CLIMATE ENGINEERING FROM HINDU-JAIN PERSPECTIVES

by Pankaj Jain

Abstract. Although Indic perspectives toward nature are now well documented, climate engineering discussions seem to still lack the views from Indic or other non-Western sources. In this article, I will apply some of the Hindu and Jain concepts such as karma, nonviolence (*Ahiṃsā*), humility (*Vinaya*), and renunciation (*Saṃnyāsa*) to analyze the two primary climate geoengineering strategies of solar radiation management (SRM) and carbon dioxide removal (CDR). I suggest that Indic philosophical and religious traditions such as Hinduism, Buddhism, and Jainism offer ethical concepts to call for humility in all acts of climate engineering leading to a favoring of CDR over SRM and a favoring of lifestyle changes (particularly vegetarianism) over both. I demonstrate these concepts by introducing the five great elements from the Hindu philosophy, two Hindu legends from Hindu mythology, the Indic ethical ideas of karma, renunciation, and humility, and the moral authority of Gandhi.

Keywords: Buddhism; carbon dioxide removal; climate engineering; dharma; geoengineering; Hinduism; Indian ethics; Jainism; karma; nonviolence; solar radiation management; vegetarianism

Hindu Texts, the Environment, and the Five Great Elements

With countless localized practices in different languages and customs, Hinduism is one of the most diverse religious and cultural traditions. Amidst its staggering diversity, we can still observe some key concepts and principles that are accepted and practiced by many Hindus for the past several millennia in India and now across the world. In this section, I explore some of such agreeable ideas among Hindus of different castes and classes as well as some Buddhist and Jain ideas that compare well with their Hindu counterparts.

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First, many Hindu sacred texts—including the Vedas, Upaniṣads, Purāṇas, Sūtras, and Āgamas—have references that suggest that the Earth, *Bhūdevī*, is one of the mother goddesses to be revered and thanked for all her bounties with which she nourishes us (Kinsley 1988; Dwivedi and Chapple 2011). The references suggest that the Earth is a creation and abode of the divine, making it divine. Buddhist texts, such as *Avataṃsaka Sūtra*, indicate that the universe is a Jewel Net of Indra with each particle teeming with the Buddha-nature, which in turn is divine (Cook 1991; Ingram 1993). Similarly, Jain texts, such as *Jīvá Vicāra Prakaraṇam*, written by Śānti Sūri in the eleventh century, describe air bodies, fire bodies, water bodies, earth bodies, plants, and all the other living beings as beings alive with soul, so we must practice nonviolence toward every creature on the Earth (Chapple 2002, 128). Second, almost all the Indian indigenous languages have the word *Dharma*, meaning duty, virtue, natural law, religion, physical property, ethical principle, and the sustaining force. In the last few decades, various scholars have interpreted Dharma to define it as our responsibility toward nature and the Earth (Jain 2011). Third, Hindu, Buddhist, and Jain texts accept that we have to deal with the consequences of our actions, karma (Dwivedi 2000). This karmic theory should be the guiding principle in all our interactions with all the beings and resources in nature. This theory is one of the reasons that many Jains, Buddhists, and Hindus do not accept meat in their staple diet and that in turn keeps their carbon footprint one of the lowest in the world. Like in many developing countries, Indian policymakers are also trying to industrialize their economies, causing increasing burdens on India's natural resources. The low meat consumption within India is a unique characteristic of this modernizing country, compared to other developing or developed country (Stone 2014).

Fourth, Hinduism reveres the five great elements—space, air, fire, water, and earth—and calls them *Pañca Mahābhūtas* (Rao 2000). Nature, both outside of the human body and inside, is interwoven, interdependent, and interconnected based on these five elements. The most extended Hindu epic text, the *Mahābhārata*, describes how these elements develop from each other, and ultimately from *Brahman*, the supreme reality, "From Brahman arises space, from space arises air, from air arises fire, from fire arises water, and from water arises earth" (Ganguli 2001, 12). Like the outside nature, the human senses also relate with the corresponding element—nose with earth, tongue with water, eyes with fire, skin with air, and ears with space. This relationship between our bodies and the elements defines our relationship with the environment. Jainism similarly, as mentioned above, refers to the four elements fire, air, water, and earth as fire bodies, air bodies, water bodies, and earth bodies alive with soul, thus worthy of our nonviolence and compassion. Buddhism, similarly, correlates each particle as part of Indra's Jewel Net, as mentioned earlier. These above-mentioned

Indic teachings can help inspire contemporary policymakers in India and elsewhere to deal with climate change and other environmental threats. Climate engineering is about human intervention into at least three of these great elements, the fire (sun), the air, and the earth. In the next section, we explore this intervention from a Hindu perspective.

Climate Engineering and Hindu Legends and Myths

The Intergovernmental Panel on Climate Change (IPCC), the scientific body of the United Nations with a mandate to study climate change, defines climate engineering as "deliberately altering the climate system to counter climate change" (IPCC 2013, 27, cited by Wong 2015). In October 2018, IPCC released its special report about the impacts of global warming of 1.5 °C. Immediately after that, GreenFaith, an interfaith organization dealing with environmental and climate issues, published an edited volume on religious responses to climate engineering (Clingerman et al. 2018). In his foreword to the edited volume, GreenFaith's executive director Rev. Fletcher Harper highlighted a caveat in the IPCC's 2018 report:

> According to the scientific consensus, the only way to limit climate change is through climate engineering's "negative emission" techniques that will remove Carbon Dioxide CO_2 from the planet's atmosphere (CDR) and will reduce the amount of sunlight reaching Earth (SRM).

Harper, like many other writers in GreenFaith's volume, expressed concern for "messing with" the natural world (Carr 2018). The very title of this volume warns about "playing God."

From a Hindu perspective, climate engineering seems to be dealing with some of the five great elements. Broadly speaking, out of the five great elements, carbon dioxide removal (CDR) is about managing the air and the earth, and solar radiation management (SRM) is about managing the sun. CDR techniques involve removing the carbon dioxide (and other greenhouse gases [GHGs]) from the ocean and the land. CDR techniques include using the bioenergy with carbon capture and storage, using biochar charcoal for agricultural purposes, ocean fertilization, enhanced weathering, and direct air capture. Primarily, I will refer CDR to mean only carbon dioxide removal instead of discussing the different ways scientists have suggested to accomplish this removal. Unlike CDR, SRM technologies are intended *not* to mitigate or sequester GHG but are proposed to reflect the sunlight and thus control global warming. The means to reflect the sunlight are of various kinds such as painting roof materials in light colors, employing reflective plastic sheets on deserts, pumping colder water to the arctic sea surfaces, spraying seawater in the atmosphere to increase the reflectivity of clouds, injecting reflective aerosols into the stratosphere, and placing mirrors orbiting around the Earth. I will use the term SRM

to mean simply solar radiation management instead of discussing various means scientists have suggested for this management.

As discussed, while CDR is about cleaning out the toxic elements from the planet that humans put out in the first place, SRM is about controlling the solar energy for planetary sustenance. There are various Hindu legends in which demons, the negative forces, *asuras*, are conquered by divine powers, *devas*. Below I have picked one such legend that comes close to the way we are now trying to deploy CDR for the cleansing of some of the toxicity that we have created in the recent past. In this Hindu legend, the *asura* force is also created first by mistake, and then a specific power is needed to correct this mistake. On the other hand, SRM aims to manipulate the sun, and there is at least one Hindu legend that is about deflecting the sunlight as I describe below to explore if and how we can interpret CDR and SRM from Hindu perspectives using two of the famous legends as described in different Hindu texts.

The Hindu legend of *Mahiṣāsura*, as mentioned in many Hindu texts (Kinsley 1988), can be a helpful way to understand CDR from a Hindu perspective. According to David Kinsley's account of this Hindu myth,

> After performing heroic austerities, Mahiṣa was granted the boon that he would be invincible to all opponents except a woman. He subsequently defeated the gods in battle and usurped their positions. The gods then assembled and, angry at the thought of Mahiṣa's triumph and their apparent inability to do anything about it, emitted their fiery energies. This great mass of light and strength congealed into the body of a beautiful woman, whose splendor spread through the universe. The parts of her body were formed from the male gods. Her face was formed from Shiva, her hair from Yama, her arms from Vishnu, and so on. Similarly, each of the male deities from whom she had been created gave her a weapon. Shiva gave her his trident, Vishnu gave her his *chakra* (a discuss-like weapon), Vayu his bow and arrows, and so on. Equipped by the gods and supplied by the god Himalaya with a lion as her vehicle, Durga, the embodied strength of the gods, then roared mightily, causing the earth to shake. (Kinsley 1988, 5)

In summary, Mahiṣāsura gained a near-immortality boon after a long penance (no male could kill him ever). After he attained this boon, he turned into a demon and started using his power to destroy the world. All the gods came together and created *Mahiṣāsura Mardini*, a new form of the goddess Durga. This new form eventually killed the demon and saved the world. Applying Forrest Clingerman's dichotomy (2012, 2014), Mahiṣāsura represents human fallibility, whereas Mahiṣāsura Mardini, the goddess, represents human capability. In other words, humans need to stop "playing God" because of our imperfection. At the same time, arguably, humans need to continue devising new ways to correct their past mistakes as long as the new methods are responsible, sustainable, and ethical.

The demonic force, in this case CDR, can be compared with the toxic GHGs that were created by humans by their reckless actions over the past couple of centuries. Because humans created the problems, it is humans that must now come up with a solution that will correct their wrongdoings, just as a boon first created the demon and another intervention later removed it. CDR seems to compare well with the idea of human response to take care of a reckless demonic force, a new kind of Mahiṣāsura. In the last couple of centuries, we achieved a lot of scientific and technological progress across the world, almost like a boon that was supposed to grant us all kinds of happiness. Sadly, this boon has also brought us the new bane of the existential threat for the planet in the form of climate change. Since our reckless use of environmental resources was a mistake, we now need to develop new ways to correct our past error and CDR is one of those ways. Like Mahiṣāsura, GHGs will remain immortal unless we develop new panacea to remove them from the planet forever. Also, like Mahiṣāsura, GHGs present a similar existential threat for us and only new solutions such as CDR can save us from this threat. However, the analogy must stop there, and there should not be any new bowing down or reverence for any new technological solution. It was our blind reverence for science and technology that gave us new problems such as climate change. We should use CDR or any new technology with the utmost responsibility and care, not blind faith, so we should not revere CDR like the Hindu goddess who kills Mahiṣāsura in the Hindu mythology.

Similarly, SRM can be compared with an incident mentioned in the *Mahābhārata*, the most extended Hindu text, which describes a great war between two groups of cousins. In the eighty-ninth chapter of his retelling of the *Mahābhārata* epic, on the fourteenth day of this war, Chakravarti Rajagopalachari (1994) describes the slaying of one of the villains, Jayadratha, by one of the heroes Arjuna with the help of Lord Kṛṣṇa, in these words:

> At that moment, however, Kṛṣṇa said to Arjuna: "Dhanañjaya, the Sindhu Raja [Jayadratha] is looking at the horizon. I have caused this darkness. The sun is still up and has not set. Do your work. This is the moment for it, for Jayadratha is off his guard." A shaft flew from the Gāndīva bow, and, like a vulture swooping down on a chicken, carried away Jayadratha's head. (Rajagopalachari 1994, 175)

At that point in the war, Kṛṣṇa stopped the sunlight and created an illusion of sunset that made one of the villains, Jayadratha, come out from hiding and then be quickly killed by the hero Arjuna. Perhaps, we can compare the problem of climate change with this villain. Hopefully, as SRM techniques try to control the sun for a short period, we will use that period to work in unison with a similar urgency to deal with the root causes of the problem of climate change and will deal with it forever. The

analogy from this Hindu story is identical only in the way both SRM and Kṛṣṇa try to control the sunlight. Just as in the case of CDR, however, SRM should also be used with the utmost care and responsibility instead of blind faith. Like any solution or instrument that helps to fix a problem, technological solutions such as CDR and SRM should be deployed for particular purposes so as not to cause further side effects.

From a Hindu perspective, as long as the focus is maintained to defeat the demonic forces leading to climate change, a temporary quick fix in the forms of CDR and SRM techniques can be adopted with all the caveats and considerations outlined below based on the Indic virtues and ideas such as karma (the natural law of action and consequence), nonviolence (*Ahiṃsā*), renunciation (*Saṃnyāsa*), and humility (*Vinaya*). The rest of the article will make several references to vegetarianism, a prime example from Indic practices, based on these Indic virtues.

Climate Engineering from the Indic Ideas of Karma, Nonviolence Renunciation, and Humility

Prima facie, both CDR and SRM can be justified as corrective actions to take care of earlier mistakes. Clare Heyward (2015) cites the IPCC's report and suggests that many geoengineering technologies are a subset of mitigation "as mitigation involves both emissions reductions and enhancing sinks, the latter of which is the aim of many CDRs." However, these corrective measures must be taken with an understanding of karmic consequences, renunciation, nonviolence, and humility.

One of the most widely known Indic ideas is *karma.* Although this word is often used in English to mean fortune or destiny, in Indic philosophical and religious traditions, it signifies the interconnectedness of the action with its consequences. In other words, our present is determined by our past actions, literally, our past karmas, and our present actions determine our future. An activity intended to bring harm to self, others, or to nature in general, will result in negative consequences for the actor of that karma. Indic philosophies connect karma with reincarnation. Our present existence and life cycle are the results of our past lives, and we can help improve our future life journey by taking control of our present life. Ethical decisions can help choose us better actions ensuring a spiritually and ethically progressive journey in the future. Because of this free will to choose our actions in the present moment, it is encouraged to cleanse even the past karmas by taking control of the present. By living a life in harmony with nature, we can help improve our karma for the future.

Indic ethics, rooted in the ideas of karma and reincarnation, would advocate that we should remove the demon of GHG emissions, but the new action of this removal should not cause further negative consequences. We should minimize any side effects or aftermaths of such geoengineering

measures. For instance, for the prevention of GHG emissions, windmills are generally welcomed by opponents of fossil fuels. However, ornithologists have found this supposedly eco-friendly measure to be one of the reasons for the near extinction of the state bird of Rajasthan in India (Platt 2018). Windmills are accused of such deaths of birds elsewhere in the world as well. The designers of such turbines should design them in such a way that they cause the least damage to the local flora and fauna. Unless we take such consequences of geoengineering measures into consideration, we might continue to harm our environment leading to more climate change. The best course of action could be the minimization of the destructive demonic forces in the first place. For instance, in addition to generating more energy by renewal sources, one of the biggest causes of energy and water consumption is the global meat industry. If we can reduce our meat consumption globally, we can reduce GHG emissions that result from raising millions of livestock for human consumption.

The next Indic virtue that we need to consider is humility, *Vinaya*, regarding geoengineering measures. Unless we change our lifestyles by reducing our carbon footprint, mere geoengineering corrective measures cannot restore our climate. The Hindu text *Īśopaniṣad* refers to this virtue by stating in its very first verse that every particle in the universe is divine. Several Hindu texts such as the *Bhagavad Gītā* (7.9 and 13.13), *Īśopaniṣad* (1.1), and the *Bhāgavata Purāṇa* mention such ideas that inspire Hindus to revere every being as divine. As mentioned earlier, this extends to the Buddhist notion of the Jewel Net of Indra as well. This reverence for all manifests in Hindu reverence even for nonhuman animals as exemplified by their devotion for "holy" cows, "monkey-god" Hanuman, "elephant-god" Gaṇeśa, a rodent temple in Rajasthan, rituals for serpents, rivers, mountains, trees, seasons, and for Earth and nature in general. Hindus can be called panentheistic because Hindus accept that the divinity is both imminent, in the universe, and is transcendent, beyond the universe.

Similarly, Hindus can be called polytheists because they recognize that the divinity manifests in infinite forms, and they can be called monists because many Hindus can explain one divine phenomenon that unifies all the countless manifestations. This spiritual unity with all universal beings leads to the virtue of *Vinaya*, humility regarding them. It is this humility that inspires many Hindus to recite a Sanskrit verse to ask for forgiveness from Mother Earth for touching her with their feet as they wake up in the morning. Hindu women tied sacred threads and hugged trees to protect them from being cut even in the eighteenth century, long before the rest of the world coined such terms as "biodiversity" or "climate change." The Indic idea of reincarnation further reminds Indians to recognize all species as family members because each soul can get reborn as any species in its journey through multiple life cycles. A book-length study (Framarin 2014) explains this direct moral standing of plants and animals.

Out of humility toward our fellow creatures, Indic traditions teach us to adopt *Ahiṃsā*, nonviolence, and practice vegetarianism. Many Hindus, Jains, and Buddhists are 100 percent vegetarians, that is, they never consume egg, meat, or seafood. Some Hindus might take an occasional nonvegetarian dish, but their staple diet mostly consists of grains, lentils, fruits, and vegetables. This low preference for meat-based food in Indic communities continues to keep India's carbon footprint much smaller than counterparts like China or Brazil. Compared to the United States or other European countries, India's per capita carbon footprint is even less, due to Indians' sustainable food habits (National Geographic 2012), as a manifestation of reverence, humility, and nonviolence for all beings. The latest research continues to show that animal farming accounts for 15 percent of GHG emissions, one of the leading causes of climate change and deforestation; the Indian diaspora in North America, Europe, and Asia can be a global advocate for vegetarian diet choices that are urgently needed to save our planet.

Another Indic idea, *Saṃnyāsa* (renunciation), discourages accumulation and possession of natural resources and encourages modest and straightforward living. Well-known teaching from the Hindu text *Īśopaniṣad*, *Tena Tyaktena Bhuñjīthā*, urges people to consume natural resources with a sense of renunciation instead of a sense of entitlement or ownership. One of the pioneering Indian environmental leaders—Sunderlal Bahuguna—inspired many Hindus by his modest lifestyle (James 2014) following his role model Mahatma Gandhi. With the wide-scale practice of nonviolence and renunciation, we can become better stewards of our planet, climate, and other natural resources. Unfortunately, even with a slow reduction of meat consumption in the United States over the past few decades, that country continues to be a world leader in meat consumption (Smith 2018). It also continues to exempt its meat industry from submitting annual emission reports, unlike all other sectors. The United States now should lead by practicing humility by incorporating nonviolence and renunciation if it is serious about mitigating climate change. This humility will supplement and complement geoengineering strategies by limiting GHG emissions, as mentioned earlier.

The last significant quality that Clingerman et al. (2018) mention is justice. Jainism, another ancient religious tradition of India with a long history of interacting with Hinduism and Buddhism, brings a distinct perspective in terms of justice for animals. According to the Jain taxonomy, all five-sensed beings are equal (Chapple 2002, 128). Hence to kill a mammal or a bird is similar in karmic consequence to killing a human. For human survival, only minimum consumption of one-sensed beings is recommended, and they are earth, water, fire, air, and plants. Among plants, consuming the root or stem of a plant is again unjustifiable from the Jain perspective because that would be tantamount to killing an entire plant.

Only the by-products of a plant are to be consumed by humans for their survival in addition to minimal usage of earth, fire, air, and water. These ideas influenced Hindus more than two millennia ago, and they embraced vegetarianism and reduced their meat consumption. Today, several sects of Hinduism represent some of the largest communities of vegetarians in the world. As mentioned earlier, avoidance of meat ensures minimal use of natural resources enabling environmental justice in the use of these natural resources. Overall, this will further reduce GHG emissions and mitigate climate change.

Long before we heard terms such as "climate change," Mahatma Gandhi developed his ideas based on Indic virtues of *Satya* (truth), *Ahiṃsā* (nonviolence), *Aparigraha* (simplicity), *Brahmacharya* (celibacy), *Puruṣārtha* (self-effort), and *Upavāsa* (fasting). Even today, Gandhi remains a global icon of these Indic virtues as exemplified by his small vegetarian diet, his yogic practices, his silence vows, his compassion for small animals, his self-reliance in making his cloth by spinning his wheel, and his avoidance of waste. These are the ideals that actually inspired and led Indians against injustice in India (led by Gandhi and Sunder Lal Bahuguna), South Africa (led by Gandhi and later Nelson Mandela), and the United States (led by Dr. Martin Luther King who visited Gandhi's home in India and launched the U.S. Civil Rights Movement based on nonviolence).

Comparing Hindu Perspectives with Buddhism and Jainism

Just as this article attempts to assess climate engineering from a Hindu perspective, Till Markus, Bhikkhu Vivekananda, and Mark Lawrence (2018) provide a similar assessment from a Buddhist perspective. As already noted elsewhere in this article, Hinduism shared many ideas with Buddhism and Jainism. As Markus, Vivekananda, and Lawrence note, Buddhist doctrines are based on a nondualistic and nonhierarchical worldview in which humans and nature are not two separate opposing or rival forces or domains, but are mutually dependent and interconnected. This worldview is identical to the Hindu worldview. The Hindu doctrine of *Brahman* is also a nondual phenomenon like the Buddhist doctrine of *Anātman*, no-self, and both Brahman and Anātman pervade, unite, and connect humans with nature. Buddhism also teaches that our sufferings are due to our desires, and practicing the eightfold path can help control them. Many Hindus would agree that the Yoga Sūtras of Patañjali contain a similar disciplinary way also with eight limbs with identical practices of regulating one's mind, speech, and body. Jainism also has rigorous methods to discipline one's mind, body, and speech. Buddhism, Jainism, and Hinduism teach that a disciplined life based on the disciplined body, mind, and speech can help avoid environmentally harmful practices. The resultant understanding can develop human society that is respectful and reverent toward nature. Also,

like Hinduism, Buddhism and Jainism emphasize nonviolence and compassion toward other animals that manifest in many Jains and Buddhists also practicing vegetarianism like their Hindu counterparts. Karma is another fundamental idea common to Hinduism, Jainism, and Buddhism, and all three teach that any climate engineering–related action that is to be taken to mitigate climate change must be analyzed first for its motivation and intention. It is the motivation and purpose that will determine the future consequence of such action, as we saw earlier in this article while discussing karma in the Hindu context. Also, as Markus, Vivekananda, and Lawrence (2018) suggest, in general CDR seems preferable than SRM because the latter intends to modify the environment with human actions whereas the former is about cleaning up the residual toxins on the planet. From the karmic perspective in Hinduism, Jainism, and Buddhism, SRM seems to start a new chain of karmic action and consequence while CDR is about dealing with the results of prior operations.

Conclusion

In conclusion, agreeing with Heyward (2015), ethical issues about geoengineering are not too different, and we need to keep the same concerns in mind as we prepare for the future. For instance, geoengineering technology should not fall into the wrong hands lest the karmic consequences will haunt us for the next several generations. We need to practice humility and sensitivity to the needs and practices of local communities of humans as well as flora and fauna. We need to be fair and balanced to nature itself as we evolve newer technologies to protect and preserve the environment for future generations using CDR and SRM strategies. Indic ethical ideas based on Hindu, Buddhist, and Jain texts and contexts can inspire us to be more responsible, sustainable, and moral to protect and preserve our planet and nature. They can prevent geoengineering technologies from becoming yet another lost chance to save our precious world.

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