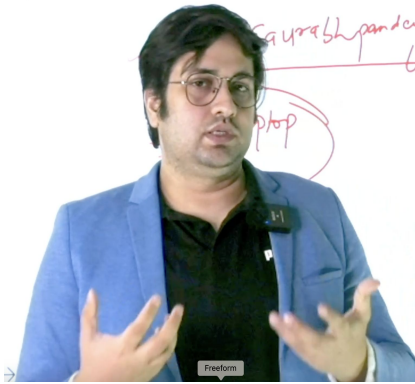
# Topics - MINDS MAPS included (Daily current affairs 25th March 2025

- Judicial Transfers in India
- Boreal Summer Intraseasonal Oscillation (BSISO),and Indian Monsoon
- India in INDIAN OCEAN REGION
- The Alarming Disappearance of Glaciers:
- Permafrost Melting: An Emerging Environmental Threat in the Kashmir Himalayas
- The Urban Metamorphosis of India
- What are DNA Polymorphisms?
- Mapping -- FRENCH alps



By saurabh Pandey

THE HINDU

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By saurabh pandey sir

# Collegium clears judge's transfer

The decision to move Justice Yashwant Varma from Delhi HC to Allahabad HC comes as inquiry into allegations of 'burnt currency' is set to commence; the judge is likely to be excluded from judicial work in the new post on the request of CJI

**Krishnadas Rajagopal**
NEW DELHI

The Supreme Court Collegium on Monday recommended the government to transfer Justice Yashwant Varma from the Delhi High Court to Allahabad even as a three-member committee of judges is scheduled to commence, in a day or two, a deeper fact-finding inquiry into allegations of "sacks of burnt currency" found in a gutted storeroom on the grounds of his official residence on March 14.

The collegium, headed by Chief Justice of India (CJI) Sanjiv Khanna, said the resolution to repatriate Justice Varma to his parent High Court of Allahabad was taken after meetings held on Monday, and earlier on March 20.

The proposal to transfer Justice Varma was first

**Under fire:** Police stand guard outside the residence of Delhi High Court judge Justice Yashwant Varma, in New Delhi on Sunday. PTI

Court Collegium on March 20 after viewing the video and photographs of what may be half-burnt money lying in the charred room.

Delhi High Court Chief Justice D.K. Upadhyaya had agreed with the Supreme Court Collegium's proposal to transfer Justice Varma on the evening of March 20 itself, saying the move would be in the "interest of better administra-

The top court had said the proposal was "independent and free" of the ongoing in-house procedure. The probe would continue while the transfer was intended to establish a distance between judge and the High Court.

The Collegium resolution to transfer Justice Varma has come shortly after Chief Justice Upadhyaya submitted an enquiry re-

## Review verdicts by Justice Varma: Allahabad HC Bar

Amid the corruption row against Delhi High Court judge Justice Yashwant Varma, the Allahabad High Court Bar Association on Monday demanded that all the judgments delivered by him during his tenure as a judge be reviewed. » PAGE 4

containing his *prima facie* opinion that the allegations require a deeper probe.

The CJI had endorsed the opinion and constituted the inquiry committee of Punjab and Haryana High Court Chief Justice Sheel Nagu, Himachal Pradesh Chief Justice G.S. Sandhawalia and Karnataka High Court Judge, Justice Anu Sivaraman. This

more intensive stage of the probe.

The Supreme Court has already sent the three judges official letters tasking them with the inquiry. There is no time limit prescribed for the committee to complete the probe. The committee, once its task is completed, would submit a report to the CJI.

The Supreme Court, in its March 21 note, had pointed out that Justice Varma was a member of the Collegium of the Delhi High Court and its second seniormost judge. In the Allahabad High Court, he would be only ninth in seniority and not a member of its Collegium.

Meanwhile, Justice Varma was removed from judicial work on the request of the CJI.

**PETITION SEEKS FIR**
» PAGE 4
**EDITORIAL**

# Judicial Transfers in India

## Key Aspects of Judicial Transfers

⚖️ Transfer Procedure: Judges are transferred after consultation with the Chief Justice of India.

🇮🇳 Presidential Authority: The President has the authority to transfer judges between courts.

📜 Article 222: This article provides provisions for transferring judges from one high court to another.

👨‍⚖️ Chief Justice's Role: The Chief Justice of India plays a crucial role in the decision-making process for judge transfers.

📚 Historical Context: There have been various cases of judge transfers in Indian constitutional history.

🤝 Federation Concepts: The transfer of high court judges is influenced by the concepts of "Quasi Federation" and "Cooperative Federation."

🏛️ Guidance of Article 222: The transfer process is guided by Article 222 of the Indian Constitution.

# Strength of cloud band influences movement and density of rain during Indian monsoons: IISc study

**The Hindu Bureau**
BENGALURU

A recent study from the Indian Institute of Science (IISc) has shown that contrary to previous understanding, the strength of a cloud band (a nearly continuous cloud formation) plays a key role in the movement and density of rain that the Indian subcontinent receives during the wet spells of monsoons.

**Welcome spells:** The monsoons in India provides the lion's share of the water used for drinking and irrigation. BISWARANJAN ROUT

The monsoons have long remained the lifeblood of India, providing the lion's share of water used for drinking and irrigation. The yearly arrival of the rains is caused by the movement of cloud bands from the equator towards the north.

An IISc release said that India receives 80% of its annual rainfall during the summer monsoon between June and September, which are marked by several wet and dry spells along with strong winds.

These spells are controlled by the Boreal Summer Intraseasonal Oscillation (BSISO), also called monsoon intraseasonal oscillations, which also brings a cloud band from the equator over to the Indian subcontinent, putting an end to the dry spell. The duration of the wet spell is determined by the size and strength of the cloud band.

Most theories suggest the cloud band propagate northward regardless the strength of disturban at the equator.

"Most of the existing l erature says that even you put any small instabi ty, it should always prop gate northwards. What w have shown is that this not the case. If the clou band in the equator weak to start with, then cannot propagate north said Aditya Kottapalli, Ph student at the Centre f Atmospheric and Ocean Sciences (CAOS), IISc, an first author of the study p blished in *npj Climate an Atmospheric Science*.

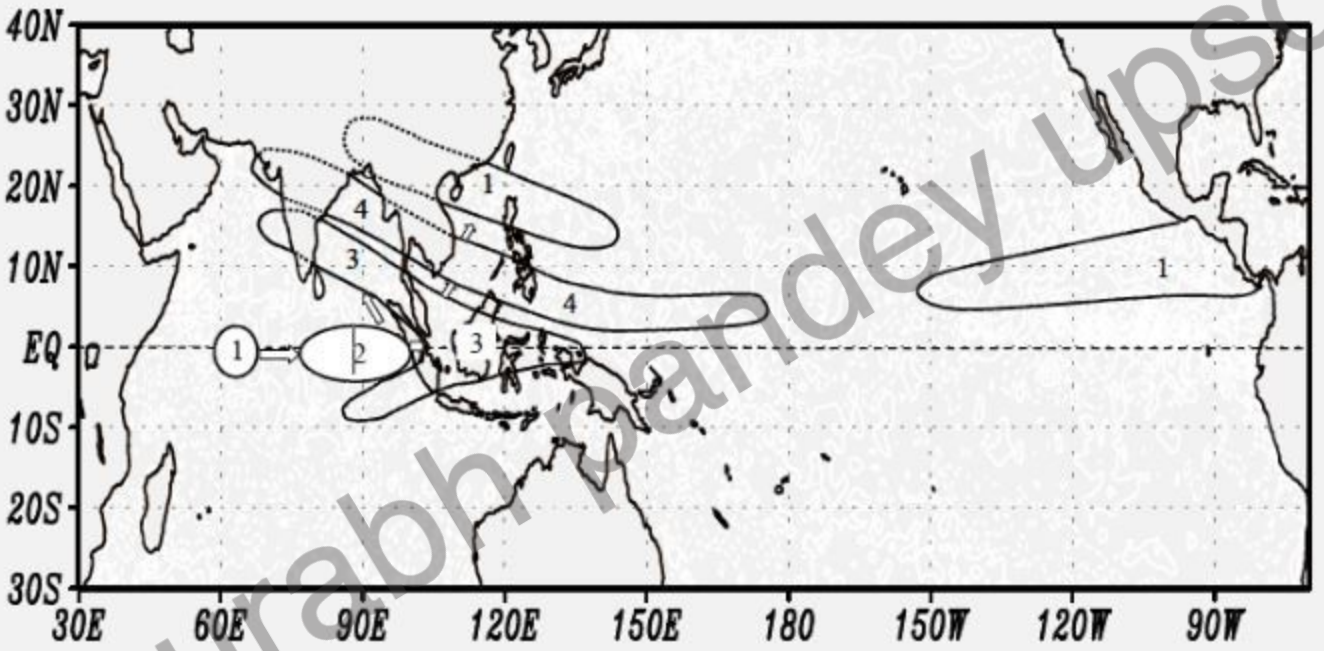
# Boreal Summer Intraseasonal Oscillation (BSISO),and Indian Monsoon

- An IISc release said that India receives 80% of its annual rainfall during the summer monsoon between June and September, which are marked by several wet and dry spells along with strong winds.
- These spells are controlled by the Boreal Summer Intraseasonal Oscillation (BSISO), also called monsoon intraseasonal oscillations, which also brings a cloud band from the equator over to the Indian subcontinent, putting an end to the dry spell.
- The duration of the wet spell is determined by the size and strength of the cloud band.

“Most of the existing literature says that even if you put any small instability, it should always propagate northwards.

What we have shown is that this is not the case. If the cloud band in the equator is weak to start with, then it cannot propagate north,

# Schematic structure/movement of BSISO




Phase1: genesis in western EIO;
Phase 2: Intensification
Phase 3: Bifurcation, formation of tilted rain band
Phase 4:Northeastward propagation

**The boreal summer intraseasonal oscillation (BSISO)** is among the most pronounced subseasonal variability in the tropics during boreal summer.

Compared with its wintertime counterpart, the so-called Madden–Julian oscillation (MJO), the BSISO convection displays more complicated spatiotemporal evolution, characterized by northward propagation over the northern Indian Ocean and western North Pacific as well as eastward propagation along the equator.

It exerts a strong effect on a broad range of tropical weather and climate phenomena, such as tropical cyclogenesis, monsoon onset, and active/break cycles, among others.

# Spatiotemporal Dynamics of BSISO

The BSISO's spatiotemporal dynamics are fascinating and crucial for understanding its impact on tropical weather systems.

**Propagation Patterns:**

The BSISO typically exhibits a northward movement across the northern Indian Ocean and western North Pacific.

Eastward propagation is also evident along the equatorial regions, which can significantly influence weather patterns in these areas.

**Convection Characteristics:**

The convection associated with BSISO is characterized by varied intensity and frequency, contributing to the complexity of its evolution.

Enhanced convection can lead to increased rainfall and storm activity in regions affected by the oscillation.

# Impact of BSISO on Weather Phenomena

**BSISO exerts a formidable influence on a wide range of tropical weather phenomena, including:**

**Tropical Cyclogenesis:**

**The occurrence of BSISO is often linked to the formation of tropical cyclones, as it can enhance the convection necessary for cyclone development.**

**Monsoon Onset:**

**The dynamics of BSISO play a critical role in determining the timing and intensity of monsoon seasons, which are vital for agriculture and water resources in many regions.**

**Active/Break Cycles:**

**The oscillation contributes to the active and break cycles of the monsoon, leading to fluctuations in precipitation that can have profound ecological and socio-economic impacts.**

## Recent Research and Findings

Recent studies have shed light on the complexities of BSISO and its implications for climate predictions.

### Current Studies:

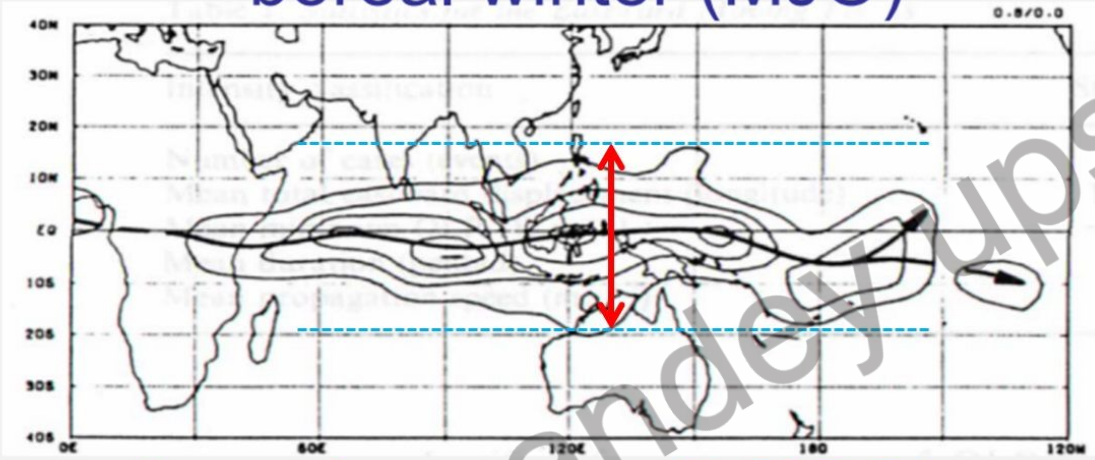
- Research indicates that equatorial convection controls BSISO dynamics, which is crucial for understanding future climate scenarios
- Another study highlights the role of cloud strength in the movement and rainfall patterns associated with BSISO, emphasizing the intricate links between cloud dynamics and weather phenomena

## Climate Models:

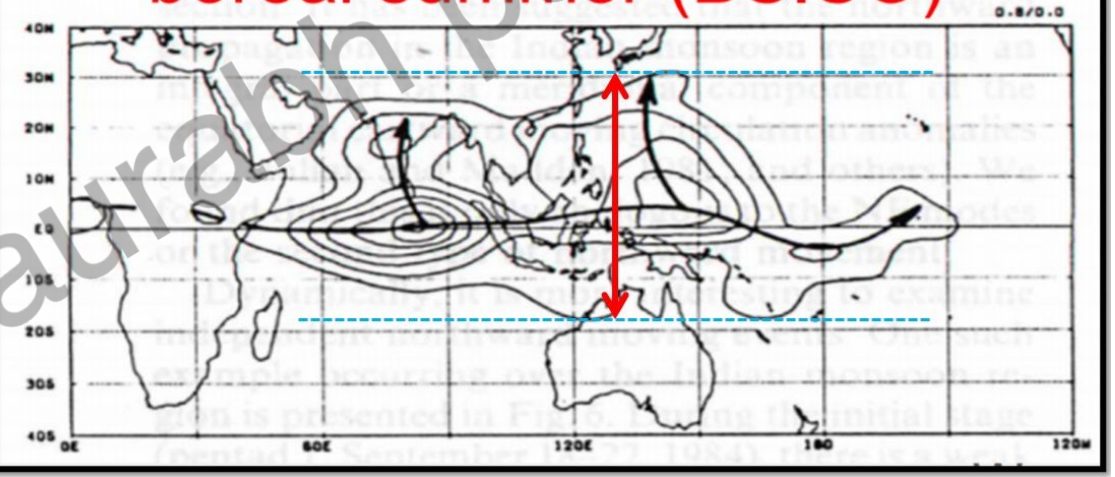
**Assessments of CMIP6 GCMs reveal varying abilities to simulate BSISO over Southeast Asia, which has implications for regional climate forecasting**

**Recent findings also suggest that BSISO could enhance heat extremes and wildfire risks in the Pacific Northwest, indicating its far-reaching impacts on climate and weather**

# boreal winter (MJO)




# boreal summer (BSISO)



## MJO (Madden-Julian Oscillation):

- **Dominant Propagation:** Primarily characterized by eastward propagation along the equator.
- **Time of Year:** Most active during boreal winter (December-April).
- **Period:** Typically recurs every 30 to 60 days.
- **Impact:** Influences tropical weather and climate, including rainfall patterns and tropical cyclone activity.

## BSISO (Boreal Summer Intraseasonal Oscillation):

- **Dominant Propagation:** Exhibits more complex propagation patterns, including northward and northeastward propagation, especially over the Indian Ocean and western Pacific.
- **Time of Year:** Most active during boreal summer (June-October).
- **Period:** Can have periods ranging from 30 to 90 days.
- **Impact:** Strongly influences the Asian summer monsoon, including onset, active/break cycles, and monsoon rainfall.

# India Navy announces maiden India-African exercise, IOS Sagar

**Dinakar Peri**
NEW DELHI

Against the backdrop of massive inroads by China in Africa, the renewed threat of piracy and the continued threat from Houthi rebels to global shipping, the Indian Navy has announced initiatives for bolder cooperation with the continent and the Indian Ocean Region (IOR). This includes a large-scale multinational exercise titled "Africa India Key Maritime Engagement", or "AIKEYME", scheduled to be held with 10 African countries.

Another cooperation initiative with Africa is the Indian Ocean Ship (IOS) Sagar under which the offshore patrol vessel *INS Sunayna* is set to be deployed to the Southwest IOR from April 5 to May 8 with a combined Indian crew and 44 personnel

Vice Admiral Tarun Sobti

from 9 African countries.

"IOS Sagar is an initiative towards continued cooperation with IOR nations. *INS Sunayna* is being deployed to the Southwest IOR with a combined crew of India and nine Friendly Foreign Countries (FFC) - Comoros, Kenya, Madagascar, Maldives, Mauritius, Mozambique, Seychelles, Sri Lanka, South Africa. The ship is planned to be deployed for over a month in April, and would be undertaking port calls at Dar-es-Salaam, Nacala, Port Louis, Port Victoria and Male and Joint surveillance of Exclusive Economic Zones (EEZs) of Tanzania, Mozambique, Mauritius and Seychelles," Deputy Chief of Naval Staff Vice Admiral Tarun Sobti said, briefing the media.

With the announcement of Mutual and Holistic Advancement for Security Across the Regions (MAHASAGAR) by Prime Minister Narendra Modi during his recent visit to Mauritius, the maiden initiatives of IOS Sagar and AIKEYME are aimed at consolidating Indian Navy's stature as the 'Preferred Security Partner' and 'First Responder' in Indian Ocean Region, he said.

The personnel from FFCs would undergo a training capsule of two weeks at various naval professional schools at Kochi, including training at sea, and would be engaged in wholeship activities, watch keeping and other events related to their respective branches/trade, according to the Navy. The participants of IOS Sagar are also set to witness harbour phase activities of Exercise AIKEYME at Dar-es-Salaam, Tanzania.

Over the past decade, the Indian Navy has been extensively collaborating with Indian Ocean littoral states on various initiatives such as joint naval exercises, coordinated patrols, information sharing, Humanitarian Assistance and Disaster Relief (HADR) efforts, capacity building and other diplomatic engagements. The maiden edition of the India-Africa multilateral exercise 'AIKEYME'is being co-hosted by the Indian Navy and Tanzania Peoples' Defence Force (TPDF) and will be conducted at/off Dar-es-Salaam, Tanzania.

# India in INDIAN OCEAN REGION

## Indian Navy's Strategic Response

Overview of AIKEYME:( "Africa India Key Maritime Engagement",) A multinational exercise involving ten African countries to enhance maritime cooperation and capabilities.
Objectives of AIKEYME: Focus on improving interoperability, sharing best practices, and fostering collaboration in maritime security.

## The IOS Sagar ( Indian Ocean Ship (IOS) Sagar) Initiative

Deployment Details of INS Sunayna: The offshore patrol vessel INS Sunayna is deployed to the Southwest IOR with a combined crew from India and nine African countries.
Port Calls and Joint Surveillance: The mission includes port calls at Dar-es-Salaam and Port Louis, and joint surveillance of EEZs in Tanzania, Mozambique, Mauritius, and Seychelles.

## The MAHASAGAR (Mutual and Holistic Advancement for Security Across the Regions (MAHASAGAR) Initiative

Goals of MAHASAGAR: Announced by Prime Minister Narendra Modi, this initiative aims to establish India as the 'Preferred Security Partner' and 'First Responder' in the IOR.

The Pastoruri glacier in Peru. It used to host ski competitions. Now it is a glacier in extinction, with the remaining ice field cordoned off because of the risk of ice fall. REUTERS

# *Glaciers losing ice at record levels around the globe: UN*

**Reuters**

Glaciers around the globe are disappearing faster than ever, with the last three-year period seeing the largest glacial mass loss on record, according to a UNESCO report released on March 21.

The 9 trillion tonnes of ice lost from glaciers since 1975 are roughly equivalent to "an ice block the size of Germany with the thickness of 25 metres," Michael Zemp, director of the Switzerland-based World Glacier Monitoring Service, said during a press conference announcing the report at the UN headquarters in Geneva.

The dramatic ice loss is expected to accelerate as climate change, caused by the burning of fossil fuels, pushes global temperatures higher. This will likely exacerbate economic, environmental, and social problems across the world as sea levels rise and these key water sources dwindle.

Zemp said five of the last six years registered the largest losses, with glaciers losing 450 billion tonnes of mass in 2024 alone.

The accelerated loss has made mountain glaciers one of the largest contributors to sea level rise, putting millions at risk of devastating floods and damaging water routes that billions of people depend on for hydroelectric energy and agriculture.

Stefan Uhlenbrook, the director of water and cryosphere at the World Meteorological Organisation, said that about 275,000 glaciers remain globally which, along with the Antarctic and Greenland ice sheets, comprise about 70% of the world's freshwater.

**Glaciers lost 450 billion tonnes of mass in 2024 alone. The highly accelerated loss has made mountain glaciers one of the largest contributors to sea level rise, raising the risk of flooding**

About 1.1 billion people live in mountain communities, which suffer the most immediate impacts of glacier loss, due to the increasing risks with natural hazards and unreliable water sources. The remote locations and difficult terrains also make cheap fixes difficult to come by.

Rising temperatures are expected to worsen droughts in areas that rely on snowpack for freshwater, while increasing both the severity and frequency of hazards like avalanches, landslides, flash floods, and glacial lake outburst floods (GLOFs).

"Things in certain regions are happening actually much faster than we anticipated," Heidi Sevestre, glaciologist at the Arctic Monitoring and Assessment Program, said.

She noted a recent trip to the Rwenzori Mountains in Uganda and the Democratic Republic of the Congo in East Africa, where glaciers are now expected to disappear by 2030. Sevestre has worked with the region's indigenous Bakonzo communities who believe a deity called Ktasamba lives in the glaciers.

Glacial melt in East Africa has led to increased local conflicts over water, according to the new UNESCO report, and while the impact on a global scale is minimal, the trickle of melting glaciers around the world is having a compounding impact.

Between 2000 and 2023, melting mountain glaciers have caused 18 mm of global sea level rise, about 1 mm per year. Every millimeter can expose up to 300,000 people to annual flooding, according to the World Glacier Monitoring Service.

"Billions of people are connected to glaciers, whether they know it or not, and that will require billions of people to protect them," Sevestre said.

# The Alarming Disappearance of Glaciers: A Global Crisis

## The Latest Findings from UNESCO

### Record Mass Loss in Recent Years

Largest glacial mass loss recorded in the last three years.

Equivalent to losing an ice block the size of Germany since 1975.

### The Scale of Ice Loss

Five of the last six years have seen the largest losses.

In 2024, glaciers lost 450 billion tonnes of mass

# Climate Change: The Driving Force

## Fossil Fuels and Rising Temperatures

Climate change, driven by fossil fuels, is the main cause.

Glaciers are melting at an unprecedented rate.

## Economic and Environmental Impacts

Melting glaciers contribute to rising sea levels and potential floods.

This is both an environmental and economic crisis.

# The Role of Glaciers in Our Ecosystem

## Freshwater Sources and Human Dependency

Glaciers hold about 70% of the world's freshwater.

Their loss threatens water supply for billions.

## The Impact on Mountain Communities

1.1 billion people in mountain communities rely on glaciers.

These communities face risks from natural hazards and unreliable water sources

# The Consequences of Glacial Melting

## Rising Sea Levels and Flood Risks

a. **Glaciers are major contributors to sea level rise.**
b. **Every millimeter rise can expose 300,000 people to flooding.**

## Natural Hazards and Water Conflicts

a. **Increased droughts and natural hazards like avalanches and landslides.**
b. **Water conflicts may arise due to scarcity**.

## Regional Focus: East Africa's Glacial Crisis

- The Rwenzori Mountains and Indigenous Beliefs
    - Glaciers in East Africa are disappearing rapidly.
    - Indigenous communities, like the Bakonzo, are deeply affected.

## The Global Perspective on Glacial Loss

- **The Connection Between Glaciers and Humanity**
    - **Glacial melting affects everyone globally.**
    - **Protecting glaciers is a shared responsibility.**

## Conclusion: A Call to Action

- Immediate attention is needed to address glacial disappearance.
- Collective action from individuals, communities, and governments is crucial.

# As ice frozen for millennia thaws, Kashmir wakes up to new risks

According to a new study, permafrost covers 64.8% of the total area of J & K and Ladakh. Experts called the finding 'crucial' because permafrost has been largely overlooked as a source of risk in Kashmir even though the construction of dams, roads, and real estate have been known to affect it

Hirra Azmat

Tourists enjoying a horse ride at Thajiwas Glacier in Sonmarg, 80 km from Srinagar. NISSAR AHMAD

Permafrost melting is emerging as a unique environmental threat in the Kashmir Himalayas. A new study has found that thawing permafrost could affect 193 km of roads, 2,415 households, 903 alpine lakes, and eight hydropower projects in the mountainous region.

Permafrost is any type of ground – soil, sediment, rock, etc. – that has been continuously frozen for at least two years. Most of the permafrost on the earth has been that way for several millennia.

But with global warming, the permafrost is slowly beginning to thaw, with dramatic consequences. Permafrost stores several tonnes of organic carbon. As it melts, the carbon is released into the environment, including in the form of methane, a very potent greenhouse gas and climate pollutant.

The stability of permafrost in the Indian Himalayas is thus of great concern.

The new study, published in *Remote Sensing Applications: Society and Environment*, was coauthored by researchers from the University of Kashmir and IIT-Bombay.

According to the study, permafrost covers 64.8% of the total geographic area of Jammu & Kashmir (J&K) and Ladakh. Of this, 26.7% is continuous permafrost (most of the soil is frozen), 23.8% is discontinuous (more than half of the soil is frozen), and 14.3% is sporadic (intermittent patches of frozen soil).

## A 'crucial' study

"Region-wise, the Ladakh plateau contains the highest extent (87%) of permafrost, while the foothill plains of Jammu, Shigar Valley, and Siwaliks do not host any permafrost," the authors wrote in their paper.

The study's corresponding author, Irfan Rashid, assistant professor in the Department of Geoinformatics at the University of Kashmir, Srinagar, said the team analysed weekly satellite data for surface temperatures from 2002 to 2023.

"Over 21 years, we examined over 56 images each year, amounting to a total dataset of 1,176 land surface temperature images," he said. The data came from a NASA sensor onboard its Terra and Aqua satellites called MODIS. Rashid said, "Each pixel in [its images] represents an area of 1 sq. km." He continued, "We analysed approximately 222,236 pixels across J&K and Ladakh. This extensive dataset allowed us to identify areas with consistently frozen temperatures and those where freezing conditions are absent or intermittent."

Reet Kamal, associate professor in the Department of Civil Engineering at IIT-Ropar, said the study (in which he wasn't involved) could be a preliminary step in assessing the impact of permafrost degradation.

"It is a crucial study, as permafrost has been largely overlooked, and no similar research has been conducted in this region," Kamal said. "While some studies exist in Uttarakhand, there is a pressing need for more research to better understand the risks associated with permafrost degradation."

According to the experts, the primary factor driving permafrost degradation is the rise in surface temperature.

Farooq Ahmad Dar, assistant professor in the Department of Geography and Disaster Management at the University of Kashmir, said that in addition to natural causes, human factors can also affect permafrost. "Activities such as deforestation, land-use change, and wildfires have a severe impact on the permafrost cover and its stability. Vegetation insulates and protects the permafrost from direct solar radiation. Natural processes such as [earthquakes] frequently shake the ground, including permafrost, and cause it to break apart," he said.

Likewise, he added, activities related to infrastructure development, such as the construction of dams, road-laying, and real estate development, have also affected permafrost in the western Himalayas. "It has also been observed that the tourism and associated activities in the region often lead to increased pressure and impact the stability of the permafrost regions," Dar said.

## Uncertainties abound

The study said the risks associated with permafrost thawing will be felt significantly across thousands of glacial lakes in the Indian Himalayan arc.

In J&K itself, the authors identified 332 proglacial lakes, of which 65 have differing (nontrivial) glacial lake outburst flood (GLOF) risks. A proglacial lake is formed when water from a melting glacier collects in a depression in the landscape or when its flow is dammed. The Central Water Commission reported last year that between 2011 and 2024, the coverage of "glacial lakes and other water bodies" in the Himalayas had increased by 33%.

In places with steep glacial landscapes, rapidly moving ice sometimes scours the underlying bedrock, further degrading permafrost. The rock-ice avalanche in Chamoli, Uttarakhand, in February 2021 is an example: the avalanche was triggered by a glacier on a sheer slope where the adjacent rock material was frozen.

> In Ladakh, steep slopes containing permafrost are home to residential settlements. Military infrastructure is at risk. Many strategic roads pass through permafrost, and their degradation could have severe implications for connectivity

The South Lhonak Lake in Sikkim suffered a significant GLOF in October 2023 in similar circumstances. The lake is surrounded by moraines composed primarily of permafrost-laden material. Over time, Rashid said, temperature fluctuations induced slope failure triggered by degraded permafrost.

According to Kamal of IIT-Ropar, permafrost degradation is also likely to adversely affect groundwater and the availability of river water. "Permafrost, in the form of rock glaciers, contributes to river flow, and in some areas, its degradation could affect the base flow of rivers. However, no comprehensive studies have been conducted to accurately identify or quantify these impacts in the Indian context. Therefore, making definitive statements on this matter would be premature," he said.

He added that permafrost "may also pose risks to infrastructure, but without in-depth studies, the extent of potential damage remains uncertain."

## Planning for permafrost

The experts suggested that while existing roads cannot be closed, the construction of future ones should be informed by the presence or absence of permafrost. This could be a long-term strategy to ensure sustainable construction in ecologically fragile areas.

According to Rashid, while environmental impact assessments are conducted for projects like hydroelectric power projects, whether they adequately account for GLOFs and other cryospheric hazards is unclear. "Increased awareness of permafrost-related risks has only emerged following major disasters. Previously, GLOFs were primarily associated with Nepal, but events such as the Kedarnath disaster, the South Lhonak Lake outburst, and incidents in Ladakh have highlighted their broader relevance," Rashid said.

Dar agreed: to mitigate potential risk, he said it is crucial to bring these findings to the implementation level, particularly in places with permafrost.

"Households in permafrost-rich regions face varying degrees of risk," he added. "In Ladakh, steep slopes containing permafrost are home to residential settlements. Military infrastructure in Ladakh is at risk, posing concerns for national security. Many strategic roads pass through permafrost zones, and their degradation due to permafrost thaw or mass wasting could have severe implications for connectivity."

"We mostly rely on satellite remote sensing to monitor land surface temperatures," Kamal added.

"However, there is currently no *in-situ* monitoring in these regions. Deploying data loggers in the same catchment areas would allow us to track temperature fluctuations more accurately. These data loggers could also help calibrate satellite data and identify any biases, making permafrost monitoring more precise and reliable."

*(Hirra Azmat is a Kashmir-based journalist who writes extensively on science, health, and environment. Her stories have appeared in various local and national publications. azmathirra@gmail.com)*

# Permafrost Melting: An Emerging Environmental Threat in the Kashmir Himalayas

## Understanding Permafrost

### What is Permafrost?

Permafrost is any ground—soil, sediment, or rock—that remains continuously frozen for at least two years. It acts as nature's freezer, preserving organic materials and carbon for millennia.

### The Importance of Permafrost

This frozen ground is crucial for regulating the Earth's climate. It stores vast amounts of organic carbon, which, when thawed, releases into the atmosphere as methane, a potent greenhouse gas.

# Impacts of Thawing Permafrost

## Effects on Infrastructure

Thawing permafrost threatens 193 km of roads, affecting transportation and connectivity.

## Risks to Households and Communities

Approximately 2,415 households are at risk due to compromised ground stability.

## Threats to Alpine Lakes and Hydropower Projects

903 alpine lakes and eight hydropower projects could face adverse effects, leading to energy shortages and ecological disruptions.

## Causes of Permafrost Degradation

Natural Factors

Rising surface temperatures are primary drivers of permafrost thawing.

Human Activities

Deforestation, land-use changes, and infrastructure development exacerbate the situation by disturbing insulating vegetation.

## The Broader Implications

Glacial Lake Outburst Floods (GLOFs)

332 proglacial lakes identified, with 65 posing nontrivial GLOF risks.

Groundwater and River Flow

Permafrost degradation impacts groundwater levels and river flow, affecting water availability.

## Conclusion

The melting of permafrost in the Kashmir Himalayas presents a unique environmental threat requiring immediate attention. Understanding and addressing the implications of permafrost degradation is crucial for the region's future

# The need for a localised urban agenda

Can centrally sponsored schemes and centrally run urban missions give localised solution to cities? Does the central control over finances bode well for the growth of cities? Can a top-down approach work? Is decentralisation of funds necessary?

EXPLAINER

Tikender Singh Panwar
Hitesh Vaidya

**The story so far:**

India is on the cusp of a profound urban metamorphosis. In the forthcoming decades, India is anticipated to boast the most significant urban population globally. However, India's urban future is shaped by blueprints drawn far from the streets where people live.

**What has been India's urban journey?**

The urban evolution was set in motion in the post-90s era when India embraced a liberalisation policy. Successive Union governments have played a pivotal role in steering India's urbanisation through a series of missions, from the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) to the five urban flagship missions. This journey underscores the crucial role of the Union Government in sculpting India's urban fabric.

**What role does the Centre play?**

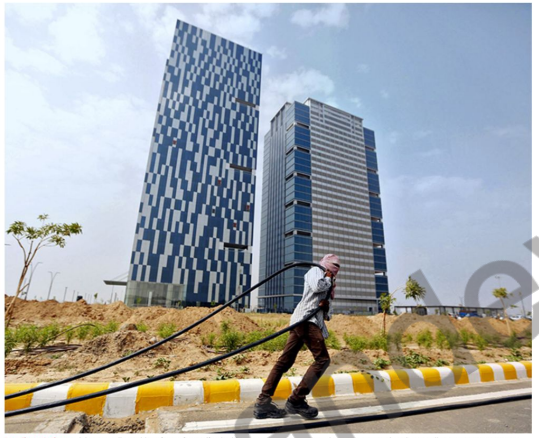
As 'urban development' is a State subject, how much of a role should the Centre have to shape the urbanisation process has always triggered many questions. Many housing schemes such as the Indira Awas Yojana, the Rajiv Awas Yojana, and now the Pradhan Mantri Awas Yojana (PMAY) as well as welfare schemes for essential utilities starting from the Basic Services for the Urban Poor (BSUP) during the UPA regime, to the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), and the Swacch Bharat Mission (SBM), have all been strong catalysts in triggering the urbanisation process in Indian cities.

In the mobility sector, centrally run urban missions supported cities in planning their city mobility plans. During the National Democratic Alliance (NDA) regime, the Union government focused on metro rail projects, which consumed almost 30% of the total Union budget. However, these missions often impose a prescriptive, top-down approach, prioritising spatial distribution, financial modalities, and administrative procedures over local needs. This leaves States and cities limited flexibility to customise and prioritise operational mechanisms within diverse contexts.

**Why is the Centre promoting a top down approach when it comes to finances?**

There are many reasons, with one of the major ones being that cities were treated as the "engines of growth", leading urbanisation. Another plausible reason is that successive Union governments have seen cities as potential hubs with which they never wanted to part. It could also be the recognition that infrastructure is a 'crucial enabler of growth' for raising India's competitiveness and achieving the target of a $5 trillion economy by 2025. Hence, even though the budgetary transfers were bracketed to centrally sponsored and Central sector schemes, they influenced urban trajectory. However, cities need targeted investments to accelerate economic growth. This includes building skilling centres, trade hubs, and innovation spaces; prioritising infrastructure that directly impacts economic indicators, not just livability.

Successive Union finance commissions, while transferring funds have put conditionalities to shape and design the urbanisation process at the sub-national level. For example, the conditionalities levied on city governments to enhance property tax and make it commensurate to the rise in the State's GDP were suggested by the 15th Finance Commission. Likewise, instead of recommending grants directly to the city governments and letting them take a call according to their priorities, the Commission added conditions to the grants.



**Localise solutions:** A labourer pulls a cable in front of two office buildings in Gujarat International Finance Tec-City (GIFT) at Gandhinagar, in 2015. REUTERS

**What could be the more effective alternative?**

Urban development is a State subject, and while the Central government can 'nudge' and 'guide' substantially, State and local governments play significant roles in shaping the sector.

India is urbanising differently in different States, and even in various regions within States. The current labour migration is from the northern States to the ones in the south, and hence southern States now have a different demographic pattern. In States like Kerala and Karnataka, it is the rural-urban continuum that is dominating – the Kerala Chief Minister termed the State as a 'single city', for one doesn't know where the boundary of the city ends and the village panchayat starts.

Initially driven by industry and migration, Gujarat's urbanisation is also quite different from that of the rest of the country. In many regions of the State, the core is dominated by the rich while the poor are pushed to the peripheries. However, in some other areas, even the wealthy are moving to the peripheries as the core has gotten too crowded or polluted. Here, they travel to the city core for business or work, but prefer staying in the peripheries, similar to some U.S. cities in the 70s and 80s.

There are such regional aberrations everywhere. Take the example of housing. Not all cities require the construction of houses. There might be ample social housing, and thus, the PMAY does not bring much traction. Likewise, in some cities, water and essential sanitation services might be better than other cities, and such cities may not want investments in these utilities. In contrast, others who lack such amenities may require them more. Therefore, the universalisation of sanitation, as the provisions of the SBM are determined from the top, is meaningless. In some clustered towns, there may be more need for a decentralised mechanism, whereas for others, one would need a centralised system. The moot point is that 'one size doesn't fit all'. The devolution process must be rethought and devised more scientifically in such a scenario. Instead of creating an island of 'developments', it would be more prudent to devise ways the devolutionary exercise triggers needs/demand-based help.

The total Union Budget should be devolved so that around 70% goes as direct transfers to the States and through State finance commissions to city governments. The other, 30%, can be decided by the Union government, which can decide on national priorities, like climate-resilient infrastructure. However, due to the top-down approach, State governments are mirroring the Centre budget lines without making creative investments to tap their unique identities and contextualities.

This direct transfer of money can be categorised into broad sections: mobility, sanitation, housing, water, waste, and so on. The cities should be asked to prioritise their plans and, in this process, identify the most pressing space in which they require money. Such an exercise can be quickly done with the help of the State governments and through other knowledge agencies. It will also help devise a better, more scientific way of utilising the central devolutionary grant. The people and the city could decide, and universal mission guidelines would not influence it.

These exercises can also avoid what happened under the smart cities mission in many cities – wherein the money remained either unutilised or in the pressing eagerness to submit what they call the 'utilisation certificate', lousy infrastructure was created which had no demand from the people whatsoever.

**Why is it important?**

National governments should focus on national and regional issues and international policy, not local ones.

In a democracy like India, national institutions are geographically distant bureaucracies that tend to be insulated from the public and disconnected from community service delivery problems. And that is precisely why a shift is required in the financial devolutionary process. This fits with the fact that plurality is the essence of Indianness.

Unless this forms part of the larger vision, any incremental fixes to making a city liveable will lead to further influx causing infrastructural collapse and deterioration in the quality of living. Centrally driven missions cannot connect the government to the lives of citizen communities in a positive way – it becomes difficult for citizens to accept the central authority of the government to protect their property, resolve conflicts and collect taxes. City governments can provide this tangible link. A fundamental shift in the design of urban missions, redefining the mandate, roles, and responsibilities of actors at Central, State, and local levels, is mandatory for transformation in the new age.

*Tikender Singh Panwar is the former deputy mayor of Shimla and Hitesh Vaidya is the former director of NIUA. Both are currently members of the Kerala Urban Commission.*

## THE GIST

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- The total Union Budget should be devolved so that around 70% goes as direct transfers to the States and through State finance commissions to city governments.
- In a democracy like India, national institutions are geographically distant bureaucracies that tend to be insulated from the public and disconnected from community service delivery problems.

# The Urban Metamorphosis of India: A Journey Towards Transformation

## Introduction: India’s Urban Future

- India is poised for a major urban transformation, with expectations of becoming the world's largest urban population.
- Urban plans are often developed far from the realities of everyday life, raising questions about their impact on citizens.

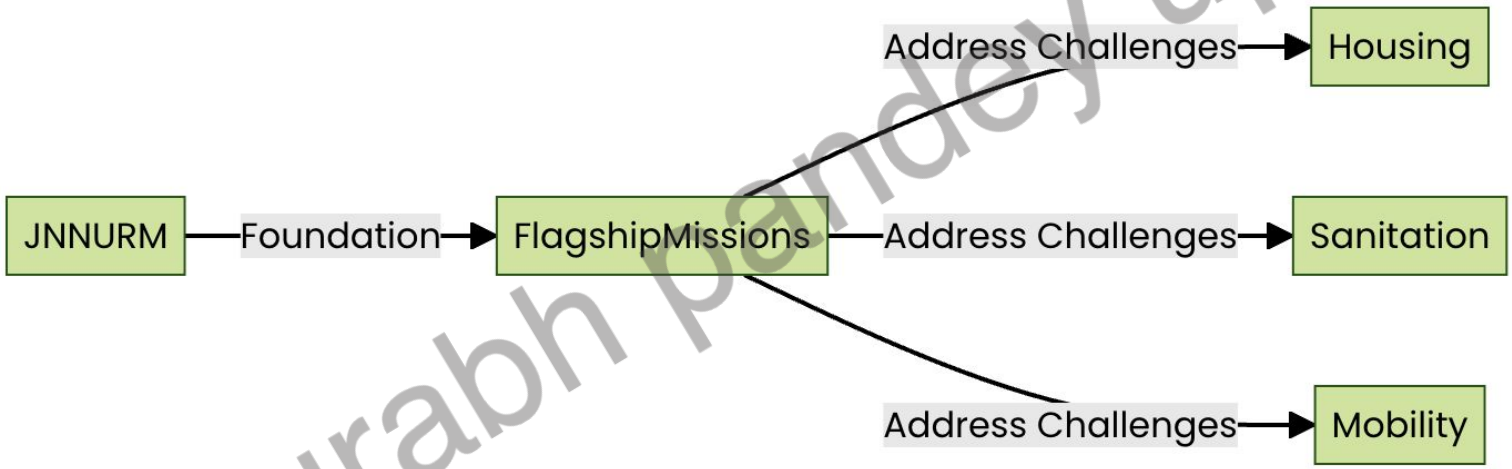
## The Urban Journey So Far

**Post-90s Liberalization Era: Marked the beginning of economic growth and urbanization in India.**
**Key Urban Missions: Various government missions have shaped India's urban landscape.**

## Jawaharlal Nehru National Urban Renewal Mission (JNNURM)

**Aimed at improving urban infrastructure and services, setting the stage for future missions**

**Urban Missions Impact:**



## The Role of the Central Government

Urban Development as a State Subject: Despite being a state responsibility, the Centre plays a significant role.
Housing Schemes: Initiatives like PMAY aim to provide affordable housing.

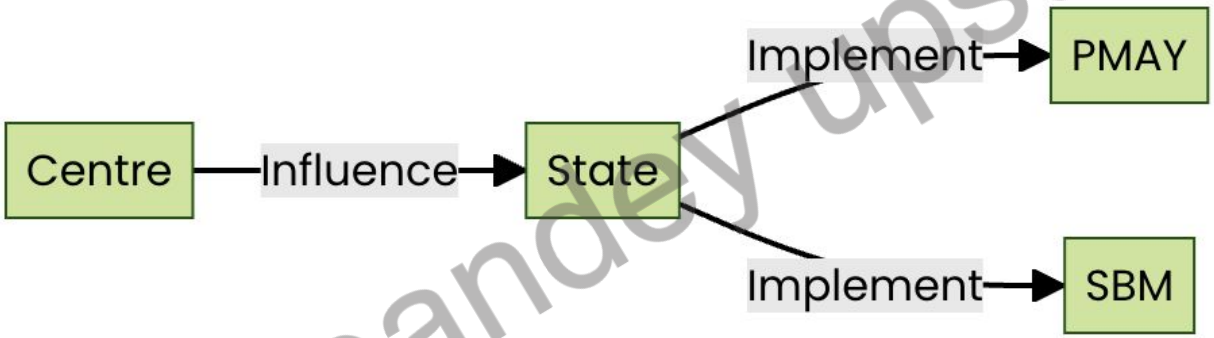
## Pradhan Mantri Awas Yojana (PMAY)

A transformative initiative, highlighting the need for localized strategies.

## Swacch Bharat Mission (SBM)

Focused on improving urban sanitation, though often missing local nuances.

**Government Initiatives:**



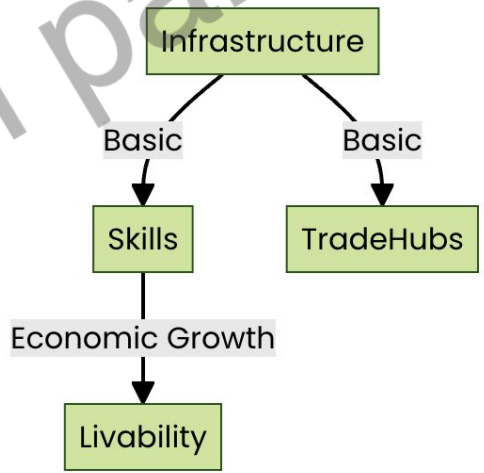
## The Top-Down Approach: Pros and Cons

Centre's Perspective: Cities as growth engines justify a top-down approach.
Challenges: This approach can disconnect the government from citizens' needs.

## The Need for Targeted Investments

Beyond infrastructure, cities need investments in skills and trade hubs.

**Investment Needs:**

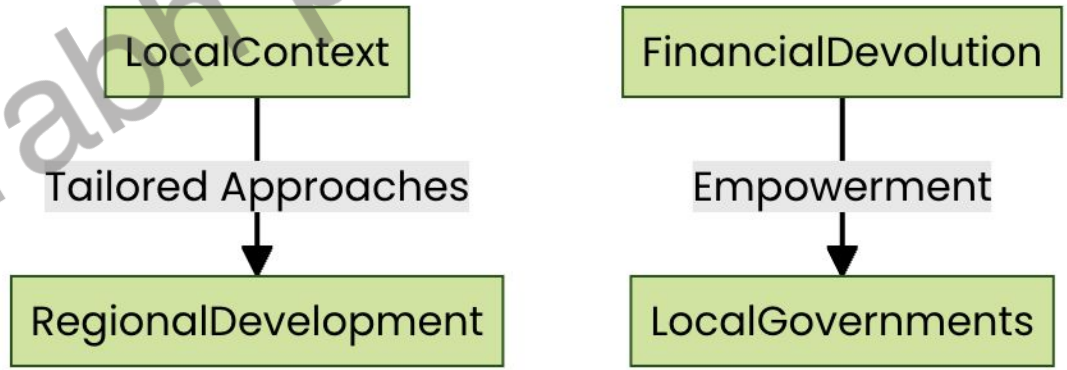


# Rethinking Urban Development Strategies

**Importance of Local Context: Urbanization varies across regions, requiring tailored approaches.**
**Financial Devolution: Empowering local governments through budget allocation is crucial.**



**Localized Strategies:**



## Conclusion: A Path Forward for Urban India

India must adopt a localized, demand-driven approach to urban development.

Empowering state and local governments can lead to vibrant, inclusive cities

GETTY IMAGES

# What are DNA polymorphisms and how do they differentiate between people?

DNA fingerprints can establish parent/child relationships and help identify individuals from their mortal remains at disaster sites. DNA fingerprints have also exonerated wrongly accused convicts. Scientists have extracted DNA, almost intact, from 65,000-year-old human remains

D.P. Kasbekar

Just like the government uses an Aadhaar number to uniquely identify an individual for social security purposes, a person's DNA fingerprint can be used for biological purposes. This is why DNA analysis is such a big deal. Today, it is most often (but not exclusively) used together with technologies like PCR, capillary electrophoresis, and fingerprinting.

**What is DNA?**

Each of an individual's cells – in one's skin, blood, teeth, bone, etc. – contain 46 DNA molecules. One set of 23 is inherited via sperm from the father and the other 23 via the egg from the mother. Sperm and egg cells are exceptional because they have only one copy of the genome each, not two. These facts underpin the generation and use of DNA fingerprints to identify individuals and their relatives.

The DNA is packed inside chromosomes. For example, chromosome no. 3 contains 6.5% of the total DNA in each cell. The chromosome 3 from the father contains DNA that is largely similar to that derived from the mother. The few parts that are different are called polymorphisms.

DNA polymorphisms can be used to differentiate one person from another. They can also tell us whether a paternal chromosome no. 3 came from the father's mother or father, and likewise for a maternal chromosome no. 3. That is, polymorphisms make the tracing of ancestry possible. DNA profiles are typically generated using polymorphisms in parts of the DNA called short tandem repeats (STRs).

**What are STRs?**

DNA has two strands. Each strand is a sequence of four chemical bases: adenine (A), cytosine (C), guanine (G), and thymine (T). The strands are anti-parallel and complementary. 'Anti-parallel' means the strands run in opposite directions. 'Complementary' means the As and Cs of one strand bond with Ts and Gs on the other. When a cell divides and needs to make a copy of its DNA, it pulls the strands apart and makes a new complementary strand for each one: As on one strand get Cs on the other and Ts get Gs. Thus, the daughter DNA has the same sequence of bases. In rare cases, the cell will make a mistake and insert the wrong base. This is called a mutation. In general, mutations occur less than once per billion base-pairs per generation.

An STR is a short sequence of base-pairs on the DNA that is repeated some number of times, such as GATCGATCGATCGATC (on the complementary strand, this STR will have the sequence CTAGCTAGCTAGCTAG). STRs are often polymorphic. Unrelated individuals almost certainly have different numbers of repeat units in at least some STRs.

**How do we make copies of DNA?**

Scientists need to make many copies of the DNA present in particular STRs to make studying them easier. They use a laboratory procedure called Polymerase Chain Reaction (PCR) to make copies of a particular stretch of DNA (up to 5,000 base-pairs). Even if they have a very small amount of DNA to begin with, PCR can make millions of copies in a short span of time.

First, scientists extract some genetic material from tissue that contains the DNA of interest. They heat it to about 95° C for 25 seconds to split the strands apart. Second, they introduce multiple molecules into the sample. The first is the primer, a short single-stranded piece of DNA that binds to a single strand: As and Ts on the primer bind with Ts and As in the strand and Cs and Gs with the Gs and Cs. The sequence of bases on the primer is configured so that it binds to the portion of interest on the DNA. The temperature in this phase is lowered to around 60° C.

Next, another molecule called DNA polymerase enters the reaction. It holds the bound primer, like for grip, and synthesises the rest of it according to the complementary bases on the strand.

To help, scientists add more bases into the sample. If a polymerase called Taq polymerase is used, the temperature is held at around 72° C. In these three steps, called one cycle, a new copy of the DNA segment is ready. If there is only one starting copy and each cycle operates with 100% efficiency, making a million copies of the segment will take about 50 minutes. The device that performs these steps is called a thermocycler.

**What is a DNA fingerprint?**

New copies of DNA can be made to move through a capillary under the influence of an electric field. The smaller ones move faster. This technique is called capillary electrophoresis. Multiple STRs can simultaneously be sized in the same test. The sizes of the various paternal/maternal variants of the different STRs are compiled in a table. This table is unique to each individual and is called their DNA fingerprint (only monozygotic twins have the same DNA fingerprints).

This fingerprint can be established using DNA from teeth, bones, blood (a drop is enough), spit, semen, skin cells, etc.

DNA fingerprints can establish parent/child relationships and help identify individuals from their mortal remains at disaster sites. DNA from blood stains, sweat, and spit from cloth or soil, retrieved from crime scenes, can be used to identify suspects. Experts also use them to identify or exclude potential donors during organ donation.

DNA is very stable. Scientists have extracted it almost intact from 65,000-year-old human remains preserved only by desiccation or cold. Many 'cold cases' have been solved by examining new profiles made from DNA extracted from crime scene materials in the archives. DNA fingerprints have also exonerated wrongly accused convicts.

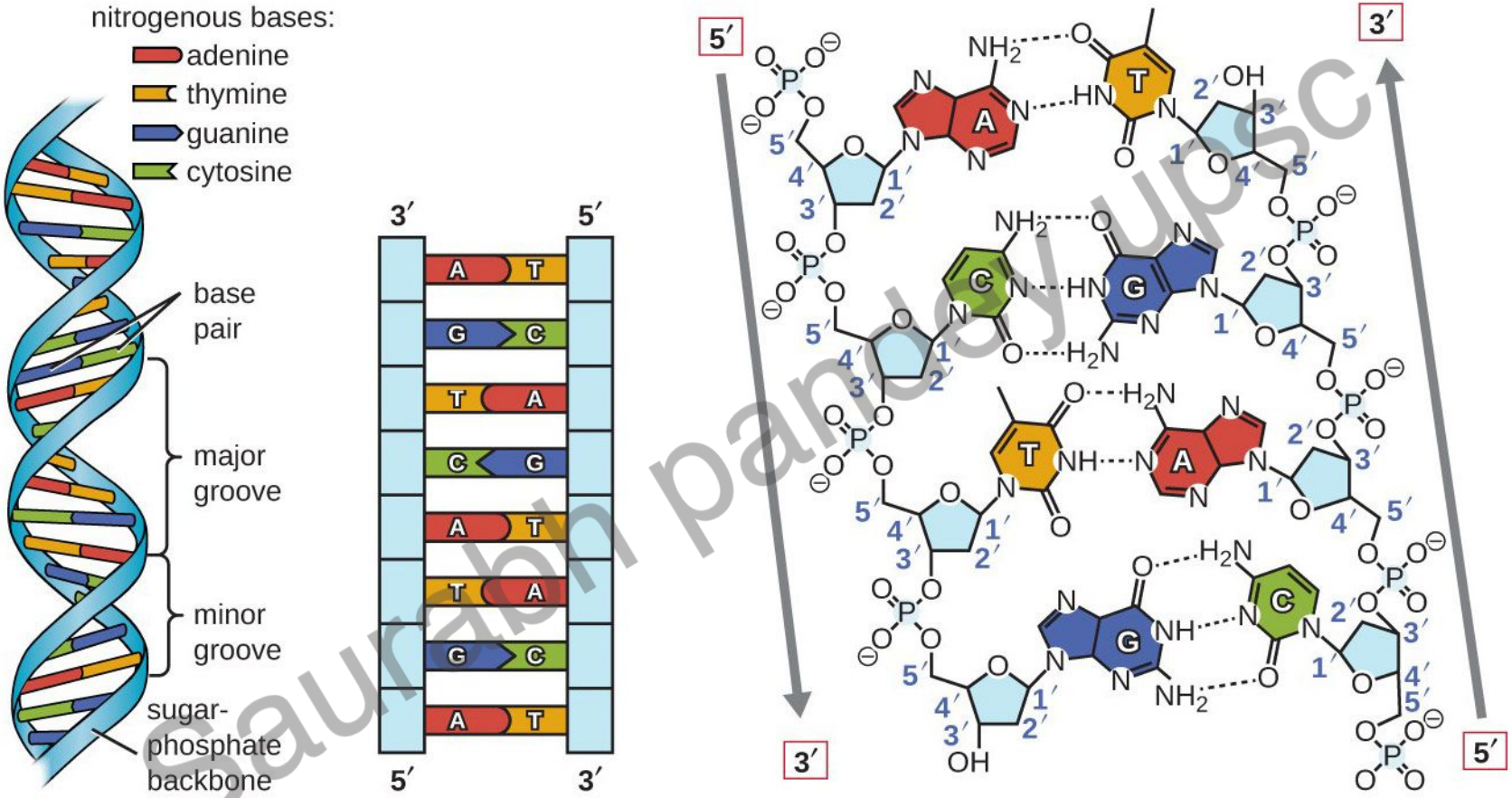
*D.P.Kasbekar is a retired scientist. He is an INSA Honorary Scientist in the Centre for DNA Fingerprinting and Diagnostics, Hyderabad.*

# What are DNA Polymorphisms?

Polymorphisms are variations in the DNA sequence that can differentiate one person from another. They can also provide insights into ancestry, revealing whether a particular chromosome came from the maternal or paternal side of the family.

## The Importance of Polymorphisms

These variations are crucial for generating DNA profiles, which are typically created using short tandem repeats (STRs). STRs are specific sequences of DNA that are repeated multiple times and can vary significantly between individuals.



# Short Tandem Repeats (STRs) Explained

## The Basics of STRs

An STR is a short sequence of base pairs that is repeated in the DNA. For example, a sequence like GATCGATC might repeat several times. The number of repeats can differ among individuals, making STRs a valuable tool for identification.

## Why STRs Matter in DNA Analysis

Because STRs are often polymorphic, they provide a unique genetic fingerprint for each individual (except for identical twins). This uniqueness is what makes STRs so important in forensic science and paternity testing.

# Timeless tribute

The 'Sonnenkugel' (Solar Sphere) by German artist Jürgen, installed at the site of the Germanwings air crash in Le Vernet, French Alps, as a tribute to the victims, is seen on the 10th anniversary of the tragedy on Monday. The crash, caused by a suicidal pilot, killed 150. AFP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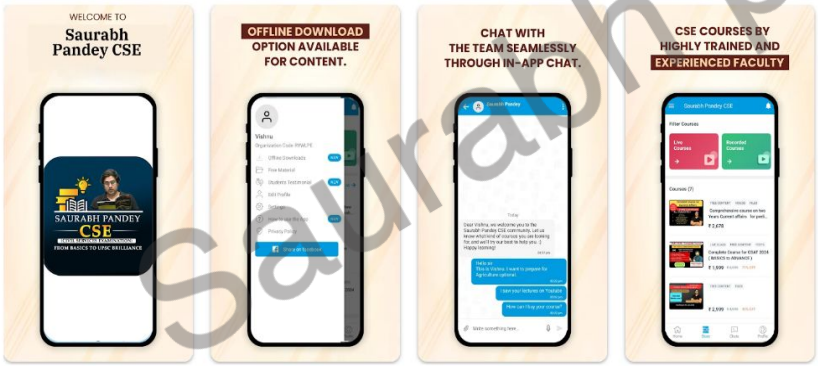


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