

Big-Historical Environmentalism for the 21st Century

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The beginning of the 21st century witnessed terrorist attacks on the World Trade Centre in the United States. This incident changed global politics and brought new twists and turns in world history. The last two decades have seen the rise of identity politics, leading to the escalation of local conflicts across the world. At the same time, environmental challenges to human societies have become increasingly threatening, manifested on a planetary scale through global warming and loss of biodiversity. The effect of political and environmental challenges happening together is being felt in social-cultural-economic realms. All of these tensions have been starkly laid bare in the way governments and societies in different parts of the world have responded to the challenge of the global covid pandemic that we are currently facing.

The pandemic will ebb and flow, and reduce itself to a non-threatening form in a few years, but the challenges of global warming and loss of biodiversity just keep growing and will plague us for decades to come. While the battle against alarming changes in the environment around us will continue till the end of the century, many experts believe that the seeds of our success or failure will be sown in this decade. The actions we take and the social-economic-political systems we set up by 2030 will largely cast the die for the future of humanity beyond the 21st century. This situation underlines the importance of seeing the big picture that only Big History can reveal by connecting the dots of events in different spheres of human activity on a planetary scale. Our big-history thinking clearly shows interlinkages between seemingly independent crises that seem to be bombarding us one after the other.

Origins and Development

We can trace the origin of both the political and environmental challenges to the start of the use of fossil fuels and steam engines for rapid industrialisation in Europe in the 1850s. Till then, technology development and industrialisation was happening across the world in varied forms, but the pace was slow everywhere. The technologies were human or animal powered or used the power of air

or water (windmills and watermills). The low power of the machines ensured that the manufacturing industries tended to be localised in terms of both raw materials consumed and markets for manufactured goods.

However, steam engines, powered by a high-energy-density fuel (mineral coal) changed the dynamics for European industries. The multi-fold increase in productivity demanded more raw materials and larger markets than ever before. The consequence was first over-exploitation of resources and humans in Europe followed by empire-building by Europeans. This mode of production and its associated social toll spread across the world. Industrialisation did bring prosperity and progress too, but its benefits were enjoyed only by a handful of people who were already holding positions of political and / or social power.

After the Second World War, political empires broke up, but economic imperialism continued in some form or other. What was triggered by mineral coal and the steam engine has been carried forward by coal-based electricity and the combination of petroleum fuels and the internal combustion engine. These are driving forces of the so-called globalised economy and connected world of the present day. The resultant socio-economic inequity is the root cause of most of the political strife in the world, whereas over-dependence on fossil fuels and excessive consumption of natural resources are the root causes of most of the environmental challenges.

Both the political and environmental challenges are manifestations of a single multi-sectoral challenge – the challenge of sustaining humans far into the future on planet Earth, the challenge of building a sustainable human civilisation. The environmental challenge has local (such as air and water pollution in developing-world cities) as well as global dimensions (as for climate change). There is also a growing consensus that we should call the present time, *Anthropocene* – the age of humans. This is because humans are irrevocably changing the conditions on the planet, making it uninhabitable for many living organisms. The corollary to this is that it is therefore in the hands of

humans to ‘repair the damage’ and ‘save the planet’.

Many of the solutions being suggested also stem from this thinking. For example, a very large number of people believe that population control will solve the environmental problems, simply because, if there are less humans, then there will be less harm to the planet. Such arguments however ignore the fact that the world’s top 20% richest people consume nearly 80% of the total annual resources. Thus, the planetary conditions are not being changed by all humans but only by those who are in the driving seat of the global economy. Data from across the world clearly shows that consumption by the rich has been a bigger driver of the over-exploitation of planetary resources than population size, especially since the 1980s.

Thanks to the hard work put in by many individuals and advocacy groups over nearly a century, population growth-rates across the world have been steadily coming down in the last decades. The absolute population number continues to increase because of improved life expectancy rather than the number of babies born. However, even this effect is levelling off and the global human population is likely to stabilise at around 10 billion by 2070. This should be celebrated as a great success since we have clearly averted the so-called ‘population bomb.’ It must also be stressed that the drivers of this global success are not based on control but instead on women’s education, access to contraceptives, and improvements in health care facilities.

Big History Views

Taking a big-history view puts the environmental challenges in a different perspective. The solar system came into existence about 4.6 billion years ago. The Earth’s planetary systems (atmosphere, geosphere and biosphere) have undergone drastic change since then. The continents as we know them were once part of a single land mass and at some future time may again form a supercontinent. Water arrived on Earth in the form of icy rocks that bombarded the Earth during its formation.

The Earth’s atmosphere was once predominantly carbon dioxide. The composition of the atmosphere changed because of CO₂ absorption by the oceans and rise of blue-green bacteria – the first organisms to evolve the ability to do photosynthesis. Because of their life processes, carbon dioxide, which was nearly 80% of the Earth’s atmosphere was reduced to a few hundred parts per million, and oxygen and ozone were introduced in the atmosphere. This was the first instance of life-induced climate change.

Life evolved and thrived for billions of years near hot volcanic vents on the ocean beds, and many of the ancient organisms still continue to thrive in niches. Even if the anthropomorphic global warming increases the average temperature of the planet by a few degrees, that shift would be insignificant for many life forms on the Earth that have evolved and survived harsher conditions. Life on Earth is not in danger at all from climate change, even if some species went extinct. The Earth as a planet will continue to exist and continue to support life in various forms for another about 5–6 billion years, which is estimated to be the life-expectancy of the sun.

The environmental crisis that we are worried about is therefore not a crisis for planet Earth but a crisis for our species. The goldilocks conditions that helped humans thrive over the last 12,000 years or so are under threat because of our actions. The ‘ideal’ conditions – from the perspective of an environmentalist – are planetary conditions best suited for humans. Examining the past from a big-history perspective also shows that this is not the first time that humans have faced a challenge of sustainability.

The shift from hunter-gatherer lifestyle to agricultural lifestyle was triggered, among other things, by band sizes outgrowing an ideal population size for a sustainable hunter-gatherer community in a region. Agriculture provides a way to improve the productivity of the land and waters, so the sustainability challenge was solved by changing the way of life. This indicates that, for any population size, there can be a corresponding set of forms of sustainable living. In other words, the Earth is capable of sustaining 10 billion humans without undue pressure on the planet’s systems, if the 10 billion humans figure out a combination of consumption patterns or lifestyles to sustain themselves within the planetary boundaries.

The big-history considerations clearly indicate that to frame environmentalism as a ‘moral duty of humans towards stewardship of nature’ is an extremely arrogant form of human-centric thinking. This thinking often justifies the sacrifice of welfare of a few human communities for the lofty ideal of ‘protecting the planet.’ Ironically, the decision-makers are the drivers of the economy (which is the true cause of the environmental problems). The sacrificed communities are generally the most disenfranchised segments of society such as aboriginal peoples (who played the least role in causing the problems in the first place). So, what is often sought to be protected under the garb of environmental concerns is the economic status quo.

On the other hand, recognising the need to conserve the planetary systems in their current forms because they are ideal for human survival and progress is a humbler form of human-centric thinking. This thinking is tacitly in favour of protecting the entire biosphere – not because it is a moral duty but because healthy and thriving ecosystems are necessary for the health and progress of local human communities. This line of thinking leans towards a *sufficiency-based economy* – use only as much resources as are needed with the maximum efficiency possible to achieve a decent quality of life for all people.

This form of sufficiency environmentalism does not advocate protecting nature at the expense of human communities, which is based on thinking of humans as something separate from nature. Instead, it supports creation of more equitable and just human societies as a part of a larger vision of strengthening the biosphere and web of life. This kind of environmentalism that clearly highlights the importance of conserving planetary conditions for the benefit of the humans is more acceptable among the general public than moralistic environmentalism preaching altruism.

Practical Experience, Pragmatic Choices

A lot of this thinking has emerged from my own work over the past thirty years or so. In 1991, I worked on improved cook-stove design for my undergraduate R&D project. This gave me a glimpse of how scientific research can help address complex socio-economic problems. The challenge

of designing an energy-conversion device that fulfils the daily cooking-energy requirements of a household has kept me fascinated.

After completing my PhD in Physics from the University of Pune in 1998, my first independent research project continued on eco-cooking strategies. It resulted in development of a process for converting agricultural waste into renewable charcoal combined with a highly-efficient and clean-cooking device that uses the charcoal as a fuel. This technology won the Ashden Award for Renewable Energy in 2002, presented at the Royal Geographic Society in London. Since then, I invented other biomass devices for cooking, seeking to reduce smoke in kitchens and dependence on firewood in rural areas.

A significant innovation was developing a preference mapping tool, which uses surveys and focus-group discussions to get a sense of features that kitchen-workers prefer or desire (such requirements are not usually considered when researchers design cookstoves). What we found was that women often are not concerned about the impacts of cooking smoke on their own health but will instead choose to use or not use a stove based on other preferences.

People can be unconsciously set in their ways, so we have to work with them to introduce the new technologies. This increases the chances of them continuing to use our improved stoves. For example, in many northern Indian communities, people want a cookstove with multiple pot holes, so that they can have gravy cooking in one pot



Figure 1: Left – Group discussion with a tribal farming community in the East Godavari District of Andhra Pradesh (India) to learn about their cooking-energy needs in 2018. Right – An improved clay cookstove with chimney in a rural kitchen in Assam (India) in 2017. Photographs courtesy of Samuchit Enviro Tech.

while they cook rotis in a skillet atop the other hole. Our preference mapping brings out these requirements, and so we ensure that people get stoves that meet all their cooking requirements.

After 2010, as the impacts of climate change started to become more and more evident in a rapidly urbanizing India, my work has focused on devising and promoting scientific strategies for sustainable / climate-aligned urbanisation. One of these was an easy-to-use ‘Samuchit Carbon Footprint Calculator for Urban Indians.’

I routinely conduct workshops on climate-friendly lifestyle and sustainable urbanisation that highlight the historical / political context of climate change along with scientific explanations. The objective is to make urban Indians realise: a) the link between lifestyle choices and greenhouse gas emissions and b) how lifestyle choices emerge from a combination of personal preferences, social norms, economic drivers and government policies. I consciously avoid guilt- tripping individuals about their contribution to climate change, while emphasising the need for a systemic change driven by individuals.

My work on biomass energy, household cooking, climate change and urbanisation pushed me to explore the history of cooking-energy technologies and land-use change associated with urbanisation. My scientific training also pushed me to look at climate change as a planetary phenomenon while charting its impacts on local

ecosystems and socio-economic systems. I’m actively involved in national and international organisations for renewable energy, equitable sustainable development, climate resilience, and related topics.

My work has been published in peer-reviewed journals, as well as popular publications, and I have presented my views at national and international conferences and workshops. Several national and international awards resulted from this work, including the World Technology Network’s Environment Award (New York, 2005), as well as several in India, including selection as one of *Leelawati’s Daughters* (2008), a collection of articles on 100 pioneering women scientists in India by the Indian National Science Academy. I was a TEDx speaker and, in 2022, was invited to speak at the *Congreso Futuro*, an international event held annually by the Government of Chile to promote scientific thinking on global issues.

Since 2005, I’ve run a socially green, consulting enterprise, Samuchit Enviro Tech, which provides information about clean cooking, decentralised waste-to-fuel technologies, urban sustainability, climate change mitigation and adaptation. In 2021, I co-founded OrjaBox, which is focused on promoting fossil-fuel-free cooking for rural and urban populations. I’m a member of several boards of directors in my areas of work in India as well as internationally. I also teach as a part-time faculty member in several universities and institutes.



Figure 2: Left – Priyadarshini Karve talking about climate change and urban sustainability with citizens in a public garden in Pune, Maharashtra in 2017. Right – Priya speaking about climate-friendly technologies for women at COP 24, Katowice, Poland in December 2018.



The various threads of my work came into focus in 2017, when I was introduced to the field of Big History by Prof. Barry Rodrigue at Symbiosis International University. The next year, I began co-teaching a core course on ‘Humanity and Big History: Our Challenge for Survival’ with historian Afshan Majid and anthropologist Barry Rodrigue, and then became a member of the Board of Directors of the International Big History Association (IBHA).

My interaction with Big History, combined with my training in physics, has given me a unique perspective on local and global environmental and economic challenges. As co-editor of *Shaikshanik Sandarbh*, a Marathi language bi-monthly newsletter on science and education, we published the first Marathi article in an on-going series on Big History.¹ And, in August 2021, I was plenary speaker at the 2021 Global Big History Conference sponsored by the IBHA, the Asian Big History Association, and the Symbiosis School for Liberal Arts.

Conclusion

In conclusion, infusing environmental concerns with a big-history perspective is more likely to help humans deal with the 21st century sustainability challenge. This strongly underlines the importance of big-history education at all levels and making it accessible to all human communities.

Endnotes

1. The website for *Shaikshanik Sandarbh* is at: <www.sandarbhociety.org>. The article on Big History appeared in *Shaikshanik Sandarbh* 118, June 2019: 29.

