



Accounting for climate variability in understanding societal outcomes: Lessons from an institutional archival study spanning the 18th and 19th centuries in semi-arid tracts of peninsular India during the British colonial period

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Anthropogenic climate change will be one of the biggest social and economic disrupters over the 21st century; in a 2⁰C warmer world, consistent with the Intergovernmental Panel on Climate Change (IPCC)'s lowest emission scenario, most regions in the global south, particularly India, could face up to a 40% increase in risk of conflict and long-distance migrations. Much of these risks will be an outcome of increased frequency of climate disasters such as droughts and floods.

Semi-arid tracts in the rain-shadow regions of the peninsular India, characterized by year-to-year variations in rainfall – stretching from Maharashtra in the west to Tamil Nadu in the south – are at an elevated risk from 21st century climate change, especially from the increased occurrence of droughts and floods. We present new data, pertaining to climate disasters, impacts and adaptive strategies, from a review of 50 volumes of archival institutional documents from the British Colonial Period pertaining to administration of districts of peninsular India. The documents span ~ 200 years (1729-1900 AD) and encompass the two phases of the British colonial period, the Company period (1757-1858 AD) and the Crown period (1858 onwards) respectively, which also, climatologically, is a period known for increased incidences of climate disasters—the Little Ice Age (LIA), a one-degree global cooling event that had put enormous pressure on existing infrastructures across the world and also in Colonial India.

We found archival institutional documents, though not adequate for climate reconstructions due to lack of information on climate parameters, to be excellent archives for reconstructing a chronology of climate disasters, studying the effects of these disasters and assessing the efficacy of adaptive strategies and policies at local scales, often at the level of districts (<30 kms). Farmers were most affected by climate disasters; vivid accounts describe impacts of climate disasters e.g. crop failure, price hike, farmer migration, riot, starvation, epidemic diseases, death during droughts, and colossal destruction, migration and death due to heavy rainfall (and associated floods). In both periods, better during the Crown period, administrators adopted coherent policies across peninsular region and developed common infrastructural facilities to mitigate against these disasters.

We do find that during the two centuries of the LIA that brought volatile oscillations in rainfall patterns, prioritizing cash crop production over food crop production and lack of alternate employment combined with a free market approach (i.e. no government intervention including not halting export of grains during periods of food scarcity) made matters stressful for the farming sector; Despite protective infrastructures, famines continued to occur every 5-10 years, consistent with decadal and sub-decadal modes of rainfall variability. For example during the Crown period, even when the protective measures were much better, major famines occurred whenever there was lack of rainfall (Great Famine 1876-1877, Indian Famine 1899-1900). We conclude, therefore, that the rainshadow regions of peninsular region are prone to climate disasters and in the 21st century will benefit from an adaptation strategy that is regionally coherent, provides alternate modes of employment and hinges on more climate-adapted food-crop based agricultural policies.