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Climate Resilience and S.D.G. 13

Consistent with Brundtland Commission (WCED, 1987), the Third Assessment Report (TAR) (IPCC,2001 b) **Sustainable Development** is defined as the development that meets the needs of the present without compromising generation to meet their own needs. Climate Change is the most significant challenge to achieving Sustainable development and it threatens to drag millions of people into grinding poverty. It is not simply a long term issue. It is happening today and entails uncertainty for the policy makers trying to shape the future. Each Country will need to find its own ways to deal with the uncertainties and devise its best option for low carbon growth and emission reduction. Option for countries all over the world include a mix of technology development that lowers air pollution, increasing investment in renewable energy and energy efficiency, expanding urban public transport, improving waste and water management and better planning for when disasters strike. Each of these climate actions as can be designed to bring short term benefits and lower the current and future emission. Climate Change increases the costs of development in the poorest countries by between 25-30 %. By 2050 two-thirds of the world's population will be settled in cities. To feed Nine Billion people nutritiously by 2050 we need to make agriculture resilient more productive in changing landscapes and aggressively reduce the food wastage. We need climate smart agriculture that increases yields and incomes builds a resilience and reduces emissions, while potentially capturing the carbon and thereby its suitable storage (CCS). According to research more than 33% of global energy is consumed in offices, homes and other buildings and is expected to double by 2030. It becomes imperative to stick to Reduce, Reuse,Recycle (3Rs) Philosophy and adopt climate-smart architecture to inhibit the impacts. Climate Change refers to the variation in the Earth's Global Climate or in regional climate over time. It describes changes in the state of the atmosphere over the scales ranging from decades to millions of years. Climate change has also been called as a causative result of human activities. Striking a balance between these two perspectives it can be explained as change attributed directly or indirectly to human activity that alters the composition of the global atmosphere apart from the natural climate variability observed over comparable time periods. The Earth's climate has been dynamic and is always changing through a natural cycle. It has taken billions of years for the Earth's climate to become conducive for the evolution of mankind. The solar energy passing through the atmosphere is absorbed by the Earth's Surface and a significant part of it is reflected back into the atmosphere. The Greenhouse Gases (GHGs) of the atmosphere act as partial blanket that trap some of the outgoing Infrared radiation and reflect it back to the earth thus making it warmer without the GHGs the Earth's mean temperature would be 30°c lower than available meaning thereby the Earth will be an ice covered place. Increased natural GHGs, man- made ChloroFluoro Carbons (CFCs), HydroFluoro Carbons (HFCs), PerFluorocarbons (PFCs) and Sulphur hexafluoride (SF6) contribute to enhanced emissions which result to increase the Earth's surface temperature the phenomena called as **Global Warming** which further causes unprecedented climate change on a global scale threatening the ecosystems of the entire world. The Paris Agreement (2016) envisages to keep the GW below 2° to reach the ultimate climate goal of net zero planet by 2050. Under these prevailing conditions it is most righteous to declare the **World Environment Day 2021** as the decade 2021-2031 with theme of **Ecosystem Restoration** by the United Nations. India Stands among top ten nations is Climate change performance index. To add to this our Hon'ble P.M. has declared that, 20% Ethanol Blending in Petrol will be achieved by 2025 and our country is realizing the vision of "One sun, One world and One Grid" by joining the International Solar Alliance. Our State Jharkhand needs to improve climate actions indices more seriously as per the latest **Niti Aayog SDG index report 2021** (15 parameters) released on **10 th June 2021**.

--- Chief Editors' Desk

"Geology (The Subject that brings the student Down to Earth) - Evan Esar

- **NEWS AND NOTES**

5th June, 2021 : United Nation World Environment Day

The University Department of Geology, Ranchi University on 5th June 2021 actively participated on the occasion of World Environment Day with the theme : **Ecosystem Restoration**,

To encourage awareness and inculcate environmental Protection. On this occasion the Department had organized the Online Competitions for the students under the chairmanship of Dr. Bijay Singh (Head of the Department). The categories for competition were : **Write Ups**, **Slogan Writing** and **Poster Making**. Around 70 students both from (SEM I and SEM IV) along with all faculty members joined the online competition through the link https://meet13.webex.com/meet/pr1580357747 out of which 26 students participated for these competitions.

The winners were declared under the supervision of four jury members, namely Dr. Bijay Singh (H.O.D), Dr. Bacha Ram Jha (Asst. Professor), Mr. Suresh Kumar Samad (Asst. Professor) and Dr. Chanchal Lakra (Asst. Professor).

For Write Ups:

1st position was secured by Divya Bhagat (SEM IV)
2nd position was secured by Suchismita Behera (SEM I) and
3rd position was shared between Aniket Shubhum Beck and Padmaraman Biswal
(Both SEM I).

For Slogan Writings:

1st position was secured by Alisha Ekka (SEM I),
2nd position was secured by Lipsa Samal (SEM I) and
3rd position was shared between Aniket Shubhum and Suchismita Behera
(Both SEM I).

For Poster Making:

1st position was secured by Bidya Bhagat (SEM IV),
2nd position was secured by Devashish Singh Sardar (SEM IV) and Soumyasmita Sahoo (SEM I) and
3rd position was shared between Kriti Beck and Divya Bhagat (Both SEM IV).

9th June, 2021 : e- Lecture was organised by the Department of Geology , RU and GSI, SUJ, Ranchi

On the commemoration of 75th Years of Independence (Bharat ka Amrit Mahotsav). The University Department of Geology in collaboration with Geological Survey of India, SUJ took initiative to organize e- Lecture on Topic : **" SINGHBHUM CRATON: GEOLOGY AND MINERALISATION WITH SPECIAL REFERENCE TO SINGHBHUM SHEAR ZONE (SSZ)"**.

PowerPoint Presentation was presented by **Mr. Arun Kr. Kujur**, Sr. Geologist, GSI, SUJ, Ranchi through the link https://meet.google.com/azf-gakw-dhi. Around 75 students participated and took benefits from this important e-lecture.

10th June, 2021 : e- Lecture was organised by the Department of Geology , RU.

On 10 th June 2021 e-Lecture was organised by the Department of Geology in collaboration with Geological Society of India to celebrate the India's 75th years of Independence . **Mr. Prafulla Vairagade**, Geologist, GSI, SUJ, Ranchi delivered the e- Lecture on

Topic : "**CGGC:GEOLOGY AND IT'S METAMORPHIC DOMAIN**"

through the link:
https://us02web.zoom.us/j/4993992991?pwd=dkJnWFEwSmpiMFc4TnhqTUdkSmlUZz09.

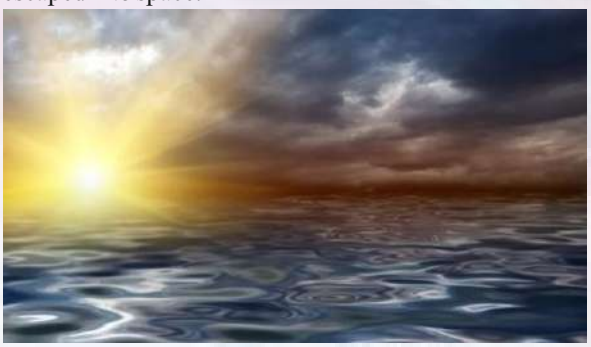
Around 35 students participated in this e- lecture and took the benefit from this important deliberation.

- **On 28th June, 2021 : e- Lecture will be organised by the Department of Geology , RU.**
- On 28 th June 2021 e-Lecture will be organised by the Department of Geology in collaboration with Geological Society of India to celebrate the India's 75th years of Independence .
- **The theme of the E- Lectures are :**
- 1 : Brief Introduction abut Activities of GSI : Role of GSI Training Institute.
- 2. Early Permian Glaciation Events and its signatures in the Dhudhinala Section, Hazaribagh, Jharkhand

GLOBAL

The Earth has lost a quarter of its water

In its early history, the Earth's oceans contained significantly more water than they do today. A new study indicates that hydrogen from split water molecules has escaped into space.



The early oceans had a deuterium/hydrogen ratio that was 0.03 smaller compared to today's oceans. This finding can be used to show that back in time there was more water on Earth than today. (Photo:Colourbox)

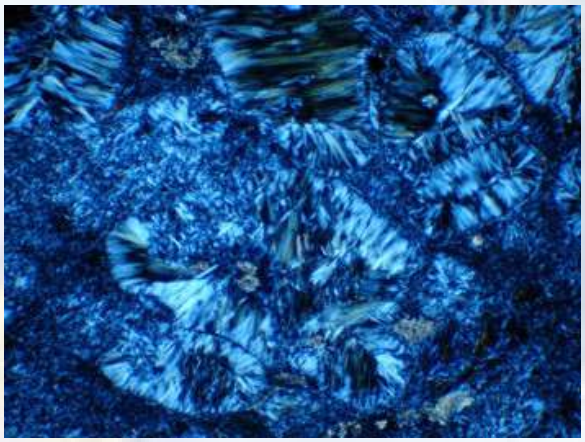
Although water covers 70 percent of the Earth's surface, water is actually a rare substance that represents just 0.05 percent of the Earth's total mass.

Water has nevertheless played a crucial role in the emergence of life on Earth. Without water, the Earth would in all likelihood be a dead planet.

The amount of water on the planet has not always been the same, however. A research group at the Natural History Museum of Denmark has discovered this by measuring how hydrogen isotope ratios in the oceans have changed over time.

"The water that covered the Earth at the dawn of time contained more of the lighter hydrogen isotope than the heavier hydrogen isotope, known as deuterium, than it does today," says Emily Pope, a post doc, who has played a central role in the study.

"By examining how the ratio of these isotopes has changed, we have been able to determine that over the course of around four billion years, the Earth's oceans have lost about a quarter of their original mass."



Serpentine seen through a microscope (Photo: Emily Pope)

Geological clues in Greenland

Pope and her colleagues found their path to discovery in a mineral called serpentine.

Serpentine is formed when the Earth's crust comes into contact with seawater circulating at high temperature through channels and cracks in the Earth's crust beneath the seabed.

The isotope ratios in serpentine are determined by the isotope ratios in the sea water at the time the mineral was formed, and this information can be used to form a picture of what the oceans were like aeons ago

.Serpentine is a relatively commonly occurring mineral, but the researchers chose to look in the Isua Belt in western Greenland where some of the Earth's oldest rocks were formed, 3.8 billion years ago.

In 2010, Emily Pope, together with colleagues Minik Rosing and Dennis K. Bird went to a part of Isua, previously identified as being an ancient seabed rich in serpentine, to collect samples.

In western Greenland, researchers have identified geological strata rich in serpentine among some of the Earth's oldest rocks so far found. (Photo: Emily Pope).

Hydrogen floats off into space

Rock samples were taken from the area and subsequently analysed in a laboratory at Stanford University in California, USA.Tests revealed a significantly higher ratio of hydrogen to deuterium than is seen today.

The explanation, according to Emily Pope, is that when the Earth was in its infancy, part of the water in the oceans was split into hydrogen, deuterium and oxygen via a process called methanogenesis. Both hydrogen and deuterium are low-density gases, so they rose through the atmosphere and eventually floated off into space.

Methanogenesis works more efficiently for hydrogen than for deuterium, so more hydrogen gas was created by this process than deuterium gas, and this slowly but surely altered the ratio of these isotopes in the oceans.

Knowing how much hydrogen had disappeared from the oceans over the last four billion years enabled the researchers to calculate that the oceans have lost about a quarter of their water since the Earth's early days.

"Hydrogen and deuterium are still escaping into space, but very slowly, says Pope.

"Today the atmosphere is rich in oxygen, which reacts with both hydrogen and deuterium to recreate water, which falls back to the Earth's surface. So the vast bulk of the water on Earth is held in a closed system that prevents the planet from gradually drying out."

Young Sun Paradox

Methanogenesis

In this two-stage process, water and carbon dioxide react to form methane, and subsequently hydrogen.

i) $2H_2O$ (water) + CO_2 (carbon dioxide) -> CH_4(methane) + $2O_2$ (oxygen)

ii) CH_4 (methane) + $2O_2$ (oxygen) -> CO_2 + O_2 + $2H_2$ (hydrogen)

Net effect: $2H_2O$ (water) -> O_2 (oxygen) + $2H_2$ (hydrogen)

In the Earth's infancy, the hydrogen escaped into space. Methanogenesis also works when water contains the heavier isotope deuterium instead of hydrogen, but this process is significantly slower.

The analyses also showed how much methane existed in the atmosphere of the infant Earth. The methanogenesis process creates hydrogen from methane, and since the researchers know how much hydrogen was lost to space, they were also able to estimate how much methane the atmosphere must have contained in the past.

Their calculations show that at the time when the rocks in the Isua Belt in Greenland were formed, the atmosphere contained 50 to 500 times more methane than it does today.

This result is relevant to the debate on why the Earth's climate in prehistory was almost as warm as it is today, despite the fact that the Sun was significantly fainter – an apparent contradiction known to researchers as the Young Sun Paradox.

One solution to the paradox is that the atmosphere at that stage in the Earth's history contained large amounts of greenhouse gases.

But this hypothesis is invalidated by the study from Pope and her colleagues.

"We have found that the atmosphere contained more methane than it does today," she says. "But it was still a fraction of the amount necessary to create a warm climate solely using atmospheric methane as a greenhouse gas."

Dramatic climate change

The reason for the climate being so warm must have been something other than atmospheric greenhouse gases. Pope favours a theory proposed by Minik Rosing and others in 2010.

Their explanation of why the climate was warm despite a fainter sun is that the surface of the Earth was covered with water at that time, whereas today the Earth's surface is partly land mass.

Seawater absorbs more sunlight than land does, so a larger amount of energy was absorbed when oceans covered the planet. It is argued that this larger energy absorption was sufficient to keep the climate relatively warm.

Minik Rosing, who also participated in the new study, emphasises that the new results not only reveal something about the past climate, but also put current climate change in perspective.

"The Earth's climate has so far been a stable system. Current climate change, for which the human race bears much of the responsibility, is dramatic compared to the small variations that have taken place over time," says Rosing.

"When we increase the amounts of greenhouse gases in this way, an imbalance results which perhaps can never be re-stabilised – a balance that has been the reason why life was able to come into being and flourish."

(Source: ScienceNordic)-

Prehistoric Fossilized Footprints Show Earliest Known Evidence of Mammals at the Seashore

*A reconstruction of the brown-bear-sized mammals (Coryphodon) that made thousands of tracks in a 58-million-year-old, brackish water lagoon in what is now southern Wyoming. Credit: Anton Wroblewsk*i

Today, the rocks of the Hanna Formation in south-central Wyoming are hundreds of miles away from the nearest ocean. But around 58 million years ago, Wyoming was oceanfront property, with large hippo-like mammals traipsing through nearshore lagoons.

In a study published in Scientific Reports, geologist Anton Wroblewski, an adjunct associate professor in the Department of Geology and Geophysics, and applied biodiversity scientist Bonnie Gulas-Wroblewski of the Texas A&M Natural Resources Institute, report the discovery of several sets of fossilized tracks, likely from the brown bear-sized Coryphodon, that represent the earliest known evidence of mammals gathering near an ocean.

"Trace fossils like footprints record interactions between organisms and their environments, providing information that body fossils alone cannot," Wroblewski says. "In this case, trace fossils show that large- bodied mammals were regularly using marine environments only eight million years after non-avian dinosaurs went extinct."

Anton Wroblewski points to an underprint made 58 million years ago by a heavy mammal (likely Coryphodon) walking on the deltaic deposits above. Underprints form when sediment is displaced downward by footsteps from heavy animals." Credit: Anton Wroblewski

The tracks that the Drs. Wroblewski found in the Hanna Formation of Wyoming include underprints, impressions in soft sediment made when heavy animals walk on overlying sediment layers, as well as prints pressed into the surfaces of ancient tidal flats. Now preserved in sandstone, the tracks are more than half a mile (one kilometer) long and were made by two different animals, one with four toes and one with five. The five-toed tracks are consistent with Coryphodon, a semi-aquatic mammal similar to a hippopotamus. The owner of the four-toed tracks remains a mystery.

"Paleontologists have been working in this area for thirty years, but they've been looking for bones, leaf fossils, and pollen, so they didn't notice footprints or trackways," Wroblewski says. He first saw the tracks in September 2019. "When I found them, it was late afternoon and the setting sun hit them at just the right angle to make them visible on the tilted slabs of sandstone. At first, I couldn't believe what I was seeing; I had walked by this outcrop for years without noticing them. Once I saw the first few, I followed out the ridge of sandstone and realized they were part of a much larger, more extensive trackway."

Fossilized plants and pollen helped the researchers determine the age of the tracks to be around 58 million years old, during the Paleocene epoch. Before this finding, the earliest known evidence of mammals interacting with marine environments came from the Eocene epoch, around 9.4 million years later. Wroblewski says that the Hanna Formation tracks are the first Paleocene mammal tracks found in the USA and only the fourth in the world, with two sets of tracks previously found in Canada and one in Svalbard, Norway. It's also the largest accumulation of Paleocene mammal tracks in the world in both aerial extent and the absolute number of tracks, he says. With at least two species leaving the tracks, it's also the most taxonomically diverse.

Today's large mammals congregate near marine environments for a variety of reasons, including protection from predators and biting insects, foraging for unique foods, and access to salt sources, which may have been limited in the tropical forests of North America during the Paleocene. The researchers say ancient mammals may have had similar reasons for seeking out a day at the beach.

Section of the 58-million-year-old tracksite demonstrating near-vertical tilting of the originally horizontal bedding with three separate trackways made by five-toed mammals walking in parallel. Credit: Anton Wroblewski

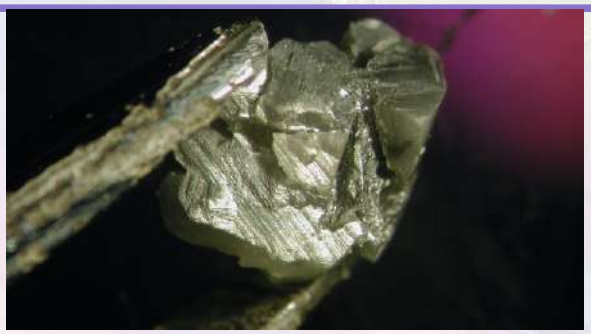
The research shows, Wroblewski says, that hypotheses of behavior and evolution based on isotopic, molecular and body fossil data can be empirically tested using trace fossils. "No other line of evidence directly records behaviors of extinct organisms preserved in their preferred habitats," he says. "There's still a lot of important information out there in the rocks, waiting for somebody to spot it when the lighting is just right!"

Source : Scitech Daily

Scientists find new way to calculate diamonds' age more accurately

New research carried out at the Lamont-Doherty Earth Observatory of Columbia University was able to identify the ages of individual fluid-bearing diamonds, the chemistry of their parent material and the geologic events that allowed the gems to form, which go back more than a billion years.

According to the scientists behind the study, this is a potential breakthrough not only in the study of diamonds but of planetary evolution.



One of the South African diamonds used in the study. (Image by Yaakov Weiss, courtesy of he Lamont-Doherty Earth Observatory of Columbia University).

In their paper, which was published in the journal Nature Communications, the experts explain that even though gem-quality diamonds are nearly pure lattices of carbon and carry very little information about their ages and origins, lower-grade specimens harbour imperfections in the form of tiny pockets of liquid, which are remnants of the more complex fluids from which the crystals evolved. Thus, by analyzing these fluids, it is possible to determine the times when different diamonds formed, and the shifting chemical conditions around them.

"Up to now, most researchers have concentrated on solid inclusions, such as tiny bits of garnet, to determine the ages of diamonds," Yaakov Weiss, lead author of the study, said in a media statement. "But the ages that solid inclusions indicate can be debatable because the inclusions may or may not have formed at the same time as the diamond itself. Encapsulated fluids, on the other hand, are the real thing, the stuff from which the diamond itself formed."

To test their hypothesis, the researchers analyzed 10 fibrous, dirty-looking diamonds from De Beers' mines in and around Kimberley, South Africa.

In detail, they measured traces of radioactive thorium and uranium, and their ratios to helium-4, a rare isotope that results from their decay. The scientists also figured out the maximum rate at which the nimble little helium molecules can leak out of the diamond —without which data, conclusions about ages based on the abundance of the isotope could be thrown far off.

The team was then able to identify three distinct periods of diamond formation. These all took place within separate rock masses that eventually coalesced into present-day Africa. The oldest took place between 2.6 billion and 700 million years ago. Fluid inclusions from that time show extremely rich in carbonate minerals. The period also coincided with the buildup of great mountain ranges on the surface, apparently from the collisions and squishing together of the rocks. These collisions may have had something to do with the production of the carbonate-rich fluids below.

The next diamond-formation phase spanned a possible time frame of 550 million to 300 million years ago, as the proto-African continent continued to rearrange itself. At this time, the liquid inclusions show, the fluids were high in silica minerals, indicating a shift in subterranean conditions. The period also coincided with another major mountain-building episode.

The most recent known phase took place between 130 million years and 85 million years ago. The fluid composition, in this case, was high in saline compounds containing sodium and potassium. This suggests that the carbon from which these diamonds formed did not come directly from the deep earth, but rather from an ocean floor that was dragged under a continental mass by subduction. This idea, that some diamonds' carbon may be recycled from the surface, was once considered improbable, but recent research by Weiss and others has increased its currency.

According to the scientists, it was at the end of this most recent period, when Africa had largely assumed its current shape, that a great bloom of kimberlite eruptions carried all the diamonds the team studied to the surface. The solidified remains of these eruptions were discovered in the 1870s and became the famous De Beers mines. Exactly what caused them to erupt is still part of the puzzle.

To test their hypothesis, the researchers analyzed 10 diamonds from De Beers' mines in and around Kimberley, South Africa. Pictured here is the company's Venetia mine. (Image courtesy of De Beers).

Another big question mark is whether these findings could help geologists find new diamond deposits. The method, however, could be applied to other diamond-producing areas of the world, including Australia, Brazil, northern Canada and Russia, to disentangle the deep histories of those regions, and develop new insights into how continents evolve. Source MINING.COM Staff Writer

Rare earth elements have a strategic value for China, but that could be overstated

China has a monopoly on rare earth elements exports, which play a central role in high-end technologies. Other countries can challenge that at a cost

New Delhi: The trade war between the US and China is hardly abating, but even in the melee of new headlines, a particular export from China has attracted considerable attention — rare earth elements (REEs).According to various estimates, China presently accounts for approximately 80 per cent of the "mining, refining and processing" of REEs, a group of 17 elements which are used for a range of high-tech applications like superconductors, magnets and lasersGiven the centrality of these elements in high-end technologies used for consumer devices and defence production, concerns have been raised that US's reliance on China for these elements may put it in a vulnerable position..

For instance, when asked if Chinese monopoly on REEs threatens US national security, former White House official Dan McGroarty told CBS News, "Unchecked, yes".

Moreover, the Chinese government has implicitly threatened to use REE exports as a strategic tool in the ongoing US-China trade war.

However, many experts have also argued that the concerns over any possible Chinese restrictions on REE exports are far-fetched.

With the trade war finding new faultlines everyday, ThePrint details what the REE exports mean in the ongoing dispute and the strategic value they hold for China.

Picture: CreditLanthanum | Commons

Rare earth elements comprise lanthanum, lanthanide series elements like cerium and neodymium, and scandium and yttrium. They serve a variety of purposes: for instance, scandium is used in aerospace components, promethium in nuclear batteries, gadolinium in cancer therapy, and neodymium in cell phones.Despite what the name suggests, these elements aren't exactly rare. The problem, however, is that they are rarely found in sufficient quantities in a single location which makes their mining economically unviable.

While China is believed to have the largest amount of REE reserves, other countries like Australia, Brazil, Malaysia, US and India also have good amounts of REE reserves.But due to the huge environmental costs associated with the mining and processing of REEs, many developed countries are sometimes reluctant to do it themselves. The US had closed its Mountain Pass mine in California in 1998 — where the majority of the world's REE supply was actually produced — after it was reported that radioactive water had seeped into nearby areas. The mine did open later but only after it adopted a more environment friendly technology.

Similarly, the Malaysian government recently asked Lynas, an Australian rare-earths mining company, to ship its radioactive waste back to Australia if it wanted to renew its operating license.

In May this year, Chinese President Xi Jinping visited a rare-earth mining facility. Observers argued that Xi's idea was to signal to the US administration that China could use REEs as a strategic tool in the trade war.

Providing further credence to such interpretations, a Chinese government official remarked, "It is normal that the top leader investigates relevant industrial policies. I hope everyone can interpret it correctly."Markets do seem to be cautiously listening to the rhetoric coming out of China. Given the possibility of REEs becoming a trade war weapon, their prices have been surging over the past few months.

This raises the question — how much can China hurt the US if it decides to radically curb REE exports to the US?

The two schools of thought

The Political Economy of Rare Earth Elements: Rising Powers and Technological Change, a 2015 book edited by Ryan David Kiggins, argued that REEs are a "strategic commodity over which states and other actors do and will compete for control".

Broadly, there seem to be two schools of thought regarding China's monopoly over REEs and their strategic utility.One set of experts argue that REEs are not really rare — because vast amount of their deposits exist across a range of countries. Thus, in emergency situations, the US and its allies would make the necessary investments and create alternate supplies of REEs.Meanwhile, the other set of experts argue that if China decides to weaponise REEs, the US firms and consumers would have to bear the costs. According to these experts, the key issue is that the refining and processing facilities predominantly exist in China — giving it a huge strategic advantage.According to Tim Worstall, senior fellow at UK-based policy think-tank Adam Smith Institute, the fears of China's monopoly are overstated. Making his point, he said a sudden hike in REE prices by China wouldn't affect the US economy adversely for two reasons.

Firstly, "the world uses products that contain rare earths. But near all of them are actually made in China". Most of China's rare earth production isn't exported directly. Rather REEs are "exported embedded into products", not as raw material.

Secondly, Worstall argued that "a near monopoly is a wonderful thing to have", but if it is a "contestable monopoly", then people would create alternate supply chains after "you try to throw your weight around in the market"."By far the cheapest and fastest way to bring more material into the market — if there was a disruption — is just sitting there in California. It's not like starting from scratch," Eugene Gholz, political scientist at the University of Notre Dame, told The Verge.But there is a more fundamental geo-economic dilemma the US government and firms face with respect to ramping up the REE supply.The actual volumes of REEs demanded by the global economy are relatively meagre. This market is already captured by a handful of Chinese players, making it hard for smaller players to survive. So, over the long-run, entering REE mining is not a profitable venture."Given the contradictory forces of national security and profits in the REE sector, only governments can influence significantly the outcomes in a positive way," wrote political scientist Steve Dobransky.If countries such as the US want to effectively challenge the Chinese REE monopoly by entering the mining process, they would need to absorb the losses associated with such a move.

Source : The Print ACHYUT MISHRA and SRIJAN SHUKLA

NATIONAL

Karnataka government decides to resume stone quarries and crusher units

The minister who has been taking over all stock of the situation since the closure, said the closure of stone quarries and crusher units resulted in revenue loss.

Karnataka Mines and Geology Minister Murugesh R Nirani on Monday announced a decision to resume operations of stalled stone mining and crusher units across the state.

The Mines and Geology department issued a circular in this regard on Monday.

Post two tragic blasts that occurred in Hunasodu quarry in Shivamogga district and another blast in a quarry in Chikkaballapur district that killed six each in a gap of month, Karnataka, had not only tightened its vigil but also ordered suspension of quarrying operations across the state. Since the closure, it is estimated that the state exchequer had incurred a loss of revenue of more than Rs 300 crore.

Nirani told reporters that the owners of quarries and stone crushers will have to give an undertaking to the authorities stating they would abide by the rules and regulations and would submit NoC (No-Objection Certificate) from Centre's Directorate General of Mines Safety (DGMS) to use explosives within 90 days.

The minister who has been taking over all stock of the situation since the closure, said the closure of stone quarries and crusher units resulted in revenue loss.

"Almost all stone quarries and crusher units stopped operating following tragic incidents in Shivamogga and Chikkaballapur districts. State exchequer has incurred a loss of more than Rs 300 crore due to closure. Resumption of stone mining will not only garner revenue but also improve employment prospects," the minister explained.

Expressing concerns over job loss and adverse impact on construction, he observed that construction activities affected the state as the government laid more emphasis on safety measures following two tragic incidents.

"Owners had started laying off large number of workers as they are unable to maintain the stalled units. The prices of raw materials have steadily skyrocketed in the market due to closure of stone quarries and crusher units. Public here find it difficult to purchase these materials," he said.

There are over 2,500 stone quarries and stone crushing units in the state and less than 10 per cent of these have NoC from DGMS. "For use of explosives of less than two kgs and less than five acres, DGMS certificate is not needed," he said.

The owners and associations involved in this business had recently met Murugesh Nirani and requested him to allow resumption of mining activities.

Batting in favour of quarry owners, Nirani observed that it was impossible to operate stone quarries and crusher units without using explosives. "Though it is mandatory to obtain permits from the DGMS, the owners are finding it very difficult to purchase, store, and operate explosives due to tough conditions. The Mines and Geology department has decided to ease the process by changing the present guidelines and obtaining undertaking for resuming operations," he explained.

Nirani said that stone mining activities ought to continue as owners who have invested huge money by availing loans in the banks are now facing hardship to repay the loans due to closure of industry in the past few months, which would result in turning as NPAs.

The minister further added that the government has been taking steps for optimum use of the district mineral fund.

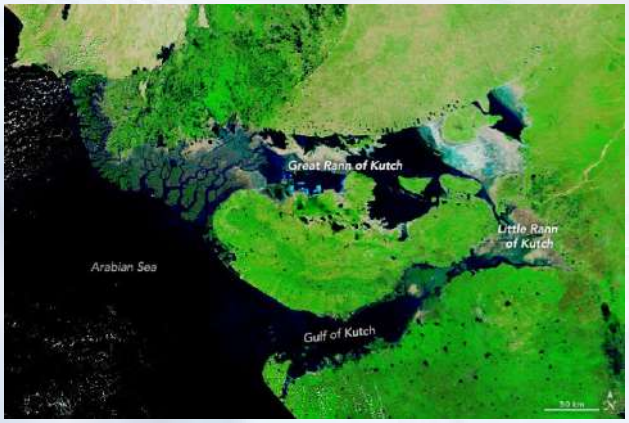
"We have devised several action plans for optimum usage of district mineral fund (DMF) for developmental works in the mining districts. Programmes formulated to address drinking water problem, health, environment protection, education, skill development, welfare of women, child, aged and differently-abled persons, basic infrastructure, irrigation, conservation of power and water," he said.

(Source: Realty Economict Tmes India Times)

The Rann of Kutch: India's White Desert

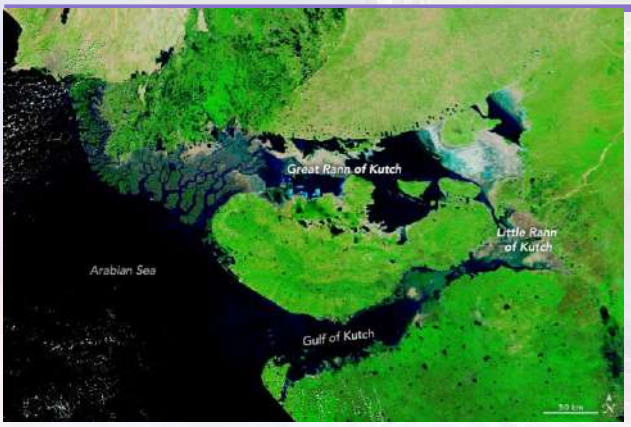
The Rann of Kutch can appear drastically different depending on the time of year.

Located in northwest India, the Kutch district can appear drastically different depending on the time of year. For half the year, the district's northern salt deserts are hot, dusty plains. During monsoon season, rains transform those deserts into wetlands with abundant wildlife.



Kasha Patel, NASA Earth Observatory on Apr 18, 2021

The images on this page show the Kutch district on October 7, 2020 (above), near the end of monsoon season, and on April 7, 2021 (below). These false-color images, acquired with the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Aqua and Terra satellite, use a combination of infrared and visible light (bands 7-2-1) to make it easier to distinguish various features. Water appears navy blue and black; vegetation is bright green; the cyan and white are clouds and bright surfaces, most likely salt pans.The Kutch district contains one of the largest salt deserts in the world: the Rann of Kutch. (Rann means desert in Hindi.) Although the desert is largely in India's Gujarat state, some parts extend into the Sindh province of Pakistan. Spanning 26,000 square kilometers (10,000 square miles), the Rann was a shallow arm of the Arabian Sea thousands of years ago.



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The Kutch district contains one of the largest salt deserts in the world: the Rann of Kutch. (Rann means desert in Hindi.) Although the desert is largely in India's Gujarat state, some parts extend into the Sindh province of Pakistan. Spanning 26,000 square kilometers (10,000 square miles), the Rann was a shallow arm of the Arabian Sea thousands of years ago. It evolved into an extensive saline mudflat due to centuries of silting. During the dry season, the area has one of the highest annual evaporation rates in the region.

The Rann of Kutch and Gujarat state are the largest salt production areas in India. During monsoon months, the Arabian Sea floods Rann with sea water. When the water retreats around October, salt farmers dig wells and pump briny groundwater into square fields where white salt crystals are naturally evaporated out.

The shallow wetland is divided into two sections: the Great Rann of Kutch and Little Rann of Kutch. The Great Rann is a vast span of salt and known for its white, snowy look, which also makes it a popular filming spot for Bollywood movies. The Little Rann, which lies to the southeast, is known for its wildlife; it is one of the few places to spot the Indian onager. The area is also a popular birdwatching spot where visitors can see eagles, flamingos, cranes, and more.

During very wet years, the wetlands can extend to the Gulf of Kutch. Lined with mudflats and small islands, the Gulf of Kutch separates the Kutch district from the Kathiawar peninsula to the south. The gulf also includes the first marine conservatory in India: the Marine Sanctuary and Marine National Park. The park includes 42 islands, as well as coral reefs, sandy beaches, and diverse marine life.

NASA Earth Observatory images by Lauren Dauphin, using MODIS data from NASA EOSDIS LANCE and GIBS/Worldview.

MoU Signed For Rare Earth Extraction From Aluminium Waste Under Aatmnirbhar Mission

MoU Signing Ceremony on Technology Development for Holistic Utilization of Red Mud for Extraction of Metallic Values

A Memorandum of Understanding, MoU was signed between CSIR Institute of Metal and Materials Technology (CSIR-IMMT), Bhubaneswar; CSIR-National Metallurgical Laboratory (CSIR-NML), Jamshedpur; National Aluminium Company Ltd. (NALCO), on 31 March for extraction of Rare Earth Elements (REE), from Red Mud(Aluminum waste).

Also part of MoU is the Nagpur-based institute Jawaharlal Nehru Aluminium Research Development Design Centre (JNARDDC) and Hindalco Industries Limited and Vedanta Limited, as reported by The Hitavada.

This will help in reducing import dependence on China for REE and will boost the Aatmnirbhar Bharat Mission. China today controls nearly 90 per cent of global rare earth production.

Red Mud is produced in alumina extraction from bauxite; around 1-ton alumina extract generates 1-1.5 tonnes of red Mud.

"Scandium is one of the strategic element in the group of REEs, which is utilise in space and defence technologies at large number(sic). India produce 10 million tonnes of red Mud per annum in which we can extract about 4,000 tonnes of Scandium per annum," told Dr Anupam Agnihotri, Director, JNARDDC, to The Hitavada.

India is the fourth-largest producer of aluminium in the world, with a share of around 5.3 per cent of the global aluminium output.JNARDDC is the only institution in the country that invented a technology to extract REE from red Mud and also to reuse red Mud for other commercial activities. Today, we are just reusing 1% of red Mud and the remaining 99% is just dumped as a waste", added *Agnihotri.*

JHARKHAND

The hits and misses of a mine reclamation project in Jharkhand

An eco-park created at the Piparwar opencast mining site in Jharkhand. Photo by Rakesh Ranjan.

After about 30 years of operations, the mining activities in Jharkhand's Piparwar opencast coal mining project, which was spread over 1100 hectares, have stopped.

The Central Coalfields Limited (CCL), which was operating the opencast mining project, has so far carried out reclamation work in about 272 hectares area including plantation, an eco-park and a few water bodies.

Land reclamation is an important process of the overall mining process once the minerals from a mine are exhausted and the mine is closed.

The Piparwar opencast mine in Jharkhand was once the largest coal-producing mine in the state and had damaged the local ecology. Now, after about 30 years of mining operations being started, the state-run Central Coalfields Limited (CCL), is carrying out reclamation and restoration in a part of the original mining area, to make it suitable for public use.

The coal mining activities in Piparwar started in 1990 in an area of about 1,120.25 hectares, and around 14 million tonnes of coal was extracted annually before mining activities finished in June 2020. After mining was shut down, the mining company, in accordance with India's mining laws, decided to reclaim the mined area. The mine was in the Chatra district of Jharkhand, which is nearly 70-kilometres from the state capital Ranchi.

Of the total leasehold area of 1,120.25 hectares, the quarry area of the mines was 540 hectares. Of these 540 hectares, reclamation work is being done in about 272 hectares area and it includes plantation in the majority of this area, a small eco-park (Kayakalp Vatika) and a few water bodies.Currently, land filling work is being carried out in another 28 hectares area. According to the CCL officials, the rest of the mined area would be re-filled and reclaimed too with plantations.

In operation since 1956, the CCL is a subsidiary of Coal India Limited, which is the world's single largest coal producer. Currently, it has over 60 operative mines including both opencast and underground mines.

It claims that the "success in land reclamation of mines spoils and afforestation have been very significant and overwhelming in places like Ashoka, Piparwar etc.." It observes that as the mined-out areas are refilled with overburden, which is not very conducive to the growth of plants, the dumped soil is improved in stages to bring back its fertility and the horticultural operations are carried out by adding nutrients, like organic, inorganic and bio¬fertilisers.

It states that since 1992, as part of reclamation, the total plantation done is more than 7.5 million trees covering about 4,740 hectares in all the mining areas of the CCL. Of the 7.5 million, more than 3.7 million trees were planted during the last 10 years.

How reclamation was planned?

In fact, the reclamation work was being planned since 2015 when the then coal minister of India, Piyush Goyal, laid the foundation stone for the development of the eco-park.

"Kayakalp Vatika is a collective effort of the CCL officials to reclaim and restore degraded mining land into greenery and biodiversity hotspot. We planted 2,000 plants of 50 species in the eco-park which has grown from 3 feet to 20 feet now. The park has fruit-bearing trees like guava, java plum, jackfruit and several others. The trees were procured from the forest department. The soil moisture and fertility has increased tremendously following our work," Sanjay Kumar, area environment officer, Piparwar circle, CCL, told Mongabay-India.

However, the eco-park is only a small part – of around 0.6 hectares – of the 272 hectares of the land reclaimed so far. The CCL is contemplating expanding the area of the eco-park by adding an area of about 20 hectares. The company is even looking at gradually developing such parks in other areas as well.

The reclamation, rehabilitation and restoration work of a mined area involves returning the mined-out land to a useful form but it is not always a single-phase work. It includes filling of the overburden into the quarry void up to the original ground level, spreading of top-soil and plantation over the reclaimed land. It also involves the development of ponds as some areas are unfilled.

The rehabilitation and restoration process also includes taking mitigation measures to improve the land degraded due to mining activities and take it to an acceptable environmental condition. According to the CCL, the development of an eco-park and farming activities are part of the overall restoration process.Before mining began in the Piparwar project, the total forest area involved was 186.50 hectares (part of the mine's total area of 1,120 hectares). Once the mining is done, the forest land is returned to the forest department after the reclamation and restoration process.

"We have already done some plantation in 242 hectares of the reclaimed land that was once a coal pit of about 90-metres depth. The focus is now on the remaining 30 hectares where plantations are being done, eco-park has been developed and three water bodies have been dug. Moreover, farming is also being done through drip irrigation in this land. The initiative has not only helped in turning the area green but has also offered employment opportunities for the local residents," said Sanjay Kumar of the CCL.

The development of the park has changed the life of some of the locals at least. For instance, 35-year-old Kathputli Devi, from Benti village, about two kilometres away from the Piparwar project site, works as a gardener in the eco-park while her husband works as a labourer.Her husband's income alone is not enough to run their family and he spends most of his earnings on alcohol. Kathputli Devi earns around Rs. 7,500 per month from the eco-park which she spends on the education of her four children including two daughters.

"I want them to become something in their life. The income from the park helps me to spend some money on their education and running the house. The eco-park is close to my house and thus saves me from the ordeal of travelling several hours for work. Moreover, while working here I am amid trees giving a breather from the hot and humid weather," she said.

Central Coalfields Limited (CCL), the mining operator at Piparwar, carried out reclamation work in about 272 hectares area including tree plantations, an eco-park and a few water bodies. Photo by Rakesh Ranjan.

She is among the four employees including two men who work at the eco-park, which attracts a lot of birds and is frequently visited by locals for recreation.

Mohammad Abbas, 28, a resident of a neighbouring Bahera village in the same district, also praised the project. "We have been living in this area for several years and have seen trucks carry loads of coal leading to dust and pollution. It's much greener now. We often spend hours inside the park which has tall trees and concrete benches for sitting. We often bring our guests here whenever they visit our homes," he said.

(Source: Mongabay Series)

Protecting fossil-rich Rajmahal Hills crucial

The hills, part of the Vindhya mountains, are situated in the Santhal Pargana region of Jharkhand. Older than the Himalayas, they are rich in fossils and medicinal trees which are fast disappearing due to large-scale stone mining, reports Deepanwita Gita Niyogi

Indiscriminate quarrying and the operation of vastly illegal stone crushing units in the tribal-dominated Rajmahal Hills of Jharkhand is not only causing massive dust pollution, but also impacting the Ganga. The hills, part of the Vindhya mountains, are situated in the Santhal Pargana region of the state comprising six districts. Older than the Himalayas, the hills are rich in fossils which are fast disappearing due to large-scale mining.

Local residents allege that mining in Rajmahal has been going on for over a decade causing great harm to the hills which are being denuded in the process. The National Green Tribunal (NGT) has pulled up the Jharkhand State Pollution Control Board for not taking

adequate measures to protect the hills. In a recent step this month, the NGT has decided to give time to a joint committee for submitting a comprehensive report.

Geology professor Ranjit Kumar Singh based in Sahibganj, one of the six districts in the Santhal Pargana region, pointed out that a team of geologists should immediately study the Rajmahal Hills area because of its prime importance full of rich minerals. "The immediate priority should be on the conservation of fossils formed millions of years ago. A geo-tourism hub can come up in this area based on the importance of the fossils found here."The fossils park at Mandro block in Sahibganj preserves fossils at a single place. Some rare fossils have also been collected recently from Gurmi hillocks to be kept in the museum which is also on the radar. These will be carefully kept with proper information for tourists. The fossils found in Rajmahal Hills are 68 million to 145 millionyears old."Public activities should not be allowed and biodiversity should be left completely alone to thrive. In some areas, a corridor should also be built for the animals. Their initiative (eco-park) is more like a recreational spot. While returning the reclaimed land, it should also be kept in mind the area should be more or less unaltered and the kind of species to be re-introduced there," Bhattacharya told Mongabay-India.

Apart from the eco-park, the CCL officials emphasise that local villagers are also getting livelihood as farming is being done in a small portion of about 30 hectares.

"The farmers now grow wheat and maize in a small part of the reclaimed land which has provided them with a fresh avenue of livelihood. The three water bodies serve as the source of water supply to the farmland and the eco-park. transportation is still being carried through the mine. We would also reclaim the entire land where open cast mining has been stopped and would transform it into an environment-friendly zone through such initiatives that have been praised from all quarters," said Anupam Kumar Rana, who is head of the CCL's public relations department.According to the CCL, the mine was in operation till June 2020 and coal

The CCL said that reclamation is a continuous process and will be carried out in the remaining area of the mine as well. The initiative was also praised by the Comptroller and Auditor General of India (CAG) in its report as a good practice and good initiative.

Severe dust pollution

According to Singh, who is the assistant professor at the department of geology in Sahibganj College, mining and environmental guidelines are being flouted when it comes to mining in the Rajmahal Hills area.

"The hills are slowly vanishing. Medicinal trees and plants found here are also at stake as a result of it. The amount of dust in the area is inconceivable. Dust forms a thick layer and students have to use lanterns or switch on lights even during the day to study. Primitive tribal communities reside in the

hills and they are facing a lot of challenges. Many of them are not aware at all about the negative impacts of dust pollution. We all want a no mining zone here. Besides this, preservation and conservation of fossils must be the top priority. There should be a permanent solution to this problem," he said.

Former divisional forest officer of Sahibganj, Mahalinga Mahendra Kumar, said dust pollution due to mining is a very pertinent issue in Rajmahal. "The hills form a continuous stretch over Pakur, Godda and Sahibganj districts. During the British time, the hills were not notified as forest land as tribals used to reside in the foothills. Instead the area was declared as Damin-I-Koh land (a Persian term) reserved for them to ensure their culture. Now, local residents are fighting against mining," he added.

Ward councillor Mohammad Khalik Ansari from Sakrigali village in Sahibganj said the environment has been totally ruined here. Blasting causes a lot of disturbance and poor people find it very hard to lead normal lives. Many of the stone crusher units operating here are illegal.

Vegetation, Ganga river at stake

According to a local resident who does not wish to be named, many important tree species like the sakhua or sal are being felled to carry out mining operations. Some of these trees have great medicinal value. He added that most of the stones quarried here are supplied to West Bengal and Bihar, but those in favour of mining often cite that the hills are bereft of vegetation which is not at all true.

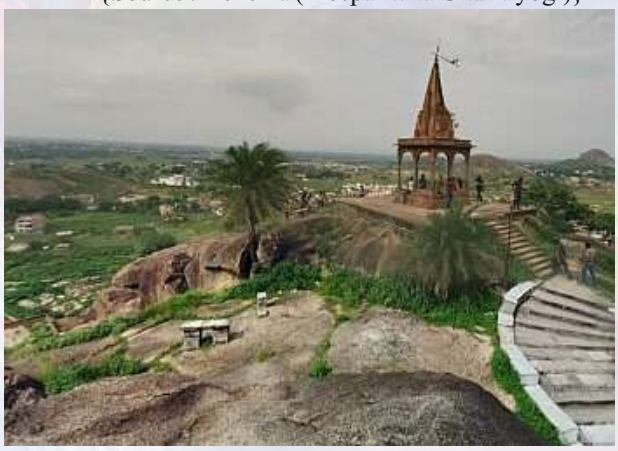
He pointed out that the Ganga river is flowing close by and when it rains, a vast amount of mud and sediments get washed up in the river. This is also harming the Gangetic dolphin. This is shocking at a time when the Centre had launched the National Mission for Clean Ganga to minimise damage to the river.

He also alleged that some pollution control board officials are hand in glove with the mining mafia. Work stops for the time being when officials come here for inspection and then again it resumes. The hills are rich in forests and the tribals here cultivate various crops. But leases are still being given through the backdoor.

Sakrigali resident Ashok Kumar said locals have complained several times and the media is also vocal but the situation is still the same. "Stone chips are loaded on the railway platform and the Ganga is just a kilometre away. There is a school as well. Standing for 10 minutes on the platform becomes difficult. Nobody cares if we live or die. There is no one to put a stop to mining."

According to an inspection report on legal and illegal mines and stone crushing units in Sahibganj district available online there are roads as well as habitations near many units but no appropriate dust control measures have been taken.

{Source : Tehelka (Deepanwita Gita Niyogi)}

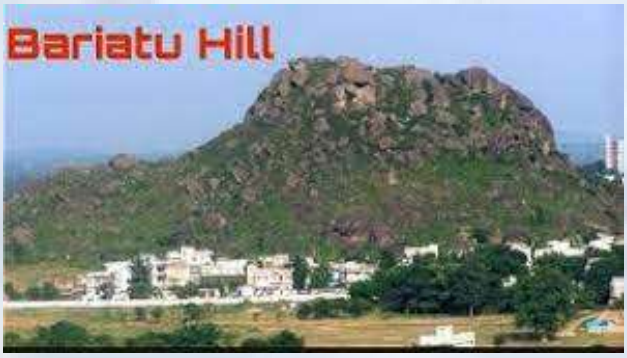


Tagore Hill

(Source :https://threebestrated.in/tourist-attractions-in-ranchi-jh)

A view of Ranchi Hill on top of which is Pahari Mandir

(SOURCE : https://www.telegraphindia.com/jharkhand/pahari-mandir-rolls-out-live-darshan-during-shravan/cid/1785318



Source": https://www.youtube.com/watch?v=ayC5dmkze2w