

The Origins of the Third World Markets, States and Climate

THE CORNER HOUSE

The “Third World” – the division of humanity into haves and have-nots – was shaped by fatal interactions between world climate and world economy at the end of the nineteenth century. Three waves of drought, famine and disease devastated agriculture throughout the tropics and northern China when the monsoons failed. The total human toll could not have been less than 30 million victims. Fifty million dead might not be unrealistic.

Researchers have since found the fingerprints of the El Niño-Southern Oscillation (ENSO) – the vast oscillation in air mass and Pacific ocean temperature – all over these catastrophic climate disasters and crop failures (*see* Box, p.16). But nature alone is rarely so deadly. Millions of cultivators in India and China had been recently incorporated into webs of world trade as subsistence adversity, caused by various state and imperial policies, had encouraged them to turn to cash-crop cultivation. As a result, peasants and farmers became dramatically more vulnerable after 1850 to natural disasters such as extreme climate events and were at the same time whiplashed by long-distance economic perturbations whose origins were as mysterious as those of the weather.

The “Third World” (a Cold War term) is the outgrowth of income and wealth inequalities – the famous “development gap” – that were shaped most decisively in the last quarter of the nineteenth century, when the great non-European peasantries were initially integrated into the world economy.¹ The famine “prisoners of starvation” were as much inventions of the late nineteenth century as electric lights, Maxim guns and “scientific” racism.

Many contemporary policy makers, however, ascribed the nineteenth-century famines not just to bad weather but also to Malthusian pressures – too many people, too little land, too little food – an explanation which survives today. But Malthusian explanations were not only wrong-headed at the time: they were also contributory causes of the deaths that occurred. Absolute scarcity of food, except perhaps in Ethiopia in 1889, was never the issue. Standing between life and death during these droughts were new commodity markets and price speculation, on one side, and the will and capacity of the state to relieve crop failure on the other. Although crop failures and water shortages were of epic proportion, often



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The great famines were forcing houses of the very socio-economic forces that had ensured their occurrence in the first place.

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the worst in centuries, there were almost always grain surpluses elsewhere in the nation or empire that could potentially have rescued drought victims.

This briefing chronicles the first wave of these late nineteenth-century famines in India and China and explores the imperial policies which caused so many deaths. The crucial role of these policies is highlighted by comparing these famines with extreme climate events in both countries 200 years earlier when state policies ensured that far fewer people died.

The briefing goes on to explore more broadly the ways in which Europe and North America created India and China as “peripheries” in the world economy: by forcibly imposing trade deficits; promoting exports that diminished food security; charging excessive taxes and introducing predatory merchant capital; taking control of key revenues and resources; waging war; and decreeing a monetary system (the Gold Standard) that picked the pockets of Asian peasants. It considers in particular how ecological poverty, especially the decline of irrigation and the enclosure of common resources, interacted with household poverty and state policies to bring about a “Third World” which was so much more vulnerable to natural disasters.

At issue is not simply that tens of millions of poor rural people died appallingly, but that they died in a manner and for reasons that contradict much of the conventional understanding of the economic history of the nineteenth century. A revised understanding not only throws light on the origins of many of the current challenges of so-called “development”: it also calls into question the wisdom of development policies that are still pursued today and the justifications given for them.

Famine in India

The first of these global subsistence crises, from 1876-1879, was a disaster of planetary magnitude. Drought and famine were reported in Asia (India, China, Java, the Philippines and Korea), Brazil, southern Africa, Algeria and Morocco. No one had hitherto suspected that synchronous extreme weather was possible on the scale of the entire tropical monsoon belt plus northern China and North Africa. Nor was there any historical record of famine afflicting so many far-flung lands simultaneously. Although only the roughest estimates of mortality could be made, it was horrifyingly clear that the million dead in the 1845-47 famine in Ireland had been multiplied tenfold.

In India, from 1876 onwards, the gathering horror of the drought-famine spread from Madras on southern India’s eastern coast through to Mysore on the west coast, then northwards to the Bombay Deccan (the peninsular interior of India south of the Narmada River) and eventually into the North Western Provinces of India’s semi-arid interior. The crop losses in many districts were catastrophic. *Ryots* (peasants) in district after district sold their “bullocks, field implements, the thatch of the roofs, the frames of their doors and windows” to survive the terrible first year of the drought. Without the essential means of production, they were unable to take advantage of the little rain that fell in April-May 1877 to sow emergency crops. As a result, they died in their myriads in August and September 1877.² Millions more had reached the stage of acute malnutrition, characterised by hunger oedema (abnormal swelling) and anaemia that modern health workers call skeletonisation.³

By 1878, the villages in the Deccan were rent by desperate internal

struggles over the last hoarded supplies of grain. A social chain reaction set in as each class of caste attempted to save themselves at the expense of the groups below them. Collectively structured expropriations against moneylenders and grain merchants tended to degenerate in the later stages of famine into inter-caste violence or war of *ryot* against *ryot*. When hungry women and children attempted to steal from gardens or take grain from fields, they were “branded, tortured, had their noses cut off, and were sometimes killed.”⁴

Heavy rains in September and October 1878 finally eased the drought in southern India. But extreme drought, by decimating the mosquito’s chief predators, ensured an explosion in mosquito populations upon the first return of the monsoon. The ensuing malaria epidemic killed further hundreds of thousands of enfeebled peasants and delayed the resumption of normal agriculture.⁵

There were other obstacles to planting a life-saving crop as well. The fodder famine had been so extreme that plough animals were virtually extinct in many localities. With their bullocks dead and their farm implements pawned, *ryots* had to scratch at the heavy Deccan soil with tree branches or to yoke themselves or their wives to the remaining ploughs. Much of the seed grain distributed by famine relief committees was bad, while that which sprouted and pushed its way above the ground was instantly devoured by great plagues of locusts that were the camp followers of drought. The final blow to the Deccan peasantry was a coercive militarised campaign to collect tax arrears accumulated during the drought.

The full measure of this global tragedy – the British scientific journal *Nature* in 1878 called it “the most destructive drought the world has ever known” – can only be guessed at.⁶ Writing to a Russian correspondent, Karl Marx warned that “the famine years are pressing each other and in dimensions till now not yet suspected in Europe.”⁷

Turning Drought into Famine

The staggering death toll – 5.5 million to 12 million died in India despite modern railways and millions of tons of grain in commercial circulation – was the foreseeable and avoidable result of deliberate policy choices. Embittered nationalist writers compared the callous policies followed by the British in India to those pursued by the British in Ireland in 1846. The chief difference, as Indian National Congress leader and economic historian Romesh Dutt pointed out, was that, instead of the one million Irish dead of 1846-49, “a population equal to the [whole] population of Ireland had disappeared under the desolating breath of the famine of 1877.”⁸

Indeed, the semi-arid interior of India was primed for disaster even before the monsoons failed in 1876. The worst recession in world trade during the nineteenth century had begun in 1873.⁹ Characterised by falling prices for commodities, the economic depression had been spreading misery and igniting discontent throughout the cotton-exporting districts of the Deccan where, in any case, forest enclosures and the displacement of *gram* (a pulse crop harvested in the spring) by cotton had greatly reduced local food security (*see* p.25). In addition, the traditional food security system, whereby household and village grain reserves were regulated by complex networks of patrimonial (hereditary) obligation, had been largely supplanted since the 1857-58 Mutiny¹⁰ by stores held by merchants and the cash nexus. Widespread unemployment and the high

Recent economic history research has demolished the stereotype that poverty and overpopulation were preconditions of nineteenth-century famines.

Drought was made into famine by decisions taken in the palaces of the rajas and viceroys.

Modern markets accelerated rather than relieved the famine.

Famines are wars over the right to existence.

price of grain thus brought the spectre of hunger into districts even where rainfall had been adequate.

Although rice and wheat production in the rest of India had been above average for the previous three years, much of the surplus had been exported to England.¹¹ Londoners were in effect eating India's bread. "It seems an anomaly" wrote a troubled observer, Cornelius Walford, "that with her famines on hand, India is able to supply food for other parts of the world."¹²

There were other "anomalies" as well. The newly-constructed railways, lauded by the British as institutional safeguards against famine, were used by merchants to ship grain from outlying drought-stricken districts to central depots for hoarding (as well as protection from rioters). Likewise, the telegraph ensured that price hikes were co-ordinated in a thousand towns at once, regardless of local supply trends. Moreover, British antipathy to any form of price control invited anyone who had the money to join in the frenzy of grain speculation. As a result, food prices soared out of the reach of outcaste labourers, displaced weavers, sharecroppers and poor peasants. "The dearth", as *The Nineteenth Century* pointed out, "was one of money and of labour rather than of food."¹³ The taxes that financed the railways had also crushed the *ryots*. Their inability to purchase subsistence was further compounded by the depreciation of the rupee against the new international Gold Standard¹⁴ (which India had not adopted), which steeply raised the cost of imports. Thanks to the price explosion, the poor began to starve to death even in well-watered districts "reputed to be immune to food shortages".¹⁵

In north-western India, even more than in the south, drought was consciously made into famine by the decisions taken in the palaces of the rajas and viceroys, resulting in terrible, wanton mortality. In contrast to the south, the northern harvests were abundant in 1874-76 and ordinarily would have provided ample reserves to deal with the *khariif* (autumn crops) deficit in 1878. But subsistence farming in many parts of the North Western Provinces had been recently converted into a captive export sector to stabilise British grain prices. Poor harvests and high prices in England during 1876-77 generated a demand that absorbed most of the region's wheat surplus.¹⁶ Likewise, most of the provinces' cruder grain stocks like millet were exported commercially to the famine districts in Bombay and Madras, leaving local peasants with no hedge against drought. The profits from grain exports, meanwhile, were pocketed by richer *zamindars* (property holders), moneylenders and grain merchants, not the direct producers.¹⁷

The deferment of collection of the land tax might have held mortality to a minimum. But the British viceroy¹⁸ Lord Edward Lytton based in Calcutta, far from the drought areas, was unswayed by images of destitute villages and rejected out of hand an appeal from the provinces' executives to postpone that year's revenues. After the publisher of the *Indian Economist and Statesman*, Robert Knight, visited the area in 1878, he bluntly used the term "murder" to characterise official famine policy.¹⁹

Deliberate British Policy Choices

Indeed, the central British government in India under Lytton's leadership adopted a strict *laissez-faire* approach to famine. Lytton vehemently opposed efforts by the British governor of Madras, the Duke of Buckingham, and some of his district officers to stockpile grain or otherwise

A Note on Definitions

El Niño

This is the least controversial but most confusing term. In scientific literature, the use of "El Niño" slides back and forth between a series of meanings nestled inside of each other like Russian dolls:

- 1) the weak counter-current that slightly raises sea temperatures off the coast of Ecuador and Peru every year near Christmas (hence El Niño, the Christ child);
- 2) the unusually large warmings that occur every three to seven years with sometimes catastrophic impacts on marine productivity (suppressed) and the Peruvian coastal desert (epic flooding);
- 3) the active ocean component of a vast, Pacific Basinwide oscillation in air mass and ocean temperature known as the El Niño-Southern Oscillation (ENSO);
- 4) the warm phase of ENSO (the cold phase is known as La Niña); and
- 5) a metonym for ENSO itself.¹

In this briefing, El Niño usually refers to (4), the ENSO warm extreme, which is associated with drought in much of the monsoon tropics and northern China.

Drought

Drought is the recurrent duel between natural rainfall variability and agriculture's hydraulic defences. It always has a human-made dimension and is never simply a natural disaster. Any drought with a significant agricultural impact is the product of two processes operating at different temporalities.

Meteorological drought is usually defined by the percentage shortfall in annual mean precipitation for a given locality or region. The definitions vary from country to country, and in relationship to socially defined "normal conditions." The present-day India Meteorological Department, for example, defines a 60 per cent or more deficiency in local mean rainfall as "severe drought", roughly equivalent to "monsoon failure".

Yet what is critical from an agricultural standpoint is less the total amount of rainfall than its distribution relative to annual cycles. A well-distributed but sub-normal rainfall may do little damage to crop yield, particularly in areas like the Indian Deccan or north China where peasants cultivate millet and other drought-resistant crops, while a "normal" rainfall concentrated in the wrong months can lead to considerable crop loss.

Historically, agricultural societies in areas of high rainfall variability were usually well-adapted to cope with severe, single-year rain deficits; most, however, required massive inter-regional aid to survive two monsoon failures in a row.

The impact of deficient rainfall on food production, moreover, depends on how much stored water is available, whether it can be distributed to plots in a timely fashion, and, where water is a commodity, whether cultivators can afford to purchase it.

Hydrological drought occurs when both natural (streams, lakes and aquifers) and artificial (reservoirs, wells and canals) water-storage systems lack accessible supplies to save crops. Local water supply is often independent of local climate.

Hydrological drought always has a social history. Artificial irrigation systems depend upon sustained levels of social investment and labour upkeep, but even natural water-storage capacity can be dramatically affected by human practices that lead to deforestation and soil erosion. The most devastating nineteenth droughts were preconditioned by landscape degradation, the neglect of traditional irrigation systems, the demobilisation of communal labour and/or the failure of the state to invest in water storage. As Rolando Garcia asserts in *Nature Pleads Not Guilty* (a landmark study of the early 1970s Sahelian crisis):

"climatic facts are not facts in themselves; they assume importance only in relation to the restructuring of the environment within different systems of production."

Garcia poses a question that is fundamental to discussion in this briefing:

"to what degree did the colonial transformation of the system of production change the way in which climatic factors could exert their influence?"²

Causes of Famine

Whether or not crop failure leads to starvation, and who, in the event of famine, starves, depends on a host of non-linear social factors. A decline in simple food availability may directly lead to famine in isolated hunger-gatherer ecologies, but it is unlikely to do so in any large-scale society.

Although distant observers of the famines described in this briefing, such as government ministers and metropolitan newspapers, regularly described millions killed off by drought or crop failure, it was generally recognised in India, both by British administrators and Indian nationalists, that the famines were not food shortages per se, but complex economic crises induced by the market impacts of drought and crop failure.

The Famine Commissions instituted to investigate the disasters were particularly emphatic in rejecting the decline in food availability as an explanation of mass mortality. Thus the official *Report* on the 1899-1902 famine in Bombay underlined that:

"supplies of food were at all times sufficient, and it cannot be too frequently repeated that severe privation was chiefly due to the dearth of employment in agriculture [arising from the drought]."

Commissioners in neighbouring Berar likewise concluded that "the famine was one of high prices rather than of scarcity of food".

Chinese official discourse also treated famine as primarily a market perturbation, although giving considerable attention as well to the corruption of local granary officials and the dilapidation of the transport infrastructure.³

In recent years, economists Amartya Sen and Meghnad Desai have meticulously formalised this

Victorian common sense in the language of welfare economics. Famine in their view is a crisis of “exchange entitlements” (defined as “legal, economically operative rights of access to resources that give control of food”) that may or may not have anything to do with crop yields. Sen emphasises that:

“Famine is the characteristic of some people not having enough food to eat. It is not the characteristic of there not being enough food to eat.”⁴

In theoretical jargon, the “endowments” of different groups (ownership of land, labour, power and so on) “map” to alternative “entitlement sets” of goods and services. People starve in a Senyan world when their endowments, for whatever reason, cannot command or be exchanged for minimal calories to subsist, or, alternatively, when their entitlement mappings shift disastrously against them.

Famine is thus a catastrophic social relation between unequally endowed groups that may be activated by war, depression or even something called “development”, as well as by extreme climate events. Most likely, it is a conjuncture of different factors.

Critics have considerably sharpened the teeth of this model. Environmental historian David Arnold, for instance, has warned against excessive demotion of environmental factors, especially the impacts of the nineteenth-century mega-droughts. He has also taxed Sen for ignoring mass extra-legal actions – riots, protests, rebellions – that constitute populist appropriations of entitlement.⁵

Amarita Rangasami similarly has reminded us that famine “cannot be defined with reference to the victims of starvation alone”. In her view, the great hungers have always been redistributive class struggles: “a process in which benefits accrue to one section of the community while losses flow to the other.”⁶

Perhaps most incisively, political ecologist Michael Watts, discounting any “generic theory” of such “enormously complex social and biological phenomena”, sees the exchange-entitlement model as merely a

logical first step in building a fully historical account of famine in different social formations:⁷

“If famine is about the command over food, it is about power and politics broadly understood, which are embedded in a multiplicity of arenas from the domestic (patriarchal politics) to the nation/state (how ruling classes and subaltern groups acquire and defend certain rights) . . . In all such cases, however, one needs to know how enforceable and legitimate are the legal and property relations which mediate entitlements and to recognize that all such rights are negotiated and fought over. Such struggles are not peripheral to famine but strike to its core.”⁸

Famine and Death

“Who defines an event as a ‘famine’,” writes Alex de Waal, “is a question of power relations within and between societies”. He rejects the “Malthusian” idea that mass starvation unto death is “a prerequisite for the definition of famine” in favour of a broader spectrum of meanings, including hunger, destitution and social breakdown encompassed within traditional African understandings of famine. Local people do not build definitional firewalls between malnutrition and famine, poverty and starvation. Nor do they fathom the moral calculus of wealthy countries which rush aid to certified famines but ignore the chronic malnutrition responsible for half of the infant mortality on the planet. And they are rightly suspicious of a semantics of famine that all too often renders “ordinary” rural poverty invisible.⁹

Thus, even while focusing on “famines that killed” (and killed on a gigantic scale), it has to be acknowledged that famine is part of a continuum with the silent violence of malnutrition that precedes and conditions it, and with the mortality shadow of debilitation and disease that follows it. Each famine is a unique, historically specific, epidemiological event, and despite the best heroic efforts of demographers, famine and epidemic mortality are not epistemologically distinguishable.

But famine synergises with

disease in two different, if mutually reinforcing, modes. Malnutrition and immune-system suppression increase susceptibility while congested, unsanitary environments like refugee camps and poorhouses increase exposure and transmission. Moreover, when basic sanitation and public health were so woefully neglected, modern infrastructures of commerce could become deadly vectors in their own right. India’s “peculiar amalgam of modernisation and underdevelopment” – a “modern transport system, huge grain trade, high human mobility (typical of advanced countries)” combined with “poverty, undernourishment, low immunities, insanitation and high exposure to infection (typical of some “underdeveloped” countries)” – promoted higher mortality than probably would have otherwise existed.¹⁰

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interfere with market forces. Buckingham was not a free trade fundamentalist and was appalled by the speed with which modern markets accelerated rather than relieved the famine.²⁰ Lytton lectured his officers, however, that high prices, by stimulating imports and limiting consumption, were the “natural saviours of the situation”. He issued strict orders that “there is to be no interference of any kind on the part of the Government with the object of reducing the price of food”, and denounced “humanitarian hysterics”. “Let the British public foot the bill for its ‘cheap sentiment’, if it wished to save life at a cost that would bankrupt India.”²¹

Lytton’s *laissez-faire* approach followed the sacerdotal authority of Adam Smith, who a century earlier, in his 1776 work *The Wealth of Nations* enunciating a new economics suited to emerging capitalist Britain, had asserted in the context of the terrible Bengal drought-famine of 1770²² that “famine has never arisen from any other cause but the violence of government attempting, by improper means, to remedy the inconvenience of dearth.”²³ Smith’s injunction against state attempts to regulate the price of grain during famine had been taught for years at the East India Company’s college at Haileybury for India’s future administrators.²⁴

None of the principal players in any of the political parties in Britain disagreed with the supreme principle that India was to be governed as a revenue plantation, not an almshouse. Thus, by official dictate, millions of lives in India were wagered against dogmatic Utilitarian faith in omnipotent markets overcoming the “inconvenience of dearth.”²⁵ Grain merchants exported a record 6.4 million hundredweight of wheat to Europe in 1877-78 rather than relieve starvation in India.²⁶

Statistics published by the 1878-80 Famine Commission revealed the perverse relationship between modernisation and mortality that challenged British belief in “life-saving” railways and markets.²⁷ In both the Bombay and Madras Deccan, “the population decreased more rapidly [23%] where the districts were served by railways than were there were no railways [21%].”²⁸ A study of one district in the Madras area came to a similar conclusion:

“The population loss [during 1876-78] in areas well served with transport . . . was high compared to irrigated areas . . . where though transport was ill-developed, better employment opportunities improved entitlement to food.”²⁹

A study of Bellary, another Madras district, showed that “the death toll was heaviest in the most commercially-advanced *taluks* [revenue divisions] of the district . . . where nearly a third of the population was lost.”³⁰ In Madras, the mortality was overwhelmingly borne by the lower castes and the untouchables.³¹

Lytton probably believed that he was balancing budgets against lives that were already doomed or devoid of any civilised quality. The grim doctrines of Thomas Malthus, who worked nearly his whole adult life at the East India Company’s college as its chair of political economy, still held great sway over the white rajahs. The principal tenet of Malthus’s theory, developed at the beginning of the nineteenth century, was that the number of people doubles every 25 years, unless checked,³² and thus grows at a geometric rate (1, 2, 4, 8, etc) while food production increases at just an arithmetic rate (1, 2, 3, 4, 5, etc), meaning that population will always outstrip food supply. Poorer people were likely to die first in a subsistence crisis, yet supporting them with money or food simply encouraged them to marry earlier and have more children, making it harder for other sections of society to buy food.³³

Revenue and irrigation policies compelled farmers to produce for foreign consumption at the price of their own food security.

Famines are social crises that represent the failures of economic and political systems.

Malthusian principles were regularly invoked to legitimise famine policy in India.

The British were terrified of setting any precedent for providing welfare for the Indian poor.

“The Malthusian overtones of famine policies and their disastrous consequences”, argues historical demographer Ira Klein, “were experienced most woefully in Mysore [in south west India]”, where the British authorities later conceded that one-quarter of the population perished.³⁴ Frugality became criminal negligence as the British chief commissioner, from “dread of spending the Mysore surplus”, refused life-saving expenditure. After his inaction became a scandal, he turned relief work into a sadistic regime of punishing the starving. “He drew up a series of irrigation and other projects, most so far from the famine stricken tracts that emaciated victims had to walk a hundred miles or more to them.”³⁵ Those who actually reached the camps found them fetid, disease-wracked boneyards where a majority of refugees quickly died.³⁶

Malthusian principles were regularly invoked back in England to legitimise Indian famine policy. Lytton, for instance, justified his stringencies in 1877 by arguing that the Indian population “has a tendency to increase more rapidly than the food it raises from the soil.”³⁷ In a later debate on the government’s conduct during the 1876-79 catastrophe, finance minister Sir Evelyn Baring said, “Every benevolent attempt made to mitigate the effects of famine and defective sanitation serves but to enhance the evils resulting from overpopulation”.³⁸ In the same vein, an 1881 report:

“concluded that 80 per cent of the famine mortality were drawn from the poorest 20 per cent of the population, and if such deaths were prevented this stratum of the population would still be unable to adopt prudential restraint. Thus, if the government spent more of its revenue on famine relief, an even larger proportion of the population would become penurious.”³⁹

As in Ireland 30 years before,⁴⁰ those with the power to relieve famine convinced themselves that overly heroic exertions against implacable natural laws, whether of market prices or population growth, were worse than no effort at all.

The British were also terrified of setting any welfare precedent for the permanent maintenance of the Indian poor. As the *Calcutta Review* pointed out in 1877, “In India, there is no legal provision made for the poor, either in British territory, or in the native states [although] the need for it is said by medical men and others to be exceedingly great.”⁴¹ The British administrations in Calcutta and London feared that “enthusiastic prodigality” would become a Trojan horse for an Indian Poor Law.⁴² In its final report, the Famine Commission of 1878-80 approvingly underscored Lytton’s skinflint reasoning:

“The doctrine that in time of famine the poor are entitled to demand relief . . . would probably lead to the doctrine that they are entitled to such relief at all times, and thus the foundation would be laid of a system of general poor relief, which we cannot contemplate without serious apprehension.”⁴³

The Poor Eat Their Homes in China

India was not alone in its distress. The failure of the rains two years in a row in 1876 and 1877 throughout the basin of the Yellow River in northern China produced a drought-famine of extraordinary magnitude, overshadowing the disaster in the Indian Deccan. The small cultivator of north China has been described as “a man standing permanently up to his neck in water, so that even a ripple is sufficient to drown him.”⁴⁴ But the drought that began in 1876 was a *tsunami*,⁴⁵ not a ripple.

In the spring and summer of 1876, the monsoon stalled over Guangdong (Canton) and Fujian, drowning these southern coastal provinces in rain and flood, while all of northern China as far as the Korean border was parched by drought. Most of the summer and autumn harvests were lost. In eastern Shandong province, where three dry years had preceded the full-fledged drought in the latter part of 1876, the desperate peasantry were reported to be eating their own homes. With the onset of winter, “the caloric deficit was aggravated by the cold, since the price curve of fuels followed that of grain.”⁴⁶ Peasants had no choice but to burn what was left of their homes for warmth. When there was nothing left to fuel a fire, those peasants who chose not to flee southward resorted to crowding together in giant underground pits.

When government assistance was desultory, peasants had traditionally relied on blood-oath fraternities and mutual loan societies. Missionary accounts of the famine in Shandong describe militant self-organisation, generally only possible in the early phase of famine, such as peasant women organising highly theatricalised demonstrations against greedy gentry and dishonest magistrates. In one *hsien* (county), “a band of women marched to a rich man’s house . . . took possession of it, cooked a meal there, and then marched to the next house for the next meal” and so on.⁴⁷

Starvation, however, began to dissolve the social fabric of the village and, eventually, of the extended family itself. During the terrible Shandong winter of 1876-77, village mutualism collapsed, bringing permanent discredit to the societies that failed to save their members.⁴⁸ In a single *hsien*, it was reported that more than 100,000 dependants were sold into servitude to contractors from the south (although the government later nullified all forced sales of women and children during the famine).⁴⁹

Entire villages fled towards the wealthy towns of the south. This organised system of village migration and collective begging was clearly distinguished in law and popular tolerance from ordinary (criminal) vagabondage.⁵⁰ Faced with the “threat of an aimlessly wandering peasantry, with all the consequences that this entailed,” the government in Beijing ordered the wealthy gentry in other cities to keep their gates open to honest refugees from the north.⁵¹ When entire villages migrated toward provincial capitals, especially the port near Beijing, they unwittingly traded starvation for the deadly epidemics of typhus and cholera being incubated in fetid relief camps and shanty towns.

When the exodus from the north became too overwhelming or uncontrollable, however, the Qing rulers⁵² had no qualms about sending in troops to turn back or even massacre the refugees.⁵³ In one village that Italian missionary Father de Marchi visited to distribute relief, many of the families had committed suicide to “avoid the ignominy of begging”.⁵⁴

The famine’s macabre climax was in the northernmost province of Shanxi, an impoverished, landlocked province as big as England and Wales in which 15 million people lived. Drought had been entrenched there since 1875, but the province’s densely populated south-western prefectures had been temporarily able to mitigate food shortages with imports from the neighbouring province. The total crop failure in the latter was effectively a death sentence for hundreds of thousands of peasants in Shanxi.⁵⁵

When the monsoon finally returned to Shanxi in summer 1878, the resumption of normal agriculture was incredibly difficult. Writing to the British ambassador, Welsh missionary Timothy Richard explained that “in hundreds, or even thousands, of villages seven-tenths of the population are already dead,” and that only 30 per cent of the normal amount of grain had been sown.⁵⁶ Some peasants were afraid of the violence that

Starvation in northern China began to dissolve the social fabric of the village and the extended family.

Famine migrants unwittingly traded starvation for typhus and cholera in the relief camps.

On one estimate, nearly one-fifth of north China's population died.

Three years of drought and famine in northern China was officially the worst disaster in twenty-one dynasties of Chinese history.

might result if they revealed seed corn that they had secretly hidden, while others were simply too sick or weak to work. Those who did manage to sow a crop then faced the challenge of guarding it against their famished neighbours. And when crops were finally harvested again in 1879:

“a new horror then claimed more victims. Among those who had survived to enjoy eating again, ‘a pestilence of dysentery beat out typhus as soon as the harvest was gathered, and the stomachs of the people were inflamed by too great indulgence in unaccustomed foods.’ Fields of millet stood unharvested, sagged and decayed.”

In this way, famine and its allied diseases continued to decimate parts of north China until the beginning of 1880 or even later.⁵⁷ It took months for accurate reports of the famine to make their way to Beijing, and further long months for a sclerotic central bureaucracy to organise relief campaigns for the five hardest hit provinces.⁵⁸ As a result of bureaucratic and transport delays, a year or more elapsed before the first meagre shipments of silver or grain arrived in many famine counties. Millions died in the meantime and large tracts of countryside were depopulated. Official Chinese estimates of the death toll ranged as high as 20 million, nearly one fifth of the estimated population of north China.⁵⁹ The British legation in Beijing believed that seven million had died through the winter of 1877. “The destruction as a whole,” according to the 1879 *Report of the China Famine Relief Fund*, “is stated to be from nine and a half to thirteen millions.”⁶⁰ In the famine epicentre of Shanxi province, missionary Timothy Richard reported that one-third of the population had died by 1879, while researchers have estimated more recently that a chilling three-quarters had perished in the southern counties.⁶¹ Indeed, the famine in one prefecture was almost an extinction event with only five per cent of the population reported still alive in 1879. Despite heavy immigration from nearby provinces during the 1880s, Shanxi – decimated as if by modern nuclear war – did not regain its 1875 population until 1953.⁶² Three years of drought and famine in northern China were officially the “most terrible disaster in twenty-one dynasties of Chinese history.”⁶³

Staking Survival on Cash Crops

On the eve of this great drought, northwest China, like India, was ripe for catastrophe even though it comprised the largest independent peasant economy in the world at the time. Peasant landownership in northern China was substantial.⁶⁴ Only 18 per cent of the cropland in the Yellow River plain was rented.⁶⁵ The Qing Empire supported smallholder agriculture there, not least by attempting to protect it against drought, flood and famine, as the preferred tax base for its centralised state. The environmental instability of agriculture in the region – caused by a harsher northern environment and relatively greater frequency of natural disasters such as floods and droughts – was counterbalanced by the smallholder social order supported by a towering imperial state.⁶⁶ The extraordinary transportation infrastructure – made up of the Grand Canal⁶⁷ which linked the Yellow River with the Yangzi River further south, its feeder waterways and storage depots – was used to move surplus wealth from south to north and to stabilise northern agriculture ecologically with imports of rice, fuel, timber and stone.⁶⁸

Yet the economic and ecological viability of smallholder agriculture in northern China declined throughout the nineteenth century, as

illustrated by peasants' increased need to sell cash crops like opium and cotton to get the money to purchase food and pay taxes. Cotton required twice as much labour as sorghum or millet, but labour was abundant and land was scarce. The diversion of so much cultivable acreage from grain to cotton or opium made tens of millions of formerly autonomous peasants directly dependent upon the grain trade and the price ratio between cash crops and subsistence cereals.

But the raw cotton (and cotton handicrafts), opium, wheat and tobacco that the poorer peasants produced were principally exchanged within local markets.⁶⁹ There was little trade outside the region, and thus the two-way flow of goods between the periodically grain-deficit north and the surplus-producing Yangzi Valley further south was insufficient to protect against harvest shortfalls on a large scale. As northern peasants increasingly staked their economy on cash crops, they became more dependent on the state's traditional capacity to ensure that grain was redistributed from south to north rather than on market mechanisms⁷⁰ – and the state's capacity was in turn dependent on the Empire's fiscal health.

Imperial Bankruptcy and British Aggressions

By 1877, however, the Empire was broke, its grain stores were empty and its administrative infrastructure was deteriorating for several reasons.⁷¹ Continuing and costly civil wars and internal crises had taken up much of the Empire's surplus revenue. From 1850 to 1873, China had been aflame with social and ethnic conflict. The carnage was largely rooted in structural recession and people's increasing insecurity of existence following the First Opium War.⁷² In the worst years, 75 per cent of the imperial budget was spent maintaining vast field armies.⁷³

The fiscal effects of civil war were enormous. The 1851-64 Taiping revolutionaries and their allies had cut the Empire off for several years from the revenues of half a dozen southern provinces. Other rebels simultaneously disrupted administration in large parts of four northern provinces, while a Muslim revolt in the north grew into a nightmarish and immensely expensive war of ethnic extermination.

The Qing fiscal system was also undermined by the exchange perturbations that followed other countries' adoption of the Gold Standard in the 1870s.⁷⁴ Despite desperate efforts to insulate taxes from monetary erosion, the real value of land revenues in China declined by almost two-thirds from the 1750s to the end of the nineteenth century.⁷⁵ The empire increasingly had to borrow from foreign countries at extortionate interest rates.⁷⁶

Finances were undermined further still by price inflation rooted in soaring trade deficits engineered by British opium traffickers. Already in 1850, imports of Indian opium imposed on China by the British had siphoned 11 per cent of China's money-supply and 13 per cent of its silver stock out of the country.⁷⁷ Indeed, Britain's dominant role in Chinese foreign trade, built by nineteenth century drug traffickers with gunboats, leveraged the whole free-trade imperium.⁷⁸

A drained imperial budget thus forced the Qing to cut state expenditures if they were to survive. Instead of spending money on the vast subsistence economy of inland north China, they opted to build forts and arsenals to protect the coastal cities where customs revenues were soaring but sovereignty was most under threat. British firms monopolised 80 per cent of China's foreign trade in the 1860s and controlled two-

As northern peasants staked their economy on cash crops, they became more dependent on the state for guarantees of survival in times of dearth.

Britain's dominant role in Chinese foreign trade, built by nineteenth century drug traffickers with gunboats, leveraged the whole free-trade imperium.

North Chinese agriculture was exposed to the most severe climate stress in 200 years just when the state was retreating from grain stockpiling and hydraulic control.

El Niño's murderous accomplices were the Gold Standard and a New Imperialism.

thirds of coastal shipping, thereby taking an important slice of China's domestic commerce.⁷⁹

Thus by 1877, the Qing had effectively abandoned the two traditional imperial mandates of grain stockpiling and hydraulic control in the Yellow River provinces, mandates that were essential to food and ecological security in the delta plain.⁸⁰ Fiscal crisis had accelerated the decline of the "ever-normal" granaries which stored reserve rice, wheat and millet and which had for centuries been the Empire's first-line defence against drought and flood.⁸¹ At the onset of famine in 1876, there were probably less than 10 million *shih* left in the entire system compared to the eighteenth century level of 48 million *shih* (one *shi* is about 176 pounds).⁸² At a local level, this was often equivalent to complete collapse. Granary inventories in some counties of Shaanxi had fallen to less than 10 per cent of their quotas by the early 1870s.⁸³ The depletion of the "ever-normal" granaries may have resulted from a vicious circle of multiple interacting causes over a 50-year span, but the final blow was the structural recession and the permanent fiscal crisis engineered by British aggressions against China in the 1850s.

Transport Bottlenecks and Corruption

All of the central government's belated efforts during the famine to move the grain they did have into north China's highlands were frustrated by the breakdown of the transportation system. The condition of the Grand Canal, inland north China's all-important lifeline to the rice surpluses of the Yangzi Valley further south, was especially distressing. "The most extensive and important canal in the world," wrote a correspondent to the *New York Times*, "it is now for hundreds of miles unnavigable, its old channel grass-grown and encumbered with the rotting hulks of hundreds of the imperial junks which formerly brought their annual tribute of grain to the capital."⁸⁴ Rivers that once fed water to the canal had been cut off by the realigned Yellow River⁸⁵ or had silted up through government neglect. Water levels in the canal fell drastically with the onset of the drought, and only desultory efforts were made to dredge sections of the canal or, alternately, to send grain in small flotillas up the drought-shallowed and treacherously silted Yellow River.⁸⁶

There were few other means of transport or communication. The Qing had refused to build railways or telegraphs out of the rational fear that foreign powers would use them to bring troops or cheap factory goods into the interior while the peasantry would use them to move around the country.⁸⁷

As the state infrastructure deteriorated, the Empire increasingly relied on a combination of cash handouts and local philanthropy to relieve famines. But monetary relief – the tardy donation of cash – was even easier than grain for officials to pilfer, while the market itself was frequently unable to accommodate emergency demand: either the explosion in grain prices quickly wiped out the money available or there was simply not enough grain locally available at any price.

Provincial and county governments were increasingly expected to shoulder the Empire's responsibilities for self-defence, flood control, irrigation and famine relief,⁸⁸ yet they depended even more than the central government on land revenue and thus faced fiscal problems as well. Most of the provincial governments were already bankrupt by the beginning of the drought. As the imperial censors pointed out in an angry note in August 1877, what financial and grain reserves remained had

Gunboats and Messiahs: The Uses of Famine

India, China and Brazil accounted for the most massive mortality in the nineteenth century famines (12–30 million in India, 20–30 million in China and 2 million in Brazil). But the world drought of the 1870s also had profound and deadly impacts in at least a dozen other lands. Drought and famine gave foreign creditors, allied with indigenous money-lenders, new opportunities to tighten control over local rural economies through debt or outright expropriation. Pauperised countrysides provided rich harvests of cheap plantation labour as well as missionary converts and orphans to be raised in the faith. And where native states retained their independence, the widespread subsistence crises in Asia and Africa invited a new wave of colonial expansion that was resisted in many cases by indigenous movements. El Niño was thus followed by gunboats and messiahs as well as by famine and disease.

The European empires, together with Japan and the United States, rapaciously exploited the opportunity of the famines to seize new colonies, expropriate communal lands, and tap new sources of plantation and mine labour. Indeed, colonial expansion syncopated the rhythms of natural disaster and epidemic disease.¹ Each global drought was in effect a green light for an imperialist landrush. If the southern African drought of 1877 was the opportunity for the British to strike against Zulu independence, then the Ethiopian famine of 1889–91 was Italy's chance to attempt to build a second Roman Empire in the Horn of Africa. Likewise, Germany exploited the floods and drought that devastated north China in the late 1890s to expand aggressively its sphere of influence there, while the United States simultaneously used drought–famine as a weapon to crush the Philippine Republic. What seemed from a

metropolitan perspective to be the nineteenth century's blaze of imperial glory was, from an Asian or African viewpoint, more like the hideous light of a giant funeral pyre.

Asia

In **Korea**, the opportunist power was Japan. When the drought in north China extended into Korea's breadbasket region, ensuing famine and peasant unrest coincided with implementation of the "open door" treaty Japan had extorted from Korea in 1876 and offered a pretext for prying open the country further for economic exploitation. Within a decade, the commercial export of rice from southern Korea to Japan during another drought had become a revolutionary grievance amongst hungry peasants in the breadbasket provinces.²

On **Borneo/Kalimantan**, the drought was a godsend to the colonial Dutch, long frustrated by their inability to subordinate the ruggedly independent Dayak communities who controlled vast tracts of valuable rainforest. Although the commercially sophisticated Dayaks grew or harvested commodities for the world market like rattan and *getah perca* (indispensable for undersea telegraph cables), they fiercely resisted sedentarisation and plantation labour. In 1877, hunger at last gave the Dutch a means of coercion:

"The rice barns were empty and famine was imminent. In order to obtain money to buy rice, only two options were left to the Dayak: either to collect more *getah perca* (of which the producing tree was already becoming extinct) or to sell one's labour to the Dutch, who had been eagerly looking for 'hands' for at least two centuries. Now . . . the Dutch finally had the labour to dig a canal . . . and thereby to push the trade in forest products up to unprecedented levels. Even the most remote parts of Borneo were now becoming part of the global economy, exposing the local population both to new opportunities and to new risks."³

Africa

In **southern Africa**, the great drought became the chief ally of Portuguese and British aggression against still independent African societies. The **Angolan** coast has famously erratic rainfall, especially in the environmentally unstable region around the town of Luanda, but the drought that began in 1876 was exceptional both in its duration, lasting until the early 1880s, and its scale, affecting populations far inland.⁴ "The intensification of external trade pressures and colonial intervention in Angola from the 1870s onwards both influenced the growing severity of famine and disease and was influenced by it."⁵ Despite the world trade recession, Angola's plantation export economy in rubber and coffee grew rapidly and profitably directly at the expense of African grazing and subsistence farming. Colonial troops and white settlers made unprecedented headway against weakened populations inland and consolidated their power.

In **South Africa**, the drought was the death knell for Zulu, Xhosa and (temporarily) Boer independence. The ceaseless encroachment of Europeans upon the range resources of African societies had generated "an explosive situation which the next drought might spark off".⁶ In the drought of 1876–79 in the Eastern Cape and Natal, European stockraisers were battered by the simultaneous crash of wool export prices and the dying off of their herds. The Transvaal Boers, less dependent upon world markets, were still hard hit by the conjunction of drought, cattle disease and a growing shortage of land. For Africans, climate shocks were magnified by their economic marginality.

The drought crisis, which weakened both African and Afrikaan societies as well as increasing the tensions between them, was a blessing to British imperial planners who, since 1875, had envisaged a single

British hegemony over the southern cone of Africa. They intended to turn central Africa and Mozambique into labour reserves for the mines and farms of the south.⁷ The discovery of diamond mines had made South Africa a major arena for capitalist investment, but the British were thwarted by their lack of control over African labour. Weakened by drought, the British thus moved their army quickly in 1877 to impose British power over militarily independent African societies on the edge of the diamond fields.⁸ After a massive military disaster, they went on to destroy "the economic foundations of Zululand". Indeed, "genocide came close to being adopted as official policy".⁹ The British military setback, however, gave the Afrikaners confidence to retrieve their independence and assert control of the mineral wealth.

In **Egypt**, a combination of the drought, collapsing export prices, high indebtedness, an infectious rinderpest epidemic affecting cattle, and overtaxation brought the country to bankruptcy in 1876, and it surrendered control over revenues to the French and British. European creditors were able to take over the property of peasant smallholders, overriding an ancient Egyptian-Islamic tradition that tenancy was guaranteed for life. Regiments of tax collectors, with moneylenders following them, imposed a reign of terror throughout the Nile Valley.¹⁰

In the Maghreb, meanwhile, **Algeria's** fields and vineyards simply burned up in the terrible heat of 1877. Half of the grain harvest was lost and famine was reported from west to east.¹¹ The worst scenes were in the east where drought and hunger persisted until early 1880, then resumed with a bad harvest of 1881.

But the disaster in the countryside was a windfall to the French interests in Marseille who controlled commerce in North African livestock products.

"The lack of water and grass threatened to decimate the native herds; the interior tribes were forced to sell their animals to livestock dealers at dirt-cheap prices. Exports of sheep doubled while wheat and barley exports fell by half."¹²

Between 1877 and 1879, Algeria's exports of beef cattle went up eight-fold from the previous three years of 1874 to 1876. "In order to avoid starvation, Algerians liquidated their only real wealth: their livestock."¹³

In **Morocco**, the countryside was turned into "an open tomb". Once again, drought pummeled a peasantry already brought to its knees by the world market. The European demand for Moroccan grain and wool collapsed during the 1870s. By the end of 1877, when drought began its seven-long siege of the countryside, the economy was already in steep decline, bled by a growing trade deficit, huge debt borrowed from Britain to pay war indemnities to Spain, and a depreciating currency that translated into runaway domestic inflation. Farmers and herdsman had to face the dry winter of 1877, and the great locust plague which followed, with much of their wealth already wiped out.¹⁴ During the summer of 1878, as starvation became endemic, vast portions of the interior and south of Morocco were virtually depopulated as "hundred of thousands of people bolted for the nearest port" and the security of imported grain supplies.¹⁵ The flight to the coast produced unsanitary concentrations of enfeebled people ripe for the spread of disease, particularly cholera, the universal scourge of famine refugees in this period, and later smallpox. But Morocco's long ordeal by famine and disease was not without "winners":

"The crisis of 1878-1885 hastened the rise of the commercial and landed capitalism that dominated the future of the country . . . The non-specialization of commerce permitted strong houses to switch from exports to imports of food. In the ports the famine created islands of prosperity."¹⁶

The "tremendous redistribution of property" likewise paved the way for famous comprador fortunes and allowed the foreign community to

accumulate massive landholdings under fictive Moroccan ownership. It also inaugurated an era of Great Power rivalry, conducted with both loans and battleships, to turn Morocco's new economic dependence upon Europe into formal colonialism.

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been promptly looted by officials.⁸⁹ The officials were far more efficient in executing famine-driven bandits by the thousands, usually by “slow, agonizing starvation,” than in distributing relief in the countryside.⁹⁰ Missionaries estimated that official relief efforts reached only 20 to 40 per cent of the afflicted population in the five affected provinces.⁹¹

Thus, as disconnected from world market perturbations as the starving and comparatively isolated north China provinces might have seemed in 1877, the catastrophic fate of their populations during the 1870s was indirectly determined by Western intervention and the consequent decline in state capacity to ensure their traditional welfare.⁹²

In both China and India, the Great Drought of the 1870s was merely Act One in a three-act world tragedy. Ten years later, dry years from 1889 to 1891 again brought famine to India, Korea, Brazil and Russia, although the worst suffering was in Ethiopia and Sudan, where perhaps one-third of the population died. In the third wave between 1896-1902, the monsoons failed once again across the tropics and in northern China. Hugely destructive epidemics of malaria, bubonic plague, dysentery, smallpox and cholera culled millions of victims from the ranks of the famine-weakened. Millions more, likely tens of millions, died during these two global El Niño droughts.

Bad Climate or Bad System?

It is tempting to assert that the great famines of the 1870s and 1890s (and more recently, the Sahelian disaster of the 1970s⁹³) were “caused” by El Niño, or at least by El Niño acting upon traditional agrarian misery. This interpretation echoes the British official line in nineteenth century India: millions were killed by extreme weather, not imperialism. (In the case of nineteenth century China, the British and their allies blamed Qing corruption for the millions of famine deaths.) Is this true? Bad climate or bad system?

An answer can perhaps be gleaned by comparing the nineteenth century events with another El Niño event two hundred years earlier, 1743-44, whose impact on the north China plain is documented in detail. Then, the spring monsoon failed for two years in a row, devastating the winter wheat. Scorching winds withered crops. Farmers dropped dead in their fields from sunstroke. Provincial grain supplies were utterly inadequate to the scale of need. Yet there was no mass mortality from either starvation or disease. Why not?

Historian Pierre-Etienne Will has carefully reconstructed the history of the famine relief campaign during these years from contemporary records. Under the skilled administration of Fang Guancheng, an agricultural and hydraulic expert who directed relief operations, the renowned “ever-normal granaries” in each county immediately began to issue rations (without any labour test) to peasants in the officially designated disaster countries.⁹⁴

When local supplies proved insufficient, Guancheng shifted millet and rice from a great store of tribute (payment) grain at the terminus of the Grand Canal, then used the Canal to move vast quantities of rice from the south. Two million peasants were maintained for eight months, until the return of the monsoon made agriculture again possible. Ultimately, 85 per cent of the relief grain was borrowed from tribute depots or granaries outside the radius of the drought.⁹⁵

This intervention was not the only one of its kind, nor the most extensive.⁹⁶ The Yellow River flooding of 1742/3 involved much larger

In Europe’s Age of Reason, the starving masses were French, Irish and Spanish, not Chinese.

Rapid warmings of the eastern tropical Pacific Ocean are associated with weak monsoons and synchronous drought throughout vast parts of Asia, Africa and northeastern South America.

expenditures over a much broader region. This was famine defence in depth, the “last word in technology at the time”. No contemporary European society guaranteed subsistence as a human right to its peasantry, nor could any emulate “the perfect timing of [Guancheng’s] operations: the action taken always kept up with developments and even anticipated them.”⁹⁷ Indeed, while the Qing were honouring their social contract with the peasantry, contemporary Europeans were dying in their millions from famine and hunger-related diseases following arctic winters and summer droughts in 1740-43. “The mortality peak of the early 1740s is an outstanding fact of European demographic history.”⁹⁸ In Europe’s Age of Reason, in other words, the “starving masses” were French, Irish and Spanish, not Chinese.

Deciphering ENSO:

The modern theory of El Niño/Southern Oscillation (ENSO) can be summarised as follows. World climate (the oceans, atmosphere and ice surfaces acting together) is driven by the excess of solar energy received in equatorial latitudes. Climate is just the time-averaged precipitation and wind patterns created by the poleward redistribution of this energy.

But the tropical regions, where oceans and atmosphere are most tightly coupled, do not accumulate heat evenly. Tropical solar energy is moved by surface winds and ocean currents into several equatorial storage systems. The easterly trade winds, for instance, drive the warm surface waters of the equatorial Pacific westward. A “cold tongue” (the Pacific Dry Zone) forms off South America where cold water upwells to replace the stripped-away surface layer, while warm water pools around the “maritime continent” of Indonesia-Australia.

This Warm Pool, with its atmospheric companion, the Indo-Australian Convergence Zone (IACZ), is the most powerful of the earth’s regional heat engines (the others are the Amazon Basin and equatorial Africa) and sustains the largest organised system of deep convection: the transfer of energy from ocean to atmosphere through condensation and release of the latent heat of water vapour. It can be imagined as a kind of cloud factory where the warmest surface waters on the globe daily manufacture thousands of towering, cumulonimbus clouds.

The El Niño, or warm phase of the ENSO, occurs when the trade winds subside or reverse direction and the Warm Pool with its vast canopy of tropical thunderstorms moves eastward into the central Pacific, around the International Date Line. Correlatively, the normal “downhill” pressure gradient between the South Pacific High and the IACZ that drives the trade winds reverses itself. The sudden fall of barometers over the east-central Pacific and their simultaneous rise over the maritime continent is the “Southern Oscillation”. Global wind circulation, meanwhile, reorganises itself around the IACZ’s new location, massively shifting rainfall patterns throughout the tropics and parts of the higher latitudes. The jet streams are displaced equatorward, pushing weather systems into anomalous latitudes.

The “El Niño” aspect of ENSO results from the subsequent warming of the Pacific off Ecuador and Peru due to the cessation of trade-wind-driven upwelling. It is usually observed by fishermen near Christmas, hence El Niño or “Christ child”. The central tropical Indian Ocean also catches a fever, which affects the strength and path of the monsoons. In big events, the normal geography of aridity and rainfall in the equatorial Pacific is reversed as thunderstorms flood the hyper-arid deserts of coastal Peru, while drought parches the usually humid jungles of Kalimantan and Papua. The monsoons fail to nourish agriculture in western India and southern Africa, while further afield drought holds northern China and north-east Brazil in its grip.

Rapid warmings of the eastern tropical Pacific (called El Niño events) are associated with weak

monsoons and synchronous drought through vast parts of Asia, Africa and northeastern South America. When the eastern Pacific is unusually cool, the pattern reverses (an El Niña event) and abnormal rainfall and flooding occur in the same regions. The entire vast seesaw of air mass and ocean temperature, which extends into the Indian Ocean as well, is formally known as El Niño-Southern Oscillation (ENSO).

A Scientific Detective Story

What we now understand as the El Niño/Southern Oscillation (ENSO) was the elusive goal of tropical meteorology for almost a century. Indeed, synchronous drought – resulting from massive shifts in the seasonal location of the principal tropical weather systems – was one of the great scientific mysteries of the nineteenth century. The search for the cause of the global droughts of the 1870s and 1890s became an extraordinary scientific detective story.

The foundations for tropical meteorology were laid during a great El Niño event of 1790-91, which brought drought and famine to Madras and Bengal as well as disrupting agriculture in several of Britain’s Caribbean colonies. For the first time, simultaneous meteorological measurements thousands of miles apart hinted that extreme weather might be linked across the tropics, an idea that developed more fully only during the global drought of 1876-8.

In 1876, the British Empire had the operational rudiments of a world climate observation system

The contrast with the chaotic late-Qing relief efforts in 1877 and 1899 (or for that matter Mao Tse-Tung's mishandling of the 1958-61 drought⁹⁹) could not be more striking. State capacity in eighteenth century China was deeply impressive: a cadre of skilled administrators and trouble-shooters, a unique national system of grain price stabilisation, large crop surpluses, well-managed granaries storing more than a million bushels of grain in each of 12 provinces, and incomparable hydraulic infrastructures such as the Grand Canal.¹⁰⁰ When millions died in the nineteenth century and large tracts of countryside were depopulated, resident Westerners construed people's immobility as the very essence of a stagnant civilisation; in reality, the deaths signified a rupture with China's highly efficient famine relief campaigns.

The Mystery of the Monsoons

linked by telegraph and undersea cables. The recording of weather data was standardised, making it easier to recognise and map large-scale events. The meteorological reporter to the government of India, Henry Blanford (who more or less founded modern monsoon meteorology) appealed for atmospheric pressure data from weather stations throughout the British Empire and the rest of Eurasia and Oceania.¹ His research clearly established that a unitary climate event was responsible for drought and crop failure in most of the Indo-Australasian region. His hypothesis of a barometric see-saw regulating rainfall over a vast swathe of the globe was a seminal idea that would contribute to the eventual discovery of the Southern Oscillation. Two key pieces of the monsoon puzzle – its planetary scale and its correlation to a gigantic air pressure oscillation – suddenly fell into place.

In the decade after the great famine, the secret of the monsoon was widely believed to lie in the variable radiation of the sun. By the early 1890s, however, it was known that correlations between the sun's activity and droughts were contradictory and inconsistent.

Heroic efforts in the early twentieth century – based on the premise that weather, like geopolitics, is organized by a few "strategic centres of action" – brought more order to meteorological data. In 1924, Sir Gilbert Walker of the Indian Meteorological Service, after 20 years of crunching numbers and getting umpteen Indian clerks to process worldwide pressure and rainfall data manually through his equations, disclosed the existence of a vast Indo-Pacific seesaw of air mass known as the Southern Oscillation (SO). But neither he nor

others could find any physical mechanisms to explain pressure fluctuations such as the SO and interest in doing so declined from the late 1930s through the early 1960s.

The missing link lay in unsuspected large-scale temperature fluxes in the equatorial Pacific Ocean, outside the study boundaries of meteorology. In the 1960s, Jacob Bjerknes, working at the University of California at Los Angeles, began to look at the problem from an oceanographic as well as a meteorological point of view. He argued that the SO and El Niño were the respective atmospheric and oceanic expressions of solar energy cycling in powerful pulses through a coupled ocean-atmosphere system.² Bjerknes showed for the first time how the equatorial Pacific Ocean, acting as a planetary heat engine coupled to the trade winds, was able to affect rainfall patterns throughout the tropics and even in the temperate latitudes. The term ENSO was first used in 1982 to characterise the unified interaction.³

Bjerknes showed how the great perturbations in tropical weather are self-generated and self-sustained. The essence of this model is that "changes in oceanic conditions are both the cause and the consequence of changes in atmospheric conditions."⁴ Yet just how the turnabout between trends takes place is still not quite clear.

There is urgent concern to understand the relationship between ENSO and global warming. The El Niño cycle seems to have been speeding up and intensifying. In the historical ENSO record, for example, there have been only eight or nine "very strong" El Niños since 1728: an average of once

every 42 years. Yet two of the three largest (1982-3 and 1997-8) have recently occurred within 14 years of one another. Even stranger was the persistent El Niño of 1990-95: the longest in the historical or paleoclimatic records. Some argue that "the prevailing warm condition during the 1990s is unique when compared with the remainder of the historical record, and is a result of anthropogenic global warming."⁵ Much of the additional heat trapped by greenhouse gases may be stored in the Pacific Ocean and released in more frequent and larger El Niño events. An enhanced ENSO cycle may be the principal modality through which global warming turns into weather.

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In the mid-eighteenth century, the Chinese imperial bureaucracy could mobilise famine relief more effectively than any European polity.

Commercialisation went hand in hand with pauperisation.

The capstone of food security was the invigilation of grain prices and supply trends by the emperor himself. Although “ever-normal” granaries were an ancient tradition, price monitoring was a chief innovation of the Qing. In contrast, moreover, to later Western stereotypes of a passive Chinese state, the government during the high Qing era was also proactively involved in famine prevention through a broad programme of investment in agricultural improvement, irrigation and waterborne transportation. Indeed, administrators like Guancheng “tended to give top priority to investments in infrastructure and to consider the organisation of food relief merely a makeshift.”¹⁰¹ Guancheng wrote a famous manual that codified historically tested principles of disaster planning and relief management, something else that has little precedent in backward European tradition.¹⁰²

Still, could even Fang Guancheng have coped with drought disasters engulfing the larger part of north China on the scale of 1876 or even 1899? Drought famines were more localised in the eighteenth century, and the 1876 drought may have been a 200-year or even 500-year event. Moreover, the late nineteenth-century droughts reached particular intensity in the north China loess highlands of Shanxi and Shaanxi provinces, where transport costs were highest and bottlenecks unavoidable. A drought of 1876 magnitude in the year 1743 would thus inevitably have involved tens, perhaps even hundreds, of thousands of deaths in more remote villages.

Such a drought, however, would have been unlikely to grow into the veritable holocaust that consumed the greater part of populations of whole prefectures and counties for several reasons. In contrast to the situation in 1876-77, when granaries were depleted or looted and prices soared out of control, eighteenth-century administrators could count on a large imperial budget surplus and well-stocked local granaries backed up by a huge surplus of rice in the south. Large stockpiles of tribute grain at strategic transportation nodes were specially designated for the relief of the loess provinces, and an abundance of water sources guaranteed the Grand Canal’s navigability year-round. Whereas in 1876, the Chinese state, enfeebled, demoralised and broke in part because of civil wars, was reduced to desultory cash relief augmented by private donations and humiliating foreign charity, in the eighteenth century it had both the technology and political will to shift grain massively between regions and, thus, relieve hunger on a larger scale than any previous polity in world history.¹⁰³ A century later, it seemed almost powerless to intervene in one of the most deadly chain reactions of civil war, foreign intervention, climate disaster, disease and famine in history.

“Laws of Leather” versus “Laws of Iron”

What about famine in pre-British India? Again, there is little evidence that rural India had ever experienced subsistence crises on the scale of the Bengal catastrophe of 1770 under East India Company rule¹⁰⁴ or the long siege by disease and hunger between 1875 and 1920 that slowed population growth almost to a standstill.

Benefiting perhaps from a milder ENSO cycle, India under the Mogul Emperors (who had controlled India since the sixteenth century) was generally free of famine until the 1770s.¹⁰⁵ In pre-British India, before the creation of a railway-girded national market in grain, village-level food reserves were larger, patrimonial welfare more widespread, and grain prices in surplus areas better insulated against speculation.¹⁰⁶

The Mogul state, moreover, “regarded the protection of the peasant

as an essential obligation”, and there are numerous examples of humane, if sporadic, relief operations.¹⁰⁷ Like their Chinese contemporaries, the Mogul rulers relied on a quartet of fundamental policies – embargoes on food exports; anti-speculative price regulation; tax relief; and distribution of free food without a force-labour counterpart – that were an anathema to British Utilitarians.¹⁰⁸ They also zealously policed the grain trade in the public interest. As one horrified British writer discovered, these “oriental despots” punished traders who short-changed peasants during famines by amputating an equivalent weight of merchant flesh.¹⁰⁹

In contrast to the British punitive taxation of irrigation and its neglect of traditional wells and reservoirs (*see pp.24ff*), the Moguls used tax subsidies to promote water conservation. In the case of Gujarat:

“Local officials had considerable discretion over tax assessment, and it seems to have been their practice to encourage well construction by granting tax concessions. In the Ahmedabad region, for example, it was common to waive the tax on a ‘rabi’ [spring harvested] crop raised through irrigation from a recently constructed well. The concession continued until the tax exemptions were held to have equalled the cost of construction.”¹¹⁰

Food security was also probably better in the Deccan during the period of Maratha rule.¹¹¹ There were few landless labourers, occupancy rights were not tied to revenue payment, taxes varied according to the actual harvest, common lands and resources were accessible to the poor, and the rulers subsidised local irrigation improvements with cheap state-backed loans.¹¹²

In contrast to the rigidity and dogmatism of British land-and-revenue settlements, both the Moguls and Marathas flexibly tailored their rule to take account of the crucial ecological relationships and unpredictable climate fluctuations of the subcontinent’s drought-prone regions. The Moguls had “laws of leather”, wrote journalist Vaughan Nash during the famine of 1899, in contrast to the British “laws of iron”.¹¹³ Moreover, traditional Indian elites seldom shared British obsessions with welfare cheating and labour discipline.

Although the British insisted that they had rescued India from “timeless hunger”, more than one official was jolted when Indian nationalists quoted from an 1878 study published in the prestigious *Journal of the Statistical Society* that contrasted 31 serious famines in 120 years of British rule against only 17 recorded famines in the entire previous two millennia.¹¹⁴

India and China, in other words, did not enter modern history as the helpless “lands of famine” so universally enshrined in the Western imagination. Certainly the intensity of the ENSO cycle in the late nineteenth century, perhaps equalled only on three or four other occasions in the last millennium, must loom large in any explanation of the catastrophes of the 1870s and 1890s. But it is scarcely the only independent variable. Equal causal weight, or more, must be accorded to the growing social vulnerability to climate variability that became so evident not only in south Asia and north China but also in north-east Brazil and southern Africa in the late nineteenth century. As geographer Michael Watts has argued in his history of the “silent violence” of drought-famine in colonial Nigeria:

“Climate risk . . . is not given by nature but . . . by ‘negotiated settlement’ since each society has institutional, social, and technical means for coping with risk . . . Famines [thus] are social crises that represent the failures of particular economic and political systems.”¹¹⁵

After the cycle of the seasons, ENSO is the most important source of global climate variations.

Disasters that historians have often attributed to climate turn out to have other causes as well.

Asia's "Stagnation". . .

Understanding how tropical humanity lost so much economic ground to western Europeans after 1850 goes a long way towards explaining why famine was able to reap such hecatombs in El Niño years. This understanding of the origins of modern global inequality has been immensely aided by statistics and comparative case studies of European and Asian standards of living gathered over the past 30 years.

The Defeat of Asia

Differences in income and wealth between the great civilisations of the eighteenth century were relatively slight. "It is very likely," claims historian Paul Bairoch "that, in the middle of the eighteenth century, the average standard of living in Europe was a little bit lower than that of the rest of the world."¹ When the *sans culottes* (French proletariat) stormed the Bastille in 1789, the largest manufacturing districts in the world were the Yangzi Delta in mid-China and Bengal in India, with Guangdong and Guangxi in southern China and

coastal Madras in India not far behind.² India alone produced one-quarter of world manufactures, and while its "pre-capitalist agrarian labour productivity was probably less than the Japanese-Chinese level, its commercial capital surpassed that of the Chinese."³

The stereotype of the Indian labourer as a half-starved wretch in a loincloth collapses in the face of data about comparative standards of living. "Indeed, there is compelling evidence that South Indian labourers had higher earnings than their British counterparts in the eighteenth century and lived lives of greater financial security."⁴ Because the productivity of land was higher in South India, weavers and other artisans enjoyed better diets than average Europeans. More importantly, their unemployment rates tended to be lower because they possessed superior rights of contract and exercised more economic power. Even outcaste agricultural labourers in Madras earned more in real terms than English farm labourers. By 1900, in contrast, the average British household income was 21 times higher.⁵

In China, "the overall economic development of the Yangzi Delta in

the Qing [era] exceeded that of 'early modern England'.⁶ Similarly, the "specific conditions associated with European proto-industrialisation – expansion of seasonal crafts, shrinking farm size, and good marketing systems – may have been even more widespread in China [and India] than in Europe."⁷ Moreover, "basic functional literacy was more widespread than in Western countries at that time, including among women at all social levels."⁸

In addition, "the Lower Yangzi appears to have produced roughly as much cotton cloth per capita in 1750 as the UK did cotton, wool, linen and silk cloth combined in 1800 – plus an enormous quantity of silk."⁹ The Chinese Gross Development Product (GDP) grew faster in absolute terms than that of Europe throughout the eighteenth century, dramatically enlarging China's share of world income by 1829.

Why Stagnation?

The usual stereotype of nineteenth century economic history is that Asia stood still while the Industrial Revolution propelled Britain, followed by the United States and

Growing social vulnerability to climate variability increased the death toll.

Perspectives on Vulnerability

What were the variables that led to famine deaths in the nineteenth century? Research over the last 20 years or so into the social and economic histories of the regions "teleconnected" to ENSO's episodic disturbances has demolished Orientalist stereotypes of immutable poverty and overpopulation as the natural preconditions of the major nineteenth-century famines. In fact, peasants and farmers became dramatically more preg-nable to natural disaster after 1850 as their local economies were violently incorporated into the world market.

Three points of articulation with larger socio-economic structures were especially decisive for rural subsistence in the late nineteenth century "proto-Third World".

First, the forcible incorporation of smallholder production into commodity and financial circuits controlled from overseas tended to undermine traditional food security. It was not entrepreneurial opportunity but subsistence adversity (high taxes, chronic indebtedness, inadequate acreage, loss of subsidiary employment opportunities, enclosure of common resources, dissolution of patrimonial obligations and so on) that typically promoted smallholders' turn to cash-crop cultivation. Rich land-owners redeployed the fortunes that they built during export booms into

. . . Tradition and Demography or Gunboat Bullying?

eventually the rest of Western Europe, down the path of high-speed growth in Gross National Product (GNP). The future Third World, dominated by the highly developed commercial and handicraft economies of India and China, surrendered ground grudgingly until 1850 (when it still generated 65 per cent of global GNP), but then declined with increasing rapidity through the rest of the nineteenth century (only 38 per cent of world GNP in 1900 and 22 per cent in 1960).¹⁰

But why did Asia stand in place? The rote answer is because it was weighed down with the chains of tradition and Malthusian demography, although this had not prevented Qing China, whose rate of population increase was about the same as Europe's, from experiencing extraordinary economic growth throughout the eighteenth century.

The relevant question, however, is not so much why the Industrial Revolution occurred first in England, Scotland and Belgium, but why other advanced regions of the eighteenth century world economy did not adapt their handicraft manufactures to the new conditions of production and competition in the nineteenth century.

The looms of India and China were defeated not so much by market competition as they were forcibly dismantled by war, invasion, opium and a Lancashire-imposed system of one-way tariffs. From about 1780 or 1800 onward, every serious attempt by a non-Western society to move into a fast lane of development or to regulate its terms of trade was met by a military as well as an economic response from Britain or a competing imperial country.

The use of force to configure a "liberal" world economy is what *Pax Britannica* was really about. The Victorians resorted to gunboats on at least 75 different occasions.¹¹ The simultaneous British triumphs in the 1857 Indian Mutiny and the 1858 Second Opium War in China were the epochal victories over Asian economic autonomy that made a world of free trade possible in the second half of the nineteenth century.

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usury, rack-renting and crop brokerage. "Marginal subsistence producers," historian Hans Medick points out, ". . . did not benefit from the market under these circumstances; they were devoured by it."¹¹⁶ Medick, writing about the analogous predicament of marginal smallholders in "proto-industrial" Europe, provides an exemplary description of the dilemma of millions of Indian and Chinese poor peasants in the late nineteenth century:

"For them rising agrarian prices did not necessarily mean increasing incomes. Since their marginal productivity was low and production fluctuated, rising agrarian prices tended to be a source of indebtedness rather than affording them the opportunity to accumulate surpluses . . . Especially in years of bad harvests, and high prices, the petty producers were compelled to buy additional grain, and, worse, to go into debt. Then, in good harvest years when cereal prices were low, they found it hard to extricate themselves from the previously accumulated debts; owing to the low productivity of their holdings they could not produce sufficient quantities for sale."¹¹⁷

Thus, Medick concludes, "instead of profiting from exchange, [peasants] were forced by the market into the progressive deterioration of their conditions of production, i.e. the loss of their property titles."¹¹⁸ As

Peasants and farmers became more vulnerable to natural disasters as their local economies were incorporated into the world market.

India and China did not enter modern history as the helpless lands of famine so universally enshrined in the Western imagination.

The forcible incorporation of smallholder production into commodity and financial circuits controlled from overseas undermined food security.

a result, the position of small rural producers in the international economic hierarchy equated with downward mobility or, at best, stagnation. In north China and India, there is consistent evidence of falling household wealth and increased fragmentation or alienation of land. Whether farmers were directly engaged by foreign capital or were simply producing for domestic markets subject to international competition (like the cotton-spinning peasants in western Shandong in north China), commercialisation went hand in hand with pauperisation without any silver lining of technical change or agrarian capitalism.

Second, the integration of millions of tropical cultivators into the world market during the late nineteenth century was accompanied by a dramatic deterioration in their terms of trade. Peasants' lack of market power vis-à-vis crop merchants and creditors was redoubled by their commodities' falling international purchasing power. As economist W. Arthur Lewis suggests, comparable productivity or transport costs alone cannot explain an emergent structure of global unequal exchange that valued the products of tropical agriculture so differently from those of temperate farming:

“With the exception of sugar, all the commodities whose price was lower in 1913 than in 1883 were commodities procured almost wholly in the tropics. All the commodities whose prices rose over this thirty-year period were commodities in which the temperate countries produced a substantial part of total supplies. The fall in ocean freight rates affected tropical more than temperate prices, but this should not make a difference of more than five percentage points.”¹¹⁹

Third, formal and informal British imperialism, backed up by the supranational automatism of the Gold Standard, eroded local fiscal autonomy and impeded state-level developmental responses – especially investments in water conservancy and irrigation – that might have reduced vulnerability to climate shocks. As Lord Curzon, India's viceroy from 1898 to 1905, once famously complained to the House of Lords, tariffs “were decided in London, not in India; in England's interests, not in India's.”¹²⁰ Moreover, any grassroots benefit from British railroad and canal construction was largely cancelled by official neglect of local irrigation and the brutal enclosures of forest and pasture resources (*see pp.28ff*). Export earnings failed to return to smallholders not only as increments in household income, but also as usable social capital or state investment.¹²¹

The Myth of “Malthusia”

But didn't population pressures – especially in India and China where partible systems of inheritance were the rule – also play a role in undermining food security in the nineteenth century?

Economist W. Arthur Lewis, one of the leading authorities on the nineteenth-century world economy, assumed as a matter of course in an influential 1978 study that the underlying cause of famine in nineteenth century British India was not the “drain of wealth” to England, but “a large population that continued to live at subsistence level on inadequately watered marginal lands, without a profitable cash crop.”¹²² Similarly, the historiography of late imperial China has been haunted by how a presumed population explosion of the eighteenth century squeezed arable land to the threshold of chronic famine.

The relationship between population and subsistence in Asia seems,

in fact, to be more complex.¹²³ In India, “it is indisputable that land was, in absolute terms, hardly under great pressure from population in the Deccan [peninsular interior of India] of the early British period.”¹²⁴ Through the 1840s, at least, “only about half of the cultivable land in most Deccan districts, according to formal British estimates, was being tilled.”¹²⁵ Although population grew rapidly in the 1850s and 1860s, the demographic boom came to an abrupt halt with the famine catastrophe of 1876. In India as a whole during the half century between 1879 and 1920, there was only a single decade (the 1880s) of significant population growth. South Asia’s percentage of world population declined during the years 1750 to 1900 from 23 per cent to 20 per cent, while Europe’s rose from 17 per cent to 21 per cent.¹²⁶

Modern case-studies corroborate the position of critics of British rule, like G.V. Josh in 1890, who argued that “the problem of India lies not so much in the fact of an alleged overpopulation as in the admitted and patent evil of underproduction.” Josh estimated that fully half the net savings of India was confiscated as revenue.¹²⁷ If cultivators in the Deccan and other drought-prone regions were relentlessly pushed onto marginal lands where productivity was low and crop failures were inevitable, the culprit was less likely overpopulation than the “British land revenue system itself”. Economic historian Amiya Bagchi made a careful study of colonial agricultural statistics and argues that revenue collectors’ inflexible claims on a high “average” harvest compelled the peasants to cultivate marginal lands, and also forced them to “mine” their land in a situation where most of them had few investible resources left to improve its productivity.¹²⁸

Likewise, contemporary scholars are dramatically revising the traditional image of late imperial China as a “demographic profligate”, the hopeless “Malthusia” depicted by generations of economic theorists and demographers.¹²⁹ Until recently, most scholars have accepted fragmentary evidence for an eighteenth-century population explosion that doubled or even tripled China’s population of the year 1700. Demographic reductionists, however, have always had difficulty in explaining how population growth that was clearly so “Boserupian”¹³⁰ in the eighteenth century (promoting a dynamic expansion of productive forces) could abruptly become so grimly Malthusian in the nineteenth (blocking all advances in productivity). Moreover, there is little evidence for any increase in demographic pressure after the end of the Qing Golden Age: China’s population was no higher in 1890 than it was in 1820 while per capita income was significantly lower.¹³¹

Historian Kenneth Pomeranz, who has examined this issue in the context of north China, agrees that population pressures alone “do not explain why ecological problems greatly worsened after the mid-nineteenth century.” His study area around the intersection of the Grand Canal and the Yellow River “after the wars, floods and droughts of the 1850-80 period . . . did not significantly exceed its 1840s population until after 1949.”¹³² Moreover, the vast human losses of the 1851-64 Taiping Revolution – an estimated 20-30 million people died in the bloodiest civil war in world history as the Qing dynasty fought the Taiping rebel army – created a demographic vacuum in the middle and lower Yangzi that was refilled after 1864 by millions of immigrants from congested provinces.¹³³ Thereafter famine and epidemic, followed by war and revolution, kept population growth in north China at a minimum until 1948.

Recently, some experts on Qing China have challenged the orthodox view of a population doubling or even tripling during the eighteenth

If cultivators in drought-prone regions were pushed onto marginal lands, the culprit was less overpopulation than the British land tax system.

Every serious attempt by a non-Western society to develop or regulate its trade was met by a military and economic response from a competing imperial country.

Rejecting demographic determinism does not mean that the number of people played no role in China's crisis.

Local population-resource relationships should figure prominently in discussions of subsistence crisis and disaster vulnerability in north China.

century. They advance compelling arguments for a population of 250 to 275 million, rather than the 150 million conventionally adopted, as a baseline for 1700. This implies an annual growth rate of 0.3 per cent (the same as India and less than the world average) rather than the 0.6 to 0.9 per cent claimed in most histories.¹³⁴ Moderate, rather than exponential, population growth during the eighteenth century would mean that explanations of China's subsequent nineteenth-century social and political crises as due to a "population explosion" in the eighteenth century need to be revised.

"If, however, the population did *not* suddenly increase during that century, but started from a higher plateau and grew moderately, many social issues must then be otherwise explained [for example] the implicit crisis in that ratio of productive land to population . . . Related views about the 'optimum population' of China, perhaps in itself a suspect notion, also must be reconsidered."¹³⁵

Rejecting demographic determinism, however, does not mean that the number of people in a certain area or the increase in their numbers played no role in China's nineteenth-century crisis. The very success of agricultural intensification in the eighteenth century encouraged excessive subdivision of land in many regions as well as ecologically destructive reclamations of previously uncultivated highlands and wetlands.

Moreover, population growth often seems to have been concentrated in the poorest and most vulnerable areas. *Local* population-resource relationships should thus figure prominently in discussions of subsistence crisis and disaster vulnerability in north China. But population growth was hardly the self-acting, archimedean lever of history imagined by so many economic historians.

Europe faced even more severe demographic and ecological pressures at the beginning of the nineteenth century, but was able to resolve them with the help of New World natural resources, massive colonial emigration and, eventually, urban industrialisation.¹³⁶

The Irrigation Deficit

There is another variable frequently missing from historical discussions of "underdevelopment": water. "Up to half of the populations of Asia, Africa and South America may have subsisted on land where water supply constituted the key constraint upon increasing agricultural output."¹³⁷ This was common sense to "Oriental despots". A major achievement of the Qing Golden Age, as well as of the Mogul zenith, had been the high sustained levels of state and village-level investment in flood control and irrigation. The nineteenth century, however, was characterised by the near-collapse of hydraulic improvement in India and China.

Public works in post-Mutiny India were driven first by the exigencies of military control and, second, by the demands of export agriculture. On the eve of the 1876 famine, 29 per cent of Indian public-works capital was invested in military installations in contrast to only 21 per cent for irrigation, canals and drainage. The railway system, meanwhile, consumed (to 1880) 13 times as much investment as all hydraulic works. In the 1880-95 period, still only about one-fifth of public works expenditure found its way to major irrigation projects, 90 per cent of which was concentrated in the Punjab and the North-West Provinces where canals, tapping the Ganges and Jumna rivers, watered commercial crops like cotton, opium, sugar cane and wheat and financial returns to the government were therefore highest.¹³⁸ By accelerating the marginalisation

Cotton's Naked Misery

From 1757 to 1947 during British rule in India, there was no increase in India's per capita income for almost two hundred years. Indeed, in the last half of the nineteenth century, income probably declined by more than 50 per cent. In effect, there was no economic development at all in the usual sense of the term.

Celebrated cash-crop booms went hand-in-hand with declining agrarian productivity and food security. In much of the cotton-growing southern Deccan (the peninsular interior of India south of the Narmada River), for instance, per-acre yields of food crops in 1947 had fallen to just two-thirds to one-half the average level of 1870.¹ Moreover, from 1872 to 1921, the life expectancy of ordinary Indians fell by 20 per cent, a deterioration in human health probably without precedent in the sub-continent's long history of war and invasion.² In essence, British "progress" was Indian ruin.

Recent research on the cotton- and wheat-producing regions that were both dynamos of India's late nineteenth century export economy and epicentres of mass mortality in the famines of the 1870s and 1890s illustrate the extent to which "modernisation" and commercialisation were accompanied by pauperisation.

Reshaping Society

The province of Berar in the lower centre of India had been selected by the British Cotton Supply Association – an arm of the Manchester Chamber of Commerce – as a platform for specialised cotton monoculture.³ The Association wielded extraordinary power over the reshaping of the Indian economy in the mid-nineteenth century.

In Berar, the Association encouraged the administrative dismantling of the *balutedari* system through which the dominant local clans or castes had exercised managerial control over a complex network of social production including communal irrigation and cotton weaving. The essence of the old order was that the upper castes had claims

on agricultural produce but did not own the land itself. After purging the "disloyal" leading families, the British spent 17 years (1861–77) reorganising the vast peasant universe of Berar (7,000 villages and 10.5 million acres of cultivable land) into the so-called *khatadari* (peasant) system. A variant of the model that had been imposed on *ryots* in most of southern and western India, it was heralded as establishing the *khatedars* as small landholders. In reality, however, the government became the supreme landlord with peasant tenure strictly conditional upon punctual payment of revenue.

The complicated reciprocities of the old *balutedari* system gave way to brutal and unilateral relations of exploitation. Diversity and mobility – "the characteristic feature[s] of precolonial Berar" – were replaced by coercive "standardization and sedentarisation". The collection of taxes and the local marketing of the cotton crop ended up in the hands of moneylender/grain merchants who became the crucial intermediaries controlling almost all transactions between the village, Calcutta and Manchester.

Meanwhile, punitive taxes on local woven goods and a flood of cheap British imports in the wake of the arrival of the Great India Peninsular Railway destroyed domestic manufacture and forced ruined artisans into the fields as propertyless labourers. The railway inflicted the same fate on most of the *banjaras*, the colourful and ethnically diverse stratum of traditional porters and carters.

From a British perspective, the reengineering of Berari society was a stunning success. By 1867, Berar was sending as much cotton to Manchester as all of Egypt, and cultivated acreage probably doubled by 1890.⁴ But the *khatedars* and their tenants had no way to participate in the profits of the boom. Precisely as the Cotton Supply Association had intended, the *khatedars* became a contingent workforce for the Association, which had no intention of ever allowing them to wield any autonomous bargaining power within the international cotton market. Instead, they were sucked into a vortex of high taxes, chronic debt and subsistence instability. Those

khatedars with more resources attempted to escape from the debt trap by becoming micro-exploiters themselves. By the 1870s, holdings were being fragmented into smaller parcels and worked by subtenants known as *bhagindars* who paid estimated rack-rents three- or four-fold greater than revenue demands imposed on the *khatedars*. By the great droughts of the 1890s, the stratum of authentically independent cultivators had been reduced to a minority, and at least 70 per cent of the population were either impoverished *bhagindars* or landless labourers whose fates hung on the capricious dance of cotton prices in faraway exchanges.

Sacrificing Food Security

This layering of exploitation had a devastating impact on overall welfare in Berar. A society formerly celebrated for its rich cotton fabrics was virtually unclothed by poverty as per-capita textile consumption plummeted in inverse ratio to soaring exports of raw cotton. "Most Berari children went naked, most Berari men were half-clad, and a majority of the Berari women clothed themselves in rags."⁵ Although massive sums of capital were sunk into the Association's export infrastructure, including railroad spurs, cotton yards and metalled feeder roads, none of it percolated to the village level where degraded sanitary conditions, especially the contamination of drinking water by human waste, spread cholera and gastrointestinal disease as well as tuberculosis.

Similarly, local food security was eroded by the advance not only of cotton production but of grain exports as well. During the famine of 1899–1900, when 143,000 Beraris died directly from starvation, the province exported not only tens of thousands of bales of cotton but an incredible 747,000 bushels of grain.

Berar was not unique. Food security was sacrificed to cotton export throughout the Deccan. In

the Bellary district, one of the epicentres of the 1877 Madras famine, commercial cotton cultivation was "associated with a progressive crisis in agricultural production and social reproduction."⁶ Although its heavy black volcanic soil was ideal for short staple cotton, Bellary was one of the driest cultivated districts in India and, without irrigation, a family required 15-20 acres of average-quality land to produce its subsistence (in millet) and pay taxes. By the 1870s, however, most *ryots* were lucky to farm seven acres, and only an elite of several thousand rich *inamdars* (an emergent "magnate class" who were almost entirely "made" by the colonial state) could afford the heavy metal ploughs pulled by up to a dozen bullocks that were required for deep ploughing.

Caught in a tightening vice between their undersized farms and rising debt, small producers made the apparently surprising choice of substituting cotton for millet, raising and selling the former in order to purchase the latter from grain merchants. Moreover, they made the switch in face of declining or stagnant cotton prices.

"In straightforward terms, this 'decision' would seem to make no sense as a subsistence strategy. It meant producing a crop whose relative value against grain halved across this period. It also involved its producers in a three-sided structure of risk: from the climate, from the oscillation of grain prices and the oscillation in cotton prices which, being internationally determined, were scarcely calculable in Bellary itself."⁷

The decisive advantage of cotton, however, as in north China, was that "for land-short peasants, [its] higher returns per acre provided a better chance of approaching subsistence targets than did grain cultivation itself – even if . . . the majority of small farmers would still not have been able to quite reach it."⁸ Cotton output was also more responsive to labour intensity than millet: desperate peasants could hope to increase their harvest incrementally by the

application of massive quantities of unpaid family labour. But at all times, cotton-growing was a survival strategy wagered against the unknown variables of weather and the world market where the price of cotton from the south of the United States generally determined demand for other varieties.

The peasantry's creditors were eager to oblige the gamble. As small farmers – more in response to economic adversity than to market opportunity – turned towards cotton, the "magnates" abandoned cotton cultivation. They aggressively switched their assets from cultivation to money-lending and cotton-factoring. It was simply easier for them to expropriate the agrarian surplus through the credit system and the monopsony of the grain market than to bear the risks involved in the direct organisation of production.

The Colonial State

It was the state itself that ultimately ensured that no productivity-raising benefit flowed from export booms to direct producers. The colonial budget, largely financed by taxes on farm land, returned less than two per cent to agriculture and education, and barely four per cent to public works of all kinds, while devoting a full third to the army and police.⁹ In a typical example of a village in the late nineteenth century Bombay Deccan, the government collected nearly 19,000 rupees annually in taxes but returned only 2,000 rupees in expenditure, largely on official salaries and a rundown school.¹⁰

Instead of transforming *ryots* and *zamindars* into modernizing market-oriented farmers, the revenue settlements subjugated the peasantry to the local despotism of money-lenders and *nouveaux riches* landowners. By making the revenue demands too high and inflexibly fixing them to the estimated average produce of the land with scant regard for climate variation, the British made it certain that a number of the designated revenue-players would lose their titles very year.

Mercantile exploitation of the small cultivator was an ubiquitous relation of production in most of late-nineteenth-century British India.¹¹ The moneylenders (at least

half a million of them by the 1870s) and wealthy landowners were profoundly anti-developmental for eminently neoclassical reasons. "[C]reditors gave out 'loans' in order to be able to secure dependants and it would have been foolish to make 'loans' which, by improving the productivity of the debtor's land, helped him to become more independent."¹²

The vast majority of small-holders could neither make production decisions independent of lenders nor take any advantage of market trends. "In these circumstances, peasant agriculture had no chance of developing into capitalist farming."¹³ It was not so much the rich peasant, *zamindar* or *khatedar* who failed to play the prescribed theoretical role of an "improving landlord" as the colonial state itself.

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3. Satya, L., "Cotton and Famine in Berar, 1850-1900", PhD diss, Tufts University, 1994, pp.50, 155. See also Harnetty, P., *Imperialism and Free Trade: Lancashire and India in the Mid-Nineteenth Century*, Vancouver, 1972.
4. Ibid., p.182, Kaiwar, V., "Nature, Property and Polity in Colonial Bombay", *Journal of Peasant Studies* 27:2, Jan. 2000, p.7.
5. Satya, L., op. cit. 3., p.200.
6. Washbrook, D., "The Commercialization of Agriculture in Colonial India: Production, Subsistence and Reproduction in the 'Dry South', c. 1870-1930", *Modern Asian Studies*, 28:1, 1994, p.131.
7. Ibid., p.145.
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of *kharif* crops, export-oriented canal agriculture may well have made producers more vulnerable to famine.¹³⁹

The British enthusiasm for revenue-generating irrigation in the Punjab and North-West Provinces was counterbalanced by their disregard for the small-scale, peasant-managed irrigation systems of wells, dams, small channels and tanks (small reservoirs) that had been the hydraulic backbone of agriculture in western and southern India since the early medieval period.¹⁴⁰ In stark contrast to the old Mogul tradition of subsidising well construction, *ryots* in British India who sank wells at their own expense on their own land were punitively taxed.¹⁴¹ Thus “[t]raditional water-harvesting systems disintegrated and disappeared in large parts of India during the early colonial period [and] high rates of land-tax left no surplus for the effective maintenance of irrigation systems.”¹⁴²

The land-tax system also destroyed the social mechanisms that had allowed villages to undertake irrigation works by themselves. In most of India, water had always been a communally managed common resource. “Generally, there was no notion of selling titles to land and its water resources.”¹⁴³ In British common law as witlessly applied to India, however, water rights went along with the land titles as private property. “In effect, this meant that only those who owned land had a right to the water on it. In this way, all those who did not hold colonial land-deeds were excluded from access to water.”¹⁴⁴ Tanks and wells were also privatised, with the consequence that “for the first time . . . water scarcity became a problem and this caused enormous hardship to the people and cattle alike.”¹⁴⁵

Indeed, British rule, in various ways, emancipated local political chiefs from their obligation to invest in community resources and public institutions such as tank systems. The shortfall was not made good by the government’s own public works.¹⁴⁶ In Gujarat in the west, new property forms freed village caste-elites from traditional reciprocities and encouraged them to exploit irrigation resources to their selfish advantage. Entitlement to water thus openly became a relation of inequality and a means of exploitation. The British constantly complained about the “inertia” of India, but when it came to potentially life-saving local public works, they themselves were the embodiment of decisive inaction. The refusal of the state to support local irrigation became a smouldering grievance everywhere in interior India.

In contrast to India, where the traditional hydraulic infrastructure in dry regions consisted of free-standing improvements (wells, ditches and tanks) that seldom depended upon a massive central project, public works in north China functioned only in an integrated and coordinated hierarchy. Flood control, canal management and local irrigation were largely inseparable. Village-level irrigation farming and local drainage depended upon regional networks of dikes, levees and master canals. The unravelling of centralised hydraulic control in the nineteenth century therefore had repercussions at every level of environmental management.

Moreover, “small irrigation” lost much of its state sponsorship during the recessions and fiscal retrenchments of the nineteenth century. In the eighteenth century, governors of Shaanxi province, for instance, authorised significant investment in wells, irrigation and drainage under the direct supervision of energetic county magistrates.¹⁴⁷ The result, in many cases, was a 200 to 300 per cent increase in the output of grain and cotton.¹⁴⁸ When irrigation subsidies were more or less abandoned in the tumult of the nineteenth century, agricultural productivity declined sharply while vulnerability to drought and flood increased. Gradually,

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or reforestation
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British rule in India freed local political chiefs from their obligation to invest in water systems, but the state did not make up the shortfall.

Common lands were transformed into taxable private property or state monopolies – free goods became commodities or contraband.

irrigation ditches became useless, natural waterways silted up and flooding along river banks destroyed some of the best farmland.¹⁴⁹ Neglect of irrigation continued for some decades: in 1932, just 6.8 per cent of cultivated acreage in north China was irrigated. There was an estimated absolute decline in irrigated cropland from 21.7 million hectares (29.4 per cent of arable land) in 1820 to 20 million hectares (18.5 per cent) in 1952.¹⁵⁰ The failure of successive governments to improve irrigation became a powerful factor in rallying the northern peasantry behind the Communist Party, which made water conservancy a priority from 1946 onwards.¹⁵¹

This irrigation deficit undergirded the Malthusian illusion of helpless “involution” in China and elsewhere. Whether as a result of population pressure or displacement by export crops, subsistence in India and China was pushed onto drier, often less productive soils, highly vulnerable to ENSO cycles, without parallel improvements in irrigation, drainage or reforestation to ensure sustainability. Modern irrigation-based revolutions in agricultural productivity in northern India and north China (since 1960) only dramatise the centrality of water resources and the political capacities to ensure their development to any discussion of “carrying capacity” or “demographic ceilings”.

Ecological Poverty and Enclosure

More broadly, any attempt to elucidate the social origins of late nineteenth century subsistence crises must integrally incorporate the relevant histories of common property resources (watersheds, aquifers, forests and pastures) and social overhead capital (irrigation and flood control systems, granaries, canals and roads). *Ecological poverty* – the depletion or loss of entitlement to the natural resource base of traditional agriculture – constituted a causal triangle with increasing *household poverty* and *state decapacitation* in explaining both the emergence of a “Third World” and its vulnerability to extreme climate events (*see* Box, pp.25-26).

In India, as elsewhere in monsoonal Asia, village economy augmented crops and handicrafts with stores of free goods from common lands: dry grass for fodder, shrub grass for rope, wood and dung for fuel, dung, leaves and forest debris for fertilizer, clay for plastering houses, and, above all, clean water. All classes utilised these common property resources, but for poorer households they constituted the very margin of survival. Moreover, forest and pasture commons “not only serve as a buffer against seasonal shortages, but also contribute to rural equity.”¹⁵²

The British consolidated their rule in India by transferring control of these strategic resources from the village community to the state. “Among all the interventions into village society that nurtured the Anglo-Indian empire, dividing public from private land stands out as the most important.”¹⁵³ Common lands – or “waste” in the symptomatic vocabulary of the British Raj – were either transformed into taxable private property or state monopolies. Free goods, in consequence, became either commodities or contraband. As in Britain during the previous centuries, the enclosure of common resources deeply undermined traditional household ecology.

Until 1870, all forests (20 per cent of India’s land area) had been communally managed. For plough agriculturalists, the forests were not only essential for wood, but also for leaf manure and grass and leaf fodder.¹⁵⁴ By the end of 1870, they had been mostly enclosed by armed

agents of the state.¹⁵⁵ The overriding interest of the British was “to assure a continuing supply of wood for imperial needs”:¹⁵⁶ shipbuilding, urban construction and, above all, the railways, as well as vast quantities of wood for fuel. Even in the midst of the most terrible famines, the foresters prevented local residents from gathering fodder for their dying cattle or firewood to heat their homes.

The British also cut off communal access to grassland resources and dissolved the ancient ecological interdependence of pastoralists and farmers.¹⁵⁷ After the 1857 Mutiny, the British pursued a relentless campaign, especially in the Deccan, against nomad and shifting cultivators whom they labelled as “criminal tribes”. Although the agroecology of the Deccan for centuries had been dependent upon the symbiosis of peasant and nomad, upon valley agriculture and hill-slope pastoralism, the colonial state’s voracious appetite for new revenue generated irresistible pressure on the *ryots* to convert “waste” into taxable agriculture. Punitive grazing taxes drove pastoralists off the land, while cultivators were lured into the pastoral margins with special leases.¹⁵⁸

The traditional Deccan practices of extensive crop rotation and long fallow, which required large farm acreages and plentiful manuring, became difficult to maintain as the land became more congested and cattle less numerous. Between 1843 and 1873, cattle numbers in the Deccan fell by almost five million. The 1876-78 drought killed off several million more, with cattle populations plummeting by nearly 60 per cent in some districts.¹⁵⁹ After comparable destruction during the 1896-97 drought, “women were seen to be pulling the plough” in some districts in the south-east Punjab.¹⁶⁰

The decline in labour productivity entailed by fewer and less powerful plough-cattle was matched by a corresponding fall in soil fertility because of the growing shortage of fertilizer. Irrigation water alone was of little value if the soil was depleted of nitrogen. The pasture soils eroded quickly and soon became useless for agriculture or grazing. “Commercialised agriculture, in tandem with a largely subsistence-oriented cultivation of foodgrains, produced a particularly intensive regime of soil depletion and erosion.”¹⁶¹

The Making of the Third World

In the half century when peacetime famine disappeared permanently from Western Europe, it increased devastatingly throughout much of the colonial world. Despite smug claims about the life-saving benefits of steam transportation and modern grain markets, millions, especially in British India, died near railway tracks or grain depots. In China, the drastic decline in state capacity and popular welfare, especially famine relief, followed in lockstep with the Chinese Empire’s forced “opening” to modernity by Britain and other countries.

At issue are not “lands of famine” becalmed in stagnant backwaters of world history, but the fate of tropical humanity during those years 1870-1914 when its labour and products were being conscripted into a London-centred world economy.¹⁶² Millions died, not *outside* the modern world system, but in the very process of being forcibly incorporated into its economic and political structures. They died in the golden age of liberal capitalism; many were murdered by the application of utilitarian free trade principles. The route to this “new world order” is thus paved with the bodies of the poor. Until the 1870s, rural Asia was not sufficiently integrated into the global economy to send or receive

Foresters prevented local residents from gathering fodder or firewood, even in the midst of the most terrible famines.

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economic shock waves from the other side of the world. During this decade, however, weather and price perturbations were linked through the medium of an international grain market. The price of wheat in Liverpool and the rainfall in Madras became variables in the same vast equation of human survival.

An inability to regulate politically interaction with the world market at the very time when mass subsistence increasingly depended upon food entitlements acquired in international trade became a sinister syllogism for famine. In the Indian Deccan and the north China Yellow River basin, former “core” regions of eighteenth-century sub-continental power systems were transformed into famished peripheries of a London-centred world economy.

Notes and References

1. In the eighteenth century, the largest manufacturing districts in the world were not in Europe but China and India, the latter producing one-quarter of world manufactures. South Indian labourers probably had higher earnings than their European counterparts in the eighteenth century, lived lives of greater financial security, enjoyed better diets and had lower unemployment rates. China's overall economic development exceeded that of early modern England, while basic functional literacy was more widespread, including among women at all social levels, than in Western countries at that time. Chinese GDP grew faster than that of Europe throughout the eighteenth century. When the Bastille in France was being stormed in 1789, the class divisions within the world's major societies were not recapitulated as dramatic income differences *between* societies. The differences in living standards between, say, a French peasant and an Indian Deccan farmer were relatively insignificant compared to the gulf that separated both from their ruling classes. By the end of the nineteenth century, however, the inequality of nations was as profound as the inequality of classes. See Pomeranz, K., *The Great Divergence: China, Europe and the Making of the Modern World Economy*, Princeton, New Jersey, 2000.
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3. Suresh Singh, K., *The Indian Famine 1967*, New Delhi, 1975, p.242.
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6. *Nature*, 1878, p.447.
7. Marx to N.F.Danielson, 19 February 1881, in *Karl Marx and Friedrich Engels on Colonialism*, Moscow n.d., p.337.
8. Dutt, R. C., *Open Letters to Lord Curzon*, Calcutta, 1904, pp.3-4.
9. From 1873 until 1896, the world's economy was characterised by falling prices and economic recession, a repeat of events from 1817 to 1850. Each of these crises was followed by a phase of recovery and renewed expansion;

thus rising prices and economic growth characterised the years 1850-1873 and the years 1896-1920.

In 1873, the puncture of a speculative investment bubble in US railway companies rapidly became a worldwide crisis. The massacre of fictitious capital on Wall Street was followed by the fall of real prices on Manchester's Cotton Exchange (which dominated the world cotton trade) and soaring unemployment in the industrial centres of Pennsylvania (US), South Wales (UK), Saxony (Germany) and Piedmont (Italy). The abrupt decline in metropolitan demand for tropical and colonial products coincided with a vast increase in agricultural exports as railways opened the US and Russian prairies while the Suez Canal through Egypt shortened the distances goods had to travel between Europe, Asia, Australia and New Zealand. The result everywhere was intensified competition and the plummeting of agricultural incomes. World market prices of cotton, rice, tobacco and sugar fell to their cost of production in many regions, or even below it. By 1875, agrarian unrest and rioting were spreading across the globe. See Hobsbawm, E., *The Age of Capital 1848-1875*, London 1975, p.46.

10. The 1857-8 rebellion began with the mutiny of Indian troops near Delhi, but large numbers of civilians and landlords joined the unrest, angered at British annexation of native states, harsh revenue policies and the plight of the Indian peasantry. When the British regained control after violent atrocities committed by both sides, India became a Crown colony governed directly by the British Parliament. Henceforth, a member of the British cabinet, the Secretary of State for India, had responsibility for Indian affairs, while in India itself, the “man” at the helm continued to be the Governor-General but he was now also known as the Viceroy of India in his capacity as the representative of the British monarch. The Mutiny spelled the end of both the Mogul Empire and the East India Company (see footnotes 111 and 24).
11. British Parliamentary Papers, *Report of the Indian Famine Commission* (part 1) *Famine Relief*, cd. 2591, London 1880, p.191.
12. Walford, C., *The Famines of the World*, London 1879, p.126.
13. *The Nineteenth Century*, Sept. 1877, p.177.
14. Changes in the prices of goods bought and sold on the world market can be measured only in an internationally accepted currency. Until 1945, this currency was a commodity as it could

be used to make comparisons among other commodities. For a long time, the currency commodities were gold and silver. Britain had adopted the Gold Standard in 1821, while the rest of the world stuck to either a silver standard or a bimetallic system. After defeating France in 1871, however, Germany shifted to gold and was soon followed by the United States, the rest of Europe and Japan. Vast quantities of demonetised silver flooded the world market, depreciating the currency of India and China, the major nations outside the hegemonic gold bloc. India began to move to the Gold Standard after 1893.

The London-based Chartered Bank of India, Australia and China, which financed much of the Indian trade, had the same kind of quasi-state influence over Indian monetary policy as the Manchester Chamber of Commerce enjoyed over Indian agriculture. Keeping the Indian rupee tied to silver had obvious advantages for Britain: the value of its exports (denominated in gold) to India increased in value while its imports (denominated in silver) declined in value. The Gold Standard stole one-quarter of the purchasing power of the silver ornaments that constituted ordinary Indians' savings. While the gold-denominated export price of Indian grains remained stable to the benefit of British consumers, their domestic cost in rupees was sharply inflated to the detriment of the Indian poor. Such inflation greatly abetted the British campaign to recruit peasants to the production of export crops like wheat, indigo, opium and jute. By absorbing silver and exporting wheat at the lowest price, India served as the buffer at the base of the world economy of the late nineteenth century. See Nash, V., *The Great Famine and Its Causes*, London, 1900, p.88, McAlpin, M., “Price Movements and Fluctuations in Economic Activity” in Dumar (ed.) *Cambridge Economic History of India*, p.890; Rothermund, D., “The Monetary Policy of British Imperialism”, *The Indian Economic and Social History Review* 7, 1970, pp.98-9.

Since the end of the Second World War, certain national currencies, particularly the US dollar, have become accepted as the basis for international payments, but gold has not disappeared as a factor in the world economy. The question of gold as a means of international payment should not be confused with the issue of everyday money and of the currency in each national economy. See Vilar, P., *A History*

of *Gold and Money (1450 to 1920)*, Verso, London, New York, 1991 (first published 1960, first English translation 1976).

15. Guilimoto, C., "Towards a New Demographic Equilibrium: The Inception of Demographic Transition in South India", *The Indian Economic and Social History Review* 29: 3, 1992, p.258.
16. The opening of the Suez Canal and the growth of steam shipping drastically reduced the transport costs of bulk commodity exports from the subcontinent. In addition to the cultivation of opium in Bengal (which was exported to China, see footnote 72), new export monocultures of indigo, cotton, wheat and rice supplanted millions of acres of subsistence crops. Part of this production was designed to assure low grain prices in the metropolis after the debacle of English agriculture in the 1870s.
17. Bhatia, B., *Famines in India 1850-1945*, Bombay, 1963, pp.98-101.
18. Viceroy was the title of the representative in India of the British monarch. See footnote 10.
19. quoted in Bhatia, B., op. cit. 17, p.100.
20. Letter from Madras Government to Government of India, 30 Nov 1876, quoted in Bhatia, B., op. cit. 17, p.94.
21. Osborne, R., "India Under Lord Lytton", *Contemporary Review*, Dec. 1879, p.553, Srivastava, H., *The History of Indian Famines*, Agra 1968, p.131; Digby, W., op. cit. 2, pp.50-51; and Steele, D., *Lord Salisbury: A Political Biography*, London 1999, p.98.
22. Some 10 million people died in the Bengal drought-famine of 1770, an estimated one-third of Bengal's peasantry.
23. Smith, A., *An Inquiry into the Nature and Causes of the Wealth of Nations*, (1776) fifth edn, London 1930, pp.27-8.
24. Ambirajan, S., *Classical Political Economy and British Policy in India*, Cambridge 1978, p.63.

The East India Company came into being on 31 December 1600 when a group of merchants incorporated themselves by royal charter and were given a monopoly on all trade with the East Indies (East and South-East Asia), although their immediate interest was the spice trade. The Company's ships first arrived in India in 1608 and gradually won trading concessions from the Mughal Empire. It established numerous trading posts along the east and west coasts of India, and considerable English communities developed around Calcutta, Bombay and Madras. It began to trade in cotton and silk piece goods, indigo and saltpetre (potassium and sodium nitrates) as well as spices. In 1769, the Company prohibited Indians from trading in grain, salt, betel nuts and tobacco and discouraged handicrafts. It also prohibited silk weavers from working at home, compelling them to work in its factories. Weavers who disobeyed were imprisoned, fined or flogged.

The Company was gradually transformed from a trading venture into a ruling enterprise exercising political sovereignty over a largely unknown land and people. The three administrative areas of India – the Presidencies of Bombay, Madras and Bengal – each maintained their own army, all paid for out of the Company's Indian revenues. Together, they were larger than the British Army itself. All the officers were British and trained at the Company's military academy in England. The vast majority of the Company's soldiers were Indian.

The East India Company's policy was influenced by its shareholders until 1773, when British legislation established a regulatory board responsible to Parliament. The Company effectively acted as an agent of British imperialism from the early eighteenth century onwards

when it gradually lost both commercial and political control. Its commercial monopoly was broken in 1813, and from 1834 it was merely a managing agency for the British government in India. After the 1857-58 Mutiny, (see footnote 10), the British government assumed direct control of India, and the Company ceased to exist as a legal entity in 1873.

The Company's activities in China in the nineteenth century served as a catalyst for the expansion of British influence there (see 72).

25. Maddison, A., *Mughul Class Structure and Economic Growth: India and Pakistan Since the Moghuls*, New York, 1971, p.40.
26. Derived from Bhatia, B., op. cit. 17, Table 5, p.38. Between 1875 and 1900, years that included the worst famines in Indian history, annual grain exports increased from 3 million to 10 million tons, a quantity that was equivalent to the annual nutrition of 25 million people. By the turn of the century, India was supplying nearly one-fifth of Britain's wheat consumption as well as allowing London grain merchants to speculate during shortages on the European Continent. See Rothermund, D., *An Economic History of India*, New York, 1988, p.36; and Dutt, R.C., op. cit. 8, p.48.
27. The Famine Commission was established as a political exercise to produce a favourable report, says Lance Brennan. On the subject of famine relief, the Commission did state that the "essential problem was shortage of work rather than food", but the majority of the Commissioners adhered to the principle that relief should be bitterly punitive in order to discourage dependence upon the government. Its final report absolved the government of any responsibility for the horrific mortality, asserting that the main cause of famine was drought "leading to the failure of the food crops on which the subsistence of the population depends", says Carol Henderson. In his 1886 critique of the Commission, H.M. Hyndman observed that famines "are looked upon as due to 'natural laws', over which human beings have no control whatever. We attribute all suffering under native governments to native misrule; our own errors we father on 'Nature'." See Brennan, L., "The Development of the Indian Famine Codes" in Tietze, W., (ed.) *Famine as a Geographical Phenomenon*, Dordrecht 1984, pp.103-7; Henderson, C., "Life in the Land of Death: Famine and Drought in Arid Western Rajasthan", PhD diss. Columbia University 1989, p.66; and Hyndman, H.M., *The Bankruptcy of India*, London 1886, p.26.
28. Digby, W., "Famine Prevention Studies", in Lady Hope, *General Sir Arthur Cotton: His Life and Work*, London 1900, pp.362-3.
29. Rajasekhar, D., "Famines and Peasant Mobility: Changing Agrarian Structure in Kurnool District of Andhra, 1870-1900", *The Indian Economic and Social History Review* 28:2, 1991, p.132.
30. Washbrook, D., "The Commercialization of Agriculture in Colonial India: Production, Subsistence and Reproduction in the 'Dry South', c. 1870-1930", *Modern Asian Studies* 28:1, 1994, p.141.
31. Rajasekhar, D., op. cit. 29, p.134.
32. Checks which could avert these crises were "preventive", such as delayed childbearing through later marriage, or "positive", such as warfare, epidemic disease, polygamy, infanticide, abortion and contraception.
33. Even though Malthus also wrote about sparsely settled lands with few resources, Malthusian crises were most readily identified in densely populated agrarian societies, such as those of India and China. Demographer John Caldwell states that those who administered the British

colonies, especially India, drew three major lessons from Malthus: colonial administration reduced the level of "positive" checks (warfare, infanticide and disease) so that populations tended to grow faster and call more frequently upon the ultimate check, famine; interventions in famines might, like poor relief in England, do more harm than good; and delayed marriage might not come into being for a very long time.

Some commentators have argued that Malthusian theses led directly to the promotion of birth control. Overall, the English-speaking world became the nineteenth-century cradle for anti-natalist thought. The main theatre for playing out such thought was India which constituted over 90 per cent of the population of the British empire. Administrators in the Indian Civil Service before and after Independence from Britain in 1947 usually had quite consciously Malthusian attitudes. The 1943-44 Bengal famine, in which at least 1.5 million people died, not least because of British policies, contributed to the 1951 Indian decision to opt for a family planning programme which became a model for Asian programmes. While in south-east Asia and Africa, the justifications today for family planning programmes place greater emphasis on broader economic development, in India and China, Malthusian beliefs and fears remain of significance, "ready to appear when crisis threatens". See Caldwell, J.C., "Malthus and the Less Developed World: The Pivotal Role of India", *Population and Development Review* 24 (4), December 1998, pp.675-696.

34. Klein, I., op. cit. 4, p.195.

35. *Ibid.*

36. Most of the relief that was organised by British officials required labour in return for food or money. In the Bombay Deccan, officials turned away anyone who was too starved to undertake hard labour. In 1877, several million emaciated labourers and poor peasants overwhelmed the relief works belatedly authorised by the Bombay and Madras governments. Viceroy Lytton chastised the British governor of Madras, the Duke of Buckingham, for making "public charity indiscriminate" in three Madras districts where one-quarter of the population was employed breaking stone or digging canals. Lytton sent the governor of Bengal, Sir Richard Temple, to the area as "famine delegate" to tighten the reins on the "out of control" expenditures. Temple's task was to make relief as repugnant and ineffective as possible so as to cut costs. In Madras, Temple required starving applicants to travel to dormitory camps outside their locality for coolie labour on railroad and canal projects. A "distance test" refused work to able-bodied adults and older children within a ten-mile radius of their homes. Temple cut rations for men carrying out hard labour down to one pound of rice a day. This "Temple wage" provided an estimated 1,627 calories each day, less sustenance than that (1,750 calories) provided in the Buchenwald concentration camp in Germany in 1944. Indeed, the "Temple wage" combined with heavy physical labour and dreadful sanitation (polluted water and filth spread cholera) turned the work camps into extermination camps. Monthly mortality in the camps became equivalent to an annual death rate of 94 per cent. The poor generally preferred jail to the relief camps – prisoners were the best fed poor people in the country. Temple also made private donations of relief illegal and insisted that land taxes in the famine districts be paid. He reported back after a few months that he had put "the famine under control" – although one quarter of the people were dead.

In mid-1877, the British government in London ordered higher rations and reduced workloads, but it was too little too late to brake the slide into a terminal phase of starvation and epidemic disease. In Indian history, Temple became the personification of free market economics as a mask for colonial genocide. The British also exploited starvation to recruit huge numbers of south Indians between 1876 and 1879 for semi-slave labour under brutal conditions on British plantations in Ceylon (now Sri Lanka), Mauritius, Guyana and Natal. See Digby, W., op. cit. 2, vol 1, pp.46-7, 265 and vol 2, pp.247, 252; Bhatia, B., op. cit 17, pp.94-5; De Waal, A., *Famine That Kills: Darfur, Sudan, 1984-1985*, Oxford, 1989, p.32.

37. quoted in Caldwell, J., op. cit.33, p.683.

38. From Parliamentary Papers 1881, 68, "Famine Commission – Financial Statement", quoted in Watts, S., *Epidemics and History, Disease, Power and Imperialism*, New Haven, CT, 1997, p.203.

39. quoted in Caldwell, J., op. cit.33, p.683.

40. The Great Famine of 1846-49 in Ireland was triggered by potato blight, caused by a fungus, which ruined the staple food crop upon which most poor people depended. Some two million people died or emigrated within five years. That the famine was God's way of redressing a Malthusian imbalance between people and resources was an argument which appealed to the British government. Nature must be allowed to take its course; aid would only confound the workings of the "market", it was argued. Thus during the famine years, exports from Ireland of grain to England to provide food for those in the Caribbean plantations increased, and peasant evictions from the land increased. See Ross, E., *The Malthus Factor: Poverty, Politics and Population in Capitalist Development*, Zed Books, London, 1998, and Briefing 20, The Corner House, July 2000.

41. "General Tremenheere on Missions", *Calcutta Review* 128, 1877, p.278.

42. Comment of Lord Salisbury, cited in Steele, D., op. cit. 21, p.98.

43. Government of India, *Report of the Indian Famine Commission, 1878*, Part I, Famine Relief, London 1880, p.59.

44. Tawney, R.H., *Land and Labour in China*, London 1932, p.77.

45. A tsunami is a high wall of water moving across the ocean at speeds that can exceed 700 kilometres per hour. It is often mistakenly called a tidal wave, but is not generated by the gravitational pull of the moon or sun. It is produced impulsively by an undersea earthquake or, much less frequently, by volcanic eruptions, meteorite impacts or underwater landslides.

46. Will, P.-E., *Bureaucracy and Famine in Eighteenth-Century China*, Stanford, CA, 1990, p.36.

47. Richard, T., *Forty-Five Years in China* (third edn.) New York, 1916, pp.98, 117.

48. Smith, A., *Village Life in China*, Boston 1970 [1899], p.116. See also Sheel, K., *Peasant Society and Marxist Intellectuals in China*, Princeton, NJ, 1989, p.12.

49. Bohr, P., *Famine in China and the Missionary*, Cambridge, MA, 1972, p.15 and Richard, T., op. cit. 47, p.119.

50. Faure, D., "Local Political Disturbances in Kiangsu Province, China: 1870-1911", PhD diss, Princeton University, Princeton, NJ, 1975, pp.162-3.

51. Will, P.-E., op. cit. 46, p.49.

52. The Qing from Manchuria were the last dynasty of emperors in China ruling from 1644, when they superseded the Ming, until 1911 when the imperial regime finally collapsed.

53. Faure, D., op. cit. 50, pp.162-5, 275, 468.

54. Quoted in UK Foreign Office, *Parliamentary Papers*, China No. 2, 1878, p.11.

55. On Shanxi's dependence of Wei Valley surpluses, see Dunstan, H., *Conflicting Counsels to Confuse the Age: A Documentary History of Political Economy in Qing China, 1644-1840*, Ann Arbor 1996, pp.250-51.

56. Broomhall, A., *Hudson Taylor and China's Open Century: Book Six*, London, 1989, p.169.

57. *Ibid.*, pp.175, 181.

58. UK Foreign Office, op. cit. 54, p.6.

59. Broomhall, A., op. cit. 56, p.466, fn. 44. See also Cotts Watkins, S. and Menken, J., "Famines in Historical Perspective", *Population and Development Review* 11:4, Dec. 1985, p.651.

60. *Report of the China Famine Relief Fund*, Shanghai, 1879, p.7; and Li, L., "Introduction: Food, Famine, and the Chinese State", *Journal of Asian Studies*, 41:4, Aug 1982, p.687.

61. See Broomhall, A., op. cit. 56, p.181; Soothill, W., *Timothy Richard of China*, London, 1924, p.101.

62. Arnold, D., *Famine: Social Crisis and Historical Change*, London, 1988, p.21.

63. Hang-Wei He, *Drought in Northern China in the Early Guang Xu (1876-1879)*, Hong Kong 1980, pp.36-7 (in Chinese).

64. Wittfogel, K., *Oriental Despotism: A Comparative Study of Total Power*, New Haven, CT, 1957, p.290.

65. Huang, P., *The Peasant Family and Rural Development in the Yangzi Delta, 1350-1988*, Stanford, CA, 1990, pp.42, 74-6.

66. Huang, P., *The Peasant Economy and Social Change in North China*, Stanford, CA, 1985, pp.102-6, 152.

67. The Grand Canal was the single most unifying link between the southern and northern provinces and the longest human-made waterway on earth. It was built by a total of some five million peasant labourers from the end of the sixth century onwards.

68. There was a fundamental geo-economic polarity between the bustling mercantilism of the valley of the Yangzi river in the central south west and the seemingly frozen subsistence economy of the Yellow River basin in the north. There was also a fundamental agricultural division between the southern rice lands and the northern wheat belt. The greater part of China's economic surplus was in the lower Yangzi Valley, but the largest centre of surplus consumption was usually the north.

69. Wilkinson, E., "Studies in Chinese Price History", PhD diss., Princeton University, 1970, pp.198-9.

70. On long-distance commercial flows, see Bin Wong, R., "Food Riots in the Qing Dynasty", *Journal of Asian Studies* 41: 4, August 1982, pp.768-9.

71. UK Foreign Office, op. cit. 54, p.6.

72. The First Opium War (1839-42) was precipitated by Chinese opposition to the opium trade, developed by the British since the early nineteenth century to "balance their trade" with China in tea. By the end of the eighteenth century, tea had become a popular drink in Britain. China reluctantly sold tea to the British in return for silver, but only from the southern port of Canton. Britain's silver reserves sank so low that the country was almost bankrupted. The British thus cast about for anything which they could sell to China in return for the tea. They opted for opium grown in India, even though China forbade the import of opium in 1800 and made opium illegal in 1836.

China was defeated in the First Opium War and had to cede Hong Kong to Britain; open another four ports besides Canton to British residence and trade; abolish a requirement for

the British to pay tribute to the imperial administration; concede that British citizens were subject to British, not Chinese, law if they committed a crime on Chinese soil; and grant Britain the same trading rights that it had granted to other countries. As a result, the opium trade more than doubled.

A Chinese defeat in the Second Opium War, often called the "Arrow" War (1856-60), resulted in still more trading rights for Europeans. Under the 1858 Treaty of Tianjin to which France, Russia and the United States were also party, China had to legalise the import of opium, allow foreigners with passports to travel in the interior, sanction Christian missionary activity (thus opening up another means of Western influence) and open 11 more ports to trading. Opium shipments from India reached a peak of 87,000 chests in 1879, the biggest drug transaction in world history. See Lu Aiguo, *China and the Global Economy Since 1840*, Helsinki, 2000, p.36.

Opium also financed the East India Company's military operations on the subcontinent. By forcibly increasing the Chinese demand for the narcotic – and thus the taxes collected on its export – the two Opium Wars and the Treaty of Tianjin revolutionised the revenue base of British India. "Opium serviced the cost of imperial expansion in India." Indeed, Britain's systematic exploitation of India depended in large part upon India's commercial exploitation of the rest of Asia, particularly China, via its exports of opium, rice and cotton thread. When the Chinese resorted to domestic cultivation of opium, British India began to export factory-spun cotton yarn which had a devastating impact on Chinese folk textiles, particularly in north China. The British tea imports from China were the source of the lucrative tea duty that by the mid-nineteenth century almost compensated for the cost of the British Royal Navy. See Wong, J.W., *Deadly Dreams: Opium and the Arrow War (1856-1860) in China*, Cambridge 1998, pp.350-55, 390, 396.

73. Bohr, P., op. cit. 49, p.24.

74. See footnote 14. The conversion of world trade to the universal Gold Standard aggravated China's external and internal exchange crises as the international price of silver plummeted. The Qing were powerless to stop the drain of silver that the British had engineered with the imposition of the opium trade, although they discouraged foreign investment for fear of repayment in silver. Imports became more expensive. The country's shortage of gold, partly compensated by the reluctant export of coolie labour (see footnote 76), was mirrored by the continuing depreciation of cash, especially in the north. Monetary instability helped fuelled rebellion at the beginning of the twentieth century. See Aiguo, L., op. cit. 72, p.48; Wilkinson, E., op. cit. 69, pp.34, 41-3, 52.

75. Wang Yeh-chien, *Land Taxation in Imperial China, 1750-1911*, Cambridge, MA, 1973, p.113.

76. The empire also became increasingly dependent upon foreign exchange remittances from five million Chinese emigrants in southeast Asia, Oceania, Peru, the Caribbean and the United States. Although the government publicly expressed its disgust with the coolie trade, it had little alternative but to collaborate in its expansion. The so-called "yellow peril" that British writers helped to popularise was a direct consequence of Asia's increasing subsidisation of the British economy. But even the coolie trade – an estimated 37 million labourers were sent abroad from India, China, Malaya and Java in the nineteenth and early twentieth centuries – did little to ease

- undercapitalisation in the Asian countryside. See Latham, A., *The International Economy and the Undeveloped World, 1865-1914*, London, 1978, pp.453-4; Breman, J. and Daniel, E.V., "Conclusion: The Making of a Coolie" in Bernstein, D. and Brass, T., (eds.), *Plantations, Proletarians and Peasants in Colonial Asia*, London 1992, p.290.
77. Trocki, C., *Opium, Empire and the Global Political Economy*, London, 1999, p.98.
78. Cain, P. and Hopkins, A., *British Imperialism: Innovation and Expansion, 1688-1914*, London, 1993, p.425.
79. Aiguo, L., op. cit. 72, pp.34, 37, 39.
80. Pomeranz, K., *The Making of a Hinterland: State, Society, and Economy in Inland North China, 1853-1937*, Berkeley, 1993.
81. Already in 1799, only one-quarter of the ever-normal granaries had stored their full quotas. Reduced to these levels, the imperial granaries were no longer able to act as an economic flywheel "normalising" grain prices. By the 1820s, the empire-wide grain reserves had fallen below 30 million *shih* from their level of 48 million *shih* in the eighteenth century. By the 1850s, they were under 20 million. See Will, P.E., op. cit. 46, p.276; Bin Wong, R., op. cit. 70, p.783.
82. Perkins, D., *Agricultural Development in China, 1368-1968*, Chicago, 1969, p.164.
83. Hsiao, K.-C., *Rural China: Imperial Control in the Nineteenth Century*, Seattle, 1960, p.154.
84. *New York Times*, 24 February 1878.
85. In 1855, a rain-swollen Yellow River switched deltas, one of the eight times in written history that it has radically switched its path to the sea, moving hundreds of miles in the process. Its changed course after 1855 and the consequent silting up of the Grand Canal, combined with an increased frequency of flood and drought, made several regions ever more dependent on cotton handicrafts for survival. See Elvin, M. and Ninghu, S., "Action at a Distance: The Influence of the Yellow River on Hangzhou Bay since A.D. 1000" in Elvin, M. and Ts'ui-jung, L., (eds.) *Sediments of Time: Environment and Society in Chinese History*, Cambridge, 1998, pp.344-407.
86. Hinton, H., *The Grain Tribute System of China (1845-1911)*, Cambridge, MA, 1956, pp.42-3.
87. In London, *The Times* (21 June 1877) blamed the famine on the refusal of the Qing to allow European investors to build a mainline railway into interior northern China.
88. Wang, Yeh-chien, op. cit. 75, pp.125-6.
89. UK Foreign Office, op. cit. 54, p.6.
90. Bohr, P., op. cit. 49, pp.60-63, 218.
91. *Ibid.*, pp.35-41, 227.
92. British supporters of Christian missionaries in China believed that sending famine relief was "a heaven-sent opportunity to spread the gospel" (Li, L., op. cit. 60, p.700). In 1877, the British consul in China said that "the distribution of funds by brave and judicious men engaged in the [relief] work will do more to open China to us than a dozen wars" (Arnold, D., op. cit. 62, p.137). In the US, humanitarian proposals to return some of the money extorted from China in 1859 were overridden by a backlash against the supposed "yellow peril" of immigrant labour. Other countries were as unrelenting as the United States in their collection of indemnities, reparations and compensations from a starving China (Williams, F., *The Life and Letters of Samuel Wells Williams*, New York 1889, p.433).
93. In 1972-74, successive years of drought triggered a famine that swept across the African Sahel from Senegal to northern Ethiopia, killing nearly 200,000 people. The Sahel, a narrow band of semi-arid land which forms the southern edge of the Saharan desert, passes through Mauritania, Mali, Burkina Faso, Niger, and Chad. The region is widely French-speaking, Islamic and takes its name ("shore") from Arabic. Periods of drought and localised environmental degradation have so curtailed agricultural production and livestock numbers that this African region, rich in culture and history, has now become linked in public consciousness to food insecurity and social vulnerability. But, comments geographer Simon Battenbury, "The constellation of forces that link the Sahel's rural people to global climatic changes, financial flows, and circuits of political and military power, cannot be adequately understood if we see the region as suffering a continuing 'environmental emergency'. Persistent drought is but one of a set of overwhelming problems affecting the Sahel, which has some of the poorest nations in the world." See Battenbury, S., "The Sahel region; assessing progress twenty-five years after the great drought", *The Geographical*, London, May 1998 and <http://www.u.arizona.edu/~batterbu/geomag.html>, accessed 8 May 2002.
94. In the seventeenth century, the first Qing emperor had envisioned ever-normal granaries in county seats, charity granaries in major towns and community granaries in the countryside. Ever-normal granaries were managed by members of the magistrate's staff. They were directed to sell, lend or give away grain in the spring and to make purchases, collect loans and solicit contributions in the autumn. See Will, P.-E. and Bin Wong, R., (with Lee, K., Oi, J. and Perdue, P.), *Nourish the People: The State Civilian Granary System in China, 1650-1850*, Ann Arbor, MI, 1981, p.19.
95. Will, P.-E., op. cit. 46, Chapters 7 and 8.
96. *Ibid.*, p.270.
97. *Ibid.*, p.86, 189.
98. Post, J., *Food Shortage, Climatic Variability, and Epidemic Disease in Preindustrial Europe: The Mortality Peak in the Early 1740s*, Ithaca, NY, 1985, p.30.
99. The drought famine of 1959-61, which killed 20 million peasants (as officially acknowledged in 1980) was the most deadly of the twentieth century. Given the People's Republic of China's commitments to food security and disaster mitigation in the early 1950s, as well as its success in raising average life expectancy, the scale of this holocaust is stupefying. There is controversy over the contribution of ENSO to the agricultural catastrophe of Chairman Mao's "Great Leap Forward", which aimed to develop China economically and technically. The "strong" El Niño of 1957-59 was probably responsible for the onset of drought in 1958-59 which affected one-third of the nation's cultivated acreage. The weather was the main cause of the enormous grain-yield losses in 1960 and 1961, points out Y. Kueh. But communes could have survived the crisis without mass mortality if the central authorities in Beijing had not reduced sown acreage in 1959 (so as to divert labour to public works and steel-making) and enforced confiscatory procurement quotas in 1959-60. Economists Jean Dreze and Amartya Sen contend that "The disastrous policies that had paved the way of the famine were not changed for three years as the famine raged on, and this was made possible by the near-total suppression of news about the famine and the total absence of media criticism of what was then happening in China." See Kueh, Y., *Agricultural Instability in China, 1931-1991*, Oxford, 1998; Dreze, J., and Sen, A., "Introduction", in Dreze, Sen and Hussain, *The Political Economy of Hunger: Selected Essays*, Oxford, 1995, pp.18-19; Kane, P., *Famine in China, 1959-61: Demographic and Social Implications*, London, 1988.
100. "Introduction", Will, P.-E. and Bin Wong, R., op. cit. 94, p.21. China's miserable roads, however, were a major obstacle to market integration as well as famine relief.
101. Will, P.-E., op. cit. 46, p.257.
102. The northern China peasantry during the high Qing era was more nutritionally self-reliant and less vulnerable to climate stress than their descendants a century later. Indeed, North China was unprecedentedly prosperous by historical standards. Formal land taxes were low, an estimated five to six per cent of the harvest, of which a large portion was expended locally by county and provincial governments. Unlike their French counterparts, the farmers of the Yellow River plain were neither crushed by exorbitant taxes nor ground down by feudal rents and the vast majority owned their land. The percentage of the rural population ordinarily living near the edge of starvation – depending, for example, on husks and wild vegetables for a substantial part of their diet – was less than two per cent. As a result, epidemic disease, unlike in Europe, was held in check for most of the "Golden Age". See Perkins, D., op. cit. 82, p.176; Will, P.-E., op. cit. 46, p.32; Roberts, J.A.G., *A Concise History of China*, Cambridge, MA, 1990, p.173.
103. Food security in the mid-eighteenth century may have consumed 10 per cent of annual Qing revenue. As R. Bin Wong states, "For a state to spend such sums for this purpose on a regular basis for well over a century is likely unique in the early modern world." See Bin Wong, R., "Qing Granaries and Late Imperial History" in Will, P.-E., and Bin Wong, R., op. cit. 94, p.477.
104. See footnote 22.
105. The Moguls did not have the resources of the centralised Qing state, nor is their administrative history so well documented. Moreover, "the problems of intervening in the complex network of caste-based local markets and transport bottlenecks rendered an effective state intervention quite difficult". See Sharma, S., "The 1837-38 Famine in U.P.: Some Dimensions of Popular Action", *The Indian Economic and Social History Review* 30: 3, 1993, p.359.
106. Bhatia, B., op. cit. 17, p.9.
107. Singh, C., "Forests, Pastoralists and Agrarian Society in Mughal India" in Arnold, D. and Guha, R. (eds.) *Nature, Culture, Imperialism: Essays on the Environmental History of South Asia*, Delhi, 1996, p.22.
108. Kondker, H., "Famine Policies in Pre-British India and the Question of Moral Economy", *South Asia* 9:1 (June 1986), pp.25-40; and Mahtur, K. and Jayal, N., *Drought, Policy and Politics*, New Delhi 1993, p.27.
109. Blair, C., *Indian Famines*, London, 1874, pp.8-10.
110. Hardiman, D., "Well Irrigation in Gujarat: Systems of Use, Hierarchies of Control", *Economic and Political Weekly*, 20 June 1998, p.1537.
111. The Marathas, located in the mountainous regions of the Deccan, were mainly drawn from the lowest caste of society, but they became a powerfully militant community in the seventeenth century. The Moguls defeated the Marathas and annexed their territories, but the Marathas adopted guerilla warfare tactics, hiding and living in the forests. They continued to rule over their territory, even though it was under the control of the Moguls, as a separate state within a state. By 1740, the Marathas

- controlled more territory than the Moguls. In the later eighteenth century, Maratha rule was a major obstacle to the British attempt to control the economy of India as the Marathas were far more resistant to British imperialism than the Moguls. The Maratha chieftains continued to rebel all throughout the early decades of the nineteenth century.
112. Richards, J. and McAlpin, M., "Cotton Cultivating and Land Clearing in the Bombay Deccan and Karnatak: 1818-1920", in Tucker, R. and Richards, J., (eds.) *Global Deforestation and the Nineteenth-Century World Economy*, Durham, 1983, pp.71, 74.
113. Nash, V., op. cit. 14, p.92.
114. Walford, C., "The Famines of the World: Past and Present", *Journal of the Statistical Society* 41:13, 1878, pp.434-42. See also Walford, C., op. cit. 12.
115. Watts, M., *Silent Violence: Food, Famine and Peasantry in Northern Nigeria*, Berkeley, 1983, pp.462-3. This "negotiation" is twosided and must include climate shock as an independent variable.
116. Medick, H., "The Proto-Industrial Family Economy and the Structures and Functions of Population Development under the Proto-Industrial System", in Kriedte, P., et al., (eds.) *Industrialization Before Industrialization*, Cambridge, 1981, p.45.
117. Ibid., pp.44-5.
118. Ibid.
119. Lewis, W.A., *Growth and Fluctuations, 1870-1913*, London 1978, p.189.
120. Cited in Dewey, C., "The End of the Imperialism of Free Trade", in Dewey, C. and Hopkins, A., (eds.) *The Imperial Impact: Studies in the Economic History of Africa and India*, London, 1978, p.35.
121. The Indian and Chinese economies were also throttled by military expenditures. No other major countries were forced to devote such excessive portions of their national income to war. India had a huge public debt incurred from reimbursing the stockholders of the East India Company, paying the costs of the 1857 Mutiny, and financing British military expeditions in Afghanistan, China, Ethiopia, Egypt and Sudan. Military expenditures were never less than 25 per cent (or 34 per cent including the police) of India's annual budget. Britain itself never spent more than 3 per cent of its net national product on its army and navy. See Hobson, J., "The Military-Extraction Gap and the Wary Titan: The Fiscal Sociology of British Defence Policy, 1870-1913", *Journal of European Economic History* 22:3, Winter 1993, p.480.
122. Lewis, W.A., op. cit. 119, p.216.
123. Overpopulation is not an issue in the famines of Brazil and Africa where land/population ratios were high and labour shortages chronic until at least the middle of the twentieth century. An estimated 1-2 million people died in Brazil in the late nineteenth century famines.
124. Charlesworth, N., *Peasants and Imperial Rule: Agriculture and Agrarian Society in the Bombay Presidency, 1850-1935*, Cambridge, 1985, pp.13, 22.
125. Ibid.
126. Tomlinson, B., "Economics: The Periphery", *The Economy of Modern India, 1869-1970*, (The New Cambridge History of India, 3:3) Cambridge, 1993, p.68, Table 3.7.
127. Quoted in Chandra, B., "Colonial India: British versus Indian Views of Development", *Review* 14:1, Winter 1991, p.102.
128. For a collection of Bagchi's essays, written or delivered over the last few decades, see Bagchi, A. K., *Capital and Labour Redefined: India and the Third World*, New Delhi, 2002.
129. Lavelly, W. and Bin Wong, R., "Revising the Malthusian Narrative: The Comparative Study of Population Dynamics in Late Imperial China", *Journal of Asian Studies* 57:3, August 1998, pp.714-48.
130. Economist Esther Boserup inverted Malthus's theory in a 1965 study to argue that population increase was really the motor, not the brake, of economic and social progress. See Boserup, E., *The Conditions of Agricultural Growth: The Economics of Agrarian Change Under Population Pressure*, Chicago, 1967.
131. Maddison, A., *Chinese Economic Performance in the Long Run*, Paris 1998, p.39. See also Kaimin, Z., "The Evolution of Modern Chinese Society from the Perspective of Population Changes, 1840-1949" in Wakeman, F. and Zi, W., (eds.) *China's Quest for Modernization: A Historical Perspective*, Berkeley, 1997.
132. Pomeranz, K., op. cit. 80, p.121.
133. Gernet, J., *A History of Chinese Civilization*, Cambridge, 1996 (2nd edn), p.560.
134. Heijdra, M., "The Socio-Economic Development of Ming Rural China (1368-1644)", PhD diss, Princeton University 1994, pp.50-56; and Mote, F.W., *Imperial China, 900-1800*, Cambridge, MA, 1999, pp.903-6.
135. Mote, F.W., op. cit. 134, p.906.
136. See Pomeranz, K., "Two Worlds of Trade, Two Worlds of Empire: European State-Making and Industrialization in a Chinese Mirror", in Smith, D., et al., *States and Sovereignty in the Global Economy*, London, 1999, pp.81-3.
137. O'Brien, P., "Intercontinental Trade and Third World Development", *Journal of World History*, Spring 1997, p.91.
138. Sharma, S., "Irrigation" in Singh, V., *Economic History of India: 1857-1956*, Bombay, 1966, p.165; and Whitcombe, E., "Irrigation" in Kumar, D., (ed.) *The Cambridge Economic History of India, Volume Two: 1757-c.1970*, Cambridge 1983, pp.678, 703-7.
139. Whitcombe, E., *Agrarian Conditions in Northern India*, vol. 1 of *The United Provinces Under British Rule, 1860-1900*, Berkeley, 1972, pp.xi, 75.
140. See Chakravarti, R., "The Creation and Expansion of Settlements and Management of Hydraulic Resources in Ancient India", in Grove, R., Damodaran, V. and Sangwan, S., *Nature and the Orient: The Environmental History of South and Southeast Asia*, Delhi, 1998, pp.87-105; Kaiwar, V., "Nature, Property and Polity in Colonial Bombay", *Journal of Peasant Studies* 27:2, Jan. 2000, pp.23, 25.
141. Hyndman, H.M., op. cit. 27, p.128.
142. Hardiman, D., op. cit. 110, p.1533. See also Agarwal, A. and Narain S., *Dying Wisdom: Rise, Fall and Potential of India's Traditional Water Harvesting Systems*, Centre for Society and Environment, New Delhi, 1997.
- Elizabeth Whitcombe has argued that the canals which replaced well irrigation were little short of an ecological disaster and brought huge, unforeseen social costs. Without proper underground drainage, the capillary action of irrigation brought toxic alkali salts to the surface. Some 15 years later, it was estimated that an immense area of between 4,000 and 5,000 square miles of farmland was blighted by salinity "with 'valuable' crops isolated in clumps upon its surface." In addition, wherever flush irrigation was practised side by side with traditional well irrigation, the new system undermined the old. In some places, rising water tables or lateral seepage from irrigated fields led to well collapses; in other cases, the water tables fell and wells became brackish and unpotable.
- Canal embankments, meanwhile, by blocking natural drainage and pooling water in swamps, created ideal breeding environments for anopheline mosquitos. The canal districts consequently became notorious for their extraordinary incidence of malaria, India's most deadly epidemic disease. Death and debilitation were greatly abetted by the British reluctance to devote resources to rural public health and to mosquito eradication.
- Indigenous irrigation systems, according to many developmental economists, avoid the problems of salinisation and mosquito-borne disease associated with the big canal complexes and are generally "(1) more efficient in the use of energy, capital, and natural resources; (2) have more stable yields over the long term; and (3) are more equitable in terms of opportunities, benefits, and risks."
- See Whitcombe, E., op. cit. 139, pp.81, 88; Stone, I., *Canal Irrigation in British India*, Cambridge, 1984, p.154; Tomlinson, B., op. cit. 126, p.76; Mabry, J. and Cleveland, D., "The Relevance of Indigenous Irrigation", in Mabry, J., (ed.) *Canals and Communities: Small-Scale Irrigation Systems*, Tucson, AZ, 1996, pp.227-8, 236.
143. Hardiman, D., op. cit. 110, p.1534.
144. Ibid.
145. Satya, L., "Cotton and Famine in Berar, 1850-1900", PhD diss. Tufts University, 1994, pp.72, 116, 122. (See also book of same title, Delhi, 1997.)
146. Mosse, D., "Colonial and Contemporary Ideologies of 'Community Management': The Case of Tank Irrigation Development in South India", *Modern Asian Studies* 33:2, 1999, p.315.
147. Naquin, S. and Rawski, E., *Chinese Society in the Eighteenth Century*, New Haven, CT, 1987, p.24.
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This briefing paper is published as part of a joint project between The Corner House and Women's Global Network for Reproductive Rights (WGNRR) which explores issues related to "Women, Population Control, Public Health and Globalisation".

Despite formidable and compelling criticism, Malthusian arguments that human numbers are to blame for environmental degradation and poverty continue to produce an unremitting anxiety about "overpopulation" in the West and among Western-influenced elites. These arguments have also long been used to justify population control policies (even though many policy makers have tried in recent years to make discredited policies appear more acceptable by framing them in the language of women's reproductive rights), but are also used to justify a range of policies in the arenas of food, international trade, water, housing and migration. Many of the policies which impact most upon women's reproductive health and their reproductive rights are not population policies, but public health and trade policies. In many places, women, men and children do not have access to any kind of healthcare services, nor the means (adequate food, water, sanitation, shelter, and livelihood) to maintain their health.

Moreover, the justifications given for anti-natalist population policies are constantly changing. This poses challenges to movements around the world committed to genuine reproductive choice for women and men and to equity and sustainable development. Today, much of the "evidence" put forward for global overpopulation, such as ethnic conflict and increased migration to the North from the South, and many of the arguments put forward for population control policies – stemming immigration, environmental security, national security – are being articulated in areas unrelated to reproductive health, although their impacts on reproductive and public health and women's choice are severe.

The joint project between The Corner House and WGNRR aims to provide analysis and information for those confronted with these challenges, to generate debate and to bring about change within policy circles, NGO networks and broader public media.

WGNRR is an autonomous network of individuals, groups and organisations in every continent which aim to support reproductive and sexual self-determination for women.



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The Corner House is a UK-based advocacy, research and solidarity group which aims to support the sustainable use of resources and the growth of a vibrant, democratic, equitable and non-discriminatory civil society in which communities have control over the resources and decisions that affect their lives and means of livelihood, as well as the power to define themselves rather than be defined by others.

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