

Protecting India's natural laboratories

Preserving geological heritage is as important as safeguarding biodiversity and cultural heritage



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Like social diversity, India's geodiversity, or variety of the geological and physical elements of nature, is unique. India has tall mountains, deep valleys, sculpted landforms, long-winding coastlines, hot mineral springs, active volcanoes, diverse soil types, mineralised areas, and globally important fossil-bearing sites. It is long known as the world's 'natural laboratory' for geo-scientific learning.

Lack of geological literacy

Broken loose from a supercontinent 150 million years ago, the Indian landmass, with all its strange-looking plants and animals, drifted northwards all by itself for 100 million years until it settled under the southern margin of the Asian continent. It got entwined with the world's youngest plate boundary. The geological features and landscapes that evolved over billions of years through numerous cycles of tectonic and climate upheavals are recorded in India's rock formations and terrains, and are part of the country's heritage. For example, the Kutch region in Gujarat has dinosaur fossils and is our version of a Jurassic Park. The Tiruchirappalli region of Tamil Nadu, originally a Mesozoic Ocean, is a storehouse of Cretaceous (60 million years ago) marine fossils. To know how physical geography gets transformed into a cultural entity, we need to study the environmental history of the Indus River Valley, one of the cradles of human civilisation. India offers plenty of such examples.

Geo-heritage sites are educational spaces where people find themselves acquiring badly needed geological literacy, especially at a time when India's collective regard for this legacy is abysmal. Indian classrooms view disciplines like environmental science and geology with disdain compared to how they view other 'pure' subjects like physics, biology, and chemistry. This lack of interest in the government and our academic circles towards geological literacy is unfortunate at a time when we face a



An aerial view of the Zhangye National Geopark in the eastern foothills of the Qilian mountains in Gansu Province of China. ■ISTOCK PHOTO

crisis like global warming. As the climate of the future is uncertain, decision-making is difficult. Learning from the geological past, like the warmer intervals during the Miocene Epoch (23 to 5 million years ago), whose climate can be reconstructed using proxies and simulations, may serve as an analogue for future climate. The awareness accrued through educational activities in geo-heritage parks will make it easy for us to memorialise past events of climate change and appreciate the adaptive measures to be followed for survival.

The importance of the shared geological heritage of our planet was first recognised in 1991 at an UNESCO-sponsored event, 'First International Symposium on the Conservation of our Geological Heritage'. The delegates assembled in Digne, France, and endorsed the concept of a shared legacy: "Man and the Earth share a common heritage, of which we and our governments are but the custodians." This declaration foresaw the establishment of geo-parks as sites that commemorate unique geological features and landscapes within their assigned territories; and as spaces that educate the public on geological importance. These sites thus promote geo-tourism that generates revenue and employment.

In the late 1990s, in what may be considered as a continuation of the Digne resolution, UNESCO facilitated efforts to create a formal programme promoting a global network of geo-heritage sites. These were intended to complement the World Heritage Convention and the UNESCO Man

and the Biosphere programme. UNESCO provided guidelines for developing national geo-parks so that they become part of the Global Geoparks Network. Today, there are 169 Global Geoparks across 44 countries.

Countries like Vietnam and Thailand have also implemented laws to conserve their geological and natural heritage. Unfortunately, India does not have any such legislation and policy for conservation. Though the Geological Survey of India (GSI) has identified 32 sites as National Geological Monuments, there is not a single geo-park in India which is recognised by the UNESCO. This is despite the fact that India is a signatory to the establishment of UNESCO Global Geoparks. The GSI had submitted a draft legislation for geo-heritage conservation to the Ministry of Mines in 2014, but it did not make any impact.

The development juggernaut

Despite international progress in this field, the concept of geo-conservation has not found much traction in India. Many fossil-bearing sites have been destroyed in the name of development. This indifference – strange as it may seem given the current dispensation's penchant for crying itself hoarse about India's heritage – is going to take a toll on our heritage. The development juggernaut will soon overwhelm almost all our sites of geo-heritage. For example, the high concentration of iridium in the geological section at Anjar, Kutch district, provides evidence for a massive meteoritic impact that caused the extinction of dinosaurs about 65 mil-

lion years ago. This site was destroyed due to the laying of a new rail track in the area. Similarly, a national geological monument exhibiting a unique rock called Nepheline Syenite in Ajmer district of Rajasthan was destroyed in a road-widening project. The Lonar impact crater in Buldhana district of Maharashtra is an important geo-heritage site of international significance. It is under threat of destruction, although conservation work is now in progress under the High Court's supervision.

We are inching towards the disappearance of most of our geological heritage sites. Thanks to unplanned and booming real estate business, many such features have been destroyed. Unregulated stone mining activities have also contributed to this destruction. This situation calls for immediate implementation of sustainable conservation measures such as those formulated for protecting biodiversity. Natural assets, once destroyed, can never be recreated. And if they are uprooted, they lose much of their scientific value.

Geo-conservation legislation

The protection of geo-heritage sites requires legislation. The Biological Diversity Act was implemented in 2002 and now there are 18 notified biosphere reserves in India. Geo-conservation should be a major guiding factor in land-use planning. A progressive legal framework is needed to support such strategies. In 2009, there was a half-hearted attempt to constitute a National Commission for Heritage Sites through a bill introduced in the Rajya Sabha. Though it was eventually referred to the Standing Committee, for some unstated reasons the government backtracked and the bill was withdrawn. In 2019, a group of geologists under the auspices of the Society of Earth Scientists petitioned the Prime Minister and the Ministries concerned about the need for a national conservation policy under the direct supervision of a national body committed to the protection of geo-heritage sites. But the government's apathy continues.

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