two provincial councils known as the Controlling Councils of Revenue were formed to supervise the revenue matters—one at Murshidabad responsible for Bengal and the other at Patna responsible for Bihar. In 1793, Patna also became a separate judicial district.

In 1783 and 1787 there was major flooding of the Ganges, which had important implications for the future of state policy concerning the rivers under colonial rule. A general fear of the company's factory being washed away developed, and it was proposed to

secure the bank of the Ganges near Patna with piles and fascines made with bundles of wood. The local officials and engineers mooted the idea that in order to save the buildings from the invasion of the Ganges at its full flow, it was essential to elevate the bank with sal timber or fascines of brushwood, or to build a fort-like wall from strata of *kankar* rock to provide the banks with the solidity and sustainability to resist the furious running waters. The official correspondence of the late eighteenth and nineteenth century would suggest that the prime focus of the company at that time was on preserving and protecting the cantonment. There was a growing concern to monitor further encroachment and manage the course and rapidity of the river, and therefore, the bank opposite the cantonment was kept well sloped to reduce the pressure of the river current. Some sort of round bastion at Bankipore was thus intended to throw the force of the river Ganges towards the mouth of the Gandak. Buchanan's account suggests that the eastern part of the town was raised "in consequence of the European settlement."

Emergence of Clay-Brick-Making Units

Construction of embankments along the river had its own repercussions. The Ganges has shifted almost seven kilometers from its original riverbed over the last century. The change has been gradual, but the last few decades have seen major shifts in the course. The oscillation of the Ganges has been a regular feature noted by and often discussed by people living in the area. However, the most recent shift of the Ganges is a new phenomenon. It has happened largely because of the embankments prevent the river from spreading onto the southern side during the flood months. Therefore, when the flood recedes, the silt is deposited along the banks, causing the river's main bed to shift annually.

The movement of the riverbed has created new open space and this has been reclaimed by human settlements. Over the last 50 years a number of brick-making units have mushroomed along the banks of the Ganges in Digha. Moving along the banks of the Ganges in Patna one can also find a number of small clay-brick-making units. These areas along the main riverbeds are flooded with Ganges water for half of the year. Then the water in the river starts receding in the month of October and these low-lying areas remain without water for the next six months. It is in these dry months that the brick-making activities take place. In recent years the brick-making units have

increased by leaps and bounds in the region because of rapid growth in Patna and its surroundings and the huge demand for bricks in construction.

The silt deposited along the banks is very fine and thin as well as very smooth. This makes it easier to make bricks from the soil. The large amounts of soil removed when making bricks creates a huge depression in the surface that is then filled up with very fine silt during the next annual flood. The proliferation of these brick-making units has contributed to major landscape transformations in the region. In recent years there have also been concerns about the rising arsenic contamination in the shallow groundwater aquifer. Most of the shallow aquifer zones that are being increasingly exploited in the urban areas of Danapur, Digha, and Maner are heavily affected by arsenic and iron. Recent studies have shown that as one moves away from the river-bank, the frequency of arsenic contaminated sources decreases. The shrinking of the Ganges riverbed could be one possible reason for such contamination, as the water is not being replenished properly. This topic needs further investigation, however.

Another long-term implication of embanking the southern side of the Ganges and of the emergence of permanent brick-making units has been the acceleration in the northward shift of the riverbed. With the growth of permanent settlements on these lands, newly reclaimed by brick-making units and other modern constructions, the Ganges spreads towards the north, i.e., the *diara* land, flood-plain regions adjacent to rivers. My interviews with the people living in these *diara* areas highlight that they are no longer left with any agricultural land for the six months of the year during which they used to cultivate pulses and wheat. The land now remains submerged in water for a longer duration, leaving them with no arable land for agricultural production. This has resulted in the forced migration of many locals to work as laborers in brick-making units or in other fields.

The essential problem with the flooding of the Ganges is that of how to handle sediments and improve drainage. The Ganges plain requires "spread-out flooding," and this term should not be seen in an inevitably negative light. The available archival sources highlight the broader drive of colonial capitalism: the process of administrative and economic control of the region, through the control of the Ganges river system and its flood control, has led to permanent structures and settlement such as brick-making units in the earlier existing broad riverbed itself. This landscape transformation does not allow any scope for the Ganges to get back to its old bed through its natural reversal cycle.

References

Buchanan, Francis. 1934. *An Account of the Districts of Bihar and Patna in 1811–12*. Patna: The Bihar and Orissa Research Society.

Correspondence Related to the Administration of the Ferry Funds of Bengal, Bengal Secretariat Office, Calcutta, 1860.

Correspondence Related to the Administration of the Local Funds Comprising the Amalgamated District Roads Fund of Bengal for the Year 1860–61, Public Works Department of the Government of Bengal, Calcutta, 1861.

Guide to the Records in the National Archives of India, Part 2: Home Department, Ministry Affairs (1748–1957). 1977. New Delhi: National Archives of India.

Home Department, Revenue Branch. 28 March 1851. Nos. 20/21, New Delhi: National Archives of India.

Maitra N. K., and N. C. Ghose. 1992. *Groundwater Management*. New Delhi: Ashish.

Proceedings of the Council of the Lieutenant Governor of Bengal for the Purpose of Making Laws and Regulations, Nehru Memorial Library and Museum, New Delhi (Microfilm) 1862–1915. V. 1–47.

Sinha, R., S. K. Tondon, M. R. Gibling, P. S. Bhattacharjee, and A. S. Dasgupta. 2005. "Late Quaternary Geology and Alluvial Stratigraphy of the Ganga Basin," *Himalayan Geology* 26 (1).

Srinivasachari, C. S., ed. 1962. *Fort William–India House Correspondence. Vol. 4: 1764–1766*. New Delhi: National Archives of India.

Secretary to the Government of Bengal Writes to the Secretary to the Government of India, 19 April 1845. Home Department. Revenue Branch. 19 April 1845. Nos. 1–3, New Delhi: National Archives of India.

Gunnel Cederlöf

Monsoon Landscapes: Spatial Politics and Mercantile Colonial Practice in India

Throughout history, one of the major obstacles for imperial armies to conquer east Bengal has been the region's climate and ecology. Both Mughal and British armies struggled endlessly with mastering the riverine system, quagmires, and seasonal lakes that changed with every monsoon. This "fluid nature'"seemed incompatible with the governing methods and land-revenue systems, which the British East India Company (hereafter EIC) tried to establish. Tracing the pasts of this region requires the breaking up of long-established theoretical binaries and forces us to acknowledge the complex interaction of mercantile interests, governance, the environment, and a multitude of perceptions of human-nature relations.

The 1980s marked a turn in historical analyses of modern India. By tackling questions of the environmental predicaments under British colonial rule, historians brought refreshingly new perspectives to the historical understanding of the formation of modern India (Gadgil and Guha 1985, 1992). In the years that followed, scholars who contributed important historical and ecological studies also joined social movements for environmental protection to criticize state-driven growth models that relied on large-scale technological solutions, destructive to nature and to the people who depended on such natures for their livelihood. These scholars often identified a sharp distinction in nature-state relations between the precolonial and colonial period. At the same time they saw long-term continuities in the working of the modern state from colonial to independent India (Rangarajan 1996; Baviskar 1995; Sundar 1997; Saberwal 1999).

In the most recent decade, historical research has increasingly pointed to more complex relations between the precolonial and colonial periods, state and citizen, colonizer and colonized, and humans and nature. This has inspired new analytical perspectives and redefined spatial demarcations.

There is now reason to move one step further, and to observe how nature and climate have delimited and contributed to the formation of modern polities and ruler-subject

relations.[1] In view of this, we may also, on empirical grounds, question assumptions of the linear growth of a colonial state since the late eighteenth century, and of a continuously successful onslaught on the natural environment pictured as an unstoppable state-machine eating its way through forests and mountains. In order to understand the early colonizers' hunger for natural resources, we need to inquire into interests, capacities, and contradictions within the mercantile corporation—the British East India Company—that spearheaded the conquest of Indian territories and natures. One of the greatest restraints for their endeavors turned out to be the climate and nature itself. Climate history, as part of the broad field of environmental history, therefore needs to inform our analysis of the emerging modern Asian polities and societies.

In the early nineteenth century, by means of alliances and warfare, the EIC had secured strongholds in the southern, northern, and northeastern parts of the Indian subcontinent. Already in 1765, the Great Mughal in Delhi had granted the Company revenue rights to large territories in east India. When they moved eastwards from Calcutta on what became their northeastern frontier, they also moved into a landscape that was continuously reshaped by water—by the annual monsoon, the riverine network, and occasional natural disasters.

Today, this colonial frontier is part of what is known as Northeast India, and in everyday conversations "the Northeast" is often used as a self-explanatory phrase, a geopolitical catchword. Often viewed from the outside, the region enclosed by Bangladesh, China, and Burma is perceived through lenses such as insurgency, identity politics, and critically contested development projects. It is also a heavily guarded gateway to Southeast Asia. "Northeast" was a catchword two centuries ago as well, but for very different reasons. To the EIC, this region spelt wealth and extended endlessly towards China. This strategically located region, termed the "North-Eastern Frontier," was a factor in securing the global dominance of the British Empire. However, in the late eighteenth and early nineteenth century, the EIC only reluctantly created a functioning bureaucracy to govern this large region. For a long time, the climate and the regional political strongholds were seen as insurmountable obstacles to conquest.

1 I explore this topic in more detail in Cederlöf 2013 and 2014.

Forming Government in Monsoon Landscapes

In the process of establishing colonial rule, three aspects stand out as having been essential to the formation of the forms of authority. Firstly, the region's climatic and ecological conditions were not only perceived as obstacles to civil administration, they also contributed to shaping the practice of governance. British officers operated with two competing narratives—one colored by their experiences of the devastating natural disasters and the other by their own ambition to establish an ordered agrarian landscape. Both came to influence the everyday administration of the region.

Secondly, historical research on colonial India has often focused on the formation and agency of the state and has thus occasionally tended to exaggerate the capacity of a state to control a particular development. More importantly, the British territories in India were not conquered by a state but by an early-modern mercantile corporation that was in conflict with the state back home in England. Merchant interests drove the aggressive advance which, on the northeastern frontier, was not primarily driven by desires for territory but for commercial gains. Thirdly, through the bureaucratic control that took form under these conditions, specific and different polities and ruler-subject relations developed in the larger region. This came to have long-term consequences.

Bengal was (and is) conditioned by a monsoon climate. Rivers carried large amounts of sediment that continuously reshaped river beds and filled up lakes and marshes, only to be removed again by the next flood. Large parts of the low-lying lands were inundated during the summer months. Today the land is open, but survey maps from the 1820s show that extensive lands were once covered by forest. Such ever-changing landscapes made the sources of livelihood flexible, and people depended on the cultivation of the soil in combination with fishing, hunting, and trade.

In European-authored reports about the region, the contrast between two different perceptions of the natural environments is evident. One set of reports described disasters and a nature out of control, while the other reported on ordered and controlled agrarian landscapes. The former were written mainly from outside the region and conveyed weather observations and information on ecological conditions. These reports were dramatic and spoke of an immediate crisis. Severe droughts and floods marked the reports from the late eighteenth century, and an earthquake in 1762 made the Europeans ques-

tion the viability of entering further into Bengal. The climate was seen as unusual and extreme, and it was not worth taking the risk for the Company.

Among the authors of these reports were influential persons like Harry Verelst (Governor of Bengal), James Rennell (Surveyor-General of Bengal), Francis Hamilton Buchanan (surveyor and member of the medical corps), William Roxburgh (Superintendent of the Botanical Gardens in Calcutta), Jean-Baptiste Du Halde (historian), and Jean Baptiste Bourguignon d'Anville (geographer and cartographer). Most of them were academically trained and belonged to the higher echelons of society. Their reports worked to restrain the politically based decisions at high levels in Calcutta that guided the Company's advance.

The authors of the latter narratives, which conveyed an image of well-organized landscapes, were of lower ranks. They were revenue surveyors and officers exploring routes of communication and boundaries between polities. Writing from within the region, they made accounts of cultivated fields and the best locations for bringing troops to the Burmese border. Floods, droughts, and earthquakes figured only marginally, if at all, in their accounts. The officers who were ordered to find the basis for revenue extraction also searched for order and logic in the landscape; thus an image of order also dominated their reports. There is therefore a risk involved in studying agrarian history from the perspective of land revenue without integrating climate history into the analysis. This cannot be done without consulting documents from other government departments and archival files. All these reports need to be read in relation to each other or else we will only get a partial understanding of the region which had now come under EIC control.

Rigid Laws in Conflict with Nature

In hindsight, we could say that, as could be expected, the large revenue settlements of 1790 and 1793 met with failure. At the time, however, they followed the logic of a mercantile corporation's bureaucracy. The revenue settlements had been put in place, in one stroke, to solve problems of governance, revenue, and subject relations. When lands were surveyed they were classified as "cultivated," "fallow," or "waste." But nature soon thwarted all intentions of efficiency and general applicability. Within a few years, cultivated fields had turned into lakes and forests into ploughed lands. However, the revenue settlement of 1793 made the original classification of a piece of land permanent.

Draft by R. B. Pemberton for an 1838 map of the EIC's North-Eastern Frontier. The map reveals the interests of the British officers: The riverine lowlands are mapped in detail, including revenue lands, market towns, and custom points along the rivers. Across Jaintia Hills only the main communication route is marked. (Courtesy of the Sterling Memorial Library Map Department, Yale University.)

On account of the "once fallow, always fallow" rule, only about a quarter of the surveyed lands resulted in revenue income. The following four decades were characterized by a constant reinterpretation of the "actual" meaning of the different revenue classes to make revenue administration adjust to the natural conditions and, at the same time, result in government revenues. Laws could not be undone, only wrestled with. And the officers in the bureaucracy were skilled at twisting and turning, and thus formed a governing practice.

European mercantile corporations like the EIC traded in the East by the legal means of royal charters, contracts, grants, and treaties. When the British Company received a Mughal grant of revenue rights in India, it posed an unprecedented challenge to the British Crown since the grant gave political immunities to the corporation for territories that were larger than the British Isles and outside the control of the British Crown. This reflected the dual personality of the Company. It was first and foremost subject to the British Crown. At the same time, it not only secured the Mughal grant, but also negotiated a great mix of agreements that gave it varying degrees of political authority in other regions. Treaties on the northeastern frontier, outside the Mughal grant, allowed the EIC access to mineral wealth, passage, and political control. These treaties subdued the local rulers to EIC rule in Garo, Khasi, and Jaintia Hills, in Cachar, and indirectly in Manipur.

However, the annexation of the Mughal territories on the one hand, and the subjugation of the autonomous kingdoms on the other, took place in different environments and under different preconditions. The legal frameworks of government were so profoundly different that we may argue they formed a dual polity under one government. The practice of administration in each locality resulted in different ruler-subject relations. While subject relations in the Mughal territories rested on fiscal relations that were vested with rights, subject relations in the former kingdoms were much weaker or often even nonexistent.

In 1813 and 1833, the British Crown and Parliament pulled the carpet from under the Company's feet when it refused to renew charter acts that included monopolies in the eastern trade. Yet the corporation's mode of operation continued through its bureaucratic practice, now under the immediate control of the British parliament. Since their decisions had legal status, regulations—however haphazard and mistaken—became cornerstones in the making of a new polity. As a consequence, the British colonial gov-

ernment inherited a contradiction between universal administrative efficiency and varying natural environments in which people's livelihoods were adjusted to the realities of a monsoon climate.

The case of the British mercantile corporation's formation of governance in east Bengal and in the annexed polities bordering on Burma points to complex relations between human action and the forces of nature and climate that contribute to condition such actions. It challenges us to integrate analyses of landscapes and climate with those of the formation of government and ruler-subject relations, and—broadly speaking—a ruler's capacity to rule.

References

Baviskar, Amita. 1995. *In the Belly of the River: Tribal Conflicts Over Development in the Narmada Valley*. New Delhi: Oxford University Press.

Cederlöf, Gunnel. 2013. *Rule against Nature: Founding an Empire on India's North-Eastern Frontiers*. NMML Occasional Papers on History and Society, New Series No. 20. New Delhi: Nehru Memorial Museum and Library.

———. 2014. *Founding an Empire on India's North-Eastern Frontier, 1790–1840: Climate, Commerce, Polity*. New Delhi: Oxford University Press.

Gadgil, Madhav, and Ramachandra Guha. 1989. "State Forestry and Social Conflict in British India." *Past and Present* 122: 148–57.

———. 1992. *This Fissured Land: An Ecological History of India*. New Delhi: Oxford University Press.

Rangarajan, Mahesh. 1996. *Fencing the Forest: Conservation and Ecological Change in India's Central Provinces, 1860–1914*. New Delhi: Oxford University Press.

Saberwal, Satish. 1999. *Pastoral Politics: Shepherds, Bureaucrats, and Conservation in the Western Himalaya*. New Delhi: Oxford University Press.

Sundar, Nandini. 1997. *Subalterns and Sovereigns: An Anthropological History of Bastar, 1854–1996*. New Delhi: Oxford University Press.

Colonial Environments

Iftekhar Iqbal

Governing the "Wasteland": Ecology and Shifting Political Subjectivities in Colonial Bengal

Contrary to the current debates on Bengal history that trace political subjectivity in terms of religious consciousness, during the last century of the colonial period (1840–1947), it was ecological contexts and considerations that informed the peasant's worldview and political actions in this region. This argument is important not only because it offers ecological understanding of the dynamics of political subjectivity, but also because it traces the emergence of ecological deterioration in the region.

Starting in the early nineteenth century, "wasteland" was at the heart of agrarian governance in the Bengal delta. Wastelands included vast areas of newly formed alluvial land, locally known as "char," and the Sundarbans, one of the world's largest mangrove forest systems. The Sundarbans, situated between the southern fringe of the delta and the Bay of Bengal, had a total area of more than 8,000 square miles (20,270 km^2) at the turn of the nineteenth century.

As Bengal was increasingly becoming connected to the world commodity market at this time, fluid wastelands became the target of a social and economic elite, including indigo planters, landlords, and leaseholders, some of them being European investors. The local peasants, on the other hand, attempted to legitimize their presence in these areas, resulting in inevitable conflicts. They competed with the indigo planters for the best land in a given cropping season. The planters would look for the most fertile char lands for planting indigo, whereas the peasants wanted them for the cultivation of paddy, jute, or other local products. The landlords would confront the peasants for the land itself. In particular, the landlords would use private gangs to claim lands outside the boundary of their permanently settled lands. The peasants struggled to retain those lands for themselves. The conflict with the leaseholders of lands inside the Sundarbans revolved around the question of the increase in rent as the reclamation process in the forests progressed.

In most of these conflicts the colonial administration passively took the side of the peasantry. This is because the dilemma for colonial administration was that, while revenue

needed to be generated, revenue flow was frustrated by the fluid and forested landscape, which needed reclamation before being fit for cultivation. The government brought these wastelands under its control and categorized them as *khas* (governmental property). In most cases, the government directly settled these lands with the peasants, while also offering them occupancy rights to land, low revenue, and access to markets. These benefits were legalized through the introduction of two tenancy acts in 1859 and 1885, which largely favored the land-reclaiming cultivators. Actual cultivators or primary producers thus benefited from the administration's uneasy encounter with deltaic ecology.

The resistance offered by peasants, under passive approval of the administration, to each of the three dominant agencies—landlords, leaseholders, and indigo planters—was articulated according to the type of challenges they faced in the deltaic ecological conditions. Acts of resistance using signs and symbols of religion, class, or caste became common and helped to organize the peasant community. The colonial government's tacit acceptance of this resistance was part of a strategy of ruling by means of the productive use of the environment rather than through coercion. By allowing the peasantry to assert political agency, the government acknowledged that complete subordination and domination of the peasants was detrimental to the state's revenue generation in the given ecological conditions. The government's inclination to settle new lands directly with the primary producers was not the result of a utilitarian turn, but was informed by the formidable wilderness of forest and chars and the fluid nature of the riverine environments of the wastelands. In other words, the peasants were favored by the state because they were perceived as the most capable group to overcome ecological difficulties and generate revenue through land reclamation.

From the narratives of the nineteenth century agrarian society in East Bengal, it would seem that the East Bengal peasants responded "rationally" to the opportunity offered by the agro-ecological resources. The peasantry modified their production behavior according to shifts in the domestic and global market demand. For example, whereas the East Bengal peasants could switch from jute to rice during the jute slumps of 1870s, the Bihar peasants could not abandon sugar and indigo. A more indirect but critical effect of the formative ecological conditions and resulting prosperity was the emergence of a relatively egalitarian society where religiously inspired communal conflict, which was remarkably present in the following century, was relatively absent.

It also appears then that the Bengal peasants did not need to be spatially aloof from the center of government to make themselves relatively ungoverned.[1] It was the highly fluid ecological conditions in the context of a set of economic considerations that influenced a closer, if discursive, relationship between the government and the governed. The peasantry was able to capitalize on the ecological circumstances and set themselves between the colonial state and the non-state forces of exploitation. The peasant society organized themselves not merely as a political force against the exploitative agencies of colonial rule, but to build a sustained system of mediation with the state power. The state was not dreaded but engaged, which put the peasants in a position between passive resistance and outright revolution against the Raj. Many important historical works on South Asia have not been able to adequately appreciate this dimension of peasant approaches to state power since they fail to take an ecological perspective.

By the turn of the twentieth century, however, such compromised governance practices and the resultant agrarian response had come full circle. About this time the Indian nationalists began to assert their political influence against the colonial rulers. It was time for the administration to formulate new governance strategies. Indeed, such strategies evolved fast in the early years of the twentieth century. One major policy shift that occurred was reflected in the way "modernization" featured in the governance of the agro-ecological regime in Bengal. The governance of nature was no longer mediated through the peasants or primary producers, but by a set of people educated in modern institutions, often generically called the *bhadralok* (gentlefolks). Environmental management, including that of irrigation and waterways and other agro-ecological practices, became the realm of such people. This group populated the bureaucracy from the late nineteenth century, and they were now encouraged to occupy cultivable land and use their "modern" knowledge in agriculture. The Swadeshi (patriotic) movement was a clear call to the educated youths to invest their energy and knowledge in agricultural improvement. The schema of rehabilitation for the new generation, from the point of view of the government, served the dual purpose of meeting the problem of unemployment and easing political challenges (Iqbal 2010).

This shift replaced earlier forms of ecology-informed governance at the cost of the relative autonomy of the peasant community. With fertile agricultural land now mostly

1 This is contrary to the argument of James C. Scott (2009), who sees spatial distance as an essential factor in the ability of the people of the Himalayan-Tibetan mountain ranges to maintain their independence from organized states.

in the hands of non-agrarian forces, the number of landless laborers and sharecroppers increased, and these new social forces became dominant in ecological resource zones and agrarian production. In terms of the question of ecology itself, I do not suggest that ecological conditions were destined to be better under the peasants' direction; however, on account of this shift in social power and the modern concepts and practices that came with it, nature came to be viewed as neatly classifiable and devoid of anything beyond the physical. The "scientific" mind began to defeat "mystic" engagement with nature. For example, Rammohun Roy, often regarded as the father of India's modern and liberal tradition, did not see the river Ganges as more sacred than any other. So the peasant consciousness of ecology, albeit via religious or spiritual engagement, was left to wither.

An ecologically insensitive modern outlook was most evidently attached to railways. Being built almost entirely on embankments crisscrossing the vast deltaic plains, railways divided the delta into "innumerable compartments." The result was the total disruption of free-flowing water bodies and loss of the concomitant benefits of the spread of silt and flushing of the landscape. The Ganges-Barahmaputra water system, which sustained a remarkably productive agricultural regime for over a millennium, came to face its most formidable man-made obstruction. These problems were further complicated by the establishment of the water hyacinth, a Brazilian weed that made its way to the region by the 1910s, choking both small and large water bodies and paddy fields across the delta. Both the colonial state and the new middle class saw the railways as agents of progress and the water hyacinth as a subject of scientific exploration for making profitable commodities (Iqbal 2010).

As the colonial state ceased its engagement with the peasantry—preferring new "modern" social forces—the peasants felt increasingly alienated. A majority of the peasantry now resorted to religion, no longer as a unifying agrarian force for bargaining with the state for better livelihood, but as a new form of self-assertion. This was often connected with the desire for a political authority that would ensure their economic security, as was the case in the course of the nineteenth century. It was at this juncture that state power and religious ideology began to converge. The birth of the Muslim League and its increasing popularity among the peasantry in the course of the first half of the twentieth century, leading to the creation of Pakistan, clearly reflected this convergence (Hashmi 1992).

The colonial administration in Bengal could not develop a coherent governing policy. Governance strategy was informed by the way it co-opted one or the other social or political force. In the Bengal delta, it clearly trod two different paths. In the course of the nineteenth century, when wasteland in the fluid and precarious deltaic landscape abounded, the administration decided to use the productive labor of the peasantry, offering them entitlement to land and other legal and practical facilities. As reclaimable wastelands became scarce at the turn of the twentieth century, such pro-peasant policy was abandoned in favor of a new "modern," politically influential, and financially capable social group.

This shifting technique of governance resulted in differentiated subjective orientations of the peasantry. When the state, faced with an unmanageable wilderness, allowed the peasant community to develop farming and cultivation, they were largely successful in their economic prospects and a non-communal outlook. However, when the state formed a new alliance with the non-agrarian forces, hitherto sidelined in the agrarian domain, the peasantry radicalized to the extent that religious signs and symbols were internalized and mobilized towards another imagined state for the betterment of their life and society. As the time for decolonization arrived, the Bengali Muslim peasantry conceived of Pakistan as the provider of protection from environmental problems and poverty and of entitlement to agricultural and ecological resources. But, as it appears, the relative autonomy that the agrarian domain lost in the late colonial period was never recovered in Pakistan or in independent Bangladesh. This is a topic that demands further critical scrutiny.

References

Hashmi, Taj ul-Islam. 1992. *Pakistan as a Peasant Utopia: The Communalization of Class Politics in East Bengal*, 1920–1947. Boulder: Westview Press.

Iqbal, Iftekhar. 2010. *The Bengal Delta: Ecology, State and Social Change 1840–1943*. Houndsmill: Palgrave.

Scott, James C. 2009. *The Art of Not Being Governed: An Anarchist History of Upland Southeast Asia*. New Haven: Yale University Press.

Sanjukta Das Gupta

Colonial Rule versus Indigenous Knowledge in Bengal's Western Frontier

In India today, indigenous knowledge of the natural environment, particularly the knowledge system of Adivasi communities that derives from lived experience, is still regarded as unscientific. Such knowledge is often not recognized as constituting knowledge at all, a belief that has largely developed out of colonial constructions of Adivasis as primitive, ignorant, backward, and needing to be civilized. In fact, Adivasis had, over generations, evolved a complex system of resource-management in consonance with their natural surroundings, which enabled various communities with very different ways of life to earn their livelihoods in a difficult terrain and also to coexist and share the same space, more or less amicably. Although the precolonial Adivasi economy had limited contacts with the outside world, it was not insulated against non-local influences and practices that were gradually accommodated within the indigenous systems. In contrast, colonial rule and its knowledge regime, by reducing local complexities into a monolithic system, tended to bring about far-reaching changes in Adivasis' relationship with nature. This was done both tacitly, through encouraging the "improvement" of local methods and their replacement with what they believed to be culturally superior practices, and also explicitly through direct intervention in local customs.

This becomes evident, for instance, from the history of the agrarian environment of the Chotanagpur Division and Santal Parganas—the western frontier of the Bengal Presidency—in the nineteenth and early twentieth centuries. Located in the northeastern corner of the Chotanagpur Plateau, this area formed part of the westernmost district of the Bengal Presidency under British colonial rule, and today constitutes the Indian state of Jharkhand. The plateau was home to many different communities, both Adivasi—including the Oraons, Mundas, Gonds, Hos, Santals, Bhuiyas, Bhumijes, Kherias, Paharias, Savaras, and Lodhs—and the Hinduized peasantry, all of whom had a history of migration and movement within this space. By the eighteenth century, despite considerable internal migration within the region, certain communities, particularly those practicing settled cultivation, came to be identified with specific zones.

1909 map of the British Indian Empire. Chotanagpur and Santal Parganas are marked in red. (Edinburgh Geographical Institute, via Wikimedia Commons. Markings added by the author.)

The Precolonial Power Structure

These Adivasi communities were associated, through long-standing economic and cultural links, with various feudalistic state systems that had arisen since the eighth century CE. Even before the advent of the British, this densely-forested region had been regarded as a frontier zone since the Mughal Empire had not considered it worthwhile to draw it into its formal fiscal network because of its low agricultural productivity. Nevertheless, in the sixteenth century, Chotanagpur became a tribute-paying quasi-independent kingdom subordinate to the Mughals. This was accompanied by the gradual intrusion of Hinduized peasantry from the north as local rulers commenced the practice of granting service tenures upon their retainers, thereby creating a class of intermediary landlords. Clearing of forests and the extension of settled cultivation thus occurred, particularly near the centers of state authority in northern Chotanagpur, where the forests had been depleted long

before the arrival of the British. The south, however, remained densely forested well into the nineteenth century. With the gradual extension of British colonial rule in Chotanagpur from the late eighteenth century, the region came to constitute the South-Western Frontier Agency of the early colonial government. During the mid-nineteenth century, it gained in economic and political significance following the large-scale demand for timber to build railways and the discovery of mineral resources.

The claims of the precolonial indigenous states to agricultural produce and military service had affected Adivasi village communities in various ways: significantly, it permitted outsiders to gain access to the villages. Yet, despite exacting tributes from Adivasi subjects, there was little direct interference in the internal domain of the village, either through control over the village community or over production decisions (Das Gupta 2011). Moreover, while the precolonial state asserted its right to special control over and taxation on certain commercially valuable products, forests were not considered to be the property of the indigenous kings or their subordinates. This allowed Adivasis to accommodate their needs within their knowledge of the environment. In contrast, under British rule the government directly intervened in local agrarian practices, particularly in its antipathy to shifting cultivation. It also embarked, first, on a policy of agrarian expansion and, later, on controlling indigenous access to forests. Not only did these policies significantly alter the landscape of the region, but they also sought to limit the diverse ways in which Adivasis depended upon their surroundings.

Modes of Adivasi Agrarian Production

The precolonial Adivasi economy, the outcome of a long evolution in knowledge and practice of adaption and adjustment to their chosen environment, was characterized by an interdependence between forest and agriculture. Food gathering and hunting were integrated with various forms of cultivation. Thanks to this variety and differentiation, Adivasi areas had been less susceptible to food shortages. This interdependence was central to their socio-economic life as it enabled a livelihood, which, although precarious, could ensure subsistence in the context of low population density. The distinction between forest and pasture was often blurred, with clearings becoming forests again on being abandoned.

Within this agrarian environment, consisting of a hilly, forested terrain and a hot, dry climate with low rainfall for most parts of the year, multiple agricultural practices had arisen according to variations in the landforms, control over landscapes, the nature of state power, and belief systems. By the eighteenth century, settled agriculture had come to prevail among the dominant Adivasi groups who had already been absorbed into the revenue collecting apparatus of the indigenous states and inhabited the open, fertile spaces in the plateau which had been cleared of forest cover. This transition may have been aided by the imitation of the agricultural practices of Hinduized peasant communities who had migrated into the region from areas under Mughal administration (Singh 1985, 65).

Throughout Chotanagpur, there were two broad categories of the arable: rice lands and uplands. Uplands were used for pasture or for cultivating more hardy crops such as coarse millets and oilseeds (Ball 1880), though occasionally these were also used for rice cultivation. A form of semi-permanent cultivation was practiced in the steeper slopes which became degraded over time and had to be abandoned periodically. The best uplands yielded an annual crop but inferior lands were fit for cultivation only once every four to five years. In contrast, the best quality rice lands were the fertile agricultural lands located at the bottom of the valleys and in the depressions that were used for winter rice and for linseed, pulses, and barley. Since these were irrigated by reservoirs, streams, and springs they were safe from drought but could be damaged by excess rain. On the other hand, the lower quality rice lands, consisting of embanked paddy lands at the top of the slopes, required a heavy and well-distributed rainfall.

The swift-flowing, seasonal rivers and streams traversing the district were not of much use for irrigation of the uplands and the Adivasi peasantry devised various means to counter the problem of water shortage. For instance, the Mundas and Oraons in the Ranchi region had evolved the method of terracing ridges into fields of various sizes in a step fashion along the contour lines (Depree 1868). Small, temporary embankments were constructed across the bed of a stream which allowed water to be stored high up on the slopes. These were useful in years of average rainfall, yet being dependent on rainfall, they could not be relied upon to prevent food shortages (Tuckey 1920). In other regions these embankments were more sophisticated, having earthenware pipes at their bases that could be opened and closed at will. The worship rituals of the Adivasis and their propitiation of mountain gods demonstrate their very real anxiety concerning annual rainfall (Dalton 1973, 187–88).

Together with settled cultivation, the dominant Adivasi communities also practiced various forms of shifting cultivation in the upland forested areas. Shifting cultivation usually followed fallow cycles, with the same clearings being cultivated after six to eight years, and did not necessarily imply a random destruction of forests as British administrators believed. Since it was based on a relatively backward technology, shifting cultivation was unsuited for intensive farming and usually inferior grains were grown in this manner. Smaller communities, living in more inhospitable areas, combined shifting cultivation with food gathering, hunting, and trade in forest produce. These different modes of subsistence gave rise to specific belief systems among different Adivasi communities. For instance, the Paharias, a community who depended principally upon food gathering, generally refused to clear forests and considered land-clearing agricultural communities to be destroyers of the forest. Their aversion to settled cultivation was rooted in their religious beliefs and they thought of ploughing as a violation of the earth.

Colonial Period: Changes in the Nineteenth and Twentieth Centuries

Many Adivasi communities had a tradition of displacement and migration within Chotanagpur and, as their folk songs testify, their search for land often brought them in confrontation with other groups. Some Adivasi groups in particular were famed for their skill in clearing jungle for cultivation. Towards the end of the eighteenth century, following western Bengal's devastating famine of 1770, when cultivatable lands had reverted to jungle in many districts, both local landlords and the British government encouraged Adivasi immigration in the hope of effecting agricultural recovery. An outcome of such movement was that shifting cultivators came to be displaced by settled cultivating communities, and in the nineteenth century there were increasing complaints of encroachments into the villages and lands of smaller groups (Sherwill 1851, 589). A significant change that occurred during the colonial period was the curb on shifting cultivation and the control of intra-district migration, leading to greater sedentarization.

British policies were also informed by their ideological beliefs. Until the mid-nineteenth century, colonial rulers had laid greater emphasis on expanding agriculture and clearing forest for cultivation. To the British of the early nineteenth century, agricultural cultivation symbolized civilization, and the wildness of the landscape was ascribed to a primitive mindset and native indolence. Unsurprisingly, cultivated productive areas,

usually located within the realms of Hinduized chiefs, were considered to be "civilized," whereas the rocky and forested parts, peopled chiefly by Adivasis, were not.

In the nineteenth century, extension of cultivation was noted in almost all the districts controlled both by indigenous landlords and the colonial government. This was accomplished through the reclamation of new land as well as through the cultivation of wastelands. The changing colonial context set in motion a series of adjustments from the local communities. With the increase of population, a process of intensification of cultivation occurred whereby uplands were gradually embanked and converted to rice lands. Hence the cultivation of hardy upland cereals was replaced by wet rice cultivation. There was an increased demand for rice both internally, because of the influx of non-Adivasi peasantry, and externally, which resulted in increased grain trade from the region. By the end of the nineteenth century rice had become by far the most cultivated food crop in Chotanagpur. Although wet rice cultivation required intensive irrigation, this change was not accompanied by any sizeable increase in artificial irrigation facilities. The existing facilities were insufficient and, since these were controlled by landlords they were in any case beyond the reach of poorer Adivasis. The new cultivation thus depended entirely on rainfall.

The intensification of agriculture in the uplands was accompanied by restricted access to forests since the last two decades of the nineteenth century, when demarcating and reserving portions of the forest for exclusive government use was taken up in earnest. The Forest Act VII of 1878 limited forest use all over India, effectively closing parts of the forests to the indigenous people. The need to reserve forest was motivated by the enormously inflated demand for timber at the time, created by the advent of railways. While forests became increasingly restricted for the local people, they were commercialized on a massive scale in the interests of enabling sustained timber production. Restriction to the use of forests also affected the traditional agricultural practices of the Adivasis as large areas of upland, usually used for growing hardy crops, were placed out of reach of ordinary cultivators. British rule thus brought about the separation of forest and cultivation, bringing an end to their complementarity in the Adivasi economy.

The net result was an increasing incidence of famines under colonial rule. Severe droughts in the first half of the nineteenth century had not caused famines or high mortality as the Adivasi subsistence economy could draw sustenance from forest pro-

duce. As access to forests became restricted, famines and starvation deaths occurred regularly. Suffering was greatest in villages where most of the uplands had been converted into rice land. Inevitably, the overall agrarian and ecological crises, as well as chronic indebtedness, compelled Adivasis to leave their lands and migrate. In districts controlled by indigenous landlords, Adivasis were subjected to high rents and usury, and ultimately lost control over agriculture to outsiders and private groups like the British-owned Midnapur Zemindary Company (Chaudhuri 2008, 759).

Colonial knowledge as an instrument of power had an impact even on remote areas peripheral to the empire and on the livelihoods of Adivasis. As this study demonstrates, the introduction of agrarian practices more suitable to lowlands had a disastrous impact upon the agrarian environment of Chotanagpur. This is not to argue that outside influences are necessarily detrimental to a locality. Alien knowledge and practices had hitherto been accommodated within the Adivasi resource-management system in keeping with their lifestyle and needs, but this had very different consequences when imposed on an unprecedented scale under colonial capitalism. By focusing on the subaltern perspectives in Adivasis' use of nature in a historical context, this paper points at the need to rethink the significance of indigenous knowledge systems and their understandings of the natural world.

References

Agarwal, Arun, and K. Sivaramakrishnan. 2000. *Agrarian Environments: Resources, Representations, and Rule in India.* Durham: Duke University Press.

Ball, Valentine. 1880. *Jungle Life in India or the Journeys and Journals of an Indian Geologist.* London: Thomas De La Rue & Co.

Chaudhuri, Binay Bhushan. 2000. *Peasant History of Late Pre-Colonial and Colonial India.* New Delhi: Pearson Longman.

Dalton, Edward Tuite. 1973. *Descriptive Ethnology of Bengal.* Reprint. Calcutta: Indian Studies Past and Present.

Damodaran, Vinita. 2007. "Famine in Bengal: A Comparison of the 1770 Famine in Bengal and the 1897 Famine in Chota Nagpur." *The Medieval History Journal* 10: 1–2.

Das Gupta, Sanjukta. 2011. *Adivasis and the Raj: Socio-economic Transition of the Hos, 1820–1932*. New Delhi: Orient Blackswan.

Depree, G. C. 1868. *Report: Geographical and Statistical on That Part of Chotanagpore Division Which Has Come under the Topographical Survey.* Calcutta.

Mohapatra, Prabhu Prasad. 1991. "Some Aspects of Arable Expansion in Chotanagpur: 1880–1950." *Economic and Political Weekly* 26 (16): 1043–54.

Padel, Felix. 1998. "Forest Knowledge: Tribal People, their Environment and the Structure of Power." In *Nature and the Orient: The Environmental History of South and Southeast Asia*, edited by Richard Grove, Vinita Damodaran, and Satpal Sangwan, 891–917. New Delhi: Oxford University Press.

Prasad, Archana. 2003. *Against Ecological Romanticism: Verrier Elwin and the Making of an Anti-Modern Tribal Identity.* New Delhi: Three Essays Collective.

Rothermund, Dietmar, and D. C. Wadhwa. 1978. *Zamindars, Mines and Peasants: Studies in the History of an Indian Coalfield*. New Delhi: Manohar.

Sherwill, Walter S. 1851. "Notes upon a Tour through the Rajmahal Hills." *Journal of the Asiatic Society of Bengal* 20.

Singh, Kumar Suresh. 1985. *Tribal Society in India.* New Delhi: Manohar.

Tuckey, A. D. 1920. *Final Report on the Resettlement of the Kolhan Government Estate in the District of Singhbhum, 1913–1918*. Patna: Superintendent, Government Printing.

Ursula Münster

Invisible Labor: Adivasi Workers in the History of South Indian Forest Conservation

Since colonial times, indigenous forest workers have played a pivotal role in the environmental history of South Indian forests. In the Western Ghats of Kerala, the environmental expertise and physical hardships of low-wage Adivasi laborers has enabled governance and state rule over inaccessible forest landscapes. The experiences of subaltern forest workers, however, have largely remained undocumented by environmental historians and anthropologists working in the region. By engaging with the oral histories and daily life experiences of Adivasi laborers at the Wayanad Wildlife Sanctuary, it becomes clear that the Indian Forest Department could not work without their support. Today, forest and wildlife conservation still relies on the exploitation of the worker's cheap manual labor and on the appropriation of their indigenous environmental knowledge.

Indigenous Labor in Wayanad's Forest History

Historically, indigenous Adivasi laborers have played a major role in the transformation of Wayanad's densely forested landscape into a site of colonial timber production. The East India Company discovered the wealth of timber resources in the forests of Malabar as early as 1805. The abundance of teak in particular attracted the British rulers to these remote forest landscapes in the Western Ghats when the demand for hardwood increased for colonial warfare, the construction of ships, and the building of railway tracks (Grove 1995, 391). For timber extraction in these inaccessible forest regions, the colonial empire depended on the labor force of forest-dwelling Adivasis. In Wayanad, the Kattunaika, former hunters and gatherers, were the main "tribal" group to work for the colonial forest department. They were knowledgeable about the forest environment and its animals; furthermore, in the interior forest areas there was no other labor available (Premachandran Nair 1987). Unlike the British officials, who greatly suffered from the climatic conditions of the region, the Kattunaika were largely resistant to malaria. Most importantly, they were cheap laborers who, to ensure their survival, worked for minimal remuneration. As stated by the conservator of forests in one of the wildlife sanctuary's working plans, when referring to the management practices of the colonial period: "The wage rates of the tribals

were nominal when compared to the rate of other local labor" (Premachandran Nair 1987, 205). The Kattunaika had been dispossessed from their land, their practice of shifting cultivation in the forest had been criminalized by the British (Logan 1887), and thus for many families no other choice remained but to work as low-wage laborers for the British rulers.

Since 1885, the colonial forest department started using Kattunaika laborers for the large-scale capturing of elephants in pits and for training the elephants to work (Logan 1887; Premachandran Nair 1987). The tradition of elephant capturing amongst the Kattunaika was only created through the colonial encounter, in contrast to other areas in South Asia, where indigenous communities had been skillful mahouts (elephant handlers) even in precolonial times (Lahiri Choudhuri 1999). In Wayanad, elephants and their Kattunaika mahouts provided the necessary infrastructure for the British to enter the remote forest regions and extract its timber wealth. The relationship between the Kattunaika and the forest environment, their use of the forest, and especially their relationship to elephants, was thus radically altered during the colonial period.

After Indian independence, the industrial use of the forest continued, mainly through the planting of eucalyptus and teak for revenue intake by the postcolonial forest department. The Wayanad Wildlife Sanctuary was formed in 1972. However, India's wildlife laws were not rigorously implemented until 1985 and after, when hunting was increasingly prohibited, possessing weapons became illegal, anti-poaching surveillance became stricter, and clear-cutting and planting of timber by the forest department stopped after protests by members of the local environmental movement. The Kattunaika elders I spent time with during my ethnographic fieldwork between 2009 and 2012 remembered these transformations as the most significant turning point in their lives. Instead of being dwellers of the forest, occasional hunters, and timber workers on the plantations, Kattunaika men were employed from that time on to serve the conservation mission of the postcolonial forest department.

Adivasi Laborers as Conservation Workers

Since the 1990s, the sanctuary's Adivasi workers have experienced the conversion of Wayanad's forests from a landscape of timber production into a postindustrial conservation landscape for tourist consumption (Münster and Münster 2012). Today, the

region is increasingly valued by urban tourists and wildlife biologists for harboring India's last endangered megafauna, such as the tiger, the elephant, the Indian guar, the leopard, and the lion-tailed macaque. In contrast to the numerous urban tourists who visit the wildlife sanctuary every day, for Madan, an old Kattunaika mahout who spent most of his life working for the forest department, it was clear that the sanctuary's "wilderness" was a highly man-made landscape that was continuously shaped and reshaped through the changing interests and management policies of the forest department and their own labor power. Madan vividly recalled the environmental changes that he lived through during his lifetime:

> First we were told to plant eucalyptus saplings and teak here in the forest. The forest department also made us capture elephants during that time, so elephants feared us humans and immediately disappeared when they smelled humans. Then, the forest department established the "animal center" [*mrnga kendram*]. Since that time the numbers of animals have increased in the forest. Now that they are "breeding" wild animals [*mrnga valartuka*] there are so many deer, pigs, wild boars, leopards, elephants, and tigers in the forest. They don't fear us, animals have become bold and aggressive [*desham*], we cannot carry weapons and scare them away anymore. Now our work is "protection" [*samrakshnanam*]. (Interview with the author)

Many Kattunaika who live in government housing colonies adjacent to the wildlife sanctuary are now employed to accomplish the manual work of conservation at the sanctuary.

Forest Labor and Environmental Subjectivities

The Kattunaika's long-time working relationship with the forest department has considerably shaped their subjectivities and the way the workers relate to their environment. As Tim Ingold points out, people's relationship to the nonhuman world is essentially based on the task that they perform in that environment (Ingold 1993). In the present day, the workers' main task is "protection work." During their job, Kattunaika men patrol the forest as anti-poaching watchmen looking for ivory smugglers and the so-called "sandalwood mafia." They also work as fire lookouts and firefighters in the dry season, they inform the wildlife veterinarian of deceased animals in the forest and burn the

Forest worker in Waynad Wildlife Sancturary, Kerala. (Courtesy of the author.)

carcasses, and they serve as trackers and guides for officials, wildlife scientists, and tourists, introducing them to the forest's flora and fauna and clearing the forest's pathways for them so that they can easily walk through the forest. Higher officials will not even enter the forest without the guidance of a Kattunaika watchman. Additionally, a few of the Kattunaika are still employed as elephant mahouts, using the forest department's remaining captive elephants primarily to mitigate the region's severe human-wildlife conflict, and to scare wild crop-raiding elephants from the nearby farmers' fields.

As a consequence, all the workers I spoke to identified themselves as *kooli pani*, daily wage workers for the forest department, and never emphasized their cultural belonging to a former hunting and gathering community. The forest laborers' work is strenuous, their employment insecure, and their payment only on a daily wage basis. Especially during the fire-prone summer season, they often work day and night to extinguish the forest fires. In addition, the forest increasingly poses a threat to the workers, as cases of wildlife attacks, especially by elephants, have steadily increased. What could be celebrated as a success for conservationists is a matter of concern and disquiet to the Kattunaika watchmen. "We are not paid according to the risk we take and the skills we have," a watchman complained, "even though we often work for 30 days, we get their salary only for 20 days. Wild elephants might attack us at night or walking through the forest." Despite the workers' commitment, their environmental knowledge and abilities are not recognized enough by the forest officials.

Notwithstanding the introduction of "participatory forest management" in India in 1990 financed by World Bank funding, the marginal position of the conservation laborers

on the lowest level of the forest department's hierarchy has not changed much since colonial times. Decision-making processes in wildlife management remain firmly in the hands of higher forest officials, experts, and scientists, regardless of their reliance on the workers' environmental knowledge. Thus, Kattunaika men working for the forest department encounter an "institutional devaluation that molds subjective experience" in their daily lives (Sodikoff 2007, 12). The workers often complained about their hard and usually dangerous manual labor for which they receive only minimum wages. The elders nostalgically remembered the "good life" [*nalla vidu*] before the wildlife sanctuary was formed, when hunting was still tolerated and food was readily available for them in the forest. Despite the role that Adivasis have played in the environmental history of Wayanad's forests and despite their importance for the present-day wildlife management, Adivasi labor remains invisible in representations of biodiversity conservation by the conservationists and the forest department officials.

By depicting Adivasi laborers as important agents in Wayanad's forest history, it becomes clear that environmental rule, subject formation, and knowledge production were never one-way (and top-down) processes: scientific environmental management and expert rule always have and continue to rely on local forms of ecological knowledge. In this process, hybrid forms of environmental knowledge and practiced expertise have emerged. At the same time, low-paid forest labor has been pivotal in forming the lives of former hunting and gathering Adivasis. Their position at the lowest level of a bureaucratic state department has deeply shaped their subjectivities and influenced their interaction with the forest and its animals. Yet, even today, indigenous forest laborers continue to play an indispensable, albeit silent role in the sanctuary's environmental governance and wildlife conservation. With an increasing commodification of Wayanad's nature for urban tourists, the value of rare wild animals enhances, since this is the "wild nature" urban tourists seek to consume on their jeep safaris. The valor of those who work hard for this wilderness to be created, however, remains unrecognized and invisible.

References

Grove, Richard. 1995. *Green Imperialism: Colonial Expansion, Tropical Island Edens, and the Origins of Environmentalism, 1600–1860*. Cambridge and New York: Cambridge University Press.

Ingold, Tim. 1993. "The Temporality of the Landscape." *World Archeology* 25 (2): 152–74.

Lahiri Choudhuri, Dhriti K. 1999. *The Great Indian Elephant Book: An Anthology of Writings on Elephants in the Raj*. New Delhi and New York: Oxford University Press.

Logan, William. 1887. *Malabar Manual*. Madras: Government Press.

Münster, Daniel, and Ursula Münster. 2012. "Consuming the Forest in an Environment of Crisis: Nature Tourism, Forest Conservation, and Neoliberal Agriculture in South India." *Development and Change* 43 (1): 205–27.

Premachandran Nair, P. 1987. *First Working Plan For the South Wayanad Division (1977–78 to 1986–87)*. Trivandrum: Kerala Forest Department.

Sodikoff, Genese 2007. "An Exceptional Strike: A Micro-history of 'People versus Park' in Madagascar." *Journal of Political Ecology* 14: 10–33.

Entangled Environments

John Knight

Bonding with the Nonhuman World: Why People Feed Wildlife in Japan

Feeding wild animals, or *esayari*, is something of a national pastime in Japan. During my fieldwork in villages on the Kii Peninsula, I have met or heard about many people who regularly feed animals. These include a man who feeds sweetfish to kites in the summer and has learned to imitate the kite's cry to attract the birds; a retired postman who every evening after dinner puts leftover food out for a family of raccoon-dogs; and a woman (a keen follower of the Buddhist sect Sōka Gakkai) who scatters oranges in the nearby forest for the wild monkeys to feed on. This feeding behavior is not limited to wildlife as normally understood. On the island of Shōdoshima I met a man who feeds large numbers of stray cats on a daily basis. He told me with pride that he doesn't just feed them with tins of cat food, but routinely visits the supermarket just before closing time and buys up all the cut-price packets of sashimi that have reached their sell-by date to feed to the cats.

It is not only local people who feed the wildlife of the peninsula. Tourists and recreationists are also keen animal feeders. Tourists feed animals in and around many of the temples, shrines, beauty spots, and other sights they visit. Visitors are also prone to the roadside feeding of animals. The sight and sound of a car pulling up on a mountain road may well trigger the approach of monkeys or deer to the side of the road, hopeful of a food handout through the side window. Hikers in the mountains also feed animals they come across. Many an amateur photographer uses food to stage photographs of birds and animals encountered in the mountains. They carry bags of feed with which to lure their subject to get a close-up photo or to frame the photo against a scenic backdrop.

Food-giving behavior is evident elsewhere in the Japanese leisure sector. In public parks and gardens people routinely feed pigeons, crows, ducks, and swans, as well as carp and other fish in ponds. There is much uncontrolled, spontaneous feeding of wildlife in tourist locales, ranging from the feeding of doughnuts to foxes and sausages to bears in Hokkaido to the feeding of tropical fish off the coast of Okinawa. In open-range monkey parks, known as *yaen kōen* or "wild monkey parks," visitors are given the opportunity to feed the "wild monkeys" of the park by hand. The parks have long marketed themselves to the public by depicting the hand-feeding of monkeys as the highlight of the visit. In

the 1960s one well-known monkey park lured visitors with the catchphrase "*yaseizaru ga anata no te kara esa o torimasu*" or "wild monkeys will take food from your hand."

I have long been intrigued by *esayari* behavior and the reasons behind it. One reason for its popularity may well be the sense of achievement it gives the human food-giver. Turning a wary, flighty animal into one that not only tolerates a human presence but accepts human food handouts is no mean feat. This gradual process of habituation demands considerable patience on the human side. In this form, *esayari* is more than mere feeding—it is "transformative feeding" that creates a relatively tame animal. The food-giver can take pride in having persuaded a hitherto fugitive animal to take food from his or her hand.

In other cases, the human food-giver encounters already tame animals. This is evident from the bold behavior of the animal when it actively begs people for food, especially from people who are eating something themselves. In this situation it is the animal that is taking the initiative, behaving in a way that prompts the person to give it some food. This is not a transformative achievement, at least not by this particular feeder. The feeder is simply feeding an animal already "tamed" by others.

Another reason seems to be that the feeder takes pity on the animal. A common word applied to such animals is *kawaiisō* or "pitiable." The animal in question is deemed to be in need of the food handouts and the human feeder can think of himself or herself as doing a good deed. The food-giver may well think that the neediness of the animal is obvious from the eagerness with which the animal takes the food, and indeed may infer from this that, without this food offering, the animal would go hungry, if not starve altogether.

Such a perception appears to be common in winter (especially at times of snowfall, which can be heavy in parts of Japan) when natural forage is at its scarcest. Food-giving behavior tends to take place in this season more than others. But food-givers may equally invoke artificial food scarcity to justify their food-giving behavior. Those who practice *esayari* may attribute the scarcity of natural foods to the transformation of the Japanese mountain forest in recent decades associated with modern forestry. This usually carries the implication that, since the problems facing the animals are man-made, humans like themselves are morally obliged to try and make amends by providing food handouts.

There are now campaigns against the feeding of wildlife across Japan. As a result of habitat loss caused by developmental encroachment, wildlife populations live in ever closer proximity to the human population, and in many cases engage in crop-raiding. *Esayari* behavior only serves to accelerate this process of spatial convergence as the animals lose their fear of humans and acquire a taste for human foods—two factors which tend to lead to, or to intensify, crop-raiding on nearby farmland. This puts wildlife at loggerheads with residents, who may well respond by demanding that the animals be culled.

There is a growing recognition in Japan that this habit of feeding wildlife needs to be stopped. Prefectural governments have launched campaigns to discourage it and municipal governments have passed ordinances banning it. In the city of Minō, people caught feeding monkeys face a fine of 10,000 yen. In the city of Nikkō, persistent feeders of animals are threatened with the penalty of having their names published in what amounts to a name and shame policy. Slogans and set-phrases aimed at discouraging *esayari* now abound in flyers, on posters, and on signposts. Here are some examples:

> "Wild animals are not pets."
> "For the sake of coexistence with humans, stop feeding pigeons."
> "Wild monkeys come down to the village and cause a nuisance.
> Please don't feed them."
> "To protect their way of life, please do not feed the deer."
> "Food is something we [animals] will find for ourselves."
> "Offering food is not the same thing as love."

Part of the message is that wild animals are not pets and should not be treated as pets. By implication, the Japanese public is mistaking the wild animals of the forest for pets that need to be cared for, rather than the autonomous wild creatures they really are. The other part of the message is that the feeding of wild animals is not an act of kindness because it has negative consequences for the animals, the most serious of which is culling. In sum, while people may believe that feeding wildlife is an act of kindness that helps the animals, in reality it is an act of folly that harms the animals.

Eleana Kim

The Flight of Cranes: Militarized Nature at the North Korea–South Korea border

The Korean demilitarized zone (DMZ), a 4-kilometer-wide, 250-kilometer-long buffer area that divides North and South Korea is, despite its name, the most heavily militarized border in the world, with more than a million soldiers on either side and a million landmines within it. Since the end of the Korean War in 1953, the DMZ has represented a scar of war and national division. Yet in the context of global climate change and mass species extinction, this "no-man's-land" has been attracting intense interest in South Korea and internationally in the last few years as an ecologically exceptional space of "nature's restoration." In light of evidence that the DMZ area, which contains the adjacent Civilian Control Zone (CCZ), hosts more than 13 percent of all species on the Korean peninsula, including 106 rare and endangered species, efforts to preserve the DMZ area's environment and to capitalize on its associations with nature and biodiversity have intensified on the southern side of the border. South Korean state- and market-based sustainable development projects promote the DMZ as the "Peace and Life Zone," or PLZ, framing the DMZ's ecology as "pure nature" (life) or as politically transcendent (peace). In contrast, my ethnographic research approaches the DMZ as a "natural-cultural contact zone" (Helmreich and Kirskey 2010)—constituted by multiple practices, politics, and social relations among scientists, policy makers, local residents, ecologists, environmentalists, tourists, as well as plants, birds, mammals, and other elements of landscape—to explore how a militarized "no-man's-land" is being refigured as a space of unique ecological value.

That the DMZ, a space of political and military exception, is now being framed as a site of ecological exception illuminates similar processes across the planet (cf. Masco 2004). At a moment in which "nature" is being subsumed by capital in ever more intensified ways, the isolation of space by states in the name of national or global security is increasingly converging with issues of habitat conservation and biodiversity preservation (e.g., Lachman et al. 2007). In the case of the Korean DMZ, the most heavily militarized border in the world maintains peace on the peninsula through the production of an untraversable territory where rare and endangered species dwell in the midst of an estimated one million landmines. Rather than considering spaces like the DMZ to be

"ironic" juxtapositions of a purified "nature" coexisting with or symbolically overcoming the human propensity for war, I argue that these are hybrid naturalcultural spaces that emerge out of interlinked processes of global capitalism and militarization. In the following case, I focus on how state infrastructures of spatial control and restricted human crossing generate new "natures" that are deeply political and enmeshed in evolving relations among humans and nonhumans.

Migratory Crane Village

In February 2012, an ice-fishing tournament took place at the T'ogyo Reservoir in Yangji village, Cheolwon County, a few kilometers from the border with North Korea. Yangji village is located within the Civilian Control Zone, a highly restricted agricultural and residential area that borders the southern edge of the Korean DMZ and is also the winter habitat for a number of endangered migratory bird species that live in the DMZ area between October and March. The most iconic and rare species found there is the red-crowned crane (*Grus japonensis*), which travels six hundred miles every year along the East Asian–Australasian Flyway from its breeding habitats in northeastern Russia to wintering sites in southeastern China and the Korean border area. More than one-third of the declining global population of 2,800 red-crowned cranes winter in the DMZ area, in Cheolwon and the neighboring Yeoncheon County, a fact that enhances the region's exoticism. Yangji village is the main destination for cranes and other endangered birds and thus also refers to itself as "Migratory Bird Village." It holds special stewardship over these precious species because of the adjacent T'ogyo Reservoir as well as the Hant'ang River and hot springs that serve as the birds' primary resting areas. Hundreds of red-crowned cranes, along with the slightly less endangered white-naped crane and the least endangered white-fronted goose, sleep on the reservoir from early evening until daybreak. When they wake, the birds fly south of the reservoir to feed on leftover grains in the fields and rice paddies of Yangji and other farming villages that populate the CCZ in the Cheolwon plain.

There is a long history of cranes' cultural significance in East Asia because of their majestic beauty and because their habits and social practices are easily anthropomorphized. This, combined with their endangered status and winter stopovers in the

DMZ area, has made their conservation particularly appealing to bird lovers, national and local governments, and everyday citizens. The endangered cranes are enrolled as main characters in the state's symbolic resignification of the DMZ as the PLZ because they literally transcend geopolitical borders, providing hope for the surmounting of the ideological differences that separate North and South.

The T'ogyo Reservoir itself reveals the history of antagonisms between the two Koreas—it was constructed by the South Korean state in 1976 in response to the North's blocking of tributaries from Bongnae Lake, which cut off the water supply to agricultural villages in the South. Indeed, conflicts over water continue between North and South Korea, as two major rivers flow south across the border, and the unannounced opening of dams in the North have led to sudden flooding and deaths in the south. Access to the reservoir is tightly controlled by the South Korean military for reasons of national security and to protect against environmental pollution, and has thus always been off limits to civilians.

The case of the reservoir exemplifies how the political ecology of the division and the well-being of the cranes are deeply interlinked. Modernization processes on both sides of the border and resultant ecological pressures have likewise affected the centuries-long adaptation of cranes to human activities. Most notably, around the time of the North Korean famine in the mid-1990s, the numbers of migratory birds, including white-naped and red-crowned cranes, began increasing in Cheolwon. Farmers had mixed reactions, but many were encouraged by ornithologists and ecologists to leave the straw after the harvest so that the birds could glean the leftover rice grains. Although these programs have been largely successful, with over 95 percent of migrating cranes coming regularly to the border area, experts are concerned about multiplying threats to the cranes' habitats and safety. Risks include power lines, chemical fertilizers, pesticides, and the reduction of feeding and resting areas as seasonal rice paddies are replaced with year-round greenhouses for specialty produce like bell peppers and blueberries. Moreover, buildings and infrastructures have been built in anticipation of a boom in ecotourism to the area, meaning cement-tile parking lots have covered over former wetlands, and paved roads divide up the territory and invite more vehicular traffic (Yoo et al. 2011).

Auspices of Endangerment

An ice-fishing tournament on the T'ogyo Reservoir provoked outrage from South Korean environmental groups, who accused the Ministry of Environment of "dereliction of duty to protect endangered species," as one press release announced. They claimed that the T'ogyo Reservoir, a habitat for the endangered red-crowned crane, would be "destroyed" by the ice-fishing competition. In response, the mayor of Cheolwon and the event organizers delayed the start of the competition by one hour, from 8 a.m. to 9 a.m., to allow time for the birds to get up and head out for the day. The activists and ecologists were still vigilant, believing that the competition would inevitably lead to deleterious effects on the cranes and their habitat. Outfitted with recording equipment, they arrived at the reservoir that morning at 7 a.m. to document evidence of the disruptive and damaging effects of the event. They counted the birds using powerful scopes, noting their species by size and color, and recording the direction of their flight.

Although most of the birds had left by 8:30, there were still a few stragglers remaining when the gates were opened for the fishing participants. A total of nine hundred people participated in the tournament, and they used large picks and even gasoline-powered saws to carve out holes in the ice. The activists noted that not all the birds had left by the time the people arrived, and recorded the sounds and measured the decibel levels of the machinery, which was supposed to have been banned by the organizers.

Competing interpretations of the birds' behavior were apparent among actors of different political persuasions. Local politicians insisted that the birds would not be disturbed, whereas environmentalists insisted that their well-being was being sacrificed for tourism income. Persistent tensions between local residents and urban environmental activists were also rekindled around this controversy. Mr. Chung, a rice farmer and head of the Crane Protection Association of Yangji village, asserted his lay expertise as someone who monitors the birds on a regular basis. He underscored the fact that the cranes don't always use the same area for resting, and that there is considerable variation in their movements, depending upon possible predators. Moreover, they hadn't used the reservoir as a resting area for many years, and they usually departed by 7 a.m. He was particularly annoyed that "outsiders" and activists assumed that the villagers were ignorantly "harming nature." Encouraged by the central and local governments to align their interests with eco-tourism development as a way to en-

sure their own survival, Mr. Chung and other residents of the economically stagnant border-area villages supported the ice-fishing tournament as part of a broader effort to enliven the local economy and the social life of the community, especially during the slow winter months after the harvest season.

Birds in flight at the DMZ zone, 2012. (Courtesy of the author.)

In this and other controversies over crane habitats along the border, observations of birds' behaviors are invariably interpreted in political terms in which there are only two possibilities—that the birds are being negatively affected, or that they are not being affected at all. Whether the birds appeared or did not, and whether they flew in one direction or another, were interpretive moments for the activists who literally used them as auspices (from the ancient divination practice of reading flight patterns of birds). Rather than divining the fate of human lives, however, activists read their flight patterns as signs of inauspicious avian futures, connoting stress, threat, and possibly even death and extinction. These were, however, rather presentist interpretations. These cranes, in fact, have exhibited rather remarkable adaptations to the conditions of the national division. After all, they had adapted to utilizing the reservoir as a habitat in response to famine conditions in North Korea and hospitable feeding programs in Yangji village.

The DMZ exemplifies the contemporary convergence of environmental protection and militarized "no-man's-lands," drawing attention to how infrastructures of the milita-

rized border become naturalized such that multiple actors with heterogeneous interests can construe the DMZ as ecologically "pure" and a man-made reservoir can be framed as a space of nature that must be protected and preserved. Yet, as I have shown, rather than a pristine space of nature's return, the DMZ is a hybrid landscape marked by political antagonism, water wars, man-made lakes, state-aggravated famine, global-warming-induced floods, and avian flyways. Like other militarized spaces framed as ecologically valuable, the DMZ must be viewed as a naturalcultural borderland that emerges out of multispecies encounters and relations of contestation, cooperation, and adaptation.

Birds are often viewed as important indicator species that can signal environmental change or ecosystem health. In this paper, I suggest that we can think of cranes as indicator species of naturalcultural borderlands, and as actors that engender new political ecologies and social relations. State narratives interpret their lines of flight as hopeful symbols of political transcendence, but these cranes also generate and reveal other lines of difference, creating social conflict, troubling human perception and rationality, and introducing doubt and indeterminacy into narratives of "nature" and human exceptionalism.

References

Kirksey, S. Eben, and Stefan Helmreich. 2010. "The Emergence of Multispecies Ethnography." *Cultural Anthropology* 25 (4): 545–76.

Lachman, Beth E., Anny Wong, and Susan A. Reseter. 2007. *The Thin Green Line: An Assessment of DoD's Readiness and Environmental Protection Initiative to Buffer Installation Encroachment.* Santa Monica: RAND Corporation.

Masco, Joseph. 2004. "Mutant Ecologies: Radioactive Life in Post-Cold War New Mexico." *Cultural Anthropology* 19 (4): 517–50.

Yoo, Seung-hwa, Ki-sup Lee, Jin-Han Kim, and Chong-Hwa Park. 2011. "Wintering Avifauna and Community Changes in Response to Agricultural Intensification in Cheorwon, Korea." *Journal of Korean Nature* 4 (4): 287–92.

Arupjyoti Saikia

Mosquitoes, Malaria, and Malnutrition: The Making of the Assam Tea Plantations

While the history of Assam tea plantations is usually told as a heroic narrative of fulfillment of capitalist desire, the discovery of tea in the wilderness of Assam also resulted in a never-ending war with nature and tea plants, placing immense pressure on a complex forest system. This paper seeks to reconstruct the interaction between humans and various nonhuman agents on the tea plantations. It will focus particularly on three interconnected phenomena: the changes made to the environment and the landscape, the high prevalence of mosquitoes and malaria, and the effects of disease and malnutrition upon the human laborers.

The East India Company's search for tea plants in India goes back to the later decades of the eighteenth century. Early in the nineteenth century, a massive search was underway to find places of tea growth elsewhere in the British Empire. Robert Bruce noticed the growth of wild tea plants in the eastern hills of newly occupied Assam between 1821 and 1826, and subsequently in Manipur. But nothing significant happened till January 1834, when Lord William Bentinck, Governor-General of India, warmly took up the matter of Indian tea cultivation. A scientific committee favorably reported on the most hopeful situations for future tea cultivation. Within a few years, the Assam tea, as it came to be charismatically known over the course of the century, was in great demand, catering to the English domestic taste. By the end of the nineteenth century, tea planters had acquired just under half-a-million acres of land in Assam.

The tea-growers in India faced two choices: either the wild tea plants had to be domesticated, or proven species from China needed to be acclimatized in the environment of Assam. This would take years and require the transformation of a complex natural system. The choice between local wild species and domesticated species from China led to intense scientific debate. At the same time, experimental gardening done with plants available locally—now widely known as indigenous tea plants—near river banks in eastern Assam did not survive, and a company official with years of experience in Assam reiterated that "the soil, which was alluvial, was unadapted for the cultivation." Charles Bruce, the East India Company official normally credited with the earliest discovery of

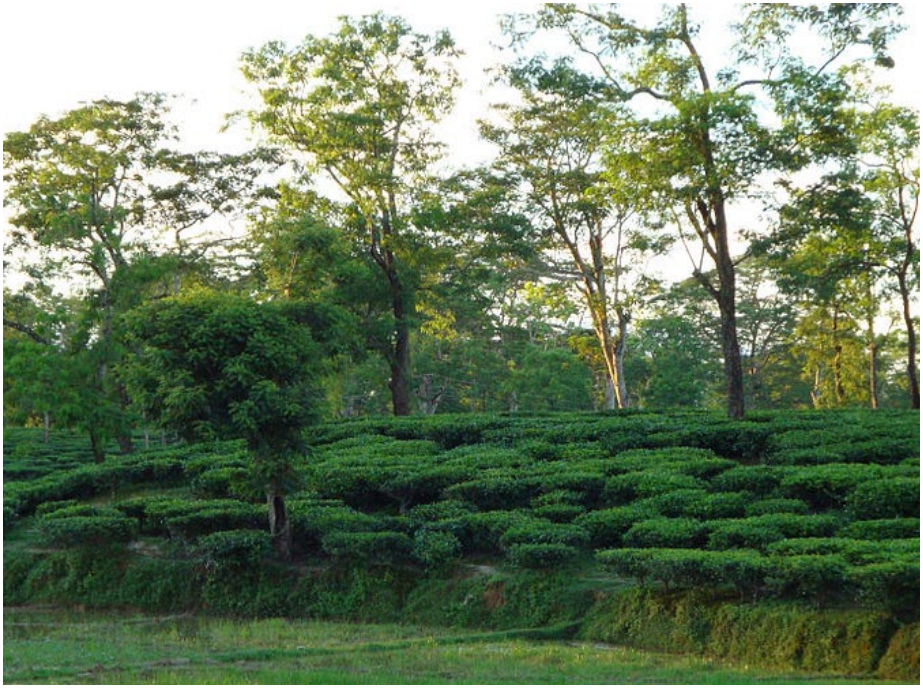
wild tea plants in Assam, noticed how tea plants grew along the riverine banks a short distance from inundated areas. But within half a century, the spatial distribution of tea growing had changed. A dramatic shift took place from the riverbanks to more secured areas in the highlands where the danger of flooding was reduced.

What was needed for healthy and yielding tea plantations were virgin forest lands. Officials and prospective planters agreed that the forested land would produce higher yields of tea compared to the alluvial low-lying areas. As official policies were framed between 1838 and 1860s for land grants to the tea planters, the highland forests became the center of attention. The government also demanded that all tea planters clear forests in the land allotted to them irrespective of whether land was actually needed for tea cultivation or not. This led to enormous swaths of forest being cleared. This was not an easy task either; clearing dense forests with huge roots was a great trouble. A nineteenth-century textbook on tea cultivation agreed that: "The huge roots in forest clearances are a terrible nuisance, and they are often so close together that they must be got rid of at any cost at the very commencement, otherwise the staking and planting out would be materially interfered with" (Crole, 1897).

It is difficult to quantify the total loss of timber and other vegetation that were cleared in this process, but the eagerness and necessity to clear all vegetation before planting could begin was itself an important indication of the massive damage caused to the nature. The planters' preference for forested soil rather than grassland was well-known, as the former had a much higher yield. The massive forest clearance could be understood if we take into account the combined clearances for tea and agricultural expansion in Assam. One study informs us that between 1870 and 1970, this clearance converted 1.5 million hectares (one-fifth of the state's geographical area) from natural vegetation to agriculture and human settlement. By far the greatest land conversion took place in the dense forest and woodland areas. Large tracts of grassland and shrubland in the river valley and tropical broad-leaved humid species accounted for over one-third of the depletion. The change in landscape occurred due to clearing large amounts of forest, not just for tea, but for other agricultural purposes as well.

Over the years, a manicured landscape replaced the complex forest system. The manicured landscape further altered the soil underneath it, too. Indeed, soil exhaustion in the plantation turned out to be of a serious nature. Unlike the floodplain and jute cultivation,

where the nutrients were often replenished annually, this did not happen on land used for growing tea, resulting in constant pressure on the soils. Additionally, excessive hoeing facilitated the growth of uniform weed instead of mixed weeds. This broken, loose, and empty soil harbored seed brought by the wind and other agencies far more than a soil with its natural herbage would. Foreign weeds were greater danger to agriculture than indigenous growth, and empty soil is sure to become clothed with some exotic weeds. The artificial character of weeds in Assam tea plantation became a matter of much concern for visiting botanists.



Badulipara tea garden in Golaghat, Assam. (Courtesy of Anshuman, via Wikimedia Commons.)

Forest clearance and weeds were not the only causes of concern for the planters. Even more worrisome was the world of the insects. The plantations of indigenous tea plants were subject to pests and blights, which became an increasing problem towards the end of the nineteenth century. In 1895, the foremost investigation of the pest problem took place. George Watt of the Royal Horticultural Society of England admitted that it was a much bigger problem than he had previously thought. Many people had

believed that the Chinese tea plant was responsible for the pest problems (i.e., when it was introduced, other diseases were brought with it, which the local variety had no resistance to). Watt convincingly argued that the increasing proliferation of pest attacks on the tea plants was due to the nature of tea plant cultivation. He also found no trace of any such pest attacks on the tea plants in the wild. Watt argued that the susceptibility to disease was a result of domestication: while there were a number of varieties of tea plants in the wild, the cultivation of tea plants produced plants that departed greatly from the wild pattern and reduced their hardiness. While tea plants could grow in any place where vegetation could survive, their aroma depended on the soil and specific ecological setting.

The Assam wild plant afforded only some 4–5 flushes during the season, while the domesticated one yielded 20–30 flushes, losing its power of flowering and fruiting. Its whole energies had been concentrated in the flushing, or production of a complete new set of shoots every seven to ten days; each shoot bears a terminal bud and three to seven harvestable leaves depending on the system of plucking. Not only had the leaves become soft and pale green, but, together with the whole of the young shoots, they were very tender and only slightly lignified. The plantation economy came to depend on these two leaves and one bud—a fitting symbol of the fragility and uncertainty to which the enterprise was subject.

By the last quarter of the nineteenth century, the planters were haunted by an additional problem: the poor health and diseases of the workers. Planters could not afford to risk the loss of life of one single laborer, and yet mortality increased during this time due to malaria and cholera. Statistics available for the period 1877 and 1920 clearly indicate that on an average one-tenth of deaths were caused by malaria. Originally the planters blamed the spread of malaria on the poor hygiene of the workers. Ronald Ross's discovery of *Anopheles* mosquitoes as the carrier of the malaria parasite in 1897 did not immediately cause the planters to take preventive measures, however.

Did the expansion of the tea plantations encourage the growth of mosquito populations in Assam? Partial answers to this can be found in the changes in the hydrological character of the soils in Assam after the expansion of tea plantations. Intensive agriculture and deforestation reduced the absorptive capacity of the soil, disturbed the natural drainage system, and resulted in an irregular river flow characterized by the abrupt

flushing and pooling of streams. In low-lying areas, by contrast, regular floods would wash away debris and contaminated water and replenish the soil.

These changes in the environmental conditions of the tea plantations—especially the changes in soil texture and structure caused by deforming and destroying the macropores and soil pore network—dramatically influenced mosquitoes' survival and distribution. As soil lost its total porosity, the resultant increase in surface runoff led to waterlogging. Tea plantations changed the distribution of forests and fields. Lands at higher levels, virgin jungle with heavy shade, had previously always remained healthy. As plantations required clearance of these landscapes, streamlets and streams were exposed. Undulating or flat plateau land surrounded by natural depressions and intersected by streamlets or tea garden drains were invariably highly malarious, for this type of landscape acted as a safe summer resort for malaria carrying mosquitoes. Planters resorted to construction of drainage for the successful cultivation of tea bush, and these drains with their slow-moving water became the most prevalent breeding areas of mosquitoes. On the other hand the low-lying flood plain areas which the tea planters had abandoned are inhospitable to the mosquitoes and their reproductive system. Flooding and flushing make these low-lying paddy lands free from the dangers of mosquitoes. Thus, when the tea planters cleared the forests and reshaped the landscape for their plantations, they unknowingly created ideal conditions for the malaria-carrying mosquitoes that plagued the plantation workers. But there was also a third factor that came into play and exacerbated the malaria problem: malnutrition.

Malnutrition amongst the tea garden workers made them more susceptible to malaria and other diseases. Most plantation workers survived on rice; they were entitled to only less than a half kilo of rice per day at a subsidized rate. Rice, an official agreed, only satisfied the sense of hunger. Other commonly used food stuffs like lentil, cereals, and oil—main sources of nitrogen—were beyond the reach of these workers. The results were devastating. Poor quality food did not contain the nutrients necessary for replenishment of their exhausted body tissues. An official report of 1877 admitted that a "considerable amount of sickness and mortality among the tea-coolies was due to their inability to procure a sufficiency of nitrogenous and oleaginous food, owing to the excessive dearness of the articles which usually supply the important elements of nitrogen and oil in the coolies' diet" (Annual Report of the Sanitary Commissioner, Assam, 1877–1878). The "extreme emaciation of many of the coolies" struck many observers. The nitrogen intake of a

plantation worker in Assam could be a mere 84 to 112 grains compared to 349 grains consumed by Irish farmers at that time. The general assumption was that a hard-working laborer needed around 250 grains of nitrogen daily. The combination of excessive physical labor and excessive malnutrition greatly reduced the workers' immunity. Unlike the plantation workers, the Assamese villagers were able to eat a balanced diet.

By the 1930s, there was a virtual war against the mosquitoes. The intensity of malaria- and cholera-induced deaths began to slow down only in the 1930s. This happened when the planter found aid in the increasing availability of quinine for distribution amongst the workers. Malaria did not spare the rich and the planters, either, even if the malnourished workers were more susceptible to it. Self-defense against malaria became prerequisite for the British planters in India. A decade later, mosquito-breeding areas around drinking wells became the target of the tea planters. By the middle of the twentieth century, many planters would agree that the situation had markedly improved, but no one could win the war against mosquitoes and malaria—a war that was at least in part the product of the changes the planters themselves had made upon the landscape in their quest to domesticate the wild Assam tea plants.

References

Crole, David. 1897. *Tea: A Text Book of Tea Planting and Manufacture…with Some Account of the Laws Affecting Labour in Tea Gardens in Assam and Elsewhere*. n.p: Crosby Lockwood.

Letter from Captain H.S. Bivar, Principal Assistant Commissioner, Lakhimpur to Colonel F. Jenkins, Commissioner of Assam, No 71, 8th October, 1859 in Bengal Government. 1861. *Papers Relating to Tea Cultivation in Assam*, Calcutta, Military Orphan Press.

Uncertain Environments

Anna Lora-Wainwright

Doomed to Suffer in Silence? Living with Pollution in Industrialized Rural China

China's rapid emergence as an economic power over the past quarter century has been accompanied by growing concerns over environmental impacts, particularly in terms of pollution. Food safety scandals, large-scale pollution accidents, and widespread, persistent, and routine pollution feature regularly in the media, both within China and beyond it. Clusters of cancer, infertility, birth defects, and other pollution-related health problems are a major matter of concern for China's citizens, who are increasingly taking action through civil litigation, environmental NGOs, the media, complaints and petitions to state institutions, and mass protests. Largely middle-class protests against anticipated pollution took place in 2012 in Qidong, Shifang, and Ningbo and were covered widely by international media. Academic studies have drawn attention to the role of the media, environmental NGOs, and civil litigation in potentially helping implement environmental protection measures.

Most environmental suffering, however, takes place far from the purview of journalists, courts, and NGOs. Equally, much citizen action is small in scale, relatively unorganized, and premised rather differently from the language of the media, courts, and NGOs. The everyday struggles of people living with pollution are hugely diverse (see Lora-Wainwright 2013b). The vast majority of Chinese people suffer in silence, are unsuccessful in their attempts to put an end to pollution, or are co-opted by polluting enterprises into seeing it as inevitable. This is especially the case when not only the local (and central) governments depend on industry but people themselves rely on it for employment. Such reliance is at its starkest in areas that have traditionally been poor and have few other sources of income. There, local governments face hard trade-offs between long-term sustainability and short-term needs to provide employment and public services. In this context, environmental regulations are largely overlooked because polluting firms provide employment and pay taxes. This happens largely with the acquiescence of locals, raising troubling questions over their potential for aiding environmental protection.

If we are to truly make sense of citizens' potential for championing sustainable development, we need to look at the intricate processes through which citizens themselves

approach environmental health threats, whether they accept them, and why. For the past decade, I have been interested in experiences of illness and healing in the Chinese countryside (Lora-Wainwright 2013a) and since 2007 I have focused on the extent to which pollution is regarded as a cause of illness and with what consequences (2009, 2010). This has involved in-depth fieldwork on how villagers understand and respond to pollution-related health risks in sites engaged in intensive resource extraction and processing in Yunnan, Hunan, and Guangdong provinces. It is typically assumed when villagers do not demand an end to pollution that this is due to their ignorance of the risks it poses. To the contrary, my fieldwork has shown that those living with pollution have a sophisticated awareness of the risks they face. Yet over time they learned that they cannot demand an end to pollution and that concerns with health effects are not a productive focus for their demands. The case of a severely polluted Yunnan village I call Baocun will serve as an example of how and why this happens and with what consequences.

Baocun is a large administrative village that depends heavily on phosphorous extraction and processing. The main employers are a large phosphorous fertilizer plant, Linchang (a pseudonym), several smaller plants, and local mines. Living in a symbiotic relationship with phosphorous mining and processing on a large scale, locals are alarmed by what they call "poison air" emitted by local industries. They blame it for air and water pollution, crop failures, and deaths of livestock. They also venture complex accounts of how pollution may be causing locals to experience frequent inflammations of the respiratory tract, painful joints, and gallbladder and kidney stones— all of which are common local ailments and are epidemiologically correlated to forms of pollution present locally. Comparisons with the past and with other places, and direct observation and experience of its effects have convinced villagers that pollution causes an increase in "strange illnesses," illnesses that were unseen in the past and grew concomitantly with industry. They believe living there results in a shorter lifespan. They talk of a putrid smell ("like dead mice"), irritated eyes, and teeth dropping out among those working in close contact with raw material.

All these examples point to locals' acute concerns for the potential dangers presented by industry. However, they also readily doubted their own ability to attribute specific illnesses to pollution. If asked directly whether their symptoms could be linked to pollution, they pervasively commented "I am not sure." Environmental health justice movements typically materialize when those affected move from individual illness experiences to the

Industrialization in rural China, 2009. (Courtesy of the author.)

social discovery of a disease (the awareness that others are affected) and the politicization of the disease (Brown 2007). This did not happen in Baocun. Villagers had a sense that a number of ailments were common locally, but hesitated in linking them to pollution. They raised several other possibilities, such as physically demanding work, individual vulnerability (for women, children, and the elderly), genes, and a weak immune system (see Lora-Wainwright 2013c).

Their uncertainty surrounding illness causation is reinforced by experiences over the past few decades. When industry (and pollution) first started, they presented a petition demanding it should stop and staged several blockades. The basis for their collective action was a concern for the environment (damages to crops and livestock) and for their own health. However, their attempts either failed or resulted in a tweaking of the distribution of benefits. This allowed some locals to draw income and opportunities from industry and made them complicit with its presence. Consequently, villagers learned to protect themselves from pollution in largely individualized ways rather than engaging in collective action against presumed health damages. Their collective complaints are targeted at damaged crops rather than harm to health or demanding a decrease in pollution.

This shift is due to the embedding of industry in the locality. The local government maintains a very close relationship with local industry, taking the lead in securing compensation deals and controlling the employment of unskilled workers in Linchang. Local industry and mining attracts a large number of migrants to Baocun, most of whom engage in low-paid and hazardous work. Locally registered residents also benefit from industry through employment opportunities, a growing service sector, and a range of land rental fees and pollution fees, which only they (not migrants) are entitled to. Locals' life experience and opportunities (as well as dangers) have become inextricable from industry (Lora-Wainwright et al. 2012). Industry has created an increasingly stratified community, divided between those registered locally (and entitled to compensation) and migrant workers. Locally registered residents in turn are a diverse group: some have become managers of private mines and industries, others have opened thriving local businesses, and yet others rely on unskilled labor in the industry for income. With such diverse structural positions and uneven benefits, the local community has little sense of cohesion or shared interests, and they approach pollution largely as an individual or family matter.

The Baocun case brings to light very powerfully the intertwining of (1) uncertainty; (2) local perceptions of industry, pollution, and illness; and (3) power relations and social, political, and economic configurations (see Auyero and Swistun 2009). The local political and economic context is central to maintaining citizens' uncertainty about pollution's effects on their health. The fact that protests initially involved demands for better pollution control and better health shows that the present subsiding of these demands is not merely due to a lack of awareness or uncertainty. Rather, uncertainty is reinforced by the current social and political economic setting. Through years of living with industrialization, pollution has also become routinized and normalized. It is experienced as an inevitable fact of life. Reactions to pollution cannot be separated from the many other challenges locals face—such as finding work, paying for healthcare, and improving their family homes. For those with a Baocun *hukou* (registration), job opportunities and compensation rates have tied them to the locality while failing to provide enough wealth to enable them to move elsewhere unless relocated by the industry. They are trapped between having a strong sense of the harm of pollution and yet feeling that they can do little to stop it.

In this context, complaints focus on elements for which individual households can more easily gain compensation (damage to crops), and which have proven more successful

in obtaining redress so far. The more visible, positive, and quantifiable outcomes of industry (work opportunities and compensation) overshadow the much more elusive and potentially contestable effects of pollution on the body, which remain the object of suspicion rather than certainty. Local power relations, opportunity structures, and interactions with the industry and the local government have disciplined villagers into making demands that comply with the economistic and materialistic approach to welfare put forth by the industry. Conversely, harm to bodies came to be constructed as difficult to prove not only scientifically, but also socially, politically, and economically. The result is that industry is asked to compensate for damages rather than prevent them from taking place again in the future.

This fragile balance is probably typical for much of industrialized rural China, and it has worrying implications. First of all, development is accompanied by staggering human costs and a deeply uneven distribution of costs and benefits. Industry has created a stratified community where "each cares for their own." Collective resistance is seen as unfeasible since entitlements are not the same across the social spectrum. Migrant workers—who constitute much of the labor force essential to the running of these factories—are paid menial wages, suffer much of the burden of pollution, have poor to non-existent welfare insurance, and are not entitled to compensation for pollution, for this is reserved for locally registered residents. This divide-and-rule strategy, however, is unstable. While local residents may get benefits denied to migrants, many work alongside migrants doing the same menial and dangerous jobs. If a growing part of the population begins to feel that the distribution of benefits is unfair, discontent might grow. This is particularly the case when, as in a site I studied in Hunan province, pollution remains but resource extraction ceases to benefit locals. Even if this dire situation does not result in violent protests, it produces disillusioned, self-abnegating people subject to environmental health threats whose effects they are painfully aware of but which they feel powerless to stop.

This brings me to my second point. Any talk of a search for an "adequate life," let alone a good life, in these settings is profoundly euphemistic (Zhang 2011). As this case shows, those living with pollution have learned to regard it as an unavoidable part of their natural surroundings. Likewise, their parameters of what constitutes a good life have been adjusted to what they conceive as possible. A clean environment is not on their list of possibilities. This is surely the deepest manifestation of environmental injustice: not

only do they live with pollution, but they do not feel entitled to demand any better. Unlike in the post-materialist model where an increase in wealth leads to greater care for the environment, here partial (and uneven) benefits from industry shift concerns away from demanding an end to pollution and instead requesting compensation for damages incurred. This highlights the difficult compromises that those who live in the shadow of industry have to make. Whether and how they mount complaints against pollution is not only an economic decision but also a deeply moral one.

This status quo is inherently unsustainable. Nobody can predict to what extent this unrelenting, uneven, and unfair environmental suffering will result in protests that challenge the government. My research has shown that the underlying (and growing) awareness of pollution's harm may escalate into violent protests when particular episodes (acid leaks, explosions, or other severe events) bring it to the fore. At the same time, it has also suggested that the longer pollution continues, the more the community sees it as inevitable, especially when their attempts to oppose it have been unsuccessful. That people do not protest, that cries for help remain unheard or silenced as they stop thinking they can demand a healthier environment, is in many ways an even bigger tragedy than when they try to resist it, as in the cases we repeatedly hear about in the media. While so many feel resigned to live in an unhealthy environment, it does not mean they are content with it. They are all too aware that there are others further up the ladder benefiting more and suffering less. In this context, citizens could play a crucial role in stopping pollution, but we first need to understand how powerless some of them have come to feel in its shadow.

Acknowledgement: The author is grateful to the Rockefeller Brothers Fund and the Social Science Research Council for fieldwork funding (RBF/SSRC-CEHI/2008-01-07) and to a Leverhulme Trust Research Fellowship (RF-2012-260) and a Writing Residency at the Rockefeller Foundation Bellagio Center for supporting writing on this project.

References

Auyero, Javier, and Débora Alejandra Swistun. 2009. *Flammable: Environmental Suffering in an Argentine Shantytown*. Oxford: Oxford University Press.

Brown, Phil. 2007. *Toxic Exposures: Contested Illnesses and the Environmental Health Movement.* New York: Columbia University Press.

Lora-Wainwright, Anna. 2009. "Of Farming Chemicals and Cancer Deaths: the Politics of Health in Contemporary Rural China." *Social Anthropology* 17 (1): 56–73.

———. 2010. "An Anthropology of Cancer Villages: Villagers' Perspectives and the Politics of Responsibility." Special issue, *The Journal of Contemporary China*. 19 (63): 79–99.

———. 2013a. *Fighting for Breath: Living Morally and Dying of Cancer in a Chinese Village.* Honolulu: University of Hawai'i.

———, ed. 2013b. "Dying for Development: Pollution, Illness and the Limits of Citizens' Agency in China." Edited collection, *The China Quarterly* 214 (June): 243–393.

———. 2013c. "The Inadequate Life: Rural Industrial Pollution and Lay Epidemiology in China." In "Dying for Development: Illness and the Limits of Citizens' Agency in China." Edited collection, *The China Quarterly* 214 (June): 243–54.

Lora-Wainwright, Anna, Yiyun Zhang, Yunmei Wu, and Benjamin Van Rooij. 2012. "Learning to Live with Pollution: How Environmental Protesters Redefine Their Interests in a Chinese Village." *The China Journal* 68: 106–24.

Zhang, Everett. 2011. "Introduction: Governmentality in China." In *Governance of Life in Chinese Moral Experience*, edited by Everett Zhang, Arthur Kleinman, and Weiming Tu. London: Routledge.

Shiho Satsuka

The Satoyama Movement: Envisioning Multispecies Commons in Postindustrial Japan

In recent years, Japanese citizens have mobilized to restore *satoyama*, traditional agrarian landscapes, as a strategy for fighting the damages modern life was thought to inflict on both humans and the environment. In the satoyama forest revitalization movement, middle-class professionals, retirees, and students intermingle with farmers and use their spare time to plant rice, clear irrigation channels, and, most particularly, reenact the traditional resource use in satoyama forests. Satoyama has become not only the locus of nostalgia for harmony between humans and nature, but also the site of biodiversity conservation for a better future. This paper discusses one especially vigorous wing of the satoyama revitalization movement: the mobilization to recreate forests that produce highly valued matsutake mushrooms. These satoyama movements suggest the possibility of emerging "new commons" in a landscape deteriorated after the rapid industrialization of Japan.

Matsutake as a Puzzle

Matsutake is a wild mushroom that has long been treasured in Japan as an autumn delicacy. Historical records show that in ancient and medieval times, matsutake was used for ritual offerings to the deities. It was also an important item of gift exchange among aristocrats, and later became popular among commoners (Arioka 1997). The Japanese government and many businesses have invested in scientific research on matsutake. However, no one has yet artificially cultivated this mushroom: matsutakes are only harvested in the "wild." Matsutake requires a specific symbiotic relationship with its host trees, which, in central Japan, are mostly red pines. By entangling with pine roots, matsutake form structures called mycorrhiza, literally meaning "fungus roots." Through mycorrhiza, matsutake exchange nutrients with live trees. The mechanism of this symbiosis and the related interspecies relations still pose puzzles for scientists (Suzuki 2005).

Matsutake's characteristics as an unpredictable and untamed wild mushroom have enhanced its charisma. Matsutake is not only one of the most expensive mushrooms on

the market and has gained international attention as the most cost-effective non-timber forest product (see Alexander et al. 2002), but it is also considered to be "a gift from the mountain deity" among Japanese pickers at home and abroad. At present, instead of relying on artificial cultivation, scientific experts have encouraged farmers and foresters to restore the entire forest landscapes back to a condition suitable for matsutake growth.

Satoyama and the Postindustrial Landscape

In central Japan the typical niche for red pines and matsutake is satoyama—secondary forests near human settlements. In satoyama, traditionally, humans have selectively coppiced and cleaned the forest ground to use wood, fallen leaves, and grasses for fuel and fertilizer. These human activities have created dry, open, and cleared forest ground with poor soil nutrition. The poor soil is an ideal habitat for matsutake because it is a weak competitor among fungi and microbes. If the soil is rich enough to provide food for other species, matsutake cannot thrive. It was therefore the human activities of coppicing woods and cleaning the forest ground that unintentionally created the niche ecological conditions for matsutake.

The decline of agricultural communities has been the major concern for many of the scientists studying matsutake. They have pointed out that due to the problem of depopulation, the satoyama forests were neglected, fallen leaves and trees piled up, and the soil grew too rich for mycorrhizal mushrooms to thrive (Hamada and Ohara 1970). The disappearance of the mycorrhizal relationship with matsutake further weakened pine trees and made them vulnerable to pine wilt disease. Rural areas were left with dense, unhealthy forests, and these "abandoned" forests became easy targets for industrial development. Many were turned into golf courses, suburban communities, factory complexes, or industrial waste dumps.

Due to the decline of satoyama, over 90 percent of matsutakes consumed in Japan are now imported from countries such as China, Korea, Canada, the US, Mexico, Bhutan, Turkey, Morocco, Sweden, and Finland, among others. For many satoyama activists, matsutake represents the serious problems facing agriculture and forestry in Japan accelerated by industrial development. Matsutake also symbolizes the heightened social concerns regarding Japan's heavy dependence on imported food.

"New Commons"

Before the modern land-tenure system was introduced in the late nineteenth century, satoyama natural resources were under the control of local communities. While the lands were governed by feudal lords, the local villagers had the customary right to use the resource and were obligated to take care of the area in order to maintain the renewal of the resource. Each settlement has developed its own detailed rules and regulations, called *iriai*, reflecting the specific natural environment and the diverse resource-use practices.

After the Meiji government was established in 1868, the state attempted to "modernize" the land-tenure system, and numerous social and legal reforms were conducted to clarify land ownership. Many of the forests were categorized as private or national forests and some were designated as communal forests under the control of the local community. Despite this, iriai rights and obligations continue to exist and have been central in the practice of satoyama resource management (Murota and Mitsumata 2004).

Iriai is often translated and discussed as a version of "commons" among the forest economists who seek alternatives to governing practices based on the private property and market economy. They evaluate the potential of iriai as a form of commons integral to the sustainable development of rural agricultural communities (McKean 1992), and argue that the iriai's detailed, regionally specific regulations represent the traditional wisdoms that redress Hardin's thesis of the "tragedy of the commons" (1968). Tomoya Akimichi (1999), himself a leading advocate of commons studies in Japan, points out the fundamental differences between the English notion of commons and iriai, deriving from different epistemological and religious traditions. For example, while the subject who uses the commons is an individual, the subject of iriai is the community itself as a collective entity. While recognizing the difference between the English term commons and iriai, Akimichi promotes the studies of iriai and argues for its significance in environmental conservation.

Some scholars argue that this primacy of community over individual represents the remains of the feudal governmentality and the premodern authoritative control of the population. Therefore, they suggest that it was the "backwardness" of iriai that pushed people to leave the rural agrarian communities (Kikuma et al. 2008). The challenge

of satoyama movements is how to revitalize the wisdoms of communal land use as a "new commons" reflecting the contemporary notion of citizenship.

Since the 1990s, various experimental movements, based on the free and voluntary involvement of urban citizens, have emerged across the nation. Even though the labor is voluntary and without any economic rewards, some of these movements are achieving certain successes by reviving agrarian landscapes in suburban bedroom communities.

Matsutake Crusaders

Among the grassroots satoyama forest revitalization movements in Japan, the Matsutake Crusaders of Kyoto may be one of the most well-publicized groups. The group is led by the charismatic microbial ecologist, Dr. Fumihiko Yoshimura. In Kyoto, the ancient capital and the historical center of matsutake harvest and consumption, the decline of domestic matsutake has been a serious concern. In 2005, Dr. Yoshimura made an agreement with a landowner near a suburban bedroom community in Kyoto to use his land for satoyama revitalization experiments. He invited his friends to work on the forests, started a blog to report on their activities, and asked local media to publicize their undertakings. Soon, their unique activities caught media attention across the nation.

The Matsutake Crusaders are a loose network of citizens: there is no membership. The participation is open to anyone at any time as long as they enjoy the activities of revitalizing the forest for matsutake, respect and help each other, and maintain equality among participants. A variety of people have joined the activities, including mountain landowners and farmers who want to learn the technique of improving matsutake harvest, forest co-op representatives and prefectural and municipal agricultural officers who hope matsutake can save the community from extinction, and university and high school students who are interested in studying agriculture. But many of the regular participants are urban, retired seniors who used to be corporate workers, schoolteachers, or professionals.

Every week, about 30 people gather and engage in a variety of tasks. They cut trees, burn diseased trees, rake leaves, and transport all the forest litter out of the forests. The mass of cut trees, grass, and leaves is enormous. In order to consume the bio-

mass, the group has made large compost holes and turned the forest litter into fertilizer. They also started a small vegetable garden at their base camp to consume the fertilizer. The more they worked, the more fertilizer they collected. Soon, they expanded the vegetable field and planted tea trees, persimmons, and mandarin oranges. They also created rice paddies. In doing this they recreated not only the red pine forest, but also a miniature landscape of the whole satoyama ecology. Through their efforts to get rid of the biomass, the by-product of conditioning the forest for matsutake, the participants have sharpened their awareness of the vast variety of other living and nonliving beings who share the same space. The participants can also learn about and feel the joy of living with diverse beings in their local landscape (Satsuka 2011).

In this small revival of satoyama landscape, Dr. Yoshimura saw the potential for bringing back biodiversity to the monotonous landscape of the bedroom community. By revitalizing the satoyama forest, the Matsutake Crusaders were rewinding time. Dr. Yoshimura borrowed the charisma of matsutake and mobilized people to redo history. His aim was to return the forest to a condition similar to the mid-1950s. This reference to the mid-1950s is not only a reflection of his personal longing for innocent childhood: 1955 was the turning point in Japanese history. The Liberal Democratic Party took power after an intense political battle with socialists and the nation was integrated into the US Cold War policy in East Asia. Critics argue that after 1955, in exchange for a military coalition with the US, Japan was able to concentrate on economic development. Sociologist Shunya Yoshimi (2001) points out that this coalition led Japan to become a poster child for capitalist development in Asia. Industrialization also accelerated the degradation of agriculture and forestry, as well as the nation's dependency on imported foods.

The Crusaders' activities show us the potential for a "new commons" enacted by the voluntary recreational activities of urban citizens. They also suggest how being attentive to the charisma of this wild mushroom can help us to understand its emerging new sociality in the midst of the depressing situation caused by rapid industrialization, Cold War legacies, and expanding global capitalism.

The charisma of matsutake leads the participants to envision multispecies connectivity and the humble position of human beings. For the participants, this humbleness is a source of pleasure: the joy of feeling the connection with other beings on the earth, the

delight of sharing the generative force of each being, and the enjoyment of exploring new subjectivities through their bodily engagement with the land and forests.

This resonates with what Felix Guattari calls "ecosophy," an ethico-political articulation of three ecological registers: the environment, social relations, and human subjectivity (Guattari 2008, 19–20). The practices of the Matsutake Crusaders and other grassroots movements that experiment with the elements of the new commons demonstrate that the revitalization of natural ecology is inseparable from social ecology, the constitution of society, and mental ecology, namely, the construction of people's subjectivities by finding a niche in the complex web of life consisting of humans and other beings who share the landscape.

References

Akimichi, Tomoya. 1999. *Nawabari no Bunkashi*. Tokyo: Shogakkan.

Alexander, Susan J., David Pilz, Nancy S. Weber, Ed Brown, and Victoria A. Rockwell. 2002. "Value Estimates of Commercial Mushrooms and Timber in the Pacific Northwest." *Environmental Management* 30 (1): 129–41.

Arioka, Toshiyuki. 1997. *Matsutake*. Tokyo: Hosei University Press.

Guattari, Felix. 2008. *Three Ecologies*. New York: Continuum.

Hamada, Minoru, and Ohara Hiroyuki. 1970. *Matsutake: Jinko Zoshoku no Kokoromi*. Tokyo: Nobunkyo.

Hardin, Garrett. 1968. "The Tragedy of the Commons." *Science* 162 (13): 1243–48.

Kikuma, Mitsuru, Natsumi Chubachi, and Sanshiro Ogawa. 2008. "An Empirical Study of Forest Commons—Management of Common Forest and Autonomy of Mountainous Community Today." *Bulletin of Yamagata University Agricultural Science* 15 (3): 165–79. [In Japanese].

Matsutake Worlds [Timothy Choy, Lieba Faier, Michael Hathaway, Miyako Inoue, Shiho Satsuka, and Anna Tsing]. 2009. "A New Form of Collaboration in Cultural Anthropology: Matsutake Worlds." *American Ethnologist* 36 (2): 380–403.

McKean, Margaret. 1992. "Success on the Commons: A Comparative Examination of Institutions for Common Property Resource Management." *Journal of Theoretical Politics* 4 (3): 247–81.

Murota, Takeshi, and Gaku Mitsumata. 2004. *Iriai Rinya to Comonzu.* Tokyo: Nihonhyoronsha.

Satsuka, Shiho. 2011. "Eating Well with Others / Eating Others Well." *Kroeber Anthropological Society Journal* 99/100: 134–38.

Suzuki, Kazuo. 2005. "Ectomycorrhizal Ecophysiology and the Puzzle of Tricholoma Matsutake." *Journal of the Japanese Forest Society* 87 (1): 90–102. [In Japanese].

Yoshimi, Shunya. 2001. "America wo Yokubo/Sokyakusuru Sengo: Kichi to Shohi no Kussetsu o Megutte." Special Edition, *Gendai Shiso* 29 (2): 44–63.

Yoshimura, Fumihiko, and Matsutake Crusaders. 2010. *Matsutake Saisei o Tanoshimu! "Matsutakeyama Fukkatsu Sasetai" no Nakamatachi.* Tokyo: Kobunken.

Bridget Love

Sustainability at Dead-Ends: The Future of Hope in Rural Japan

Nowhere is the fiscal and demographic slowdown of twenty-first-century Japan reflected more dramatically than in the mountainous regions of its countryside. In the 1990s, sociologist Ōno Akira (1995) coined the term "hamlets at their limits" (*genkai shūraku)* to denote a rapidly growing category of rural communities aged and depopulated to the point of collapse. They are the outcome of long-term rural decline, unfolding against the grain of the nation's Tokyo-centered postwar economic "miracle" and high-speed growth. Today, Japan's rural peripheries face an increasingly precarious future in an era of protracted recession and state streamlining. As decentralization policy demands greater autonomy of the nation's regions, self-sufficiency has become a dominant priority of rural sustainable development in Japan. In this short paper, I examine a community mapping initiative that empowers regional residents to rediscover the character of their depleted surroundings. I argue that it is an exercise suited to a climate in which responsibility for the future of the countryside is devolved onto its inhabitants, yet also indicative of the status of Japan's regions as unexpected sites of hope in a nation mired in downturns.

During my fieldwork in northeastern Japan in the early 2000s, residents and officials of the Nishiwaga region in Iwate Prefecture organized locality studies workshops in the area's far-flung mountain hamlets.[1] A popular community mapping exercise, locality studies (*jimotogaku*) begins with "treasure hunts," during which small groups of local residents explore their surroundings on foot in order to catalogue their important features. As part of my research on rural revitalization, I participated in several workshops in Nishiwaga, including in its most radically depopulated regions where the closing of once-bustling copper mines in the 1970s has left hamlets, up to 75 percent elderly, that dead-end in the region's deep mountains. Treasure hunts were upbeat expeditions during which elderly hamlet members, accompanied by one or two outside visitors, charted and photographed antique farm tools and architecture, sites related to ancestral tales and historical rumors, and spots that triggered memories of childhood experiences. In follow-up sessions, groups compiled their findings on paper maps and in hamlet "treasure" databases. According to locality studies proponents, the goal of workshops

1 See Love 2013 for a more thorough analysis of locality studies in relation to sustainability discourse and neoliberal reform in Japan.

is the "rediscovery" (*saihakken*) of a region by its inhabitants. They are forums for re-envisioning an area not as a depleted periphery, but as a durable community rooted in its physical surroundings and ancestral history.

"Rediscovery" is a precondition of regional "activation" (*kasseika*), a vision of rural revitalization achieved through resident initiatives to awaken the dormant vitality of their homes. At a roundtable organized by a popular agricultural publisher on how to activate Japan's countryside, locality studies enthusiast Yoshimoto Tetsuro explained: "To begin with, it's important that people know the richness of their regional life, the richness of delicious water, food and air, the unique character of a region's natural features and life-culture, things beyond monetary value" (Yoshimoto 2001, 194). Credited as a founder of locality studies, Yoshimoto is a former municipal official of Minamata in Kumamoto Prefecture, a city known internationally as the site of a devastating industrial disaster. In the 1970s, residents waged a legal battle against the Chisso Corporation for flushing decades' worth of mercury-laden toxins into local waterways. Years later, Yoshimoto mobilized residents to explore their natural environment and cultural history as clues to a new self-image, unbiased by the stigmas of contamination. Today, Minamata has rebranded itself an "eco-town," celebrated by activists and government officials, not for its success in prevailing over corporate and governmental irresponsibility, but as an example of the power of proactive civic engagement.

Locality studies emerged on the national scene in the early 2000s as a technique of regional renewal suited to an era of state streamlining. Neoliberal reforms pursued aggressively by the Koizumi administration in the early twenty-first century included decentralization reforms that reapportion taxes long shunted from Japan's populous urban centers to subsidize its flagging countryside. A national wave of municipal mergers was intended to pave the way for subsidy cuts by creating larger, more effective, and autonomous municipalities. So were calls for a flexible network of private enterprise, nonprofit organizations, and civic groups to emerge and shoulder responsibility for regional upkeep in the wake of withdrawing state support. Critics fear that decentralization represents a government divestiture in Japan's aging and economically moribund countryside. In Iwate Prefecture, where Nishiwaga is located, outreach units from both the prefectural university and government began separately promoting locality studies workshops as a way of helping communities adapt to these policy realignments. In helping residents envision their homes as durable, treasure-laden communities of

which they are stewards, locality studies organizers pursue layered outcomes—from community bonding to small-scale economic development. As a technique of regional activation, locality studies is similar to other technologies of governance that aim to foster self-motivating and self-sustaining citizens and communities that can survive on less and less government support (see also Cruikshank 2010).

Community mapping groups set off on "treasure hunts." (Courtesy of the author.)

Yet the ideals of regional self-sufficiency that underpin locality studies so hold particular appeal in Tōhoku, Japan's large and historically underdeveloped northeast. Long viewed from the perspective of central Japan both as a reservoir of cultural tradition and a remote backwater, Tōhoku was where Japanese ethnology burgeoned in the early twentieth century to document the underside of the nation's emerging modernity. Its rural villages were objects of nostalgic metropolitan longing as the old hometown or "native place" (*furusato*) of a nation rapidly transformed by economic growth (Ivy 1995; Robertson 1991). Such nostalgia obscured an extractive relationship that drained Tōhoku of its natural resources and population to serve the needs of Japan's center. It became the basis for government-promoted tourism development that transformed the landscape of the countryside through the frenzied building of subsidized hot springs resorts and ski slopes during Japan's economic heyday. Today, many stand empty, gathering dust and debt.

As a dominant approach to rural development today, activation reflects a rejection of conspicuous consumer and public works spending in post-bubble Japan. It is part of a changing paradigm that favors small-scale and regionally-distinct agrotourism, eco-museum, and heirloom farming initiatives undertaken by residents rather than planned by government officials. In promoting heritage-themed, eco-friendly, and self-propelled development, activists, academics, and government officials align themselves with the priorities of a global sustainability discourse. They also draw on an intellectual current of regionalism prominent in 1970 and 80s Japan as a critical alternative to center-led rural

development agendas. Regionalists, like Tsurumi Kazuko (1989), promoted efforts by local populations to pursue development agendas suited to their regional ecologies and cultural traditions, rather than the dominant priorities of Western capitalism. Her theory of "endogenous development" hinged on a folkloric notion of rural communities as sodalities defined by shared ancestral histories, and formed within unique geo-climatic circumstances. Locality studies is premised on a similar vision of regional social cohesion—especially in contrast to characterizations of the individualized and stagnating agency of contemporary urban Japan. It promotes a vision of rural stewardship undertaken by regional communities as agents of "sustainable region-making" (*jizoku kanōna chiiki-zukuri*). Along these lines, staff writer for the nonprofit organization Japan for Sustainability Takahashi Ayako (2003) claims that locality studies can foster rural sustainability by invigorating *en* (the bonds of fate) that tie localities together. She explains: "There is en with nature, *en* with ancestors, and *en* with local residents who share a common future. Locality studies helps remind citizens of their communal *en*, a feeling that has been fading in recent years."

Such idealized visions of rural community solidarity are not just based on reactionary nostalgia, but rather evoke the supple connections through which academics, activists, and government officials hope post-growth Japan might generate its future. Economist Hiroi Yoshinori (2010, 40) argues that a pervasive belief that "time will pass and growth will solve our problem" represents an outdated way of thinking along a "temporal axis" about solutions to pressing social problems. He proposes instead that Japanese imagine the future along a "spatial axis" along which people "sink roots into their regions," improving life conditions by cultivating the diversity of regional cultures and ecologies. For Hiroi, this shift requires a decentered national geography in which the "monocentric concentration" of people and finances in Tokyo is replaced by a "multi-polar concentration" in regional hubs and hamlets where people are attached via bonds of care and community (41). Even agencies of Japan's central government emphasize the importance of rooted connections as vital to civic engagement and rural sustainability in the regions. A Ministry of the Environment report on sustainable development describes locality studies as a means of helping regional inhabitants "sense the relationship between themselves and their environments" such that that "*aichaku* (affection or attachment) wells up and leads to action" (Kankyō-shō 2003).

As a technique for mobilizing engaged stewardship, locality studies prioritizes regional self-sufficiency and self-sustainability, rooted in an ethic of locality and care that characterizes rural development approaches in Japan. In Nishiwaga, treasure hunts and mapping workshops have been followed in some hamlets by more intensive sessions to study local history or plan heritage festivals surrounding, for example, the revival of old industries, such as making charcoal or gathering mountain plants. Such activities cannot sustain the region in a normative sense against a future of projected decline. The area has lost 60 percent of its population to outmigration over the past half-century; today nearly half of its population is at least 50 years old. Remaining residents struggle with the logistics of decline: the care of elderly, the upkeep of vacant homes and land, encroaching forests, shrinking budgets for municipal snowplowing, and closing schools. Yet due to its radical demographics and remote location vis-à-vis Japan's center, the region also draws a small but steady influx of activists, bureaucrats, academics, and volunteers working to encourage civic regional revitalization projects like heirloom farming, heritage projects, community currencies, and community mapping. Their hopeful vitality is welcomed in the area as a sign that the region's distinctive character might become a resource for fostering a post-growth future in Japan.

References

Cruikshank, Barbara. 1999. *The Will to Empower: Democratic Citizens and Other Subjects.* Ithaca: Cornell University Press.

Hiroi, Yoshinori. 2010. "Keizai seichō naki jidai no chiiki to ibasho to shigoto" [Work, Belonging, and the Regions in an Era without Economic Growth]. *Kikan chiiki* 2: 38–41.

Ivy, Marilyn. 1995. *Discourses of the Vanishing: Modernity, Phantasm, Japan.* Chicago: University of Chicago Press.

Kankyō-shō (Ministry of the Environment). 2003. "Chiiki shakai kara hajimaru jizokukanōna shakai e no henkaku." [Local Communities Leading the Transition to a Sustainable Society]. *Annual Report on the Environment.* http://www.env.go.jp, accessed 20 July 2012.

Love, Bridget. 2013. "Treasure Hunts in Rural Japan: Place Making at the Limits of Sustainability." *American Anthropologist* 15 (1): 112–24.

Ōno, Akira. 2005. *Sanson kankyō shakaigaku jyosetsu* [Introduction to the Sociology of Farm Village Environment]. Tokyo: Nōbunkyō.

Robertson, Jennifer. 1991. *Native and Newcomer: Making and Remaking a Japanese City.* Berkeley: University of California Press.

Takahashi, Ayako. 2003. "'Jimotogaku': Community Studies for Creating and Maintaining Harmony in Society, Nature, and Industry." *Japan for Sustainability Newsletter* 14. http://www.japanfs.org/en/mailmagazine/newsletter/pages/027966.html. Accessed May 2010.

Tsurumi, Kazuko. 1989. "Naihatsuteki hattenron no keifu." [The Genealogy of a Theory of Endogenous Development]. In *Naihatsuteki hattenron*, edited by Kazuko Tsurumi and Tadashi Kawata. Tokyo: Daigaku shuppankai.

Yoshimoto, Tetsuro. 2001. "Kaze ni kike, tsuchi ni tsuke: Chiiki kara kawaru nihon" [Japan: Changing from its Regions]. *Gendai nōgyō* 52: 190–93.

About the Authors

Gunnel Cederlöf is a professor of history at Uppsala University. From 2014–15 she is working at the KTH Environmental Humanities Laboratory at the Royal Institute of Technology in Stockholm. She is also a guest professor at the Linnaeus University Centre for Concurrences in Colonial and Postcolonial Studies and a research fellow at the Department of Archaeology and Ancient History at Uppsala University. Her work spans the environmental, legal, and colonial history of early modern and modern India and the British Empire. Among her publications are *Founding an Empire on India's North-Eastern Frontiers, 1790–1840: Climate, Commerce, Polity* (2014), *Landscapes and the Law: Environmental Politics, Regional Histories, and Contests over Nature* (2008), *Ecological Nationalisms: Nature, Livelihoods and Identities in South Asia* (2005, with K. Sivaramakrishnan) and *Legal Landscapes and Conservations Regimes* (2009, with Mahesh Rangarajan).

Sanjukta Das Gupta is an associate professor at Sapienza University of Rome. Her research interests focus on rural societies and the agrarian and environmental history of India. Her publications include a monograph entitled *Adivasis and the Raj: Socio-economic Transition of the Hos, 1820–1932* (2011). She also coedited *Narratives of the Excluded: Caste Issues in Colonial India* (2008) and *Narratives from the Margins: Aspects of Adivasi History in India* (2012).

Iftekhar Iqbal is an associate professor of history at the University of Dhaka. His research interests include the environmental and transregional history of modern South Asia and Southeast Asia. His recent book, *The Bengal Delta* (2010), examines the political-ecological history of the region in colonial times with a focus on shifting agrarian economy and wellbeing. He is currently working on the history of Yunnan, Myanmar, Assam, and Bengal from a transregional perspective.

Eleana Kim is an assistant professor of anthropology at the University of Rochester, NY. Her current project, "Making Peace with Nature: The Greening of the Korean Demilitarized Zone," ethnographically examines the ecological revitalization of the border area between North and South Korea. She is the author of *Adopted Territory: Transnational Korean Adoptees and the Politics of Belonging* (2010).

John Knight is Reader in Anthropology at Queen's University Belfast. His main area of research is human-animal relations, including hunting, people-wildlife conflict, and wildlife tourism. He is the editor of *Natural Enemies* (2000), *Wildlife in Asia* (2004), and *Animals in Person* (2005), and the author of *Waiting for Wolves in Japan* (2003) and *Herding Monkeys to Paradise* (2011).

Kuntala Lahiri-Dutt is a senior fellow at the Resource, Environment & Development group at the Crawford School of Public Policy, College of Asia and the Pacific, at the Australian National University. She has written widely on the micropolitics and impacts of the large dam project of the Damodar Valley Corporation, as well as on water management in India.

Bridget Love is a cultural anthropologist at the Expository Writing Program, University of Oklahoma, and an alumni Carson Fellow. Her research focuses on rural depopulation, sustainability, aging, and care in Japan. Using ethnographic research in northeastern Japan, she is completing a book manuscript *Places at their Limits: the Problem of Sustainability in Rural Japan*. Her work has appeared in *Critical Asian Studies, American Anthropologist,* and in edited volumes on food in Japan and ethics in anthropology.

Anna Lora-Wainwright is an associate professor in the human geography of China. Her current research concerns are lay cancer aetiologies; experiences of urbanization and land loss; international flows of e-waste; resistance to waste incineration; the rise of citizen science in rural China; the production and contestation of knowledge around pollution; environmental health activism and the formation of "environmental health subjects." Her recent publications include *Fighting for Breath: Living Morally and Dying of Cancer in a Chinese Village* (2013) and the special collection *Dying for Development: Pollution, Illness and the Limits of Citizens' Agency in China* (2013). In 2013, she was awarded the prestigious Philip Leverhulme Prize in Geography.

Ursula Münster is a postdoctoral researcher at the Department of Anthropology, LMU Munich, and a visiting fellow at the Rachel Carson Center. Her current work focuses on species extinction, wildlife conservation, and human-elephant relations in the Western Ghats of Kerala in southern India. She is interested in issues of environmental governance, human-animal interfaces, social and environmental movements, gender, indigenous land rights, post-colonialism, and globalization.

Arupjyoti Saikia is an associate professor of history in the Department of Humanities and Social Sciences at the Indian Institute of Technology, Guwahati. His recent books are *Forests and Ecological History of Assam: 1860–2000* (2011) and *A Century of Protests: Peasant Politics in Assam since 1900* (2014). He is currently working on his book project titled *The Unquiet River: An Environmental Biography of Brahmaputra.*

Shiho Satsuka is an assistant professor of anthropology at the University of Toronto and an alumni Carson Fellow. Her research concerns the politics of knowledge production, discourses of nature and science, and cultural practices of capitalism. Currently, she is working on the grassroots citizens' satoyama movement in Japan, which aims to recreate the forests that produce a highly valued wild mushroom called matsutake. This research is also a part of Matsutake Worlds, a collaborative ethnographic project.

Vipul Singh is an associate professor of history at the University of Delhi and an alumni Carson Fellow. His main areas of research include migration, rivers, and land-use change. His research paper "Environmental Migration as Planned Livelihood among the Rebaris of Western Rajasthan, India" appeared in *Global Environment: A Journal of History and Natural and Social Sciences* (2012). Presently, Singh is researching the Ganges basin, and exploring the implication of the embankments in the region in a long-term historical perspective. He is finishing his manuscript "Controlling a Stable River: An Environmental History of the Mid-Gangetic Basin."

Ling Zhang is an assistant professor of history at Boston College. Her research interests include premodern Chinese history, environmental history, environmental justice and ethics, water studies, and landscape studies. Ling is finishing her manuscript *The River, the Plain, and the State: Making a Yellow River Delta, 1048–1128.* She is also working on another project, "China's Sorrow or Yellow River's Sorrow? An Environmental History of the Yellow River."

RCC Perspectives

RCC Perspectives is a digital publication that exists to record and reflect on the diversity of events and dialogues at the Rachel Carson Center for Environment and Society. We aim to make scholarship, accessible to a wide range of readers, wherever they are in the world. The *RCC Perspectives* provides a forum for scholars and thinkers engaged in a broad spectrum of topics related to society and environment and is designed to inspire new perspectives on the complex relationship between nature and culture.

perspectives@carsoncenter.lmu.de

All issues of *RCC Perspectives* are available online. To view past issues, please visit www.environmentandsociety.org/perspectives

To learn more about the Rachel Carson Center for Environment and Society, please visit www.rachelcarsoncenter.de.

Rachel Carson Center for Environment and Society
LMU Munich
Leopoldstrasse 11a
80802 Munich
GERMANY

Design by Stefan Zinsbacher
Cover photo courtesy of Colegota, via Wikimedia Commons

Printed on recycled ENVIROTOP paper by PAPER UNION GmbH

ISSN 2190-5088

Munich, 2014

ClimatePartner°
printed climate-neutrally

This issue of *RCC Perspectives* offers insights into similarities and differences in the ways people in Asia have tried to master and control the often unpredictable and volatile environments of which they were part. In these histories, nonhuman actors such as capricious rivers, fluid delta regions, monsoon rains, and wild animals play an important role. In some instances, the power of nature facilitated colonial rule and exploitation; in others, it helped to subvert political control. The essays gathered here present new environmental scholarship that speaks across political boundaries, draws new connections between regions and time periods, and tells unexpected stories about the manifold relationships between nations, people, and their environment.

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

Deutsches Museum

ISSN 2190-5088