

GEOGRAPHY**Explained: Snapping of Black Hole**

NASA released the first ever photograph of a black hole and its shadow.

Foremost thing: What is a Black Hole?

- A black hole is an object in space that is so dense and has such strong gravity that no matter or light can escape its pull. Because no light can escape, it is black and invisible.
- They drastically warp the fabric of space-time and anything that passes too close gets sucked into it be it a wandering star or a photon of light.
- They exist from the size of a human cell to more massive than the sun.
- Black holes of stellar mass are formed when a massive star collapses at the end of its life cycle.
- After a black hole forms, it continues to grow by absorbing mass from its surroundings.

Why a black hole was never photographed before?

- By definition, a black hole is a region in space where the pulling force of gravity is so strong that neither matter nor light can ever escape.
- For anything approaching a black hole, the point of no return is called the “event horizon”; anything that comes within the event horizon will be consumed forever.
- Because no light can escape from it, a black hole is invisible.

Then how it became possible?

- Advanced space telescopes can identify black holes by observing the behaviour of material and stars that are very close to black holes.
- The hot disk of material encircling a black hole, as NASA explained, shines bright.
- The gases in that accretion disk are heated up as they accelerate toward the black hole, causing them to glow extremely brightly.
- The colours they glow are invisible to us, but are detectable with an X-ray telescope.
- Scientists have also detected the gravitational waves generated when two black holes collide.

Black hole in Messier 87 (M87) galaxy

- The first photograph, which comes from the Event Horizon Telescope (EHT) project, shows the black hole that is at elliptical galaxy Messier 87 or M87.
- This black hole is 6.5 billion times the mass of the Sun. It is located some 55 million light-years from Earth.
- Catching its shadow involved eight ground-based radio telescopes around the globe, operating together as if they were one telescope the size of our entire planet.

About EHT Project

- The Event Horizon Telescope is a network of 10 radio telescopes on four continents that collectively operate like a single instrument nearly the size of the Earth.
- The EHT project is an international partnership formed in 2012. Its main objective is to directly observe the immediate environment of a black hole. T
- he findings will provide insight into the celestial object so dense that their gravitational field swallows everything including light.

What Einstein has to do with this mission?

- Einstein’s general theory of relativity predicts how space-time is warped by the extreme mass of a black hole, which he said has a mass that’s 7 billion times that of our sun.
- Einstein’s visions of a geometric bending of space and time first came to light in 1919.

CONSTITUTION AND POLITY**The right to criticise**

In its judgment dated April 8, the Manipur High Court ordered the release of journalist KishorechandraWangkhem, who was charged with sedition under the National Security Act for criticising the Chief Minister.

History of sedition judgments

- Though the petition was allowed only on the technical ground that certain material mentioned in the detention order was not supplied to the petitioner, it could have also succeeded on the ground that in a democracy people have a right to criticise the government.
- Article 19(1)(a) of the Constitution was upheld by the Supreme Court in RomeshThapar v. The State of Madras (1950).
- In KedarNath Singh v. State of Bihar (1962), the Supreme Court held that mere criticism of the government is not sedition unless it is an incitement to violence or breach of public order.
- The U.S. Supreme Court, in Brandenburg v. Ohio (1969), laid down the ‘imminent lawless action’ test, which says that free speech is protected by the First Amendment to the U.S. Constitution unless it incites imminent (not remote) lawless action.

- This judgment was followed by the Indian Supreme Court in Arup Bhuyan v. State of Assam (2011) and in Sri Indra Das v. State of Assam (2011), and hence it is the law of the land in India too.
- The present situation in India
- Unfortunately, what has been often witnessed in India is that political functionaries get incensed and cannot tolerate criticism.
- Then they slap sedition charges or preventive detention laws against their critics, as the Maharashtra government did in the case of the cartoonist Aseem Trivedi, or the West Bengal government did in the case of Professor Ambikesh Mahapatra of Jadavpur University, or the Tamil Nadu government in the case of the folk singer Kovan
- To speak for the poor or marginalised sections of society has become particularly dangerous, as was seen in the cases of those accused of inciting violence in Bhima Koregaon.

Conclusion:

- By enacting the Fundamental Rights of the people in Part III of the Constitution, and by making the courts the guardians of the rights of the people, a solemn duty has been cast on the judiciary to uphold democratic principles.
- The Manipur High Court therefore deserves to be commended in this connection.
- It is hoped that other courts in India, too, will follow its example.

Closure on Cynicism

By ordering an increase of the existing Voter-Verifiable Paper Audit Trail (VVPAT) verification rate from one to five random Electronic Voting Machines (EVMs) per Assembly constituency or segment, the Supreme Court has sought to reassure those sceptical about the integrity of counting by means of EVMs.

Impact of this decision

- By limiting the verification to five machines instead of the 125-odd machines per constituency that the Opposition's demand for a 50% VVPAT count would have amounted to, the apex court has enabled the Election Commission of India to declare the results on the counting day itself.
- The higher figure, which will increase the overall number of EVMs to be counted to close to 20,000 machines, should reasonably address the very remote possibility of 'insider fraud'.
- It will also verify a higher sample of EVMs in the smaller States and bring the sample within reasonable confidence levels to discount chances of EVM-tampering.
- In any case, the VVPAT slip verification is more of a reassurance to voters that the EVM is indeed foolproof, over and above the technical and administrative safeguards that are already in place to prevent any tampering.

ECI's Point of view and efforts

- For the ECI, the key technical issue with EVMs and VVPATs is not really in regard to tampering but to machine glitches.
- While the parliamentary by-elections in Uttar Pradesh and Bihar and the Assembly election in Karnataka last year had registered significant machine replacement rates (20% and 4%, respectively), these were brought down to less than 2% in later elections held in the winter months.
- The ECI made technical fixes to the VVPAT to make them more resilient during use across the country, and it should be well-prepared to handle any glitches during the seven-phase Lok Sabha election.
- The availability of replacement machines and the ability to deploy them quickly in case of a failure of VVPATs are essential to avoid disruptions.

Conclusion

- In the past couple of years, the doubts raised about EVMs by parties and the new constraints encountered in the electoral process due to hastened VVPAT implementation have bogged down the ECI and narrowed the discourse regarding electoral reforms.
- Now that the Supreme Court has brought a closure of sorts to the issue, it is time for the ECI to focus on the hassle-free conduct of polls to the Lok Sabha and to four State Assemblies, and later consider other important issues — increasing voter enrolment, effective regulation of campaign financing and implementation of the model code of conduct.

PCI issues guidelines for objective reporting on polls

The Press Council of India (PCI) on asked the media to give objective reports about the election and cautioned it against the phenomenon of paid news.

Guidelines by PCI

[I] A note for Media

- The PCI said newspapers are not expected to indulge in unhealthy election campaigns, exaggerated reports about any candidate or party during the elections.
- It will be the duty of the press to give objective reports about the election and the candidates.

- While reporting on the actual campaign, a newspaper may not leave out any important point raised by a candidate and make an attack on his or her opponent.
- It also cautioned the press to eschew reports which tend to promote feelings of enmity or hatred between people on the grounds of region, religion, race, caste, community or language.
- The press should refrain from publishing false or critical statements in regard to the personal character and conduct of any candidate or in relation to the candidature or withdrawal of any candidate or candidature.

[II] Against unverified news

- The PCI also cautioned against publishing unverified allegations against any candidate or party.
- The council said whenever the newspapers publish pre-poll surveys, they should take care to preface them conspicuously.
- They should indicate the institutions which have carried on such surveys, the individuals and organisations which have commissioned them, the size and nature of sample selected and the method of selection of the sample for the findings.

[III] Against paid news

- The PCI asked the media to guard against paid news which it defined as “any news or analysis appearing in any media (print & electronic) for a price in cash or kind as consideration”.

[IV] Lighter note for Authorities

- It also urged authorities that rules and orders regulating entry of the media persons to places of election should be notified and the cut-off date for applying for passes should be given due and advance publicity.
- The authorities cannot prohibit the use of vehicles by the media persons for movement during elections although its use for the voters by candidates and their agents is prohibited.
- This is because the journalist have to move from booth to booth and collect information from all the centres whether on the polling day or at the time of counting.

Significance of Election Commission

The Election Commission of India, once a formidable force during elections as poll monitor, is now being heard less and less, or only for its feeble interventions.

Events Weakening authority of election commission

- The election process has only just begun but there is already a long list of interventions by the players that have seemed to challenge, if not outrightly flout, the Model Code of Conduct, and get away with it.
- UP Chief Minister Yogi Adityanath called the Indian army “Modijikisena (Modi’s army)”, and despite the EC’s direction to parties, post-Pulwama, to desist from political propaganda involving the armed forces, earned only a tepid warning.
- The NitiAayog chairperson spoke publicly against the Congress’s Nyay scheme.
- Rajasthan Governor Kalyan Singh also crossed the lines of his institutional role and shared his fervent faith in the leadership of NarendraModi ahead of polls.
- The EC has handed the Kalyan Singh matter to the President who has forwarded it to the Home Ministry.
- The list goes on, and it includes the hagiographic Modi bio-pic seeking release days ahead of polling, and the income tax raids that seem to target leaders of the Opposition parties across the country.
- Last but certainly not least, it includes speeches by the Prime Minister himself that are communally charged and appeal to “Hindu” voters and hold up the figure of the soldier.

Election Commission’s Response

- In all these matters, the EC has been muted, when it has not been silent.
- Of course, this is not to say that the EC, mostly, can go far beyond the slap on the wrist anyway — it has resorted only in extraordinary situations to its stronger powers under Article 324 of the Constitution.
- The Model Code of Conduct, which is routinely invoked, is more spirit, less letter — primarily, a moral and ethical restraint on parties in the poll fray.
- Yet, it is also true that the EC has, in the past, used its subtle powers to greater effect.
- It has amplified its influence by its vigilance and impartiality. As a result, the EC’s censure was deemed to be embarrassing to the censured, it was a rebuke that mattered.

Conclusion

- By all indications, the EC’s reprimand is losing its power to chasten.
- It is also evident that this is not just because of a larger coarsening of the political discourse, but more specifically, due to the EC’s own unwillingness or inability, or both, to push back at a time when the political executive is strong and overweening.

- This depletion of the EC's stature is troubling and must be reversed — much depends on it in an exuberant and boisterous democracy.

INTERNATIONAL AFFAIRS- BILATERAL, GROUPINGS, ORGANISATIONS**IMO's new rule on electronic information exchange between ships and ports comes into force**

A new global rule mandated by the International Maritime Organisation (IMO) for national governments to introduce electronic information exchange between ships and ports has come to effect.

New rules to FAL Convention

- The FAL Convention contains standards and recommended practices and rules for simplifying formalities, documentary requirements and procedures on ships' arrival, stay and departure.
- The requirement, mandatory under IMO's Convention on Facilitation of International Maritime Traffic (FAL Convention) is part of a package of amendments adopted in 2016.
- The new FAL Convention requirement for all public authorities to establish systems for the electronic exchange of information related to maritime transport.
- It marks a significant move in the maritime industry and ports towards a digital maritime world, reducing the administrative burden and increasing the efficiency of maritime trade and transport.

What are new rules in actual practice?

- The Convention encourages use of a "single window" for data, to enable all the information required by public authorities in connection with the arrival, stay and departure of ships, persons and cargo, to be submitted via a single portal, without duplication.
- The rules seeks to make cross-border trade simpler and the logistics chain more efficient, for the more than 10 billion tonnes of goods which are traded by sea annually across the globe.

ENVIRONMENT- CONSERVATION, BIO-DIVERSITY AND ISSUES**India stares at pile of solar e-waste**

By 2050, India will likely stare at a pile of a new category of electronic waste, namely solar e-waste, says a study made public on Thursday.

Background

- Currently, India's e-waste rules have no laws mandating solar cell manufacturers to recycle or dispose waste from this sector.
- No laws mandating disposal; volume estimated at 1.8 million tonnes by 2050.
- "India's PV (photovoltaic) waste volume is estimated to grow to 200,000 tonnes by 2030 and around 1.8 million tonnes by 2050," said the study by Bridge To India (BTI), an energy consultancy firm.
- India's achievement in solar sector
- India is among the leading markets for solar cells in the world, buoyed by the government's commitment to install 100 GW of solar power by 2022.
- So far, India has installed solar cells for about 28 GW and this is largely from imported solar PV cells.

Solar cell waste

- Solar cell modules are made by processing sand to make silicon, casting silicon ingots, using wafers to create cells and then assembling them to make modules.
- India's domestic manufacturers are largely involved in assembling cells and modules.
- These modules are 80% glass and aluminium, and non-hazardous.
- Other materials used, including polymers, metals, metallic compounds and alloys, and are classified as potentially hazardous, says the study.

Handling of solar waste

- India is poorly positioned to handle PV waste as it doesn't yet have policy guidelines on the same
- a lack of a policy framework is coupled with the fact that even basic recycling facilities for laminated glass and e-waste are unavailable.
- Despite the e-waste regulation being in place for over seven years, only less than 4% of estimated e-waste is recycled in the organised sector as per the latest estimates from the Central Pollution Control Board

Conclusion: While the solar sector continues to grow robustly, there is no clarity on solar waste management in India.

SCIENCE AND TECHNOLOGY- EVERYDAY SCIENCE, SPACE, NUCLEAR, DEFENCE ETC**Bamboo Rice shows up in Odisha**

Odisha is among the states known for a wide variety of rice, the staple food of eastern and north-eastern India and beyond.

Bamboo Rice

- Bamboo rice is special rice that is grown out of a dying bamboo shoot.

- When the bamboo shoot breathes its last, it flowers into a rare variety of rice seeds, which are known as bamboo rice.
- It is said that the bamboo rice harvesting is a major source of income for the tribal communities living in the interiors of Wayanad Sanctuary in Kerala.
- The gates of Chandaka-Dampara Wildlife Sanctuary in Cuttack district Odisha have been recently opened for forest dwellers to come and collect the rice.

What's so special about it?

- The bamboo rice, which grows only twice or thrice in a century. And it is being harvested now.
- The last collected bamboo rice in Odisha was in 1979.
- Whenever bamboo blossoms, the rat population increases. To prevent rats from running the rice, local villagers and forest dwellers collect bamboo rice.
- Also, the rice then becomes a major source of income and food for villagers living near the forest.

Nutritional content

- The variety looks like paddy rice and tastes more like wheat.
- It is believed to have low glycaemic index compared to other varieties and it is good for diabetics.
- It's rich in proteins and does not contain any fat.

IIT Bombay's bacteria preferentially degrade aromatic compounds

Using a unique strain of bacterium isolated from soil contaminated with petroleum products, IIT Bombay researchers selectively removed from the environment toxic pollutants.

Pseudomonas Putida CSV86

- The bacteria helped selectively remove pollutants such as aromatic pollutants such as benzoate (sodium benzoate is used as a food preservative), benzyl alcohol and naphthalene.
- The strain can degrade aromatics and organic acids simultaneously.

What makes this bacterium so special?

- The unique feature of the bacterial strain is its preference for aromatic compounds and organic acid as a food source even when glucose is available.
- Since breaking down aromatic compounds is difficult, bacteria generally prefer simple carbon sources such as glucose for obtaining energy.
- Even the bacteria that are known to degrade aromatic compounds tend to first prefer glucose and other simple carbon sources for energy and feed on aromatic compounds only when glucose gets exhausted.
- Even when both benzoate and glucose were available, the bacteria first utilized benzoate, and only when it was exhausted did it start feeding on glucose.
- This gives an advantage to remove the pollutants with priority even in the presence of simple carbon source from the contaminated site.

Significance

- The bacterial strain is a very good candidate for bioremediation or waste-water treatment.
- We can increase the metabolic diversity and capacity by genetically engineering the strain.
- The team hopes to engineer the strain so it can be directly applied to the soil to preferentially degrade aromatic pesticides.

DEFENCE

Exercise Bold Kurukshetra

- The 12th edition of joint military exercise between India and Singapore culminated on 11 April 2019 after an impressive closing ceremony held at Babina Military Station (UP).
- The Exercise is aimed at attaining a high level of interoperability between the armies of both the nations through mutual understanding and familiarization with each other's operational procedures and equipment.
- The troops learnt about each other's organisations and best practices being followed in combat.
- The exercise was a grand success and taught valuable lessons to troops of both the participating nations.

QUOTE OF THE DAY

Keep your eyes on the starts and feet on ground.