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## GS 01: GEOGRAPHY

### THE HINDU PAGE : 1

# Most parts of India to see more heatwave days: IMD

**Jacob Koshy**  
NEW DELHI

North India is likely to experience a cooler-than-normal summer this time, while other parts of the country may see more number of heatwave days, the India Meteorological Department (IMD) said on Tuesday.

From April to June, above-normal maximum temperatures are expected over most parts of east and northeast India, as well as eastern parts of central India, and adjoining peninsular regions. Maximum temperatures are likely to be "normal to below normal" over the remaining parts.

There will likely be

more than the usual number of heatwave days over parts of east, central and northwest India, and southeast peninsula during this period. Many parts of coastal Odisha, West Bengal, Tamil Nadu, Puducherry, Andhra Pradesh, and some regions of Gujarat, Maharashtra and Karnataka are likely to see heatwaves in April.

#### El Nino fears

The country will likely receive 12% more rain than usual in April.

In July, however, forecasts suggest the emergence of an El Nino, warming of regions of the Central Pacific Ocean that frequently links to reduced



Experts say it is early to link cooler summers to low monsoon rains, though it is a pattern seen in the past. SHASHI SHEKHAR KASHYAP

rain in India. Experts said it is still early to link cooler summers to diminished monsoon rainfall though it is a pattern that has held in the past. The IMD is expected to provide an initial forecast on the expected

performance of monsoon 2026 on April 15. India experienced surplus monsoon in 2024 and 2025. With fertilizer output expected to be hit this year on account of the Iran-Israel-U.S. war, weak rainfall

could impact kharif sowing.

"Cooler than normal summer means less heating of the landmass, which typically acts as a natural pull for moisture and monsoon. This could affect the onset of the monsoon and its initial progress [over Kerala in June]," said Madhavan Rajeevan, climatologist and former Secretary, the Ministry of Earth Sciences.

"However a clearer picture could emerge only around end May. There is also a forecast for a 'super' El Nino. We shouldn't worry now but if these signals persist in May, the government should prioritise drought management."

## GS 2: FEDERAL ISSUES

### THE HINDU PAGE : 3

# Telangana accuses A.P. of illegal power generation

**The Hindu Bureau**  
HYDERABAD

Telangana Excise Minister Jupally Krishna Rao alleged that the Andhra Pradesh government was generating power at the Srisailem dam in violation of established norms, ignoring the irrigation and drinking water needs of Telangana.

Addressing the media, the Minister said that there is a clear rule that power generation should not be undertaken at the Srisailem reservoir once the minimum water level falls to 834 feet (254.2 metres). Despite this stipulation, the A.P. government had been drawing water and producing electricity illegally and unjustly, “without considering the irrigation and drinking water requirements of Telangana”, he alleged.

## GS 3: INTERNAL SECURITY

### INDIAN EXPRESS PAG

# 42,000-sq. km Bastar largely free from Maoist violence, but IEDs remain a challenge: police

**Vijaita Singh**  
NEW DELHI

From tracking the movement of security teams out on patrol with satellite-enabled navigation devices and ensuring communication through satellite phones, to opening new security camps in the so-called liberated zones in the Bastar division of Chhattisgarh, the State Police and the Central Reserve Police Force (CRPF) followed a clear strategy to declare the 42,000-sq. km area “Maoist-free” by March 31, a deadline set by Union Home Minister Amit Shah on August 24, 2024.

The number of districts affected by left-wing extremism, often referred to as the red corridor, has shrunk from 126 districts across Chhattisgarh, Jharkhand, Odisha, West Bengal, Bihar, Maharashtra, Telangana, Andhra Pradesh, and Madhya Pradesh in 2014 to just two districts – Bijapur and Sukma (in Chhattisgarh) – in 2026. In 2005 the number of affected districts stood at around



Former Maoist insurgents attend a vocational training programme in Dantewada district. AFP

230. Many districts were reorganised in the following years.

Bihar, Maharashtra (barring one district), Jharkhand, and Odisha had already been declared free of Maoist activities before 2024, Home Minister Amit Shah informed the Lok Sabha on March 30. Bastar was one of the regions worst affected by left-wing extremism.

The Minister said that the number of police stations in the country which recorded Maoist incidents came down to 60 in 2026

from 350 in 2014. According to the annual report of the Home Ministry for 2005-06, the number of such police stations stood at 460 in 2005.

#### Security camps

Sundarraaj P., Inspector-General of Police, Bastar Range, told *The Hindu* that as new security camps were opened in Bastar, the influence of the Maoists dwindled. “The movement of each patrol team was tracked through GPS devices. To tide over connectivity issues in the interior, sa-

tellite phones were used. If a team came under fire, the reinforcements were sent from the nearest camp. The change in strategy helped in bringing down the number of casualties, unlike earlier when teams were out patrolling for two or three days; it was like shooting in the dark,” the officer said.

The Home Minister said that in the past six years, 406 new Central Armed Police Force (CAPF) camps and 68 night landing helipads were built in areas affected by left-wing extremism. As many as 400 bullet-proof and blast-proof vehicles were also provided to jawans.

Data show that in Bastar alone, out of the 432 security camps set up since 2001, 168 were established between 2001 and 2014, while 264 camps were established between 2015 and 2026. Bijapur and Sukma, the only two districts that have some presence of Maoist activity, account for 50% of the total such camps.

According to the Bastar

Police Action and Outcome Report, security camps are no longer limited to troop deployment but operate as Integrated Development Centres, helping extend governance, welfare schemes, and essential services to previously inaccessible villages. The expansion of these camps is described as central to restoring territorial control and public trust.

Mr. Sundarraaj said that though the area had been almost cleared of the presence of Maoists, with the exception of seven or eight cadres, the challenge posed by Improvised Explosive Devices (IED) remained. “We will take some time to de-mine the areas and declare them free of IEDs that may have been planted by the Maoists before they deserted their camps or surrendered,” Mr. Sundarraaj said.

Mr. Sundarraaj said that the incidents of Maoists damaging infrastructure had decreased significantly, with only two incidents of damage to mobile phone towers reported in 2025.

# GS 3: SPACE

## THE HINDU PAGE : 7

# Earth's orbits are filling up because governance hasn't kept pace

There is no regular way to check whether satellite operators follow through on promises to make satellites safe when they stop working, to move them out of the way or to bring them down once their mission ends; thus, regulators often go by what companies say they will do before launch rather than on what regulators can confirm

Shrawani Shagun  
Abhiram Nair

**T**hroughout human history, the sky symbolised freedom – vast, open, untouched. Today, that no longer holds. The earth's orbital environment has become crowded, fragile, and vulnerable, threatened by what is today evidently a failure of governance rather than just of engineering.

The language of space sustainability has grown familiar in international forums and policy documents. Yet familiarity has bred complacency. As launches become more frequent and the number of private actors multiplies, the gap between what is promised and what is implemented has continued to widen. The result is an orbital environment that is actively used, commercially exploited, and strategically warranted but ethically under-governed.

Orbital harm is difficult to govern because much of the debris capable of causing damage is impossible to track consistently. Authorities are also able to say which fragment came from which object only after it has caused some damage, and even then with limited certainty.

Reducing risk depends on having accurate information about when objects in orbit might come close to one another and exactly where they are.

But access to this information is uneven across satellite operators and countries, and it may be withheld for commercial reasons or kept secret for security reasons.

There's also no regular way to check whether operators actually follow through on promises to make satellites safe when they stop working, to move them out of the way or to bring them down once their mission ends, especially for small satellites or missions that last only a short time.

As a result, regulators mostly go by what companies say they will do before launch rather than on what regulators can confirm once the satellite is in orbit, which ultimately leaves responsibility unclear.

**Responsibility and prevention**  
Even debris smaller than a coin, travelling at orbital velocities, carries enough energy to disable or destroy active satellites. Each collision generates thousands of new fragments, multiplying risk. International law obligates states to take reasonable measures to prevent foreseeable harm arising from activities under their jurisdiction. In the context of orbital debris, this means states need to plan for collisions, fragmentation, and long-term congestion – but do they? Indeed, choosing not to mitigate risk is itself a decision because it expects others to deal with dangerous situations. Orbital governance also remains



By dramatically cutting launch costs, reusable boosters allowed SpaceX to deploy the large Starlink satellite constellation at an economically viable scale. SPACEX

anchored in outdated assumptions. The existing treaties were written for an era when space activity was limited, controlled by states, and innovation was slow. Importantly, they do not address cumulative harm and stewardship.

Article VI of the Outer Space Treaty makes states internationally responsible for national activities in outer space, including those carried out by private actors. Article VII establishes liability for damage caused by space objects. Yet these provisions were not designed to prevent cumulative harm and are also poorly suited to preventing cumulative harm before it becomes irreversible.

At present, there is no international duty-of-care standard for the earth's orbits and no ethical threshold for 'acceptable' congestion.

National licensing regimes are one of a few mechanisms that can enforce orbital responsibility before damage occurs. Increasingly of late, before they approve a rocket launch or a mission, regulators need to be told the orbital lifetime, the ways in which the payload can be disposed of, whether it has provisions to avoid collisions, and whether it can be passivated (i.e. deprived of the ability to move around). However, regulators in different jurisdictions ask for different levels of details, so operators register in permissive regulatory environments.

To avoid this, licensing conditions need to be standardised, alongside mandating launch operators to use measurable debris-mitigation thresholds, compulsorily share data to improve space situational awareness, and use verifiable end-of-life disposal strategies.

**Orbital harm is difficult to govern because much of the debris capable of causing damage is impossible to track consistently. Authorities are also able to say which fragment came from which object only after it has caused some damage**

The ethical vacuum is becoming more pronounced as new actors enter space. Nations entering spaceflight for the first time and private enterprises are central to the future of orbital activity – but will these actors inherit the permissive norms that produced today's congestion or will they help redefine responsibility for the decades ahead?

Principles embedded in international environmental law, including precaution, proportionality, and intergenerational equity, offer a useful guide. These principles recognise that uncertainty does not excuse inaction and that the way we use (non-rivalrous) resources today should not foreclose future generations' access to the same resources.

**India's opportunity**  
The present moment is particularly significant for India. Its space programme has for a long time operated with tight constraints while delivering global services. As commercial participation expands and launch capabilities grow, India can either remain a silent participant or help shape their ethical norms. Specifically, as India develops its national space legislation and licensing

regime, it has a chance to embed orbital responsibility as a legal requirement.

Ethical governance means recognising that shared environments demand shared restraint and that access to orbit carries obligations beyond national interest or commerce. Setting up such a governing system in turn requires us to answer some tough questions first: When does congestion become negligence? Who bears responsibility for cumulative risk? What obligations do present-day operators owe to future spacefarers?

Voluntary guidelines and rhetorical commitments no longer work; instead, governments and private sector enterprises must express the best principles of environmental governance in enforceable terms in space policy. Existing guidelines to mitigate debris in orbit, while being technically sound, rely largely on voluntary compliance and lack uniform monitoring or sanctions for non-compliance. This has resulted in an uneven regulatory landscape in which the responsible operators absorb higher costs.

Space should be sustainable, which means we should be willing to build the ethical governance required to make it so. In space as on the earth, governance that waits for damage before assigning responsibility will arrive too late.

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Abhiram Nair is a space sustainability researcher and entrepreneur shaping the future of responsible orbits. ceo@orets.uk)

### THE GIST

▼ The earth's orbital environment has become crowded, fragile, and vulnerable, threatened by what is today evidently a failure of governance rather than just of engineering

▼ Reducing risk depends on having accurate information about when objects in orbit might come close to one another and exactly where they are

▼ Even debris smaller than a coin, travelling at orbital velocities, carries enough energy to disable or destroy active satellites

▼ The existing treaties were written for an era when space activity was limited, controlled by states, and innovation was slow

## GS 3: SCIENCE AND TECHNOLOGY

### THE HINDU PAGE : 7

#### WHAT IS IT?

# Entanglement: spooky action

Vasudevan Mukunth

Scientists have shown that helium atoms can be entangled through their movement. A team from Australia and the U.S. collided clouds of helium atoms together to create pairs that shared a single quantum state.

The achievement showed that even 'heavy' particles could follow the same strange quantum physics rules that scientists have mostly observed so far in much lighter particles like electrons. The possibility also opens new ways for researchers to study the link between quantum physics and gravity — a famous unsolved problem in physics.

Quantum entanglement occurs when two particles become so deeply linked that they share a single existence.

The study achieved momentum entanglement, where the link involves the particles' momentum. When scientists collided the atoms, the resulting pairs flew apart. Because of quantum mechanics, neither atom had a definite direction until a detector measured it. However, once they measured the momentum of one atom, they instantly determined the momentum of its partner, no matter how far apart they'd travelled.

In entanglement, one atom does not disappear and reappear elsewhere. Instead, teleportation involves quantum



Scientists have shown that helium atoms can be entangled through their movement. GETTY IMAGES

information: when a measurement defines the first atom's state, that information effectively dictates the state of the second atom across the void. Albert Einstein famously called this "spooky action at a distance" because it defies everyday logic. In classical physics, objects usually only affect things directly next to them. Momentum entanglement proves that whole atoms can remain connected through a nonlocal bond.



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## GS 3: DISASTER MANAGEMENT

### THE HINDU PAGE : 7

# Counting people is not counting disaster risk

**O**disha is, by any measure, one of India's most disaster-prone States. Its 574.7-kilometre coastline has absorbed some of the most powerful cyclones to make landfall on the subcontinent. Over two decades, through investment in early warning systems, cyclone shelters, and mass evacuations, the State has reduced cyclone mortality to near zero. It is, therefore, not merely paradoxical but troubling that the 16th Finance Commission has awarded Odisha the single largest reduction in disaster funding share among all 28 States, a decline of 1.57 percentage points relative to the 15th Finance Commission's allocation.

How does a State with the highest hazard score in the country, and the deepest investments in preparedness, end up losing the most? The answer lies in a structural problem in the Finance Commission's allocation formula.

#### The revised formula and its rationale

The 16th Finance Commission has allocated ₹2,04,401 crore to State Disaster Response Funds (SDRF), a 59.5% increase over its predecessor. The Commission adopted a multiplicative Disaster Risk Index (DRI = Hazard X Exposure X Vulnerability), drawing on the theoretical framework. This is a departure from the additive approach of the 15th Finance Commission, which treated hazard and vulnerability as substitutes rather than complements. Risk arises only when hazard intersects with exposed and vulnerable populations. A powerful cyclone striking an uninhabited coastline is a natural event, not a disaster. The logic is correct. The operationalisation is not.

The first problem lies in the measurement of 'Exposure'. The Commission uses the total population of each State, scaled linearly between 1 and 25, as its exposure metric. Uttar Pradesh receives 25 and Sikkim receives 1. This is administratively convenient but scientifically indefensible. Exposure, per the United Nations Intergovernmental Panel on Climate Change



**Aswathy Rachel Varughese**

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Structural problems in the 16th Finance Commission's disaster funding formula leave India's most hazard-prone States underserved

(IPCC)'s Sixth Assessment Report, is the presence of people in places that could be adversely affected by hazards, not simply the number of people within a political boundary. A State with 10 crore people on a hazard-safe inland plateau has lower exposure than a State with three crore people settled entirely along a cyclone-prone coastline. Total population and hazard-zone population are not the same variable.

The practical consequences are stark. Odisha's hazard score of 12 is the highest in the country. But because its population score is only 5, its computed DRI of 79.8 is overshadowed by Bihar's 224.2 and Uttar Pradesh's 413.2, two States with lower hazard scores. The multiplicative formula, in practice, rewards demographic size. A State can face the most intense hazard in India and still lose funding because it is not populous. This is precisely the outcome that a risk-based allocation framework was designed to prevent.

The second problem compounds the first. Vulnerability is measured through each State's average per capita Net State Domestic Product (NSDP), inverted so that poorer States score higher. The intuition is clear – poorer States have fewer fiscal resources to absorb disaster shocks. But the NSDP measures fiscal capacity, not disaster vulnerability. Vulnerability is multidimensional, encompassing housing quality, health infrastructure in hazard zones, early warning reach, and the share of population in structurally unsafe dwellings. Average per capita income conceals enormous intra-state inequality.

In 2018, Kerala suffered its worst flooding in a century, causing estimated damages of ₹31,000 crore. Yet, the formula assigns Kerala a vulnerability score of just 1.073, near the minimum, because its per capita income is relatively high. Combined with a population score of 4, Kerala's DRI of 34.5, is lower than many States with negligible disaster history. Jharkhand, with the second-highest vulnerability score reflecting genuine poverty and tribal fragility, still loses 0.78 percentage points of funding share

because its population score cannot compensate in the multiplicative framework. Twenty States in total have lost relative share. The common thread is not that they are safer; it is that they are smaller, wealthier on average, or both.

#### What needs to change

Exposure should be measured as the number of people living within defined hazard zones, flood plains, cyclone-prone coastal belts, earthquake-susceptible zones, using the Building Materials and Technology Promotion Council (BMTPC) Vulnerability Atlas cross-referenced with Census enumeration block data. Vulnerability should be reconstituted as a composite index incorporating the share of kutcha housing, agricultural labour dependence, health infrastructure density in high-hazard districts, crop insurance penetration, and early warning effectiveness. The National Family Health Survey (NFHS)-5, the Pradhan Mantri Fasal Bima Yojana (PMFBY) database, National Health Mission (NHM) facility surveys, and India Meteorological Department (IMD) monitoring records collectively provide that information. The Finance Commission should mandate the National Disaster Management Authority to publish an annual State Disaster Vulnerability Index as the authoritative input for each subsequent award period, institutionalising the methodology and ending contested metrics at every Commission.

India cannot afford to get disaster finance wrong. Climate projections indicate intensifying cyclone frequencies along both coastlines, expanding drought belts across peninsular and central India, and escalating extreme rainfall in already-stretched States. The States most likely to face the sharpest increase in disaster frequency – Odisha, Andhra Pradesh, Kerala, Assam – are precisely those the current formula underserves. A formula that measures total population rather than the exposed population is not a risk index. It is a headcount.

**GS 2: SOCIAL JUSTICE**  
**INDIAN EXPRESS PAGE : 16**

**India faces challenge in meeting 2030 maternal mortality goals, shows study**

Anuradha Mascarenhas  
 Pune, March 31

A RECENT study in The Lancet Obstetrics, Gynaecology, and Women's Health journal shows the challenge before India in meeting the Sustainable Development Goal of bringing down the Maternal Mortality Ratio (MMR) to below 70 deaths per 1 lakh live births by 2030.

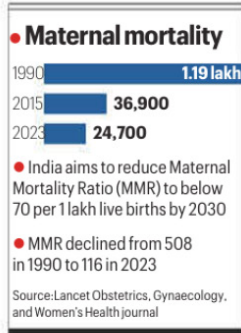
While the country has successfully brought down maternal mortality numbers from 1.19 lakh in 1990 to 36,900 in 2015 and 24,700 in 2023, the progress has slowed. As per the study, 'Global Burden of Diseases, Injuries and Risk Factors', while the MMR in India stood at 508 in 1990, it was down to 116 deaths per lakh live births in 2023.

India accounted for one-tenth of all maternal mortality numbers in 2023, the study says, putting the total deaths globally at 2.4 lakh. The study also shows that 100 of the 204 countries and territories covered had reached

the 2030 SDG target of below-70 MMR by 2023. Of the 104 not yet meeting the target, 15 had MMR in the range of 70 to 100, 16 between 100 and 140 (including India), and 73 MMR greater than 140. Apart from India, the countries struggling to meet the SDG 2030 target include the Democratic Republic of the Congo, Ethiopia, Nigeria and Pakistan.

Given the low starting point, India, however, remains among countries to have seen the most substantial improvement in MMR since 1990, along with Bangladesh, Ethiopia, Morocco, Nepal and Rwanda.

Maternal mortality is defined as deaths due to obstetric complications or comorbid disorders exacerbated by pregnancy, up to 1 year after the end of the pregnancy, irrespective of the method by which pregnancy ended. Dr Anjali Radkar, a demographer and former Professor and Head, Centre for the Study of Social Inclusion, Gokhale Institute of Politics



and Economics, says that within India, while the South and some states are on course to achieving the SDG target by 2030, the overall MMR is being pulled down by states such as Assam and Uttar Pradesh.

As per the Sample Registration System (SRS), which is the major source of fertility and mortality rates in India, while India's MMR declined from 122 per one lakh live births in 2015-17 to 88 in

2021-2023, MMR in Assam came down from 215 to 110 in the same period, and in UP, from 197 to 141, Radkar pointed out.

The demographer advised targeted action, including by strengthening primary health-care systems, with a focus on maternal and child health. "When child mortality declines, fertility rates tend to decrease as well. Lower fertility in turn, contributes to a reduction in maternal mortality... This integrated approach can play a key role in reducing MMR," she said, adding that unless maternal mortality was reduced, the global SDG goals for maternal health would also remain out of reach. At the same time, experts at the International Institute for Population Sciences pointed to the possibly flawed presentation in the study, grouping smaller countries with India.

"Because India has a much larger number of births, comparing absolute maternal death numbers with countries like

the Democratic Republic of the Congo or Nigeria is not appropriate," Dr Nandita Saikia, a professor at the institute, said.

Pointing out that MMR was 565 for Congo compared to 116 for India, Saikia said: "Remember that India had about 23.22 million births in 2023 against 4.37 million in Congo... In India's case, wide demographic diversity further adds to the complexity and may affect the accuracy of such comparison." Saikia also pointed to different numbers for maternal mortality calculated for India by the United Nations Maternal Mortality Estimation Inter-Agency Group and the SRS for 2023, at 80 and 88, respectively.

As per the Lancet study, haemorrhage and hypertensive disorders — easily preventable — accounted for nearly half (above 40%) of the maternal deaths in 2023. Setbacks to general healthcare during Covid are believed to have played a role in the slide seen in 2020-21.