

Book Review

Climate Change and Energy Options for a Sustainable Future

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Climate Change and Energy Options for a Sustainable Future (2021) by Dinesh Kumar Srivastava and V.S. Ramamurthy is a deceptively simple book. Pegged as an accessible text on the science of climate change that caters to students and non-specialists alike, it, however, foregrounds diverse discourses on the issue of climate change. Structurally, the text (excluding the two concluding chapters) could be effectively divided into 2 parts with both parts having clearly identifiable goals. With a view to encouraging climate literacy and inculcating climate consciousness, the first part forms the foundation of the text offering a grounding in not just the science of climate change but also a range of ecological perspectives in general. The second half discusses naturally occurring carbon-based energy resources as well as sustainable sources of energy with a major focus on solar energy and nuclear energy.

The first part (from chapters 01 to 06) touches upon several distinct approaches to climate change from the cultural/psychological to the philosophical (although not always explicitly stated). Andrew J. Hoffman in *How Culture Shapes the Climate Change Debate* refers to social science researches that claim that cultural worldviews and vested interests (political and economic) play an important role in how people process information, including information related to the current climate crisis. The authors of the text under discussion, thereby, make a case for the conservation of natural life and resources in the prologue through a host of cultural references – from Rigvedic incantations and ancient Egyptian gods to Shakespeare and Tagore. The references, while quite extensive and eclectic in nature, emphasize on a shared cultural recognition of the sacredness of nature not unlike what Vandana Shiva has claimed in the introduction to her essay “Globalism, Biodiversity and the Third World” (1992). Both texts, likewise, blame western colonialism/colonial administration and continued neo-colonialist interventions for the current climate predicament which would adversely affect the ‘Third World’ countries. It is equally important to note that some of the references such as the origin of the ‘swars’ of the Indian Classical Music and Beethoven’s

Symphony no. 6 validate the biosemiotics assumption that “meaningful communication has been part of all life... and that... human language and culture are extensions of that semiosis” (Westling, *Deep History, Climate Change and the Evolution of Human Culture*, 03).

The loss of ecological biodiversity, noted as a crucial issue in conservation biology and discussed at length in several areas of environmental thought, becomes the focus of chapter 2. In this chapter, the authors estimate the worldwide loss of native animal and plant species ‘by at least 20% since 1900 with an additional 1 million species on the verge of extinction. Echoing several reports such as the one by Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) released in 2019 or the periodically published Intergovernmental Panel on Climate Change (IPCC) reports, the authors allude to the unprecedented loss of biodiversity caused by a slew of anthropogenic activities - deforestation, the introduction of invasive flora and fauna, pollution, and over-exploitation of natural resources. Examples of ‘environmental colonialism’ or ‘ecological imperialism’ abound in the chapter. For instance, the authors mention the congress grass, inadvertently introduced to India in the 1950s, which produces allergens that affect both crops and animals. Likewise, the introduction of several varieties of foreign fish species that eventually start ‘eliminating local fish’ is another example that demonstrates ecological imperialism. It also includes some shocking incidents of hunting such as the slaughter of thousands of sparrows during the Mao administration which contributed to the great Chinese famine of 1959 or the rampant hunting of tigers in India. Particularly interesting was a statement on the severe decline in vulture population in India due to diclofenac, a banned drug used to cure inflammation in cattle. A fact also remarked upon by my mother several years back. Given that I was completely unaware of the implications of this observation is the reason why it is crucial for us as a society to adopt a more proactive approach to environmental issues.

The question of biodiversity is further deeply and philosophically entangled with the notion of the fragility of ecosystems. The next four chapters (chapters 3 to 6) deal with precisely this notion of a fragile earth system. Chapter 3 answers foundational questions regarding both the formation of earth and ourselves in it. Life, as we know it, was made possible due to the delicate balance of all the elements on earth. As scientists have constantly reminded us, for life to be created and evolve, the conditions had to be just right. Chapter 4 primarily discusses the birth of civilizations and their eventual fall. By referring to concepts such as the ‘carrying capacity of the environment’ and ‘ecological debt,’ the authors relate the fall of civilizations to climate change and overexploitation further emphasizing the cultural impact on environment. In the current scenario of impending ‘climate apocalypse,’ philosophically speaking, our understanding of the world, although consistently anthropo-centric, can no longer escape the nonhuman.

Chapter 5 tackles the question of global warming and its consequences. It draws a bleak picture of impending disasters and explicates the consequences of

melting polar ice caps and rising global temperature. It talks of erratic weather patterns with frequent cyclones and storms as well as extreme weather conditions that would lead to forest fires and coastal erosion, all of which ultimately impact food production. In short, a whole host of chain reactions occur that irreversibly damage our ecosystems and jeopardise our survival. Chapter 6 provides a correlation between CO₂ levels and global temperature and traces the history of the linkage in scientific discourses. According to the authors the warning bells were sounded more than a century ago, in 1896. Today, human activities have pumped so much excess CO₂ into the atmosphere that it would take several hundred years for the trees and forests to absorb it. In short, everything and everyone is interconnected; the world is an open system and all the elements in it, human or non-human, constantly interact with one another in what could only be termed as the 'web of life.'

Chapters 7 and 8 act as introductions to the second part consisting of chapters 9 to 16. They deal with the complicated concepts of energy requirement and energy consumption. In essence, all indicators of Human Development Index (HDI) are directly or indirectly connected to the consumption of energy. The later chapters build on this idea of the per-capita requirement of energy to look for sustainable means of producing it.

Chapter 9 begins by listing the non-renewable sources of energy such as coal and oil before moving to renewable sources like wind, tidal and hydroelectric energy. The chapter details the process of generating energy and gauges the efficacy of these sources of energy. Chapter 10 focuses entirely on solar energy. Inexhaustible and freely available, there are several methods of harnessing solar energy, according to the authors. The most efficient of these methods is the application of photoelectric or photovoltaic effect that converts solar energy into electrical energy using photovoltaic cells. Chapter 11, on the other hand, details nuclear power, specifically the process of nuclear fission. If the radioactive material is fissile or capable of maintaining a chain reaction it could lead to a 'sustained energy release.' Uncontrolled chain reactions, however, can lead to explosions. The chapter also discusses the various geopolitical factors that result in the highly controlled usage of nuclear energy.

Chapter 12 enumerates the various possibilities for realising controlled nuclear fusion reactions. The general hope is that the energy output would far exceed the energy input. Chapter 13 proposes replacing conventional nuclear reactors with the far safer Accelerator Driven Subcritical System (since it can be externally controlled) that would produce high energy particles while simultaneously incinerating highly radioactive nuclear waste. Chapter 14 addresses the disposal of radioactive nuclear waste and nuclear safety concerns and protocols. Chapter 15 discusses the healthcare and other benefits of radiation as in the case of radiation therapy or in treating municipal sludge and sewage water. Chapter 16 addresses the cleanest source of energy namely hydrogen. It is, however, highly flammable, and reactive. The authors explain the various uses of Hydrogen as a

fuel source – fuel cells being a major example. Excluding the core chapters, both the preface (provided by Prof. Ashutosh Sharma, Secretary, Department of Science and Technology, Government of India) and the Epilogue posit the core philosophy of the text. *Aparigraha* or the philosophy of not accumulating more than what is necessary - a means prescribed for escaping excessive greed that has contributed to the current climate predicament.

Although the core chapters on sustainable energy resources would not be of much interest to the cultural scientist, a case can be made for supplementing cultural notions of environment with the science of climate change and vice-versa. Certainly, a holistic approach would help combat the climate change issue better. As the authors point out, the implementation of clean energy would necessitate a sustained global cultural and political cooperation. A recommendation, perhaps overtly hopeful, that deliberately overlooks the overwhelming geopolitical and economic realities. Yet it could precisely be what we need right now.