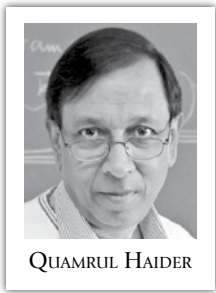


Using rocks in farmlands to remove carbon dioxide from the atmosphere



QUAMRUL HAIDER

WE should not be fooled into believing that global warming will cease to be a problem in the coming years if we reduce emission of carbon dioxide into the atmosphere. Even zero emission followed by switching to “green” sources of energy is not going to alleviate the detrimental effects of global warming substantially. That is because carbon dioxide that we have dumped into the air since the beginning of the Industrial Revolution is going to remain in the climate system and impact the well-being of all forms of terrestrial life for what can be thousands of years.

So, what should be done to avoid a catastrophic global warming? The answer is simple: at the least, remove some carbon dioxide from the atmosphere before the climate breaches the threshold of runaway greenhouse effect due to positive feedback loops of the greenhouse gases.

We have an expanding portfolio of actions available to us for removing and sequestering carbon dioxide. One such action, albeit shockingly simple and low-tech, is to do what nature has been doing since time immemorial—sucking carbon dioxide out of the atmosphere using rocks, particularly the types created by volcanic activity. These rocks react with the heat-trapping carbon dioxide to form stable carbonate minerals which are eventually washed away to be locked into the soil or in the ocean beds. This weathering process, called “mineral carbonation,” is one of the mechanisms our planet

uses to remove carbon dioxide from the atmosphere across geological time scales.

Indeed, scientists recently discovered that Peridotite, a silicate containing rock pushed up from Earth’s upper mantle long ago in what is now the country of Oman, is removing roughly 100,000 tons of carbon dioxide from the atmosphere each year. That is enough to soak up carbon dioxide emissions from burning more than ten million gallons of gasoline.

The process of mineral carbonation is extremely slow—far too slow to offset global warming from human activities. However, the rocks will work their magic most efficiently in the shortest possible time if they are crushed into a fine powder. Known as “enhanced rock weathering” (ERW), the powdered rock increases the surface area available for chemical reactions and thereby speed up the removal of carbon dioxide from the air.

According to a research paper published in July 2020 in the journal Nature, crushed silicate-rich volcanic rocks, such as Olivine and Basalt, have the potential to draw down billions of tonnes of carbon dioxide from the air. Consequently, among a handful of negative-emission technologies, ERW is gaining traction, although the approach is still in its infancy.

Scientists believe that for good measure, we can use the technique of ERW in the agriculture industry. By spreading crushed rocks all over the farmland, the roots of crops and fungus in the soil will hasten the chemical and physical breakdown of the rocks, while carbon dioxide will be pulled from the air into the soil as part of the weathering process.

The concept of enhanced rock weathering is not new, though. It basically replaces crushed limestone

that farmers in many countries use to improve crop yields with volcanic rocks rich in silicate and magnesium. Researchers are now taking the concept out of the labs and testing ERW in real farmlands to see how it fits—practically and economically—in the wider portfolio of options for slowing down the steady rise of carbon dioxide in the atmosphere. They are conducting an experiment on a farmland in California



Crushed basalt is applied to an arable field in Norfolk, East Anglia, England as part of a research programme of the Leverhulme Centre for Climate Change Mitigation.

PHOTO: DIMITAR EPHIOV/THE GUARDIAN

in association with farmers, ranchers, government, the mining industry and Native American tribes.

The benefits of ERW are not just limited to the climate. In addition to capturing carbon dioxide, the weathered rocks will release valuable nutrients such as phosphorus and potassium into the soil, which will boost production of healthy crops. The rocks, preferably Basalt, will provide plants with silica as well, which will

help them build stronger cells to better fend off pests. As a matter of fact, one compelling outcome of the research in California is that in controlled-environment studies involving Basalt and Wollastonite, a calcium silicate mineral, corn yield increased by nearly 12 percent.

Application of enhanced rock weathering technique in farming will create a protocol for farmers to make

achieved by using existing stockpiles of Basalt—one of the most common rocks on Earth—and other silicate rock dust left over as byproducts from the mining industry. This would remove the need to grind the rocks into fine particles, which is energy intensive. Furthermore, calcium-rich silicate byproducts of iron and steel manufacturing plants, along with waste cement from construction and demolition industries, can also be processed and used for ERW. This “green recycling” of waste rocks will help in improving the sustainability of these industries alongside achieving their carbon neutrality goals.

It should be noted that enhanced rock weathering is not a cheap, easy fix for mitigating global warming. It comes with a price tag—mainly from mining, crushing and transporting rocks to farms, as well as emissions of greenhouse gases from these activities. The cost will of course be highly dependent on where the rocks are mined, and where and how they are crushed and spread. If machines used for ERW are powered by renewable energy, then scientists believe that the net amount of carbon dioxide removed from the air will be on the positive side.

Mineral carbonation in general and enhanced rock weathering in particular is not the last word to fight climate change. Nevertheless, it is an essential adjunct to other ways of ameliorating the brutal repercussions of anthropogenic climate change. If successfully applied, this natural process will ensure that some carbon dioxide will be permanently sucked out of the atmosphere. But the big challenge to implement this is the political will of our leaders who are beholden to powerful vested quarters.

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How sectarianism precipitated the 1947 partition

MUHAMMAD NURUL HUDA

IN many quarters, the blame for the partition of India in August 1947 is still squarely placed on Muslims and the so-called two-nation theory of the Muslim League. But it’s worthwhile to recall the competing sectarianism of the two major communities of the subcontinent that actually hastened its division along communal lines.

A thorough reading of the political history of the subcontinent would reveal that in the second half of the nineteenth century, political extremism in India drew its inspiration from a cultural and intellectual movement that developed simultaneously with and parallel to the moderate politics of the Indian National Congress. This extremism contained an attempt to define the Indian nation primarily in terms of Hindu religious symbols, myths and history.

Religion was never totally detached from Indian politics, nor was it exclusively confined to the private space. What was often referred to as “revivalism” in pre-partition India was actually marked by a conceptualisation of a glorious Hindu past, believed to have been degenerated under Muslim rule and threatened by the colonial British. This revivalism, besides being obscurantist, had a strong political overtone.

The Hindu revivalism was centred on the supposed supremacy of Hindu civilisation over Islamic and Western ones, and saw attempts to exalt and rationalise Hindu institutions and practices. Many high-caste Hindu leaders attempted to construct a nationalist ideology premised on the notion of a golden Hindu past. Such attempts inspired many, while alienating many others at the same time. Apparently, Indian nationalism came to be associated with the defence of Hindu religion, and Bengali and Marathi literatures started to see Indian nationalism through Hindu imageries.

Such developments alienated Muslims from this stream of nationalism, and a new consciousness was developing among them as well. They too sought to advance their interests in opposition to those of the Hindus, and colonial policies further encouraged the Hindu-Muslim schism. As the Arya Samaj started the cow protection movement, this conflict of interests began to acquire a mass dimension. Large-scale communal disturbances rocked northern India from the 1870s. The eighteenth-century concept of Hindustan, being equally shared by Hindus and Muslims, was gradually receding in the face of an emerging communal exclusivism in the nineteenth century, paving the way for a violent contest for territory in the twentieth century. The political project of imagining an Indian nation had to confront, from the very beginning, the difficult issues of diversity and difference.

The social composition of the Indian National Congress, quite clearly, resulted in social orthodoxy. Between 1892 and 1909, nearly 90 percent of the delegates attending Congress sessions were Hindus and only 6.5 percent were Muslims, and among the Hindus nearly 40 percent were Brahmans and the rest were upper-caste Hindus. The crucial issue of Muslim mobilisation did not arise yet although prominent Muslim leaders did not like the Congress demand for elected councils. Additionally, its silence during the cow-killing disturbances of 1893 raised misgivings. Congress felt that by speaking against it, it might lose the support of the Hindu constituencies. Muslim participation in Congress started to decline in large measure and yet there was no endeavour to bring the Muslims back into its fold.

cow protection movement put an unmistakable Hindu stamp on the nationalist agitation. Consequently, Muslims were alienated from Congress politics.

The alienated Muslims “began to see themselves in the colonial image of being unified, cohesive, and segregated from the Hindus”. They started to construct a Muslim community identity that was later enlarged into Muslim nationhood. The Muslims began to see their identity informed by their common religion and an invented shared past. The aggressive Arya Samaj movement contributed to counter-mobilisation by the Muslims in urban Punjab. Among the Bengal Muslims, a distinct Muslim identity had been developing at a mass level from the early nineteenth century through various Islamic reform movements.

there was widespread fear among the Bengali Muslims that the government might annul the partition to the disadvantage of the Muslims. Thus in the Dacca Educational Conference, on December 30, 1906, a new party was launched—the All-India Muslim League. Amongst others, its professed goals were to safeguard the political rights and interests of the Muslims.

It is relevant to note that the Bengali Muslims were always more politicised and the Bengal situation of 1906 had acted as a catalyst in bringing into existence the new Muslim party. Subsequently, the Morley-Minto Reforms of 1909 provided for reserved seats for the Muslims in imperial and provincial legislatures in larger numbers and in keeping with their political importance. The granting of separate electorate for the Muslims

eliminated. Leaders of Hindu Mahasabha decided to operate as a separate pressure group within the Congress, trying constantly to marginalise the secularists and destroy any possibility of an understanding with the Muslims. Nationalism based on the idea of an implicit racial domination of the Hindus was not renounced explicitly by Congress leadership. Consequently, Muslims became suspicious about the real intent of Congress politics.

In view of the electoral debacle of the Muslim League in 1937, Pandit Nehru launched his Muslim Mass Contact campaign to bring ordinary Muslims into the Congress fold. This endeavour, however, failed as the Hindu Mahasabhis sabotaged it from within. The class approach in Congress policies, and its emphasis on individual citizenship, failed to satisfy the community-centric concerns of the Muslims. Muslims missed out from the patronage distribution system created by the new constitutional arrangement of 1935.

On the other hand, Muhammad Ali Jinnah launched a Mass Contact campaign and pressed the Ulama into service. The passage of the Shariat Application Act in 1937 provided a symbolic ideological basis for Muslim solidarity on a national level. By December 1939, the Muslim League membership had risen to more than three million. The notion of Muslim nationhood germinated at this time in the political context of estrangement and distrust.

The need for political self-determination of Hindus and Muslims was discussed at this time. The Lahore Resolution of 1940 signalled the transformation of the Indian Muslims from a “minority” into a “nation”. It also stated that no future constitutional arrangement for India could be negotiated without their participation and consent any longer. The central plank in Mr Jinnah’s politics henceforth was to be a demand for parity between the Hindus and Muslims in any such arrangement.

The conceptualisation of a Muslim nation was not the making of Mr Jinnah alone or a select group of articulate intellectuals. This was legitimised by thousands of ordinary Muslims who joined the processions, participated in the hartals and organised demonstrations in major parts of India between 1938 and 1940. The Muslim alienation was born of provocations from the militant Hindu nationalists, as well as constant sneering by an intransigent secularist leadership of the Congress. It is an irony that for Muslims, who in 1921 saw no conflict between their Indianness and Muslim identity, recognition of a separate Muslim nationhood became a non-negotiable minimum demand in the 1940s.

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Muslim refugees sit on the roof of a railway coach near New Delhi trying to flee India in 1947.

PHOTO: AP

The use of orthodox Hindu religious symbols for political mobilisation took a more militant form in north India through the Arya Samaj and the cow protection movement. This movement gradually became an issue of communal rivalry. For Muslims, cow slaughter, apart from the economic reason, had a political meaning: it meant a symbolic assertion of freedom from Hindu supremacy. For many, the cow question was merely a war cry to arouse the lethargic Hindus and it was used as a symbol for community mobilisation.

There was an increasing need for such mobilisations along communal lines, as constitutional questions were now being discussed and new competitive institutions were being created. In such an environment, there was a need for both the communities to mobilise along communal lines in order to register their collective presence in the new public space. The

Muslims of Bengal became conscious of the political implications of their numerical superiority and were keen to forge social mobilisation. The easiest way to forge such mobilisation was through focusing on the common faith, and the Mullahs through the local Anjumans carried the message to the countryside. The masses were brought into the larger political conflict. Quite naturally, extremist politics and Hindu revivalism, by reinforcing social fault lines, facilitated Muslim mobilisation. The Swadeshi anti-Bengal partition agitation appeared in Muslim consciousness as an anti-Muslim campaign.

Under such circumstances, Muslim leaders felt the urgent need for a political organisation for the Muslims that could provide them with an independent political platform. At this time, the Congress-led agitation against the Partition of Bengal had gained an unexpected momentum. As a result,

provided an official legitimacy to their religious minority status and the separate political identity of the Indian Muslims with the Muslim League representing them. The Khilafat movement itself contributed to the strengthening of Muslim identity in Punjab and Bengal. This Muslim mobilisation generated a sense of insecurity among the Hindus, however. Inevitably, this led to a series of communal disturbances between the Hindus and Muslims in 1920s in different parts of India.

Although Congress leaders like Jawaharlal Nehru emphasised a secularist view of the Indian nation, a binary opposition was visualised between nationalism and communalism. As a result, whoever talked about community were dubbed as anti-nationalist or communalist. The scope for accommodation of community identity within a composite nationhood was thus