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Page 01 : GS 1 : Indian Society : Social Empowerment

Government data from over 3,000 urban local bodies across 29 States and Union Territories shows that 91.9% of the 38,000 sewer and septic tank cleaners profiles belong to SC, ST, or OBC communities.

92% of workers cleaning urban sewers, septic tanks from SC, ST, OBC groups: survey

Abhinay Lakshman
NEW DELHI

In a first-of-its-kind attempt to enumerate people engaged in the hazardous cleaning of sewers and septic tanks in India's cities and towns, government data gathered from over 3,000 urban local bodies in 29 States and Union Territories shows that 91.9% of the 38,000 workers profiled so far belong to Scheduled Caste (SC), Scheduled Tribe (ST), or other backward class (OBC) communities.

Of the profiled workers, 68.9% were SC, 14.7% were OBC, 8.3% were ST, and 8% were from the general category.

Between 2019 and 2023, at least 377 people across the country have died from hazardous cleaning of sewers and septic tanks, according to government data tabled in Parliament.

Hazardous cleaning

The profiling of sewer and septic tank workers (SSWs) is being carried out by the Ministry of Social Justice and Empowerment as part of its NAMASTE programme, a scheme to mechanise all sewer work and prevent deaths due to hazardous cleaning work. In 2023-24, this scheme was brought in to replace the Self-Employment Scheme for Rehabilitation of Manual Scavengers (SRMS).

The Union government's rationale is that manual scavenging as a practice has ended across the country and what needs to be fixed now is the hazardous cleaning of sewers and septic tanks. It draws this distinction based on a technical difference in how manual scavenging and hazardous cleaning are defined in the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act.

The NAMASTE programme targets "workers directly associated with sewer and septic tank cleaning including drivers of desludging vehicles, helpers, machine operators and cleaners", the Ministry says.

Its goal is to profile such workers in a nationwide enumeration exercise, give them safety training and equipment, and offer capital subsidies that could turn sewer and septic tank workers into "sanipreneurs", or sanitation entrepreneurs.

Since the scheme began a year ago, 3,326 urban local bodies (ULBs) have begun the process and profiled around 38,000 SSWs. So far, 283 ULBs have reported zero SSWs, and 2,364 ULBs have reported less than 10 SSWs each.

The Ministry of Housing and Urban Affairs estimates that there are 100 core sanitation workers for an urban population of five lakh. Based on this, the government used decadal growth rates to estimate that as of 2021, there are likely to be one lakh SSWs employed by India's 4,800 ULBs. The NAMASTE programme intends to profile all SSWs across the country to create a central database.

Twelve States and UTs, including Kerala, Rajasthan, and Jammu and Kashmir, have completed the profiling process, while the exercise is still under way in 17 States, including Andhra Pradesh, Bihar, Gujarat, Uttar Pradesh, Madhya Pradesh, and Maharashtra. Chhattisgarh, Meghalaya, and West Bengal are among the States that have yet to begin the profiling process. Tamil Nadu and Odisha are running their own programmes for SSWs, and are not reporting data to the Centre under this programme.

State efforts

States such as Kerala and Karnataka are holding information, education, and communication (IEC) campaigns to profile workers at special camps. In Andhra Pradesh, ULBs are visiting workers' homes and workplaces to profile them, with State data showing that around 30% of their profiling was done this way.

By the end of the 2023-24 financial year, 31,999 SSWs had been validated, the Ministry's annual report said. Capital subsidies amounting to ₹2.26 crore have been given to 191 beneficiaries and their dependants for alternative self-employment projects, while 413 sanitation workers and dependants have received capital subsidies of ₹10.6 crore for sanitation-related projects, the report said.

Under the previous SRMS scheme, the government had identified 58,098 manual scavengers till 2018. Since then, it has insisted that no other manual scavengers have been identified, claiming that none of the 6,500-plus complaints reporting manual scavenging could be verified.

Of the identified manual scavengers, the government said it had data on the social categories of 43,797, showing that 97.2% of them were from SC communities. The share of STs, OBCs, and others were each around 1%.

Ministry records showed that all the 58,098 people identified as manual scavengers till 2018 had been given a one-time cash transfer of ₹40,000. While 18,880 of them had opted for skills training in alternative occupations, 2,051 had opted for loans under the scheme's subsidies to start alternative businesses as of 2022.

What are the socio-economic conditions of workers engaged in sewer and septic tank cleaning?

- **Demographics:** A significant majority (91.9%) of the 38,000 profiled workers belong to marginalized communities: 68.9% Scheduled Castes (SC), 14.7% Other Backward Classes (OBC), 8.3% Scheduled Tribes (ST), and 8% from the general category.
- **Employment Status:** The workforce largely comprises low-income individuals engaged in hazardous, low-status jobs, reflecting persistent caste-based disparities.
- **Capital Subsidies support:** Since the launch of the NAMASTE program, ₹2.26 crore in capital subsidies have been distributed to 191 beneficiaries, indicating some financial support for transitioning into self-employment.

How effective are current policies and rehabilitation schemes for sanitation workers?

- **NAMASTE Programme:** Aimed at mechanizing sewer cleaning and providing safety training and equipment, the program is a replacement for the Self-Employment Scheme for Rehabilitation of Manual Scavengers (SRMS).
- **Enumeration Process:** Over 3,326 urban local bodies (ULBs) are involved, with 38,000 workers profiled so far. However, 283 ULBs reported zero workers, suggesting that the profiling might not be comprehensive or that many workers are unrecognized.
- **Rehabilitation Success:** Out of 58,098 identified manual scavengers under the previous SRMS scheme, 97.2% were from SC communities. While cash transfers of ₹40,000 were provided, only a fraction pursued skills training or loans for alternative livelihoods.

What are the challenges?

- **Social Stigma:** Predominantly from marginalized communities (SC, ST, OBC), these workers face discrimination, limiting their access to better job opportunities and social mobility.

- **Health Risks:** Exposure to hazardous working conditions leads to significant health risks, with a high mortality rate (377 deaths from 2019 to 2023) due to unsafe practices.
- **Ineffective Rehabilitation:** Current policies and support programs lack comprehensive coverage, leaving many workers unrecognized and limiting the effectiveness of financial assistance and training initiatives.

What are the health risks and safety measures for workers in hazardous cleaning roles?

- **Hazardous Working Conditions:** Between 2019 and 2023, 377 workers died from hazardous cleaning activities, highlighting the extreme risks associated with sewer and septic tank cleaning.
- **Safety Training:** The NAMASTE program aims to provide safety training for workers to minimize health risks, but the effectiveness of such training needs further evaluation.
- **Equipment and Mechanization:** The goal is to transition workers from manual cleaning to mechanized processes, reducing their exposure to dangerous conditions and improving overall safety.

Way forward:

- **Comprehensive Training and Support Programs:** Enhance the effectiveness of the NAMASTE program by providing robust safety training and resources for workers, coupled with extensive outreach to ensure all workers are identified and supported, including those currently unrecognized.
- **Promotion of Mechanization and Safety Standards:** Accelerate the mechanization of sewer cleaning operations to reduce health risks, and establish strict safety standards and regulations to protect workers, ensuring regular monitoring and enforcement of these standards.

UPSC Mians PYQ: 2018

Ques : Whether the National Commission for Scheduled Castes (NCSC) can enforce the implementation of constitutional reservation for the Scheduled Castes in the religious minority institutions? Examine. **(200 words/10m)**

The recent escalation in conflict between Israel and Hezbollah has resulted in significant casualties, with targeted airstrikes leading to the deaths of key Hezbollah leaders.

- The ongoing violence underscores the heightened tensions and deteriorating security situation in Lebanon.

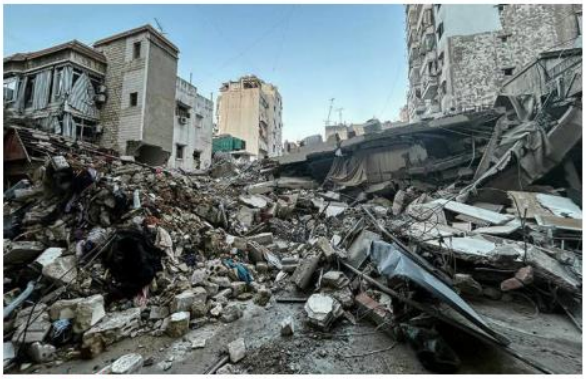
Israel pounds Lebanon, 2 more Hezbollah leaders among dead

Hezbollah confirms death of Nabil Kaouk, a veteran member, and Ali Karaki, a senior commander; Sunday's strikes across Lebanon killed over 50 people, left dozens injured; Israel says at least 20 Hezbollah militants were killed in Friday's strike

Associated Press
JERUSALEM

Two days after taking out Hezbollah's chief Hassan Nasrallah, Israel continued its airstrikes on Lebanon well into Sunday evening and said it struck nearly 120 Hezbollah targets. Hours after the first wave of attacks, Israeli military announced it had killed Nabil Kaouk, the deputy head of Hezbollah's Central Council, in a strike on Saturday.

At least 24 people were killed in Israeli airstrikes that hit two adjacent buildings east of the southern city of Sidon, the Lebanese Health Ministry said. In Baalbek-Hermel, 21 people were killed and at least 47 injured. Four more died in a raid targeting Joub Jenin in the Bekaa area. The consecutive strikes on Sunday on Ain el-Delb, east of Sidon, were caught on camera by neighbours.



Deadly strike: A building flattened by an overnight Israeli strike in Shiah in Beirut's southern suburbs on Sunday. AFP

Hezbollah confirmed Kaouk's death, making him the seventh senior Hezbollah leader slain in Israeli strikes in a little over a week. They include founding members who had evaded death or detention for decades.

Kaouk was a veteran member of Hezbollah going back to the 1980s and served as the group's military commander in southern Lebanon during the 2006 war with Israel. He often appeared in local media, where he would comment on politics and security developments, and he gave eulogies at the funerals of senior militants. The United States had announced sanctions against him in 2020.

Hezbollah had earlier confirmed that Ali Karaki, another senior commander, died in Friday's strike that killed Nasrallah. The Israeli military had said that Karaki was killed in the strike that targeted an underground compound in Beirut where Nasrallah and other Hezbollah figures were meeting.

The military said at least 20 other Hezbollah militants were killed in the strike, including two close associates of Nasrallah.

Hezbollah has also been targeted by a sophisticated attack on its pagers and walkie-talkies that was widely blamed on Israel. A wave of Israeli airstrikes across large parts of Lebanon has killed at least 1,030 people in less than two weeks.

ISRAEL STRIKES YEMEN TOO
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Israeli air strikes kill 11 persons across Gaza Strip

CAIRO

Israeli military strikes across the Gaza Strip have killed at least 11 Palestinians, health officials in the enclave said on Sunday. A school sheltering displaced Palestinians in Beit Lahiya in the northern Gaza Strip was among buildings hit, Gaza medics said. » PAGE 14

Places In News:

- **Sidon:** A southern city where airstrikes resulted in significant casualties, including the deaths of at least 24 people from strikes on two adjacent buildings.
- **Baalbek-Hermel:** A region where 21 people were killed, with at least 47 injured.
- **Bekaa Valley:** Specifically, the Joub Jenin area saw additional fatalities in targeted raids.
- These areas are crucial for Hezbollah's operations and have faced intensified military actions.

UPSC Prelims PYQ : 2018

Ques : The term "two-state solution" is sometimes mentioned in the news in the context of the affairs of (2018)

(a) China
(b) Israel
(c) Iraq
(d) Yemen

Ans: (b)

Page 03 : GS 3 : Environment – Environmental pollution and degradation

Glaciologist S.N. Remya is conducting research on permafrost collapse in the Himalayas as part of India's Arctic Expedition, focusing on its potential role in natural disasters.

- Her work aims to address data gaps and improve early warning systems for vulnerable communities.

Glaciologist digs deep into permafrost to gauge future climate change disasters

The Hindu Bureau
THIRUVANANTHAPURAM

Possible collapse of permafrost, which are permanently frozen rock or soil formations, is an emerging climate change-induced issue in the upper reaches of the Himalayas. Glaciologist S.N. Remya from Kerala, who is part of this year India's Arctic Expedition, currently based at the Himadri research station in Norway, says that her work is aimed at identifying the probability of disasters due to the collapse and help provide early warnings to local communities.

"Soil or rock that remains frozen for atleast two consecutive years is considered as permafrost. Underneath the surface, there would be regions of ice. Due to global warming, this layer of ice will melt leading to a permafrost thaw, causing fluctuations or collapse of the ground. There have been cases in Canada and other places where buildings or other infrastructure have collapsed. We still do not have proof whether permafrost had a role to play in some of the disasters in the Himalayas and it is something that has to be studied," says Remya, from the Himadri station, hosted by the National Centre for Polar and Ocean Research (NCPOR) at the International Arctic Research base in Ny-Alesund.

Understanding nature: Glaciologist S.N. Remya during her research as part of India's Arctic Expedition. SPECIAL ARRANGEMENT

Data gaps

"I have conducted studies in a rock glacier located closer to our station. We still don't have much knowledge about permafrost in the Indian Himalayas. One of the reasons for the bursting of the South Lhonak glacial lake and flooding in Sikkim could have been this. There are a lot of data gaps, which have to be addressed. Once the study here is complete, we can use satellite imagery to map areas of similar topography in the Himalayas. The aim is to use the knowledge to create awareness among the local communities for early warnings and long-term infrastructure planning," she says.

One of the issues she faced during the research in the Arctic was the presence of polar bears. Due to this, she went to the field in the company of a guard with a gun.

What Is Permafrost?

- Permafrost is a layer of soil or rock that remains frozen for at least two consecutive years, typically found in polar and high-altitude regions.
- It often contains ice and organic materials trapped beneath the surface.
- As global temperatures rise, permafrost thaws, which can lead to ground instability, erosion, and the release of greenhouse gases, contributing to climate change.
- Its degradation poses significant risks to ecosystems, infrastructure, and local communities.

Key Findings Of The Research:

- **Impact on Infrastructure:** The thawing of permafrost poses serious risks to infrastructure, with potential for buildings and roads to collapse, as evidenced by similar occurrences in other parts of the world, such as Canada.
- **Link to Natural Disasters:** There is an emerging correlation between permafrost thaw and recent natural disasters in the Himalayas, such as the bursting of the South Lhonak glacial lake in Sikkim, indicating that permafrost dynamics could be a contributing factor.
- **Insufficient Data:** The study highlights significant data gaps regarding permafrost conditions in the Indian Himalayas, necessitating more detailed research to understand its characteristics and behaviour.

Thawing of Permafrost

- **Hazards Associated with Thawing of Permafrost Infrastructure Damage:** Thawing can destabilise buildings, roads, and pipelines, leading to structural failures and costly repairs.
- **Erosion and Land Subsidence:** As permafrost melts, the ground can collapse, causing erosion and loss of land, especially near coastlines and riverbanks.
- **Release of Greenhouse Gases:** Thawing permafrost can release stored carbon dioxide and methane, exacerbating global warming.
- **Disruption of Ecosystems:** Changes in soil composition and moisture levels can alter habitats, affecting local flora and fauna.
- **Increased Flooding Risk:** Melting ice can lead to the formation of new water bodies, increasing the risk of flooding in low-lying areas.
- **Ways Forward for Addressing Thawing Permafrost Smart Sensors and IoT Integration:** Deploy advanced sensors for real-time monitoring of temperature, moisture, and ground movement for data collection.
- **Sustainable Infrastructure Planning:** Implementing resilient construction practices to adapt to changing ground conditions.
- **Climate Mitigation Efforts:** Reducing greenhouse gas emissions to limit global warming and its impact on permafrost.
- **Bioengineering Solutions:** Plant native vegetation and use microbial treatments to stabilise permafrost.
- **Climate Resilient Urban Planning**: Design urban areas with green spaces and natural drainage systems.
- **Community-Based Monitoring Programs:** Involve local communities in environmental monitoring and data collection.

UPSC Prelims PYQ : 2019

Ques : Which of the following statements is/are correct about the deposits of 'methane hydrate'?

1. Global warming might trigger the release of methane gas from these deposits.
2. Large deposits of 'methane hydrate' are found in Arctic Tundra and under the sea floor.
3. Methane in atmosphere oxidizes to carbon dioxide after a decade or two.

Select the correct answer using the code given below.

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Ans: (d)

The LUX-ZEPLIN experiment has made significant advancements in understanding dark matter by placing stringent limits on its possible identities.

- Despite ongoing challenges and null results, the scientific community remains dedicated to uncovering the nature of this elusive substance.

Not just nothing, dark matter quests close in on dire 'neutrino fog'

Scientists have placed the tightest restrictions yet on the identity of the particles that make up dark matter. It was a null result: it didn't say what the particle's identity was but suggested which identities the particle couldn't have. It prompted a sense of resignation. Similar experiments have been turning up empty-handed for decades

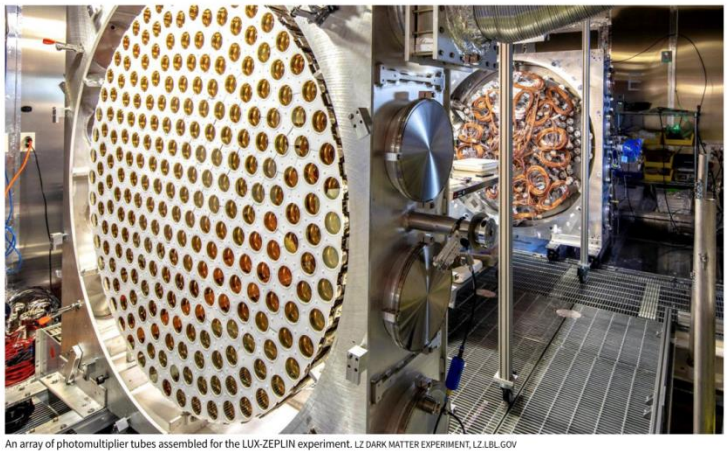
Nirmal Raj

On August 28, two members of an experiment at conferences in Chicago and São Paulo had an announcement to make.

They were representing about 200 of their colleagues involved in the design, building, and operation of the LUX-ZEPLIN (LZ) experiment located 1.5km below the earth's surface at the Sanford Underground Research Facility in South Dakota, U.S. Their news: their band of scientists had placed the tightest restrictions yet on the identity of the particles that made up dark matter.

It was a null result: it didn't say what the particle's identity was but suggested which identities the particle couldn't have. And it didn't prompt disappointment from the physics community. Instead, it prompted resignation.

Experiments similar to LZ – such as XENON-nT in Italy, PandaX-4T in China, and dozens of others around the world – have been turning up empty-handed for decades now despite heroic efforts.



An array of photomultiplier tubes assembled for the LUX-ZEPLIN experiment. LZ DARK MATTER EXPERIMENT, LZ.LBL.GOV

Dark matter and its handshake

Dark matter is the invisible stuff making up most of the mass in the universe, responsible for giving the cosmos its current looks. Stars, gas, and planets contribute only 15% to the universe's mass.

The simplest contender for the make-up of dark matter is a previously unknown type of particle that doesn't interact with photons and lives – i.e. without disintegrating, unlike most particles – for at least the age of the universe, about 14 billion years.

This raises a question: does dark matter ever touch us? More precisely, can atomic nuclei and electrons scatter dark matter particles when they come close?

Several theories of dark matter indeed predict this handshake between the visible and invisible. The issue is how we can detect it.

A sail to catch the wind

In 1985, physicists Mark Goodman and Ed Witten proposed a new strategy that has since mushroomed into an entire sub-field of experimental physics. (This is the same Witten of string theory fame. Thus the most theoretical of physicists has spawned an industry of experiments, proving the artificiality of divisions within physics. It is ironic that if dark matter is discovered in an underground laboratory, Witten will be awarded the Nobel Prize for something he has spent the least time on.)

We are all familiar with the pancake shape of the Milky Way galaxy. This disk of stars is embedded in a ball of dark matter about 100,000 lightyears across. In the Solar System, every teaspoon of space contains about two protons' weight of dark particles. These particles blow as a wind into us from all directions at one-thousandth the speed of light.

Goodman's and Witten's (GW) idea was to catch this wind in a "sail" – a chunk of metal placed deep underground to shield against other radiation from space. If a nucleus in the metal were seen to recoil spontaneously, it must be the invisible bump of dark matter.

In Ernest Rutherford's gold foil experiment, his team shone a well-understood beam at a mysterious target. GW's idea was the reverse: an enigmatic beam on a familiar target. The goal of the experiment is to measure two quantities: the unknown mass of the dark particle and the unknown rate at which atomic nuclei scatter dark matter particles. Physicists track this rate using a variable called the cross-section.

Consider the passage of light in a vacuum, in glass, and in a piece of rock. In the first case, a photon travels unimpeded; in the second, it travels a good distance before being scattered by an atom; and in the third, it is immediately stopped. We then say, for these three cases respectively, that the scattering cross-section is zero, small, and enormous.

Transparency needn't apply to light alone: any medium can be quantifiably transparent or opaque to any particle type. GW's proposal would have measured the cross section for dark matter to scatter on nuclei down to 10^{-38} cm^2, already a staggeringly tiny quantity. It would imply that dark matter would have to traverse 10 billion km of rock before being stopped.

Scientists are actively pursuing other avenues of research, too. One is to detect dark particles that are lighter than atomic nuclei, for these would scatter feebly off the target nucleus

'The neutrino fog'

These mousetraps for dark matter have since come a long way. Where GW proposed the use of a kilogramme of metal for a day, today scientists expose tonnes of liquid xenon and argon to the dark-matter wind for years. The advantage of going bigger and running longer is that one can catch dark matter that is ghostlier, i.e., with a smaller cross section. As a result, we can now say with a straight face that we have ruled out dark matter-nucleus cross sections of 10^{-44} cm^2, a million times smaller than the GW limit.

This is just the announcement LZ made in August.

Could we go on making our detectors bigger and probe arbitrarily smaller cross sections? Not quite. Future detectors that will weigh tens to hundreds of tonnes will also register much more noise from the scatters of other ghostly particles, especially neutrinos forged in the Sun's interior and in the earth's atmosphere. In fact, PandaX-4T and XENONnT are already reporting this issue. The resignation following LZ's announcement is partly for this reason: scientists had hoped to reveal dark matter's identity before facing this "neutrino fog." Telling dark matter and neutrino signals apart in future searches is a challenge that drives a great deal of research.

Every last drop

Scientists are actively pursuing other avenues of research, too. One is to detect dark particles that are lighter than atomic nuclei, for these would scatter feebly off the target nucleus.

Picture a bug hitting a truck, which would hardly move the vehicle. The goal is to develop technology to perceive the slightest of energy transfers, which involves building detectors using special materials that are currently restricted to the realm of condensed matter physics.

Thus the hunt for dark matter, like that of the Calydonian boar, unites many talents. That is not surprising: the effort to decipher the natural world has always drawn every last drop of human ingenuity.

(Nirmal Raj is an assistant professor of theoretical physics at the Centre for High Energy Physics in the Indian Institute of Science, Bengaluru. nraj@iisc.ac.in)

THE GIST

Dark matter is the invisible stuff making up most of the mass in the universe, responsible for giving the cosmos its current looks. Stars, gas, and planets contribute only 15% to the universe's mass

The simplest contender for the make-up of dark matter is a previously unknown type of particle that doesn't interact with photons and lives for at least the age of the universe, about 14 billion years

The researchers' plan is to catch the dark matter in a 'sail' — a detector placed deep underground to shield against other radiation from space. If a nucleus in the detector were seen to recoil, it must be the invisible bump of dark matter

The goal is to measure the unknown mass of the dark particle and the unknown rate at which atomic nuclei scatter dark matter particles. Physicists track this rate using a variable called the cross-section

Introduction to LUX-ZEPLIN (LZ) Experiment

- Scientists involved in the LUX-ZEPLIN (LZ) experiment, located 1.5 km underground in South Dakota, announced that they placed the tightest limits on the possible identities of dark matter particles.
- Although this result was a null outcome, meaning it did not identify dark matter, it clarified what dark matter could not be.

Understanding Dark Matter

- Dark matter makes up most of the universe's mass, with visible matter like stars and planets contributing only 15% but it does not emit, absorb, or reflect light, making it invisible to direct observation.
- It is thought to interact with ordinary matter through gravity, influencing the structure and behaviour of galaxies and cosmic phenomena.
- Despite extensive research, its exact composition remains unknown, with various theories proposing unknown particles as potential candidates for dark matter.

Detecting Dark Matter

- The challenge is to detect whether dark matter interacts with atomic nuclei and electrons.
- Some theories suggest that dark matter can "touch" visible matter, but detecting this interaction is complicated.

Advancements in Detection

- Today's experiments use tonnes of liquid xenon and argon to capture dark matter.
- Recent findings have ruled out dark matter-nucleus interactions at even smaller scales than previously thought.

Challenges Ahead

- Future experiments face increased noise from neutrinos, complicating the search for dark matter.
- Scientists are exploring ways to detect lighter dark particles that would scatter even less off nuclei.

Conclusion

- The hunt for dark matter continues to unite diverse talents in science, reflecting humanity's relentless quest to understand the universe.

UPSC Prelims PYQ : 2015

Ques : In the context of modern scientific research, consider the following statements about 'IceCube', a particle detector located at South Pole, which was recently in the news:

1. It is the world's largest neutrino detector, encompassing a cubic kilometre of ice.
2. It is a powerful telescope to search for dark matter.
3. It is buried deep in the ice

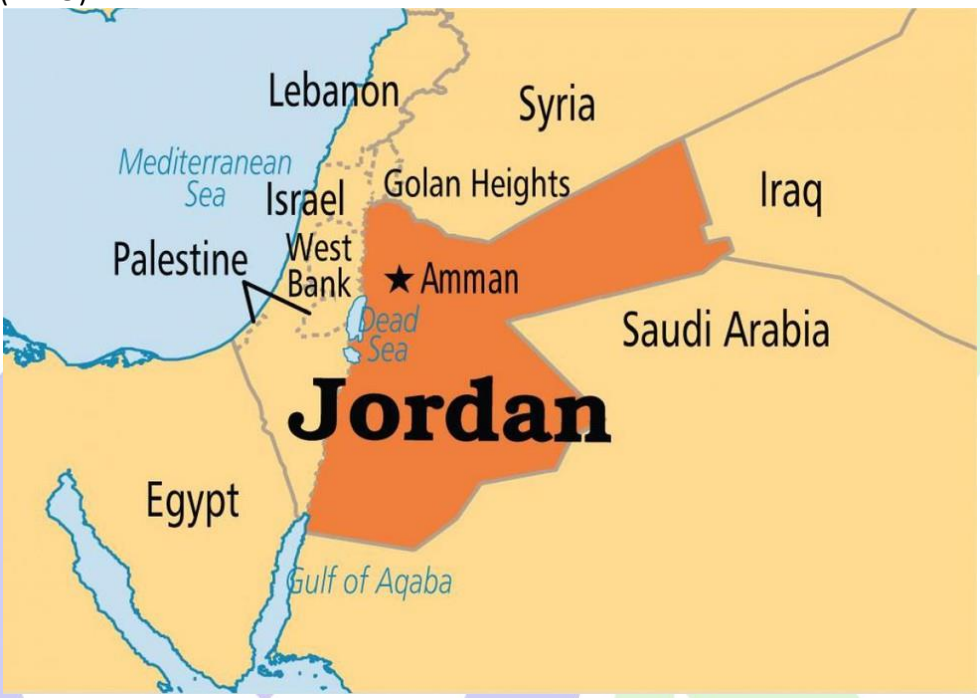
Which of the statements given above is/are correct?

(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Ans: (d)

Country In News : Jordan

Jordan becomes the first country in the world to eliminate leprosy, receiving official verification from the World Health Organisation (WHO).



About Jordan:

- It is an Arab country of Southwest Asia, in the rocky desert of the northern Arabian Peninsula.
- It is named for the Jordan River, which passes on its western border.
- It occupies an area of around 91,880 sq. km.
- **Bordering Countries:** It is bounded to the north by Syria, to the east by Iraq, to the southeast and south by Saudi Arabia, and to the west by Israeland the West Bank.
- The capital and largest city in the country is Amman—named for the Ammonites, who made the city their capital in the 13th century BCE.
- Jordan has 16 miles (26 km) of coastline on the Gulf of Aqaba (Red Sea)in the southwest, where Al-ʿAqabah, it's only port, is located.
- Jordan has three major physiographic regions (from east to west): the desert, the uplands east of the Jordan River, and the Jordan Valley (the northwest portion of the great East African Rift System).
- The desert region is mostly within the Syrian Desert—an extension of the Arabian Desert—and occupies the eastern and southern parts of the country, comprising more than four-fifths of its territory.
- The Jordan Valley region contains the Dead Sea.
- **Language:** The official language is Arabic.
- **Currency:** Jordanian dinar

UPSC Prelims PYQ : 2015

Ques : Which one of the following countries of South-West Asia does not open out to the Mediterranean Sea?

(a) Syria
(b) Jordan
(c) Lebanon
(d) Israel

Ans: (b)

Common Practice Standards must have India outlook

Sayanta Ghosh

Associate Fellow, Land Resources, The Energy and Resources Institute

Jitendra Vir Sharma

Senior Director, Land Resources, The Energy and Resources Institute

India's vast potential in the agroforestry sector is a unique opportunity to integrate with carbon finance projects through Afforestation, Reforestation, and Revegetation (ARR) initiatives. There is a possibility to expand the area under agroforestry from the current 28.4 million hectares to 53 million hectares by 2050. Agroforestry accounts for 8.65%of India's total land area and contributes 19.3% of the country's carbon stocks. Thus, agroforestry plays a significant role in environmental sustainability and economic development.

Recent research suggests that if adequate policies, financial support, and incentives are implemented, the sector could contribute an additional carbon sink of over 2.5 billion tons of CO_2 equivalent by 2030.

'Common Practice' in Carbon Standards

In the realm of carbon finance, "common practice" is a key criterion used to assess whether a project is additional – meaning, it goes beyond what is typically done in a given region. For ARR projects, this involves determining whether similar activities are commonly practised without the financial incentives provided by carbon credits. According to carbon standards such as Verra's Verified Carbon Standard (VCS) or the Gold Standard, if an activity is deemed "common practice", it may not qualify for carbon credits, as it is not seen as contributing additional environmental benefits beyond the norm.

However, the current definition of common practice in global carbon standards often reflects the realities of large-scale agricultural practices found in regions such as Latin America, Africa, or the United States, where landholdings are extensive and contiguous. In contrast, India is characterised by small and fragmented landholdings. Recent data indicate that 86.1% of Indian farmers are small and marginal, with landholdings of less than two hectares. These farmers often engage in agroforestry in a non-systematic, scattered manner, planting trees alongside crops or on small patches of fallow land.

While beneficial, these practices may not meet the additionality criteria set by current carbon standards because they are perceived as "common" within the Indian context. This presents a significant challenge, as it effectively excludes a large number of Indian farmers from participating in ARR carbon finance projects, thereby denying them the opportunity to earn additional income from carbon credits.

International carbon finance platforms must revise their standards to better align with the realities of Indian agriculture

Need for India-centric approaches

Given India's unique agricultural landscape, there is an urgent need to redefine and consider the common practice criterion to better reflect the specific challenges and opportunities within the Indian agroforestry sector. An India-centric approach would recognise that even small, incremental changes in land management practices such as adopting more systematic agroforestry techniques or utilising carbon finance to maintain tree cover can be transformative.

Revising and consideration of the common practice standards to accommodate the fragmented, small-holder model prevalent in India would unlock the vast potential for carbon sequestration. This would enable a greater number of farmers to participate in carbon finance projects, providing them with additional income streams while contributing to India's climate goals. Further, by acknowledging the fragmented nature of Indian agriculture, carbon credit platforms could design incentives that encourage systematic agroforestry, thereby enhancing both environmental sustainability and rural livelihoods.

Agroforestry, when integrated with ARR initiatives, offers a viable solution to the various challenges faced by India's agricultural sector. By promoting alternative livelihoods and providing additional income streams for farmers, these projects can help address issues such as low productivity, dependence on monsoons, and environmental degradation. The carbon finance provided by ARR projects enables a more systematic and sustained approach to agroforestry, which would otherwise be difficult to achieve given the financial pressures and market constraints faced by many Indian farmers. For farmers grappling with unpredictable weather patterns and fluctuating crop yields, participating in ARR projects presents a pathway to income diversification. By integrating trees into their agricultural landscapes or restoring degraded forest areas on their land, farmers can tap into additional revenue streams through carbon sequestration. Beyond economic gains, ARR projects deliver crucial environmental benefits, such as enhancing soil fertility, improving water retention, and mitigating erosion, thereby bolstering agricultural productivity and ensuring long-term sustainability.

Help small and marginal farmers

Research institutes such as The Energy and Resources Institute (TERI) have already demonstrated the potential of ARR projects in India, spearheading 19 projects across seven States, benefiting over 56,600 farmers. However, for such initiatives to scale up, it is imperative that international carbon finance platforms revise their standards to better align with the realities of Indian agriculture.

As India looks to expand its agroforestry sector and leverage the benefits of carbon finance it is crucial that international standards evolve to reflect the specific conditions of the Indian subcontinent. Revising the "Common Practice" guidelines to be more inclusive of Indian agroforestry practices will enable millions of small and marginal farmers to participate in ARR projects. This would not only drive sustainable development but also provide a much-needed boost to the incomes of millions of rural households, ultimately contributing to the overall economic and environmental resilience of the country.

It is imperative that carbon credit platforms such as Verra and Gold Standard recognise the need for India-centric standards. Only then can the full potential of agroforestry and ARR initiatives be realised, paving the way for a greener, more sustainable, and economically prosperous future for India's farmers.

GS Paper 03 : Indian Economy : Agriculture

(UPSC CSE (M) GS-2 2022) : "The most significant achievement of modern law in India is the constitutionalization of environmental problems by the Supreme Court." Discuss this statement with the help of relevant case laws. (150 w /10 m)

UPSC Mains Practice Question : Discuss the challenges faced by India's agroforestry sector in accessing carbon finance under current global standards. Suggest measures to make these standards more inclusive for small and marginal farmers. (150 w /10 m)

Context :

- India's agroforestry sector offers significant potential for carbon finance integration through Afforestation, Reforestation, and Revegetation (ARR) initiatives.
- However, existing global carbon standards pose challenges due to their "common practice" criteria, which do not align well with India's fragmented, small-holder agricultural landscape.

About Agroforestry?

- Agroforestry accounts for 8.65% of India's total land area and contributes 19.3% of the country's carbon stocks.
- Thus, agroforestry plays a significant role in environmental sustainability and economic development.

What is the Carbon finance contribution?

- Recent research suggests that if adequate policies, financial support, and incentives are implemented, the sector could contribute an additional carbon sink of over 2.5 billion tons of CO_2 equivalent by 2030.

'Common Practice' in Carbon Standards

- In the realm of carbon finance, "common practice" is a key criterion used to assess whether a project is additional — meaning, it goes beyond what is typically done in a given region.
- For ARR projects, this involves determining whether similar activities are commonly practised without the financial incentives provided by carbon credits.
- **Current Standards:** According to carbon standards such as Verra's Verified Carbon Standard (VCS) or the Gold Standard, if an activity is deemed "common practice", it may not qualify for carbon credits, as it is not seen as contributing additional environmental benefits beyond the norm.

- **The current definition:** of common practice in global carbon standards often reflects the realities of large-scale agricultural practices found in regions such as Latin America, Africa, or the United States, where landholdings are extensive and contiguous.

The Indian Context

- **Fragmented land:** In contrast, India is characterised by small and fragmented landholdings
- **Data inputs:** Recent data indicate that 86.1% of Indian farmers are small and marginal, with landholdings of less than two hectares.
- **Planting practices**: These farmers often engage in agroforestry in a non-systematic, scattered manner, planting trees alongside crops or on small patches of fallow land.
- **Need for additional criteria's:** While beneficial, these practices may not meet the additionality criteria set by current carbon standards because they are perceived as "common" within the Indian context.

Need for India-Centric Approaches

- **Redefining common practice:** Given India's unique agricultural landscape, there is an urgent need to redefine and consider the common practice criterion to better reflect the specific challenges and opportunities within the Indian agroforestry sector.
  - An India-centric approach would recognise that even small, incremental changes in land management practices such as adopting more systematic agroforestry techniques or utilising carbon finance to maintain tree cover can be transformative.

Potential benefits

- **Revising and consideration of the common practice standards**: to accommodate the fragmented, smallholder model prevalent in India would unlock the vast potential for carbon sequestration.
- **Inclusion of farmers:** This would enable a greater number of farmers to participate in carbon finance projects, providing them with additional income streams while contributing to India's climate goals.
- **By acknowledging the fragmented nature of Indian agriculture:** carbon credit platforms could design incentives that encourage systematic agroforestry, thereby enhancing both environmental sustainability and rural livelihoods.

Challenges and opportunities in agroforestry

- **Addressing Agricultural Challenges:** Agroforestry, when integrated with ARR initiatives, offers a viable solution to the various challenges faced by India's agricultural sector.
  - By promoting alternative livelihoods and providing additional income streams for farmers, these projects can help address issues such as low productivity, dependence on monsoons, and environmental degradation.

- The carbon finance provided by ARR projects enables a more systematic and sustained approach to agroforestry, which would otherwise be difficult to achieve given the financial pressures and market constraints faced by many Indian farmers.

- **Income Diversification:** For farmers grappling with unpredictable weather patterns and fluctuating crop yields, participating in ARR projects presents a pathway to income diversification.
  - By integrating trees into their agricultural landscapes or restoring degraded forest areas on their land, farmers can tap into additional revenue streams through carbon sequestration.
  - Beyond economic gains, ARR projects deliver crucial environmental benefits, such as enhancing soil fertility, improving water retention, and mitigating erosion, thereby bolstering agricultural productivity and ensuring long-term sustainability.

Help small and marginal farmers

- **Successful Initiatives:** Research institutes such as The Energy and Resources Institute (TERI) have already demonstrated the potential of ARR projects in India, spearheading 19 projects across seven States, benefiting over 56,600 farmers.
  - However, for such initiatives to scale up, it is imperative that international carbon finance platforms revise their standards to better align with the realities of Indian agriculture.
- **Call for Evolving Standards**: As India looks to expand its agroforestry sector and leverage the benefits of carbon finance, it is crucial that international standards evolve to reflect the specific conditions of the Indian subcontinent.
  - **Revising the "Common Practice" guidelines:** to be more inclusive of Indian agroforestry practices will enable millions of small and marginal farmers to participate in ARR projects.
  - This would not only drive sustainable development but also provide a much-needed boost to the incomes of millions of rural households, ultimately contributing to the overall economic and environmental resilience of the country.

Conclusion

- It is crucial for carbon credit platforms such as Verra and Gold Standard to recognize the need for India-centric standards.
- Only by doing so can the full potential of agroforestry and ARR initiatives be realised, paving the way for a greener, more sustainable, and economically prosperous future for Indian farmers.

What is the Carbon Market?

- **About:** Carbon markets are market-based mechanisms designed to reduce greenhouse gas emissions by creating a financial incentive for individuals and organizations to reduce their carbon footprint.
  - They operate on the principle of cap-and-trade, where a government or regulatory body sets a cap on the total amount of greenhouse gas emissions allowed within a specific jurisdiction.

Types of Carbon Markets:

- **Compliance Markets:** These markets are mandatory, requiring regulated entities to purchase carbon credits to offset their emissions. Often, these entities are large industrial polluters.
- **Voluntary Markets:** These markets are voluntary, allowing individuals, businesses, and organizations to purchase carbon credits to offset their emissions beyond regulatory requirements.
- India is a significant exporter of carbon credits into the decentralized voluntary market, with its credits worth between USD 200-300 billion per year and accounting for 17% of the global supply in 2022.
- **Carbon Credits:** They represent a reduction in greenhouse gas emissions that can be traded. One carbon credit equates to one ton of carbon dioxide equivalent (tCO_2e) reduced or avoided.
- **Carbon credits can be generated through various activities, such as:**
  - Implementing energy-efficient technologies, reducing waste, or transitioning to renewable energy sources.
  - Preventing deforestation or promoting reforestation.
- **Carbon Taxes:** They are direct levy on the emission of greenhouse gases. This means that polluters pay a tax based on the amount of greenhouse gases they emit.
  - Carbon taxes generate revenue for the government, which can be used to fund climate mitigation and adaptation projects or reduce other taxes.
- **Global Trends in Carbon Markets:** As of August 2023, 74 carbon pricing mechanisms have been identified worldwide, in either the form of carbon taxes or emissions trading schemes (ETS).
  - In 2023, carbon pricing revenues reached a record USD 104 billion, according to the World Bank's annual "State and Trends of Carbon Pricing 2024" report.

What are the Current Government Initiatives Related to the Carbon Market in India?

- **Carbon Credits Trading Scheme (CCTS):** Building on the Electricity Conservation Act, 2001, and the Environment (Protection) Act, 1986, India launched the CCTS to reduce GHG emissions by trading carbon credit certificates.
- The compliance segment of CCTS will commence in 2025-26, allowing non-obligated entities to participate and trade carbon credit certificates (CCCs).
- **Other Existing Schemes:** The Perform, Achieve and Trade (PAT) scheme and the Renewable Energy Certificates (REC) system are existing market-based emission reduction schemes in India.
- **Monitoring and Verification:** The Bureau of Energy Efficiency (BEE) and the National Steering Committee for Indian Carbon Market (NSCICM) are responsible for ensuring the integrity of the carbon credits through rigorous monitoring, reporting, and verification processes.

India's agroforestry sector

India's agroforestry sector plays a crucial role in the country's agricultural landscape, combining forestry and agriculture to enhance productivity, sustainability, and biodiversity. Here are some key aspects of this sector:

Definition and Practices

- Agroforestry integrates trees and shrubs into agricultural landscapes, promoting a diverse range of crops. Common practices include:
  - **Alley cropping:** Planting trees in rows with crops in between.
  - **Silvopasture:** Combining livestock grazing with tree farming.
  - **Forest farming:** Cultivating high-value crops under a forest canopy.

Benefits

- **Enhanced Biodiversity:** Promotes a diverse ecosystem, benefiting soil health and pest control.
- **Soil Conservation:** Reduces soil erosion, improves fertility, and enhances water retention.
- **Climate Resilience:** Provides protection against extreme weather events and improves carbon sequestration.
- **Economic Diversification:** Offers additional income sources through timber, fruits, nuts, and medicinal plants.

Socioeconomic Impact

- **Agroforestry can empower rural communities by providing:**
  - **Employment Opportunities:** Jobs in tree planting, maintenance, and harvesting.
  - **Food Security:** Increased crop diversity leads to improved nutrition.
  - **Livelihood Stability:** Diverse income streams reduce vulnerability to market fluctuations.

Government Initiatives

- The Indian government promotes agroforestry through various schemes, such as:
  - **National Agroforestry Policy:** Aims to promote agroforestry practices across the country.
  - **Financial Support:** Subsidies and loans for farmers adopting agroforestry systems.

Challenges

- Despite its benefits, the sector faces challenges, including:
  - Lack of Awareness: Many farmers are unaware of agroforestry benefits and practices.
  - Land Tenure Issues: Unclear land ownership can hinder investment in agroforestry.
  - Market Access: Farmers may struggle to access markets for their agroforestry products.

Future Prospects

- With increasing awareness of sustainable practices and climate change, agroforestry in India is poised for growth. Research and innovation, coupled with supportive policies, can help overcome existing challenges and maximize its potential.
- Overall, the agroforestry sector is vital for enhancing food security, improving livelihoods, and promoting environmental sustainability in India.