

Why Geography Matters to the Economic History of India

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Why Geography Matters to the Economic History of India¹

Abstract

That geography shapes long-run economic change is almost an axiom in economic history, but there is neither adequate understanding nor much agreement about how this influence works. This paper is an attempt to contextualize Indian economic history against what we now know of this influence. It is also an attempt to define the geographical condition of the South Asia region in a manner compatible with the purpose of economic history, which is to explain the deep roots of economic growth and inequality.

There are several routes through which geography enters economic history. One of these is spatiality, broadly, the cost of distance and the economies of proximity. The role of spatiality in shaping economic change is in evidence in the trade-based models of specialization and in classical theories of agglomeration, developed through the works of August Lösch, Johann Heinrich von Thünen, Alfred Weber, and others. A second way that geography matters is via natural resources. For example, Karl Marx's and Karl Wittfogel's accounts of some premodern states built on modes of water use, and these models implied pathways of economic change. A third way is to bring in climate and latitude as arguments. For example, tropical aridity has an association with droughts and famines. Even when that risk disappears, the tropical monsoon climate could still impose extreme degrees of seasonality upon economic activity.²

Presently, each one of these three ways of bringing in geography finds applications in explanations of uneven development between countries. My purpose here is different. It is to assess if spatiality, resources, and climate can be useful as concepts to understand the pattern

of economic change in colonial India (1857-1947). I suggest that the great nineteenth-century forces that transformed the world economy – trade, technology, or colonialism – worked through spatiality, resources, and climate to shape livelihoods in any of the world’s regions. Some aspects of that geographical mediation historians of the economy and the environment have written about. Some aspects remain under-researched. In this paper, I survey the India-bound scholarship that helps to understand the mediation. The concluding section assesses how the combined understanding of geographical mediation can change conventional economic history narratives about India.

It is useful to set out the stylized facts that this account of geography tries to explain. In colonial India, average income rose at around one percent per year for most years, the interwar years seeing near-zero rates. This dismal record hides a huge divergence between business and agriculture. Between 1900 and 1945, real income in industry and services increased by 133 percent, and real income in agriculture by 26 percent. At the same time, income per worker in industry and services increased by 180 percent, and income per worker in agriculture increased by six percent (Roy 2020a). Average income is a ratio with population in the denominator. The per capita income growth was depressed because India scored a significant success in raising life expectancy and reducing infant and adult mortality rates but was much less successful in increasing land yield. In turn, the success in the shape of a demographic turnaround had owed to eliminating the risk of dryland famines endemic in the region. In the nineteenth century, population grew at around 0.4 percent per year. In the next fifty years, the rate reached one percent per year. Although land yield did not change, foodgrain production increased from 15-20 million tons in 1885 to 50 million in 1950 thanks to growth in cultivated land area. Food production matched the enormous expansion in the population (from 230 million in 1881 to 425 million in 1951).

Most explanations of India's economic performance in the colonial era explain trends in the per capita income with political variables such as colonial exploitation and deficient institutions, or global forces like trade growth and factor mobility. Causal models of that kind cannot explain Indian economic history well because that history did not follow a unitary pattern. Per capita income trends hid divergences within the society. Because there were these divergences, macro variables like colonialism, institutions, and globalization cannot explain the pattern of change. Institutions, for example, cannot explain why Punjab forged ahead with a green revolution in the late nineteenth century, and Bengal saw agricultural stagnation, even regress, for both regions were under similar laws. The paper argues that we need to add geographical 'filters' between these macro forces and the Indian conditions to explain the divergence.

In the next section of the paper, I suggest that spatiality, resource, and climate worked to the advantage of businesses that concentrated in the cities, especially port cities. The second and the third sections focus on agriculture and population, showing why the geographical impact was more binding here, how that impact changed, and why the change was of limited order.

Spatiality or the geography of specialization

The key intuition behind spatiality is that geography means distance, and distance adds to the costs of exchange. With reduced costs of market exchange, trading economies acquire a capability to grow that would otherwise not exist. Historically, reduced trade costs were a combination of measures to bridge physical distances between markets and measures to create or impose uniform laws and institutions on markets. It was geographical in another sense too, inducing specialization across the globe and potentially causing uneven development.

Adam Smith popularized the idea that market exchange incentivized specialization and division of labour – the rule that individuals and spaces devote themselves to those activities for which these are best suited. In the 1770s, when Smith drafted the theory, nations were more similarly placed than they became a century later, and the idea could translate into a practical guide and a campaign point. But as England industrialized, the political appeal of the theory of specialization based on comparative costs collapsed quickly; every country wanted to become like England and industrialize. Practice and policy diverged from theory, based on the further intuition that ‘while agriculture has a capacity for increase that is limited by the “law” of non-proportional increase, industry has a potential that in theory is infinite and in practice very broad-ranging’ (Modigliani 1938).

That industry had this potential was expressed formally much later. From long before, the idea shaped the instinct of politicians and economists. Protectionism became the ruling ideal from shortly before World War II when development was identified with national industrial policy in a range of countries where colonial rule ended or reformed. During much of the twentieth century, the world struggled to keep protectionist rather than free trade impulses in check. In nationalist historiographies that emerged in the formerly colonial regions, principally India in the interwar period, market pessimism was deep-rooted. It had a precise origin. Using its power to impose zero-tariff trade on all parts of the British Empire, Britain had obstructed the industrialization in its colonies, even caused a deindustrialization in the periphery. In intellectual exchanges about the historical roots of underdevelopment in the 1970s, deindustrialization acquired an axiomatic status, not only among the adherents of the old nationalist school, which had dwindled in number, but among Marxists, development experts, and economic historians across ideological leanings.

One element in that anti-specialization historiography was the ‘transition to capitalism’ literature. The World Systems theorists claimed that capitalism spread throughout the world,

eventually dividing it into zones specializing in different activities. Though interested in trade, Smith and his contemporaries had not foreseen the globalizing propensity of market exchange on quite such a scale. Karl Marx sensed this potential, and the Marxist theorists of imperialism generalized that hunch. The World Systems theory was Smithian in its accent on specialization. It was Marxist in its accent on the exploitation of labour as the source of the value that was transferred from the peripheral zones to the core, Western Europe, from the sixteenth century (Wallerstein 1986).

The idea that specialization caused inequality does not need to rely on exploitation. A theory of trade with increasing returns leads to the same outcome. A large fall in the prices of manufactured goods produced in Western Europe and a rise in the demand for primary commodities available in the tropics led to a massive trade boom from the nineteenth century. So large was the rise in demand and so large the technological leap that they jointly led to a long-term increase in the terms-of-trade or the price of tropical exports as a ratio of the price of its imports. W. Arthur Lewis considered that the terms-of-trade rise was one of the drivers of tropical development. At the same time, it also led to deindustrialization there (Lewis 1970). Jeffrey Williamson agrees and holds deindustrialization responsible for uneven development. '[T]erms of trade improvements,' Williamson says, 'raised long-run growth in the rich core, they did not do so in the poor periphery.' Deindustrialization of the periphery was the reason for this asymmetric effect (Williamson 2008).

India fits this account of divergence poorly. Although a primary commodity exporter in the nineteenth century, India specialized to a far smaller degree than most tropical export economies of the time. At its peak, the trade-GDP ratio did not exceed 0.2, and the proportion of agricultural produce exported stayed around 0.1. Cocoa and rubber exporting countries experienced a 2000 percent increase in exports between 1860 and 1913, grain and cotton exporters like India much less. India was exceptional too in the survival of artisanal textiles,

which happened on a quite gigantic scale. Further, the impact of price-ratio shifts was uneven; it was devastating in cotton yarn but modest in cotton cloth, even though mechanized goods were much cheaper than the handmade indigenous alternatives in both areas.

Dividing the world neatly into industrial and agricultural does not work for this region either, for India was both agricultural and industrial. Between 1860 and 1913, 'in manufacturing, India did better than most other tropical countries ..' (Lidman and Domrese 1970: 311-2). India led the contemporary developing world in the industrial revolution's two primary industries, cotton textiles and iron and steel. In 1928, 48 percent of the cotton spindles installed outside Europe, North America, and Japan were in India (Dunn and Hardy 1931). In 1935, 50 percent of the steel produced outside Europe, North America, and Japan was produced in India (BKS 1950). Indeed, a big part of the third world does not fit the story for a similar reason. 'In terms of periodization,' writes William Clarence-Smith, 'Williamson wrongly asserts that the nadir of Third World industry correlated with the zenith of free trade in the long nineteenth century. The era of free trade actually involved a rapid development of factories for export processing and intermediate goods, the industrialization of some services, and a hesitant emergence of import substituting industries, whether craft based or not' (Clarence-Smith 2018: 32)

How do we reconcile the theory with the evidence? One option would be to say that the tropical export growth, in which India took part, was not driven by specialization but was a 'vent for surplus' (Myint 1958). Lewis, in his summary of the tropical development experience, appeared to side with such a view. However, individual country experiences produce plenty of evidence to suggest that deindustrialization did happen. Indian experience was no different in the presence of deindustrialization in some form.

But the Indian experience also shows that another set of forces pushed back against deindustrialization and specialization. From the late nineteenth century, these forces

dominated as the decline in the crafts was arrested, and import-substituting industrialization took hold. The Indian evidence also shows that the pushback did not come from state policy, in the shape of protection or the statist measures usually associated with the concept of 'late' industrialization (Amsden 1991). If anything, it weakens the case that late industrialization needed a political type of pushback.

To understand the pushback against deindustrialization, it is necessary to bring in elements of business history, or what in fashionable terminology might be called the logic of capitalism. The ports were the nodal points in an extensive railway system that came up. Cargo carried by the railways and the ports increased from 5 to 140 million tons between 1871 and 1939. Commercialization on such a scale induced capital accumulation. The profits in the primary export trade made Indian grain and cotton merchants of the port cities, Bombay, Calcutta, and Madras, interested in finding new investment avenues. These cities' cosmopolitan business environment made the knowledge needed to set up and run a textile factory readily available. They imported the machines and hired the people abroad to run these machines, and set up the world's fourth-largest cotton mill industry in competition with Manchester. Trade created the financial capacity to industrialize (Gupta and Roy 2017).

In the sphere of the craft industries, a pushback was again at work. For example, the clothes that survived competition from British textiles usually involved skills that the machines could not impart and that the consumers valued. Treating these skills as a form of capital, we again see a similar accumulation process at work. Skill-intensive traditional industry gained from taking part in the globalization process, importing various manufactured inputs, including cotton yarn and dyes, to save on cost and simplify the process (Roy 2020b).

India, in short, does not fit the theory of specialization. That does not make spatiality irrelevant for the region. As the remarks above suggest, spatiality is still essential to

understand the regional pattern of commercialization within India and the origin of regional inequality. There are two ways this relevance can be seen.

Compiling a new set of data on the late-eighteenth and early-nineteenth-century, Roman Studer says that whereas those regions of Western Europe which forged ahead earlier had been involved in a market integration process, in areas that fell behind, the preconditions for exchange-based economic growth to occur were slow to develop. '[T]rade networks and market structures were shaped by geography more directly than by political boundaries' in these areas (Studer 2015: 153). Geography mattered via transportation cost, which tended to be relatively low in Western Europe, whereas 'nature burdened India with more hurdles to overcome' (Ibid. 155). Although India is cited in this work as a generic opposite to Western Europe, the data comes from a specific part of India, the Deccan Plateau, dominated by an arid and undulating landscape with relatively low market density. It follows that those regions located nearer cheaper trade routes or the emerging port cities were less constrained by the same logic.

The expatriate merchants who did business in the cities had an interest in the commodity-producing interior. Their campaign influenced the decision to construct railways from the 1850s. The network initially connected the port cities with zones with commercial possibility. Once a large enough system was in operation, around 1900, the gains were not confined to profits in particular types of trade. Donaldson (2018) finds that the railways contributed to real income growth via their impact on regional market integration and price convergence. This is a significant change for the vast Deccan Plateau region with low density of river and wheeled traffic, earlier served by the slow and expensive bullock caravan trains for bulk transportation of goods. Railways, however, were a limited agent of change because it could not alter production conditions in the countryside.

The second use of spatiality is increasing returns associated with cities or clusters rather than industry or countries. This spatiality dimension finds a fuller exposition, more use, and more contestation within economic geography than economic history (Phelps 2004). Its historical role is rarely questioned by urban studies experts. The industrialization drive in India concentrated in the port cities. These cities emerged from the British East India Company's old trading enterprise, hence their maritime situation. However, from the late-nineteenth century, their maritime activity was not the most crucial characteristic of these places. The advantage of their location was partly geographical and partly the synergy between industry, finance, trade, and technology.

I will show in the next section that much of the countryside in the peninsular region was constrained by a lack of secure supply of water and high seasonality of agriculture owing to its monsoon-dependence. Before 1850, trade and finance in the port cities did respond to the seasonality effect, for shipping needed to use the monsoon winds and avoid the monsoon storms. But the port cities were not water-scarce, thanks to higher rainfall on the coasts and their ability to situate on estuaries and deltas where there was enough water flow even in rivers that tended to shrink in summer. They could grow more prominent because they could provide food and water to more people. As more workers and more businesses migrated into these cities, businesses found it easier to move money between activities. Being centres of administration, these places also had concentrations of judicial and educational institutions. The diverse job market, the prospect of higher education, and institutional density attracted skilled service workers. These advantages, and integration with the world economy, were concentrated, consolidating over time, and added to growing regional inequality (Roy 2014). Outside the coasts, deltas and floodplains of Himalayan rivers, towns had limited capacity to provide water and the countryside even smaller capacity. How did that pervasive insecurity affect growth and inequality?

Managing resources

The main intuition of the resource-based accounts of economic change is that managing scarce resources has political and institutional consequences that can shape pathways of change. In recent economic history literature, an example of the resource view would be the argument that land abundance and labour scarcity induced the emergence of labour coercion in precolonial Africa (Austin 2008, Fenske 2013). The historical roots of labour institutions are an undeveloped theme in Indian economic history, possibly because the caste system makes it difficult to separate the economic from the ritual origins of obligatory labour.

Another resource-based account of comparative economic history deals with India explicitly. It builds again on forced labour mobilization, but now serves a specific aim, to channel large quantity of water from the commons to private productive use. '[T]his mass labor must be coordinated, disciplined, and led' by 'a state stronger than society' (Wittfogel 1957: 18). In this way, Karl Wittfogel connected societies that needed to rely on large-scale waterworks and the formation of states that exercised absolute power over their people. In early statements of the thesis in journals, Wittfogel did not appear to be aware of Marx's claim that Asiatic states were distinct from the European ones because Asia was geographically distinct. He acknowledged the parallel in the book version of the thesis.

Wittfogel's central purpose was to explain forms of power and not do environmental economic history. The accent on forced labour underlines that his theory was ultimately a theory of power. If the states were as strong in Asia as Wittfogel imagined, the societies were comparatively weak. And if they were weak, they were changeless; the despots did not like change. And if they were changeless, European expansion in these lands should bring about a much-needed revolution. Using such logic, Marx made claims about Asian inertia (Marx

1954: 513-5; Engels 1934: 228-9). Fernand Braudel had an identical reason for being interested in wet rice cultivation, which to him ‘implies a stable society, state authority and constant large-scale works.’³ The image of inertia carried over into present-day writings about Indian history, for example, into Eric Jones’ ‘indestructible atoms’ that composed India, the atoms being ‘village agriculture’ and the ‘caste system,’ hinting again at the crucial role of forced labour mobilization (Jones 1987: 193).

Historians of India debate whether precolonial states anywhere in this region were as centralized as Wittfogel and Marx imagined. The current consensus is that even the strongest polities before British India ruled by sharing sovereign power and giving away rights to the local elite. As the fourteenth century Tughlaq king of Delhi Feroz Shah did, precolonial states constructed waterworks but rarely regulated their use. Most waterworks were local and bounded by the capacity of the local sources. These needed decentralized regulation. Studies of South India observe that whereas water control was vital to political power, the states did not necessarily centralize that control but distributed it, in the same way, they dispensed land grants, hoping to obtain the loyalty of regional and local elite (Mosse 2006).

The real problem of Wittfogel’s work is not the theory of power but that it builds its central claims on a singularly unreliable account of geography. Climatically, India is a tropical monsoon region. The word monsoon is missing from the book, and the word tropical occurs once. There is no worthwhile discussion of geology at all. Propositions about arid and rainfed zones within India build loosely on how ‘humid’ they are. Wittfogel had the annoying habit of bracketing India with Egypt, China, and Mesopotamia in most statements about how geography shaped politics, making his knowledge of India both suspect and hard to test. In the end, the readers of this book do not get a clear explanation of why water supply was a particular problem for India. An answer to that question would show that large-scale waterworks were not the necessary solution to that problem.

Why was water a problem in India? It was a problem because of a combination of climate and geology. Excluding the Ganges delta and the coastal regions, India in the colonial times, or mainland South Asia in the modern times, falls in a climatic zone – tropical monsoon – that is a combination of two conditions. One of these is above average heat. The heat causes faster evaporation of surface water, making mobilization of water for cultivation, industrial use, and consumption a costly activity. The heat also makes for the hydrologic cycle that produces a powerful monsoon. However, the monsoon rainfall is concentrated in a few months in a year, making for a pronounced seasonality in surface water supply. Together, the two conditions mean that the tropical monsoon situation, while not imposing water-scarcity in an absolute sense, made securing water for the drier months of the year a challenge. Ways of recycling water between seasons were usually expensive, though not necessarily large-scale.

There were broadly three systems in which monsoon water could be saved and secured for the dry months – canals, tanks or artificial lakes, and wells. Canals recycled water from more abundant sources to more fragile ones, tanks impounded rainwater on a big enough scale to withstand evaporation, and wells mined water from underground aquifers. Doing any of these depended on geological conditions. For example, in the Indo-Gangetic Basin watered by rivers that received supply from Himalayan snowmelt, it was easier to build canals that would carry enough water in the dry seasons. In the South Indian peninsula or Deccan Plateau, the rivers did not receive snowmelt and lost too much water in the dry months to sustain canals. Instead of canals, tanks were common in South India. But tanks were expensive to build and maintain and did not always survive dry seasons. Wells were relatively inexpensive to make, and a lot of them were built with private resources in the Indo-Gangetic Basin, which had rich aquifers and soft alluvium. In the Deccan, a part of which formed of late-Mesozoic

volcanic activity, aquifers occurred between layers of hard rock, and few people could afford to invest in wells boring through the rock.

In other words, whereas a range of local responses prevailed over large-scale projects that Wittfogel imagined were the norm in India, that response was not cheap and not enough to protect vulnerable regions and peoples from the risk of droughts and famines. Again, the extent of vulnerability was not uniform. The relative resource security of the Indo-Gangetic Basin or deltaic zones in South India is reflected in their population densities compared to the peninsular and central India. In 1901, the density in the Indo-Gangetic plains and Eastern India was about double that of South India, the density in deltaic South India about 40 percent higher. These differences were possibly long-standing and derived from the higher mortality risk in the peninsular region or the Deccan plateau. There is no reliable data to say if drought-induced famines were less or more frequent during India's colonial rule than before. Without question, droughts were a common occurrence everywhere in the monsoon tropics. In the Deccan region, droughts had a high chance of developing into famines. The area ordinarily received a relatively weak monsoon, canals and wells were not common, and tanks dried up during very dry seasons.

Several million lives perished during three such episodes in the late nineteenth century (1876-78, 1896-7, and 1898-9). Deaths occurred due to starvation and waterborne diseases, as people and livestock had to rely on contaminated water sources. These crises became a turning point in Indian history in many senses. They caused a political scandal in Britain and energized the Indian nationalists. They also led to collection of an enormous volume of data, based on which a theory of famine emerged. The theory said that the risk of a failed monsoon was relatively high in the region, but the link between dryness and famine could be broken with better food and water distribution. On the food front, the solution was straightforward, build more railways. Many railways did get built as famine insurance, and these projects did

pay off in preventing famines (McAlpin 1983; Burgess and Donaldson 2010; Ravallion 1987). On the front of water, however, public investment was not a solution. Water could not be transported, and canals were not feasible in the famine regions.⁴

State intervention in water took broadly two forms. A series of canals were built between 1870 and 1920, using the waters of the five rivers that met to form the Indus river in the Punjab region. The river and the canal system were a product of the Himalayas and transformed a vast savannah into a cultivable agricultural zone. These canals were not directly famine-related, but the famines reinforced the importance of any canal as a protection against future famines and as an instrument in the production of more food. As I said before, the worst affected areas in the Deccan did not have conditions suitable for perennial canals, though some did get built. A different, institutional form of response took shape in these areas, which had more effect on life expectancy than food production.

Wells had an ambiguous property right. The masonry work on the surface was a private property everywhere, but the water the well drew upon was common property. The anomaly still plagues the management of underground water in India. Famine relief authorities did not have the legal right to sequester wells, but they did assert and enforce a public trust principle on the commons on occasions. Acting as if they followed that doctrine, they did occasionally sequester wells, built many new ones in the 1890s, and took over private sources by force to disinfect the common pool. Repeated cholera outbreaks underscored the urgency of public intervention, not only to acquire water but also to treat it. In 1882, the Indian Easements Act sanctioned the assertion of public trust upon water bodies though the law was not always applied in the parties' best interest. In the interwar period, a series of provincial legislation took the state's eminent domain rights further.

The famine documentation highlighted that the weak ritual entitlement of the lower caste population to the village wells meant that they died in much greater numbers than the upper

castes during famines. The finding boosted the political movements for equal rights then emerging, which adopted access to water bodies as a campaign agenda. The press in Bombay city took up the cause. Numerous cases came to the courts where a plaintiff complained of an insult to religion because a lower-caste person had used a well dedicated to a temple. In increasing proportion, the plaintiffs lost these cases. Between 1919 and 1937, Indian provinces gained elected governments. As they did, the equality movements turned political. Not by accident, the most organized such activity formed in the north-western part of the Deccan Plateau, the so-called Trap area where the last two famines had taken place.

The assertion of public trust in the commons, the movement for equality, legislation, and large-scale waterworks, including canals and urban water supply, had an effect (Roy 2021a). Between 1885 and 1938, water usage per capita in India about doubled (from 200 to 400 cubic metres per year). Along with a rise in average supply, the distribution of water became fairer too. Canals or tap-water in the cities did not discriminate users by their ritual status, and therefore, were egalitarian. Drought-induced famines disappeared from 1900, leading to an irreversible fall in death rates and a rise in life expectancy. Urbanization rates started to rise. Food production and gross cultivable area expanded 50-100 percent.

This narrative of how India's water problem eased under multiple pressures questions the common premises on which the environmental history of India has developed. The environmental history scholarship on India in the nineteenth and early-twentieth century is mainly interested in the impact of European colonialism on ideologies and practices of regulation of the commons.⁵ Most of this scholarship is far removed from economic history, in that it is interested more in imperial power than economic growth and inequality. It does suggest that ordinary people lost access to the commons because of imperial regulation, which was primarily a device to govern the subject populations by dispossessing them of traditional entitlements. By implication, the precolonial situation would appear to be

cooperative and egalitarian, a golden age that colonial power destroyed as it moulded the commons to suit a capitalistic purpose.

Some historians rightly point out that this reading of the precolonial is mythical.⁶ What about the reading of the colonial regulation? The allocation of water rights in the past times was highly unequal. Water rights were unequal because only the rich could afford wells, and the upper castes could secure rights by referring to their ritual entitlement to water. Such culturally conditioned rule of usage might have secured sustainability of underground and surface water resources in the region before the nineteenth century. But they did so only at the cost of high famine mortality and caste-biased mortality. The subsequent trajectory of change that I described above saw greater and fairer access to common property resources. In short, in water, we see a pathway of change that contradicts the Indianist environmental historians' enclosure story. There was opening access, not closing off.

That said, the interventions described above had limited effect on agriculture and land yield. Canals did lead to an extension of land area in the areas where canals came up. Sequestration of wells or building new ones might make drinking water safer for many but had almost no impact upon dryland agriculture. There just was not enough to serve both surety to life and revolutionize livelihoods. The proportion of land irrigated by wells rose marginally (five percent) between 1885 and 1938, whereas that by canals rose 20 percent (from eight to 28). In 1938, nearly 60 percent of the land in Punjab was irrigated by canals. In the dry well-dependent Madras and Bombay, the proportion was 10-22 percent. In the drylands, wells remained far too expensive to be developed as an input in intensive agriculture.

If water insecurity was a joint effect of climate and geology, climate impacted the economy more directly via seasonality.

Climate and seasonality

The intuition behind the climatic influence on economic growth or inequality is that, whereas all agricultural societies face seasonality in work opportunities, monsoon tropics face an extreme degree of seasonality, imposing enforced idleness for an extended part of the year. Growth would depend on breaking out of the seasonal unemployment syndrome via expansion in non-seasonal work and circulation of labour and capital between activities. Inequality would rise if some groups can access these reallocation prospects better than others.

The conduct of agriculture under tropical monsoon conditions was marked by extreme seasonal fluctuations in the pace of economic activity because of the concentrated occurrence of most rainfall. During a short busy time of year, capital and labour were fully employed. During the rest of the year, wages fell, labour became surplus, and capital awaited the busy season. From the time we have data to measure seasonality (say, monthly interest rate movements, available from the 1880s), the seasonal effect was far higher in India than in any temperate zone country (Roy 2016).

In the 1980s, Harry Oshima's work on 'monsoon Asia' tried to bring seasonality into economic history and development policy. Oshima saw a pattern in how different parts of Asia met a challenge deep-rooted in their geography: a poor peasantry employed for only half the year on-farm (Oshima 1986, 1987). The high seasonality made labour-force utilization the critical problem to solve in such societies. The premodern societies solved it by combining farming and nonfarm activity and achieving high degrees of employment intensity. The post-war industrialization policy involved intensive use of labour in industry and was thus consistent with these traditional forms of resource use while being an advance on it.

This attempt to read the history of monsoon Asia through a mainly Japanese lens fails for India. While the monsoon did occur over a wide expanse of Asia, the challenge in India was not just seasonality, but seasonality combined with extreme aridity. A temperate monsoon region like Japan did not face such a challenge. In Oshima's scheme, traditional rice cultivation through methods that employed farming families throughout the year appeared to meet the challenge. That model had geographically limited use. Dryland India did not cultivate rice. It did not have enough water for months in the year to sustain off-farm work. If the enforced idleness period extends long enough, nonfarm work cannot grow. The condition would depress local demand for non-agricultural goods so much as to make extensive off-farm employment unlikely.

Extreme seasonality, in other words, is a more dire scenario than Oshima's monsoon Asia implied. Japanese economic history has few useful lessons to offer to Indian economic history. Rainfed agriculture might make subsistence possible but exposes that subsistence to high insecurity due to drought-risk. It leaves the population with few options to diversify and earn extra income. Recent national income estimates for periods before 1850 confirm that India was a considerably poorer place than Western Europe before the Industrial Revolution began (Broadberry, Custodis and Gupta 2015, Roy 2011). These studies do not explain why it was a poor place for centuries. Environmentally enforced low yield and unemployment of resources explain the finding.

And yet, a short productive season suggests that there is always surplus labour. If there is a prospect of work outside agriculture, there is a chance to earn extra money or for some members of the family even leave agriculture altogether. It is not likely that such work would appear in the neighbourhood, because a short productive season and small marketable surplus also imply limited local demand for consumer goods. For the reallocation model to work in

the monsoon tropics, *rural* nonfarm work was not necessarily viable because seasonality could depress demand; urban industry and services were more promising.

A few significant mitigating forces pushing back against seasonal unemployment did develop from the end of the nineteenth century. Their combined effect on average income was small and not perfectly measurable, for example, when farmworkers migrated to tropical colonies. Still, significant numbers within India tried to alter their situation because these forces came into being. I will discuss three such forces – changes in labour market institutions that enabled the easier circulation of farm labourers, fall in migration costs, and the growth of jobs in the cities. I will follow up this discussion with two other topics, reallocation of capital between seasons and why the combined effect of all these steps on wages and peasant incomes was small.

The employers' problem in tropical monsoon agriculture was that labour was potentially scarce during the busy seasons but potentially idle for the rest of the year. If inexpensive to do so, employers would want to tie in labour. There was little outright slavery in India, but farm servant arrangements were quite extensive, especially in southern India's drylands. There were four features of these farm servant arrangements. First, they were caste-based. In that case, the workers attached to plots of land did not have the entitlement to own land. Second, a servitude of this sort involved a lack of specialization. The workers were attached to the land, but they were available to work in a range of services in the slack season. Third, these activities were not market-driven or chosen by the servants but dictated by their employers. And fourth, these were manual and unskilled work, rarely involving more than the essential tools and basic skills. Where artisanal activity was a part of the portfolio, such as weaving or leatherwork, the quality of the work was raw and far simpler than the work produced by specialist artisans.

Farm servants in colonial India were not alike. In colonial Madras, they belonged in castes that could not effectively own land. On the other hand, in Punjab, farm servants were cultivators on the side and worked under negotiated contracts. In some parts of central India, farm servants were like apprentices. Significantly, Madras was the driest of these three examples around 1900. Despite these differences, there might be a single motivation behind these arrangements. To avoid a shortage of workers in the peak season, the employers offered a contract that carried a small wage but contained an implicit insurance element for those months when there was no work and little water and food.⁷ Seasonality did not mean complete idleness in the slack months; instead, it could mean being available for any odd job.⁸

The 1881 census called the mass of such people ‘general labour,’ or persons who ‘take to miscellaneous tasks involving as little as possible of anything beyond bodily strength’ (India 1881: 196). In the 1960s, Daniel Thorner, who made the first serious effort to understand the nature of work in rural India, considered that this group consisted mainly of agricultural labourers (Thorner and Thorner 1962). Curiously, women crowded general labour more than they did field labour. In the census scheme, field labour was specialized, and general labour was not. Because women were usually non-specialized workers at any time in the year, they were counted as general labour in the nineteenth century.

The proportion of agricultural labourers in the rural workforce increased in the census period (1881-1931). Marxist readings of these data said that debt-ridden peasants lost control of the land to the moneylenders to become landless labourers. There is little direct evidence that this is what happened. In fact, there was an extensive reshuffle between categories of labour. Some castes classified as multitasked or artisanal before reported themselves as field labourers (Kumar 1965). Many moved out of general labour to be classified as field labour. General labour shrank so much that the census gave up this category from 1901 (Roy 2005).

In Madras, the proportion of farm servants among labourers fell from half in 1881 to about a third in 1931 to one percent in 1951 (India 1954). After the 1950s, official sources discarded any notion of attachment on the ground that ‘attached labour is no longer attached to any particular household in the old sense. Such attachments are now conditioned more by economic considerations and may not extend beyond a season or a year at the most’ (India 1973: 65).

What was happening here? A kind of implicit contract had sustained the arrangement where field labour in one season became general labour in another. According to that contract, low wage traded off against drought insurance. That contract did not appeal to either party after 1900. Increased migration possibilities and a fall in migration costs thanks to the railways offered employers a larger casual labour pool. The same conditions encouraged the workers to try their luck elsewhere. Migration opportunities increased in the newly emerging agricultural regions like the Punjab, which did not have its traditional labour pool. The risk that droughts would induce famines fell in the aggregate. From 1900, famines disappeared from the drylands because, as I said above, the vulnerable population saw the barriers to access to water fall. More people than before had access to the water-secure environments of the city or the deltaic regions. Therefore, one condition for entering year-round commitments – securing access to food and water if these things ran out in the dry season – did not operate as powerfully as it did before.

Between 1870 and 1920, agricultural production and trade increased. Rural workers migrated more. Rural incomes did grow, not equally in all regions, and the peasants and workers consumed more non-food articles. Estimates of average cloth consumption suggest a significant increase from six square yards in 1840 to 15 in 1940 (Roy 2012). The extent of the increase in consumption could not just happen by relying on small urban demand for textiles. Peasants too bought more cloth and good-quality cloth. In some parts of rural India, they did

because incomes grew with irrigation expansion and commercialization of agriculture. New agricultural frontiers like these attracted migrations.

There were not many options like these. Migration opportunities for farm labourers was no revolution. Caste was a powerful driver of occupational choices and training. As rural consumption increased, the specialist artisan gained because new consumption goods embodied skills, and the general labourers or farm servants faced barriers to acquiring these skills. Labourers moved into other forms of labour. In the end, there was divergence rather than convergence in wages between agricultural and artisanal work, despite increased movements of people. Rural women, by and large, could not access new labour markets. Owing to low average age at marriage for women in India, women stayed behind.

In parallel with these changes in the labour market, the capital market changed too. A developed commercial tradition had created a large indigenous banking system before the British colonial empire appeared in the region. However, colonialism and globalization changed the structure of trading, and in turn, the financing of trade. Unlike artisanal and high-valued goods traded in the past, agricultural commodity exports became the main item of trade from the mid-nineteenth century, sustained by the railways, the telegraphs, the port city infrastructure, and indigenous banking. The entire financial system, including a nascent corporate banking segment, had to reorient to this new and vast field to deploy money.

The core of the modern banking business became tied to commodity trade, increasing the seasonal influence on their business rather than reducing it. Seasonality in such lending would mean that during the sowing season, when peasants needed credit, and the harvest season when the trade needed credit, bankers must expand credit a lot and very quickly. To do so, they usually dealt in the most liquid of assets, such as cash, made unsecured loans, relied on their informal knowledge of the clients, and avoided deposit banking, which would impose a seasonally invariant liability. During the rest of the year, the slack season when the

circulation of money in the countryside significantly reduced, bankers often hoarded cash in readiness for the busy season than lend it. Money, therefore, was expensive for, say, long-term industrial investment (Roy 2016).

Seasonality, in other words, limited financial intermediation.⁹ The persistence of huge inter-year fluctuations in interest rates showed that the banking business did not increase credit sufficiently in the busy season without running into unsustainable default and did not deploy surplus funds profitably in the depressed months. Lenders in agricultural credit did not usually transact using negotiable instruments or bills. Their clients did not understand or accept papers, and the courts of law and discounting counters were too distant from them. A string of provincial laws restricting land mortgage obstructed the use of a mortgage document as a negotiable instrument.¹⁰ There were other hurdles to legislation. The diverse profile of the actors, most being merchants and bankers of small resources and immense variation in local conventions, would have made designing a proper legal framework for bills a frustrating enterprise. Therefore, the financial system was poorly equipped to spread credit between seasons and types of borrowers. It is not surprising that despite the growth of indigenous banking, aggregate saving and investment rates remained low in the early twentieth century. Long-term interest rates stayed high, much higher than in the money markets of Europe, and fell marginally between 1880 and 1940.

The seasonality effect was stronger in local banking and moneylending than in the port cities. The financial system in the port city overcame the seasonality effect to some extent. The biggest of the banking firms here funded export trade, funded other bankers, sometimes did some deposit business, and were somewhat less susceptible to seasonality. A key feature of their operation was the extensive use of negotiable instruments, especially a group of instruments collectively known as 'hundi.' The ordinary meaning of hundi was a banker's draft or promissory note. Sometimes merchants' bills of exchange were also called hundi. An

important piece of British Indian legislation, the Negotiable Instruments Act (1881) partially covered hundi (Martin 2012). The acceptors' reputation as banking houses and the customary law and conventions that they followed ensured that the mainly European-owned corporate banks discounted the hundis issued. In other words, their inherited institutional strengths and colonial legal intervention together helped these bankers expand their business and diversify the portfolio. In short, the seasonality effect did modify, but not enough. For the poorer agricultural classes or local banking, there was but a limited kind of change.

Conclusion

Three geographical filters – spatiality, water, and seasonality – modified the working of the big drivers of global economic change on the colonial Indian economy. These drivers included European rule, commodity trade boom, mass migration, construction of railways and canals, and technological change. Productive use of these drivers depended on how the filters worked, as a constraint or as a facilitator. In turn, the strength of the geographical effect also changed, but the options and instruments to change that effect were rather limited. The uneven development pattern that followed from the mediation of these filters is a fundamental fact of Indian economic history and requires a systematic reference to geography for a fuller explanation.

Using that idea, we see that the seaboard was less constrained and more advantageously placed to benefit from globalization, being service- and manufacturing-based, and thanks to benign climate and geology. The interior zones experienced resources and climate more usually as a constraint. These areas had inadequate access to the world trading economy too. These zones were also institutionally dissimilar from before European colonialism began. Better-irrigated and more densely populated regions such as the eastern Indo-Gangetic Basin

and coastal-deltaic South India supported more elaborate social hierarchies. Land, rather than water, was the scarcer resource in these parts. Landowners and landless labourers were at two ends of the hierarchy. Colonial property rights reform that focused on land ownership had a significant impact on inequality and investment here.

By contrast, in the arid and semi-arid interior zone, water control – not a field of extensive legislation as land was – mattered more to livelihood and inequality. Canal projects where the geology permitted their construction offered the prospect of exporting agricultural commodities. The rest of the region was not stagnant. The drylands of the peninsular did see a form of institutional and political intervention that made water access fairer and greater than before. If that eliminated famines from the drylands, the intervention was nowhere near enough to transform agricultural conditions. Circulation of labour and capital between more climatically constrained activities and those less constrained increased – but again not enough. The former sphere was limited in space, and there were social barriers to occupational choices.

How does the narrative change after 1947? A completely different industrialization regime took hold, one relying on protectionism and a push for autarky. It makes little sense to compare the two phases of industrialization or treat these as parts of a continuous story. The former phase, I have suggested, allowed a fuller play of spatiality. Whereas in the latter phase, the state deliberately chose interior and often geographically disadvantaged areas to locate big public sector industrial firms. Overall, public investment raised industrial and economic growth, but the rise came with costs. Independent India's pursuit of heavy industry involved vast wastage of taxpayers' money. The strategy led to the decline of the earlier businesses that had grown thanks to resource advantage, agglomeration economies and global links. Commodity export and cotton mills declined. The seaboard cities lost their economic importance and experienced urban unrest and deindustrialization in the 1970s and the 1980s.

While Bombay and Calcutta retreated, interior cities like Bangalore and Bhopal forged ahead based on heavy public investment in industry. Private and government efforts to mobilize water and supply a part of it for intensive agriculture also increased. Again, these policies delivered significantly higher economic growth rates, but the costs, including the rapid depletion of groundwater resources in recent decades, were high too.

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Notes

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² In a broad sense, ‘geography’ includes many aspects of the natural world, such as space, climate, soil, geology, biotics, elevation, and vegetation. Economic history is yet to come to grips with most of these dimensions, except for space, land, and minerals. I suggest in this paper a way to integrate climate into discussions on growth and inequality.

³ Cited by Moore (2003); see also Stargardt (2018).

⁴ The focus of the official enquiries was on the dryland and drought-induced famines. In contrast, much of India’s famine historiography of recent years concentrates on two famines that occurred in a *wet* region. These were the Bengal famines of 1770 and 1943. Although natural disasters and crop failure preceded both episodes, much of Bengal is not arid. Therefore, the attention of historians fell on ‘manmade’ causes like colonial policy, warfare, and conflict. The Bengal fixation led to an oversight of the environmental causes of famines in arid India.

⁵ For a survey, Rangarajan (2012) and ‘Introduction’ in Grove, Damodaran and Sangwan, eds. (2000).

⁶ For a critique of the myth of the ‘eco-golden-age,’ see Krishan (2011).

⁷ For an application to a later time, see Sanghvi (1969).

⁸ Minding livestock was an important task. See Atchi Reddy (1991).

⁹ Goldsmith (1983) found that the level of financial intermediation was relatively low in interwar India. Across emerging economies of the time, the level was not highly correlated with per capita income, even though all showed a rise in intermediation in the long run.

¹⁰ See Nath (2020) for more discussion on problems of drawing and enforcing contracts in rural credit.