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MK Yadav Sir

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COUNCIL OF MINISTERS

(Syllabus: GS Paper 2 – Polity)

On the size of council of ministers

What has been the composition of the Council of Ministers at the Centre and in States since India became a democracy? What were the instances when the council became too large and unwieldy? How were the laws brought in to rein in this trend?

EXPLAINER

Rangarajan R

The story so far:

The Union Council of Ministers (COM) headed by Prime Minister Narendra Modi was sworn in on June 9, 2024. The present COM consists of the Prime Minister, 30 Cabinet Ministers, 5 Ministers of State (MoS) with independent charge and 36 MoS.

Who constitutes the Council of Ministers?

India is a parliamentary democracy with the President as its nominal head. Article 74 of the Constitution provides that there shall be a COM headed by the Prime Minister (PM) to aid and advise the President. The real executive powers lie with the COM. A Minister should be a member of either the Lok Sabha or the Rajya Sabha and if not, should become one within six months of his/her appointment. A similar setup prevails in States with a COM headed by the Chief Minister (CM).

The COM consists of a Cabinet minister, MoS with independent charge, MoS and a Deputy Minister. The Constitution does not classify the members of the COM into different ranks. All this has been done informally, following the British practice. Cabinet Ministers are higher in rank and handle large portfolios while MoS assist the Cabinet Ministers and work under them. MoS with independent charge directly reports to the Prime Minister for their respective ministries.

What is the constitutional limit?

The first COM at the time of independence had only 15 Ministers headed by Prime Minister Jawaharlal Nehru. After the first general elections in 1952, Nehru inducted around 30 Ministers into his COM. Over the years, the size of the COM had gradually increased to around 50-60. Interestingly, it is the United Front governments led by Deve Gowda (June 1996) and I.K. Gujral (April 1997) that were sworn in with just 21 and 34 Ministers respectively. In 1999, when Atal Bihari Vajpayee became Prime Minister, his COM had 74 Ministers. However, the size of COM was becoming unwieldy in some of the larger States. For instance, in 2002 when Mayawati was the Chief Minister of Uttar Pradesh, she had 79 Ministers.

The National Commission to review the working of the Constitution under the Chairmanship of Justice Venkatachaliah set up in February 2000, had suggested a ceiling of 10% of the total strength of Lok Sabha/Legislative Assembly for the number of Ministers at the Centre/State level. Finally, through the 91st Constitutional Amendment in 2003, the total number of Ministers including PM/CM in the COM was limited to 15% of the total strength of the Lok Sabha/State Legislative Assembly. There is no minimum requirement at the Central level whereas even the smaller States should have a minimum of 12 Ministers. For Union Territories of NCT of Delhi and Jammu & Kashmir (J&K), the maximum limit is 10% of the total strength of its Assembly.

What are the issues?

A thorny issue even after the limit on the number of Ministers is the appointment of Parliamentary Secretaries in various States. The office of Parliamentary Secretary (PS) also has its origin in the British system. In India, the post of PS was first created in 1951. They have not been a regular feature in the Central governments thereafter and the last PS at the Centre was appointed in 1990. However, various States have continued with their appointment to circumvent the limit on COM placed by the 91st Amendment. High Courts of Punjab & Haryana, Rajasthan, Bombay, Calcutta, Telangana, Karnataka etc. have quashed or questioned the appointment of PS in the States under their jurisdiction for indirectly violating the maximum limit on COM. The Supreme Court in July 2017 had also declared a law passed by Assam in 2004 for the appointment of PS as unconstitutional. The most recent instance is the order of the Himachal Pradesh High Court in January 2024 that restrained six PS appointed in the State from functioning as Ministers or availing facilities provided to Ministers. Appointing MLAs to the position of Ministers under the guise of PS to circumvent constitutional limits should be strictly prohibited and discontinued.

It is also pertinent to note that States like Sikkim, Goa and smaller States in the northeastern region with a current estimated population ranging from seven to forty lakhs have a minimum of twelve Ministers. However, Union Territories of Delhi and J&K with estimated population of over 2 crore and 1.5 crore, can have only a maximum of seven and nine Ministers respectively. The administration of public order, police and land in Delhi is not with the Delhi government. Similarly, public order and the police of Jammu and Kashmir will not be with its government. Nevertheless, considering the population of these Union Territories, the 10% limit for their COM may be reconsidered.

Rangarajan R is a former IAS officer. He currently trains civil-service aspirants. Views expressed are personal.



Number game: Prime Minister Narendra Modi, left, with his Council of Ministers at the Rashtrapati Bhavan in New Delhi on June 9.AFP

THE GIST

- The present Council of Ministers consists of the Prime Minister, 30 Cabinet Ministers, 5 Ministers of State (MoS) with independent charge and 36 MoS
- The first COM at the time of independence had only 15 Ministers headed by Prime Minister Jawaharlal Nehru. When the council started expanding, through the 91st Constitutional amendment in 2003, the total number of Ministers including PM/CM in the COM was limited to 15% of the total strength of Lok Sabha/State Legislative Assembly.
- A thorny issue even after the limit on number of ministers is the appointment of Parliamentary Secretaries in various States. Courts have stepped in multiple times to restrain States from appointing PS to circumvent the constitutional limit set for the number of Ministers

- **Cabinet Ministers:** These are ranked as the senior-most in the council, second only to the Prime Minister. They oversee the strategic and important ministries of the Central government – related to Home Affairs, Finance, Defence, etc.
- **Ministers of State (Independent Charge):** These are junior members of the COM. A Minister of State (Independent Charge) is empowered to administer their respective ministry without oversight from cabinet ministers or other members of the Union government.
- **Ministers of State:** As opposed to a Minister of State (Independent Charge), a Minister of State does not enjoy the foremost administerial duties over a ministry, but assists a cabinet minister with the same, and is responsible for specific functions as delegated to them by their superior.

Context: The Union Council of Ministers was recently sworn in, comprising the Prime Minister, 30 Cabinet Ministers, 5 Ministers of State with independent charge, and 36 Ministers of State.

Council of Ministers

- **Article 74:** It provides that there shall be a Council of Ministers (COM) headed by the Prime Minister (PM) to aid and advise the President.
  - The real executive powers lie with the Council of Ministers (COM).
- **Article 75**: It states that the President appoints the Prime Minister. Based on the PM's recommendation, the President also appoints other ministers. The article mandates that the size of this council should not exceed 15% of the strength of the Lok Sabha, or the House of the people.
- **Criteria for Ministers**: A Minister should be a member of either the Lok Sabha or the Rajya Sabha and if not, should become one within six months of his/her appointment.
  - A similar setup prevails in States with a Council of Ministers (COM) headed by the Chief Minister (CM).
- **Composition**: The COM consists of Cabinet Ministers, Ministers of State (MoS) with independent charge, Ministers of State (MoS), and Deputy Ministers.
- **Article 88**: It empowers the ministers to speak or otherwise participate in proceedings in both the Lok Sabha and Rajya Sabha, as well as any joint session of both houses or any Parliamentary committee they may be a part of.

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GANDHI SAGAR SANCTUARY

(Syllabus GS Paper 3 – Env and Eco)



Another home for cheetahs

Gandhi Sagar Wildlife Sanctuary in western MP is set to become the second home for cheetahs in India. It has been described as 'perfect' cheetah habitat, but introducing the feline predator will come with its challenges

ANAND MOHAN J
BHOPAL, JUNE 15

THE GANDHI SAGAR Wildlife Sanctuary will be the second home for cheetahs in India, after the Kuno National Park. The Madhya Pradesh government has announced that it has completed its preparations for the ambitious project.

The final call on when the cheetahs will be imported from Namibia and South Africa will be made after the monsoons, during which the cats may be vulnerable to infection, especially with their winter coats on.

What makes Gandhi Sagar an ideal habitat for cheetahs?

The sanctuary is spread across an area of 368.62 sq km, in the districts of Mandsaur (187.12 sq km) and Neemuch (181.5 sq km) in western MP, on the border with Rajasthan.

It sits atop a flat rocky plateau, with the Chambal river cutting the sanctuary into two almost equal halves. The Gandhi Sagar dam, constructed on the river in 1960, lies within the area of the sanctuary, and so does part of its reservoir, 726 sq km large in area and third largest in the country.

Due to the rocky terrain and exposed sheetrock, the topsoil is shallow. This is behind Gandhi Sagar's savanna ecosystem comprising open grasslands interspersed with dry deciduous trees and shrubs. The riverine valleys, however, are evergreen.

MP's wildlife officials say that Gandhi Sagar makes for "perfect" cheetah habitat.

"The landscape has much promise. It looks like Maasai Mara [a national reserve in Kenya known for its savanna wilderness and wildlife including lions, giraffes, zebras, hippos, elephants, and cheetahs]. Gandhi Sagar has the best habitat for the cheetahs [in India] after Kuno," a senior official told *The Indian Express*.

Officials, in fact, see the potential of expanding the cheetah habitat in Gandhi Sagar to an area of around 2,000 sq km. But that will depend on the coordination between Rajasthan's Bhainsrodgarh sanctuary, as well as the territorial divisions of Mandsaur and Neemuch.

Expanding the core area will rely "heavily on the states of Rajasthan and Madhya Pradesh to come up with a unified management plan," officials said.

How have officials prepared for introduction of cheetahs in Gandhi Sagar?

But before the introduction of cheetahs, the sanctuary still needed to be "prepared" for their arrival. Currently, an area of 64 sq km has been developed for the cheetahs, at a cost of Rs. 17.72 crores.

Wildlife officials have been busy constructing a soft release enclosure (or boma) which, according to them, would "ensure a suitable and secure habitat for the cheetahs upon their arrival". This enclosure is 1 sq km in area, with four equal partitions.

Authorities are also constructing a hospital which would cater to the needs of cheetahs.

Moreover, wildlife officials are currently in the process of conducting a comprehensive status assessment of herbivores and predators in the sanctuary to gauge the existing ecological dynamics.

The Chairperson of the Cheetah Steering Committee was tasked to oversee and evaluate the overall readiness of the sanctuary to "ensure that the sanctuary is adequately equipped and prepared to support the successful integration and conservation of cheetahs within its natural landscape".

What is the biggest challenge to making Gandhi Sagar a viable cheetah habitat?

In one word: food. For cheetahs to sustainably survive in Gandhi Sagar, the first step is thus prey base augmentation, i.e. increasing the number of animals that the wild cats can prey upon.

Male cheetah siblings form coalitions comprising three to five members, whereas females live more solitary lives (unless they are with their litter). On average, a cheetah coalition is expected to make a kill every three to four days.

According to a Wildlife Institute of India report, "considering the finite growth rate of ungulates to be ~1.33, a population of about 350 ungulates are required for a single cheetah coalition family" (Y V Jhala et al, "Assessment of cheetah introduction sites and proposed action", 2021). Ungulates are members of a diverse clade of animals, primarily consisting of big mammals with hooves (like deer).

"About 1500 chital, 1000 blackbuck, and 350 chinkara should be translocated to Gandhi Sagar... this prey base would suffice for 7-8 cheetah family coalition," the WII assessment said.

MP's wildlife officials told *The Indian Express* that "prey animals such as chital (spotted deer) and gaurs (Indian bison) have been relocated from Kanha, Satpura and Sanjay tiger reserves to Gandhi Sagar."

But, an insufficient prey base is still an issue in Gandhi Sagar, much like it has been in Kuno. Officials are now pushing for around 5,000 antelopes to be relocated to Gandhi Sagar. This too will have its own hurdles, including "stress related mortalities" during the capturing and relocation process.

What are some other challenges that cheetahs will face in Gandhi Sagar?

Just like in Kuno, the leopard population in Gandhi Sagar will pose a threat to cheetahs, with the two feline predators competing for the same prey, and possibly even clashing with each other in wild encounters.

In fact, apart from leopards, the sanctuary has several other co-predators as well, including sloth bears, striped hyenas, gray wolves, golden jackals, jungle cats, Indian foxes, and marsh crocodiles.

Moreover, experts have also stressed on the enhancement of protected areas across the region.

While the forest department stressed that poaching was not a problem, the 2021 assessment found that despite the reasonably good status of the habitat, ungulate densities are extremely low, perhaps due to meat-eating communities residing in the area.

Unlike Kuno, highways and human habitation pass right outside the boundary of the protected area in Gandhi Sagar.

How will Gandhi Sagar be developed over time?

According to the 2021 report, the "first phase of augmentation should target the section west of the Chambal river so that cheetah reintroduction can commence there as soon as sufficient prey is available".

Wildlife officials too suggested the same, saying that developments within Gandhi Sagar should initially focus on the "Neemuch side of Chambal". The Chambal river acts as a "barrier to casual movement of wildlife" between the two halves of the sanctuary.

At present, the eastern side (Mandsaur side) sees more human activity. The Gandhi Sagar township, housing employees of the hydroelectric project on the dam, is located on the eastern end of the sanctuary.

Today, the banks of the reservoir see some agriculture and livestock rearing, with the reservoir itself being used for commercial fishing.

The Gandhi Sagar Wildlife Sanctuary (left). Instagram/@gandhisagarwildlife_official



Context: The Gandhi Sagar Wildlife Sanctuary will be the second home for cheetahs in India, after the Kuno National Park.

Gandhi Sagar Sanctuary

- **Location**: It is situated at eastern Madhya Pradesh.
- **Spread**: It is spread over two districts of Madhya Pradesh, i.e., Mandsaur and Nimach.
- **Area**: It covers 368 square kilometres and has an additional 2,500 sq km area surrounding it.
- **Establishment**: The sanctuary was notified in the year 1974 and added to the list of sanctuaries in 1984.
- **Presence of Water Bodies**: The Gandhi Sagar dam, constructed on the river in 1960, lies within the area of the sanctuary, and so does parts of its reservoir, which is 726 sq km large in area and the third largest in the country.
- **River**: The Chambal River flows through this sanctuary, dividing it into two parts.
- **Flora**: The principal tree species found here are Khair, Salai, Kardhai, Dhawda, Tendu, and Palash.
- **Fauna**: Herbivores like Chinkara, Nilgai, and Spotted Deer, and carnivores like the Indian Leopard, Striped Hyena, and Jackal are found in good numbers in the region.
- **Comparison** It looks like Maasai Mara [a national reserve in Kenya known for its savanna wilderness and wildlife including lions, giraffes, zebras, hippos, elephants, and, of course, cheetahs].

Kuno National Park

- **Situated**: Between the Aravallis and the Madhav National Park, Kuno serves as an important wildlife corridor
- **Establishment:** It was notified as a sanctuary in 1981 and then upgraded to a national park in 2018.
- **Area**: 750 kilometers of pristine wilderness.
- **Vegetation:** The tropical dry deciduous forest mainly consists of Anogeissus pendula (Kardhai), Senegalia catechu (Khair) Boswellia serrata (Salai), and associated flora.

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SPECIAL MARRIAGE ACT, 1954

(Syllabus: GS Paper 2 – Polity)



High Court's take on Marriage Act, an erosion of rights

A problematic order from the Madhya Pradesh High Court has given rise to the likelihood of a misinterpretation of the law around inter-faith marriages and a calling into question the scope of the Special Marriage Act, 1954. If unresolved, this could potentially lead to consequences contrary to the objectives of the Act, which sought to provide a viable legal avenue for inter-religious marriages.

The issue has risen out of a petition that sought protection for an inter-faith marriage, jointly filed by an unmarried Hindu-Muslim couple before the Madhya Pradesh High Court. While hearing the arguments, the High Court went into the question of whether such a marriage of "a Muslim boy with a Hindu girl" under the Act would constitute a "valid marriage or not". The High Court then proceeded to not grant police protection to the unmarried couple on the grounds that theirs would amount to an invalid marriage. By doing so, the High Court has reversed the gains in the jurisprudence on the right to choice of partner and has rewritten the well-settled objectives of the Special Marriage Act.

Erroneous considerations

It is common practice that when a petition seeking police protection is filed under Article 226 of the Constitution of India, the High Court looks into the violation of rights of the petitioners and the extent of threat faced by them. Such petitions are usually filed by couples in inter-faith and inter-caste marriages. However, it is now seen that even in cases of unmarried persons, High Courts have extended them protection after considering the various threats emanating from society. In similar circumstances, Justice N. Anand Venkatesh of the High Court of Madras recognised the precarious situation encountered by same-sex couples and granted police protection to a lesbian couple.

Similarly, the Punjab and Haryana High Court granted police protection to a live-in couple holding that "the key issue at hand is not the legality of the petitioners" relationship, qua which they may be liable for civil as well as criminal consequences in accordance with law, but whether they are entitled to protection of their fundamental right under Article 21 of the Constitution".

In contrast, the Madhya Pradesh High Court, without weighing in on the real and apparent dangers faced by an inter-faith couple and adjudicating on the prayer for protection based on a threat assessment, has gone into the merits of an impending marriage itself. Even if the couple does not get their marriage registered, their claim for protection ought to have been decided in accordance with Article 21 of the Constitution, which provides for the protection of the right to life and liberty of an individual.

Dilution of the Special Marriage Act

Another serious concern is that the order passed by the Madhya Pradesh High Court goes against the very basis and objects of the Special Marriage Act. The order refers to a precedent from the Supreme Court of India in *Mohammed Salim vs Shamsudeen* (2019), a case which dealt with the issue of property succession arising out of a marriage between a Muslim man and Hindu woman under the Mohammedan Laws. This judgment should never have been considered as a precedent in either deciding the validity of an inter-faith marriage or for police protection.

The order also goes into Section 4 of the Special Marriage Act which excludes marriages between persons within the "prohibited degrees of relationship". The reliance of the Madhya Pradesh High Court on this prohibition is entirely untenable and factually flawed as this provision only bars marriages between those who are related. By doing so, the High Court failed to recognise that the objective of the Act is to facilitate marriage between any two Indian nationals "irrespective of the faith with either party to the marriage may profess".

The India of today and special marriages

The Madhya Pradesh High Court order assumes importance in the current social and political climate, where there is a real threat of vigilantism against inter-faith and inter-caste marriages, which do not have the sanction of the parents. The love jihad conspiracy, right-wing propaganda and consequent vigilantism have directly challenged our constitutional morality. While these are yet to be resolved, there is also a batch of petitions challenging unconstitutional provisions within the Special Marriage Act, such as prior notice which are pending before the Supreme Court. Tying these together is a common thread of individual autonomy, liberty, and equality. The Supreme Court in *Shafin Jahan vs Asokan K.M.* (2018), held that "intimacies of marriage lie within a core zone of privacy, which is inviolable". Dealing with a case of inter-faith marriage, Justice D.Y. Chandrachud, as he was then, wrote that "social approval for intimate personal decisions is not the basis for recognising them" and further, that "the Constitution protects personal liberty from disapproving audiences".

The *ratio decidendi* of the Shafin Jahan case has the effect of prioritising the absolute right of an individual to choose a life partner over any consideration of faith or caste-based diktats. With the spirit of this judgment having been lost sight of in recent years, it is wholly necessary for constitutional courts across the country to keep in mind that the arc of jurisprudence bends towards autonomy, privacy and liberty.

Manuraj Shunmuga-sundaram

is a media spokesperson for the Dravida Munnetra Kazhagam (DMK) and advocate practising before the High Court of Madras. He appeared for the petitioners in the case where the Madras High Court granted protection to a same-sex couple

Haripriya Venkatakrishnan

is an advocate practising before the High Court of Madras

The M.P. High Court order goes against the very basis of the Special Marriage Act

Context: A problematic order from the Madhya Pradesh High Court has given rise to the likelihood of a misinterpretation of the law around inter-faith marriages and a calling into question the scope of the Special Marriage Act, 1954.

Special Marriage Act, 1954

- **About**: It is an Indian law that establishes a legal framework for marriages between individuals of diverse religions or castes.
- It lays down the procedure for both solemnization and registration of marriage, where either of the husband or wife or both are not Hindus, Buddhists, Jains, or Sikhs.
- **Written Notice**: According to this Act, the couples have to serve a notice with the relevant documents to the Marriage Officer 30 days before the intended date of the marriage.
- **Civil Regulation:** It primarily regulates civil marriages, with the state's endorsement rather than religious institutions.
- **Age Limit**: The minimum age to get married under the SMA is 21 years for males and 18 years for females.
- **Parallel with UK Law**: In India, the legal recognition of both civil and religious marriages mirrors the provisions of the UK's Marriage Act of 1949.
- **Applicability**: The Act is applicable to individuals of all faiths, encompassing Hindus, Muslims, Sikhs, Christians, Jains, and Buddhists, throughout India.
- **Prohibition of Polygamy**: It forbids polygamy and declares a marriage null and void if either party had a spouse living at the time of the marriage or if either of them is incapable of giving valid consent to the marriage due to unsoundness of mind.
- **Succession Rights**: Section 26 deals with succession under the SMA, recognising the validity of children born to people married under the SMA.
    - **Mohammed Salim vs Shamsudeen (2019)**: It dealt with the issue of property succession arising out of a marriage between a Muslim man and Hindu woman under the Mohammedan Laws. This judgment should never have been considered as a precedent in either deciding the validity of an inter-faith marriage or for police protection.
- **Property Rights**: Offspring of such marriages are not entitled to ancestral property but can obtain a share of their parents' self-owned or inherited property.

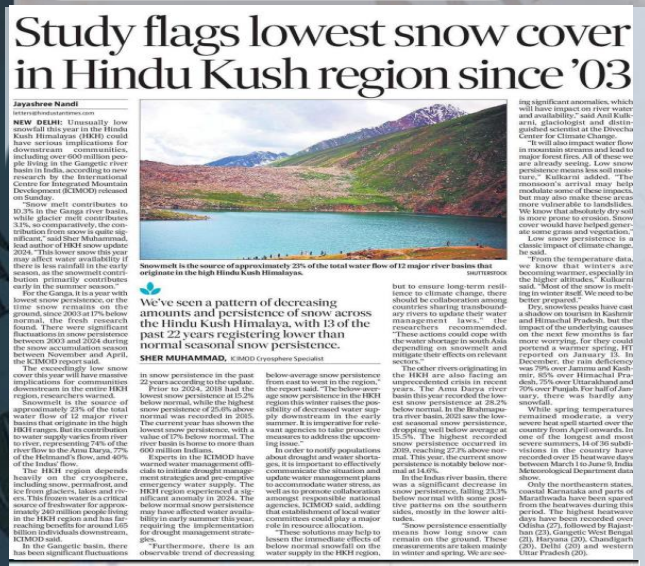
Differentiation from Personal Laws

- **Conversion Requirements:** Personal laws, such as the Muslim Marriage Act, 1954, and the Hindu Marriage Act, 1955, require either spouse to convert to the religion of the other before marriage.
- **Retention of Religious Identity:** The SMA enables marriage between inter-faith or inter-caste couples without them giving up their religious identity or resorting to conversion.
- **Impact on Family Rights**: Once married as per the SMA, an individual is deemed severed from the family in terms of rights like the right to inheritance.

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SNOW UPDATE REPORT 2024

(Syllabus: GS Paper 3 – Env & Eco)



Study flags lowest snow cover in Hindu Kush region since '03

Jayashree Nandi
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NEW DELHI: Unusually low snowfall this year in the Hindu Kush Himalayas (HKH) could have serious implications for downstream communities, including over 600 million people living in the Gangetic river basin in India, according to new research by the International Centre for Integrated Mountain Development (ICIMOD) released on Sunday.

"Snow melt contributes to 30.3% in the Ganga river basin, while glacier melt contributes 3.1%, so comparatively, the contribution from snow is quite significant," said Sher Muhammad, lead author of HKH snow update 2024. "This lower snow this year may affect water availability if there is less rainfall in the early season, as the snowmelt contribution primarily contributes early in the summer season."

For the Ganga, it is a year with lowest snow persistence, or the time snow remains on the ground, since 2003 at 17% below normal, the fresh research found. There were significant fluctuations in snow persistence between 2003 and 2024 during the snow accumulation season between November and April, the report pointed out.

The exceedingly low snow cover this year will have massive implications for communities downstream in the entire HKH region, researchers warned.

Snowmelt is the source of approximately 23% of the total water flow of 12 major river basins that originate in the high HKH ranges. But its contribution to water supply varies from river to river, representing 74% of the river flow to the Amu Darya, 77% of the Helmand's flow, and 40% of the Indus' flow.

The HKH region depends heavily on the cryosphere, including snow, permafrost, and ice from glaciers, lakes and rivers. This frozen water is a critical source of freshwater for approximately 240 million people living in the HKH region and has far-reaching benefits for around 1.65 billion individuals downstream, ICIMOD said.

In the Gangetic basin, there has been significant fluctuations in snow persistence in the past 22 years according to the update.

Prior to 2024, 2018 had the lowest snow persistence at 15.2% below normal, while the highest snow persistence of 25.6% above normal was recorded in 2015. The current year has shown the lowest snow persistence, with a value of 17% below normal. The river basin is home to more than 600 million Indians.

Experts in the ICIMOD have warned water management officials to initiate drought management strategies and pre-emptive emergency water supply. The HKH region experienced a significant anomaly in 2024. The below normal snow persistence may have affected water availability in early summer this year, requiring the implementation for drought management strategies.

"Furthermore, there is an observable trend of decreasing below-average snow persistence from east to west in the region," the report said. "The below-average snow persistence in the HKH region this winter raises the possibility of decreased water supply downstream in the early summer. It is imperative for relevant agencies to take proactive measures to address the upcoming issue."

In order to notify populations about drought and water shortages, it is important to effectively communicate the situation and update water management plans to accommodate water stress, as well as to promote collaboration amongst responsible national agencies, ICIMOD said, adding that establishment of local water committees could play a major role in resource allocation.

"These solutions may help to lessen the immediate effects of below normal snowfall on the water supply in the HKH region, but to ensure long-term resilience to climate change, there should be collaboration among countries sharing transboundary rivers to update their water management laws," the researchers recommended. "These actions could cope with the water shortage in south Asia depending on snowmelt and mitigate their effects on relevant sectors."

The other rivers originating in the HKH are also facing an unprecedented crisis in recent years. The Amu Darya river basin this year recorded the lowest snow persistence at 28.2% below normal. In the Brahmaputra river basin, 2023 saw the lowest seasonal snow persistence, dropping well below average at 15.5%. The highest recorded snow persistence occurred in 2019, reaching 27.1% above normal. This year, the current snow persistence is notably below normal at 14.6%.

In the Indus river basin, there was a significant decrease in snow persistence, falling 23.3% below normal with some positive patterns on the southern sides, mostly in the lower altitudes.

"Snow persistence essentially means how long snow can remain on the ground. These measurements are taken mainly in winter and spring. We are seeing significant anomalies, which will have impact on river water and availability," said Anil Kulkarni, glaciologist and distinguished scientist at the Divecha Center for Climate Change.

"It will also impact water flow in mountain streams and lead to major forest fires. All of these we are already seeing. Low snow persistence means less soil moisture," Kulkarni added. "The monsoon's arrival may help modulate some of these impacts, but may also make these areas more vulnerable to landslides. We know that absolutely dry soil is more prone to erosion. Snow cover would have helped generate some grass and vegetation."

Low snow persistence is a classic impact of climate change, he said.

"From the temperature data, we know that winters are becoming warmer, especially in the higher altitudes," Kulkarni said. "Most of the snow is melting in winter itself. We need to be better prepared."

Dry, snowless peaks have cast a shadow on tourism in Kashmir and Himachal Pradesh, but the impact of the underlying causes on the rest few months is far more worrying, for they could portend a warmer spring. IT reported on January 1 that Kashmir received 79% deficient snowfall. It was 79% over Jammu and Kashmir, 85% over Himachal Pradesh, 75% over Uttarakhand and 70% over Punjab. For half of January, there was hardly any snowfall.

While spring temperatures remained moderate, a very few beat spell started over the country from April onwards. In one of the longest and most severe summers, 14 of 36 subdivisions in the country have recorded over 15 heatwave days between March 1 to June 9, India Meteorological Department data show.

Only the northeastern states, coastal Karnataka and parts of Marathwada have been spared from the heatwaves during this period. The highest heatwave days have been recorded over Odisha (27), followed by Rajasthan (23), Gangetic West Bengal (21), Haryana (20), Chandigarh (20), Delhi (20) and western Uttar Pradesh (20).

Snowmelt is the source of approximately 23% of the total water flow of 12 major river basins that originate in the high Hindu Kush Himalayas. SHUTTERSTOCK

We've seen a pattern of decreasing amounts and persistence of snow across the Hindu Kush Himalaya, with 13 of the past 22 years registering lower than normal seasonal snow persistence.

SHER MUHAMMAD, ICIMOD Cryosphere Specialist



Context: New research by the International Centre for **Integrated Mountain Development (ICIMOD)** reveals that unusually low snowfall this year in the **Hindu Kush Himalayas (HKH)** may have significant consequences for downstream communities.

Hindu Kush Himalaya

- **About**: The HKH region spans 3,500 km, covering parts of eight countries from Afghanistan to Myanmar.
- **Area**: 3500 kilometres
- **Countries**: Afghanistan, Bangladesh, Bhutan, China, India, Nepal, Myanmar and Pakistan.
- **Significance of the HKH Region**: It serves as the origin of ten major Asian river systems, including the Amu Darya, Indus, Ganges, Brahmaputra (Yarlungtsanpo), Irrawaddy, Salween (Nu), Mekong (Lancang), Yangtse (Jinsha), Yellow River (Huanghe), and Tarim (Dayan).
- **Ecosystem Services**: The region supplies water and ecosystem services crucial for sustaining livelihoods to approximately 240 million people residing within its boundaries.

Key findings of Snow Update Report 2024

- **Decline in Snow Persistence:** Research indicates that 2024 marks the year with the lowest snow persistence for the Ganga since 2003, measuring 17% below normal.
- **Implications for the HKH Region**: The unprecedentedly low snow cover in 2024 will have profound implications for downstream communities across the entire HKH region.
- **Snowmelt Contribution to River Basins:** It contributes significantly to water flow in 12 major river basins originating from the high HKH ranges, accounting for approximately 23% of total water flow.
- **Impact on River Systems**: The contribution of snowmelt to water supply varies greatly among rivers: 74% for the Amu Darya, 77% for the Helmand, and 40% for the Indus.
    - The Gangetic basin has experienced significant variability in snow persistence over the past 22 years, with 2018 recording the lowest at 15.2% below normal and 2015 the highest at 25.6% above normal.
    - In 2024, the Gangetic basin has recorded its lowest snow persistence at 17% below normal, highlighting potential implications for its over 600 million inhabitants.

LIVE SCIENCE June 16

PLANET NINE

(Syllabus: GS Paper 1 – Geography)

Planet Nine: Is the search for this elusive world nearly over?

Context: Astronomers have been searching the outer solar system for nearly a decade for signs of a theoretical ninth planet, with no success so far. However, experts suggest we may be on the verge of a breakthrough in discovering it.

Planet Nine

- **About:** It is a theoretical celestial body situated in the outer reaches of our solar system.
- **Origin**: Proposed by Batygin and Brown, Planet Nine might be a remnant core of a giant planet disrupted by Jupiter early in the Solar System's history.
    - Other theories suggest it could have been captured from another star, started as a rogue planet, or originally formed on a distant orbit.
- **Hypothesis of Gravitational Influence**: It is proposed to explain the unusual clustering and alignment of extreme trans-Neptunian objects (ETNOs) in the outer Solar System, suggesting a massive, unseen celestial body shepherding their orbits.
- **Characteristics**
    - **Mass**: Planet Nine is estimated to possess a mass that ranges from 5 to 10 times that of Earth.
    - **Orbit:** The hypothesized orbit of Planet Nine is highly elliptical, with a semi-major axis spanning approximately 400 to 800 astronomical units (AU).
    - **Orbital Period**: It is projected that Planet Nine's orbital period could vary significantly, ranging from 10,000 to 20,000 years.
    - **Distance**: At its nearest approach to the Sun, Planet Nine may be about 200 AU away, while at its farthest, it could extend to around 1,200 AU.
- **Existing Planets**: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.
- **Future:** The search for Planet Nine is set to receive a major boost with the Vera C. Rubin Observatory scheduled to begin operations in 2025.
    - This observatory's enhanced capabilities may soon provide conclusive evidence either confirming the existence of Planet Nine or debunking the hypothesis altogether.

INDIAN EXPRESS

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BAYESIAN CONVOLUTIONAL NEURAL NETWORK

(Syllabus: GS Paper 1 – Geography)

A new way to predict El Niño, La Niña

ANJALI MARAR
BENGALURU, JUNE 16

HYDERABAD-BASED Indian National Centre for Ocean Information Services (INCOIS) has developed a new product to predict the emergence of El Niño and La Niña conditions — they are different phases of El Niño Southern Oscillation (ENSO) — up to 15 months in advance. The product is known as the Bayesian Convolutional Neural Network (BCNN).

What is ENSO?

ENSO is a climate phenomenon which involves changes in the temperature of waters in the central and eastern tropical Pacific Ocean, coupled with fluctuations in the overlying atmosphere. It can alter the global atmospheric circulation, which, in turn, influences weather across the world.

ENSO occurs in irregular cycles of 2-7 years and has three different phases — warm (El Niño), cool (La Niña), and neutral. In the neutral phase, the eastern side of the Pacific Ocean (near the northwestern coast of South America) is cooler than the western side (near the Philippines and Indonesia). This is due to the prevailing wind systems that move from east to west, sweeping the warmer surface waters towards the Indonesian coast. The relatively cooler waters from below come up to replace the displaced water.

EXPLAINED SCIENCE

In the El Niño phase, however, wind systems weaken, leading to lesser displacement of warmer waters. As a result, the eastern side of the Pacific becomes warmer than usual. In the La Niña phase, the opposite happens.

What is BCNN?

The new product uses the latest technologies such as Artificial Intelligence (AI), deep learning, and machine learning (ML) to improve forecasts related to the ENSO phases.

The model's prediction relies on the fact that El Niño or La Niña are connected to the slow oceanic variations and their atmospheric coupling, which gives sufficient lead time to issue early forecasts. It calculates the Niño3.4 index value — used to determine the different phases of ENSO phases — and makes the forecast.

Why is BCNN significant?

There are largely two kinds of weather models used for forecasting. One is the statistical model, which generates forecasts based on various information sets received from different countries and regions. The other is the dynamic model, which involves a 3D mathematical simulation of the atmosphere done using high performance computers.

The BCNN, however, is a combination of the dynamic model with AI. This helps it forecast the emergence of El Niño and La Niña conditions with a 15-month lead time — unlike other models which can give a prediction up to six to nine months in advance.

What were the challenges?

Typically, researchers need historical weather data — spanning several decades, and even centuries — to feed into models to generate forecasts. While rich data are available for land, there is a scarcity when it comes to seas and oceans. This gap has hampered the weather and climate prediction accuracy.

The INCOIS addressed the issue by taking data from historical runs (1850-2014 period) from the Coupled Model Intercomparison Project phases 5 and 6 (CMIP5 and CMIP6), thus augmenting the training dataset. CMIP is an experimental framework, which allows climate modellers to simulate various scenarios to test the past climate and project the future climate situations.

Context: Indian National Centre for Ocean Information Services (INCOIS) has developed a Bayesian Convolutional Neural Network to predict the emergence of El Niño and La Niña conditions they are different phases of El Niño Southern Oscillation (ENSO) up to 15 months in advance.

Bayesian Convolutional Neural Network

- **About:** It is the new product uses the latest technologies such as Artificial Intelligence (AI), deep learning, and machine learning (ML) to improve forecasts related to the ENSO phases.
- **Focus**: To enhance forecasts related to ENSO phases (El Niño Southern Oscillation).
- **Model Operation:** BCNN operates by leveraging the relationship between El Niño or La Niña and the slow oceanic variations coupled with atmospheric conditions.
- **Mechanism**: The model predicts ENSO phases by calculating the Niño3.4 index value.

ENSO

- **About:** It is a climate phenomenon which involves changes in the temperature of waters in the central and eastern tropical Pacific Ocean, coupled with fluctuations in the overlying atmosphere.
- **Found:** It occurs in irregular cycles of 2-7 years and has three different phases — warm (El Niño), cool (La Niña), and neutral.
  - In India, while El Niño conditions usually lead to a weak monsoon and intense heatwaves, La Niña conditions result in a strong monsoon.

Comparison of BCNN with Existing Weather Models

- Types of Existing Weather Models:
  - **There are two main types of weather models**: statistical models and dynamic models.
  - Statistical models rely on diverse datasets from various sources for generating forecasts.
  - Dynamic models utilize 3D mathematical simulations of the atmosphere using High Performance Computers (HPC).
    - ✓ Dynamic models generally provide more accurate forecasts compared to statistical models due to their detailed simulations.
- **Forecasting Abilities of BCNN:** It is capable of forecasting the onset of El Niño and La Niña conditions with a lead time of 15 months.
  - In contrast, other existing models typically provide predictions up to six to nine months in advance.

PIB June 16

DIVYA DRISHTI

(Syllabus: GS Paper 3 – Sci and Tech)

A Woman-led Start-up Develops 'Divya Drishti', a Cutting Edge AI Tool for Personal Identification, Under Technology Development Fund

Context: DRDO has achieved a breakthrough with its new **AI tool "Divya Drishti,"** which combines face recognition technology with immutable physiological parameters like gait and skeleton characteristics.

Divya Drishti

- **About:** It integrates face recognition with immutable physiological parameters such as gait and skeleton, developed by Ingenious Research Solutions Pvt Ltd.
- **Development by**: Ingenious Research Solutions Pvt Ltd, highlighting advancements in biometric authentication technology.
    - Developed under the technical guidance of CAIR (Centre for Artificial Intelligence & Robotics), a DRDO lab in Bangalore, ensuring robust technical oversight and mentoring.
- **Accuracy and Reliability**: This solution marks a significant advancement by offering enhanced accuracy and reliability in identifying individuals, minimizing false positives and identity fraud.
- **Applications Across Sectors**: Its dual approach enhances identification accuracy, making it suitable for Defence, Law Enforcement, Corporate, and Public Infrastructure sectors.

Technology Development Fund (TDF)

- **About:** The TDF scheme is a flagship programme under the Ministry of Defence's 'Make in India' initiative, executed by DRDO.
- **Objectives**: Aimed at building Indian industries' capacity and capability in defence technology development, fostering a culture of design and development, and creating an R&D ecosystem.
    - It supports niche technology development and prototype creation, contributing to achieving self-reliance (Aatmanirbharta) in defence technology.
- **Focus Areas:**
    - Enhancing existing products and processes, advancing technology readiness from TRL 3 to meeting Tri-Services needs.
    - Innovating futuristic technologies for defense applications and substituting imports with domestically developed components, aimed at strengthening national defense capabilities.

THE HINDU

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SOLID WASTE MANAGEMENT

(Syllabus: GS Paper 3 – Env and Eco)



What is SWM cess and why is it levied on waste generators?

How has the SWM cess fared so far and why has it hit the headlines suddenly? How has Bengaluru been handling its solid waste management and what is about to change going forward?

Pushkara S.V.

The story so far:

The Bruhat Bengaluru Mahangara Palike (BBMP) has proposed a Solid Waste Management (SWM) Cess of ₹100 per month for each household. While the proposal has sparked debate and criticism among residents and stakeholders, it is important to understand the rationale behind SWM cess, its intended use, and the broader context of solid waste management challenges faced by Urban Local Bodies (ULBs) in India.

Urban Local Bodies (ULBs) levy user fees or SWM cess as per the provisions of Solid Waste Management Rules, 2016. According to these guidelines, ULBs must collect user fees/cess for SWM services provisions provided. ULBs typically charge about ₹30-50 per month as SWM cess, which is collected along with property tax. ULBs are now considering revising these rates and imposing higher charges on bulk waste generators to meet a portion of the costs incurred in providing SWM services.

What are the costs?

Offering SWM services is complex and resource-intensive. ULBs typically deploy about 80% of their manpower and up to 50% of their annual budgets to provide SWM services to city residents.

In a city like Bangalore, an urban resident generates about 0.6 kg of waste per day, totalling 0.2 tonnes per person per year. Overall, Bangalore generates about 5,000 tonnes of solid waste per day. Managing this volume of waste requires around 5,000 door-to-door waste collection vehicles, 600 compactors, and about 20,000 Paurakarmikas.

SWM services comprise four components: collection, transportation, processing and disposal. ULBs package collection and transportation together, and processing and disposal together. Collection and transportation are resource and labour-intensive and come up to 85-90% of the SWM budget, whereas only about 10-15% is spent on processing and disposal of waste.

What are the challenges?

Solid waste generated in Indian cities consists of about 55-60% wet biodegradable material and 40-45% non-biodegradable material. The portion of recyclable material in the dry waste is minimal, only about 1-2%, with the rest being mostly non-recyclable and non-biodegradable waste. Although 55% of the wet waste can be converted into organic compost or biogas, the yield is as low as 10-12%, making both composting and biogas generation from solid waste financially unviable. Typically, operational revenue from waste processing facilities covers only about 35-40% of operational expenses, with the rest subsidised by the ULB.

Apart from financial challenges, ULBs face other challenges associated with SWM services, such as extra work of

Context: The Bruhat Bengaluru Mahangara Palike (BBMP) has proposed a Solid Waste Management (SWM) Cess of ₹100 per month for each household.

Solid Waste Management (SWM)

- **Solid Waste:** It refers to the undesired or nonessential solid materials produced from human activities in residential, industrial, or commercial zones.
- **Examples of Solid Waste:** Common examples of solid waste include paper, plastics, glass, metal, textiles, food scraps, yard waste, and electronic waste.
- **Present Status:** India currently generates 62 million tons of waste annually, as reported by the Ministry of Environment, Forest and Climate Change.
- **Growth Rate:** The waste generation shows an average annual growth rate of 4%.
- **SWM Cess by ULBs**: It levy user fees or SWM cess as per the provisions of Solid Waste Management Rules, 2016.

Waste Management Rules and Guidelines in India

- **Solid Waste Management Rules, 2016:** The rules emphasize the importance of waste segregation at the source, hold manufacturers accountable for packaging and sanitary waste disposal, and suggest implementing user fees for waste collection, processing, and disposal.
- **Environment Protection Act (1986)**: It was enforced in 1986 to safeguard and enhance the environment.
  - **Responsibility Mandate**: Industrial units and corporations are obligated to act responsibly to safeguard the environment and regulate waste generation.
- **Hazardous Waste Management Rules**: Notified to ensure safe handling, processing, transportation, and disposal of hazardous waste.
- **E-Waste Management Rules**: Aimed at preventing the leakage of e-waste into informal sectors at all stages of its management.
  - **Applicability**: Applicable to producers, consumers, recyclers, and all involved in the e-waste lifecycle.
- **Plastic Waste Management Rules (2016)**: Focuses on minimizing plastic waste, source segregation, and involving stakeholders in waste management.
- **Bio-medical Waste Management Rules (2016)**: Applies to entities generating, collecting, storing, transporting, and handling biomedical waste.

LIVEMINT June 16

CORPORATE SOCIAL RESPONSIBILITY
(Syllabus: GS Paper 3 – Economy)

Sebi seeks changes to CSR rules to include donations via social stock exchange

Context: Recently, the Securities and Exchange Board of India (SEBI) has sent a proposal to the government to amend Corporate Social Responsibility (CSR) rules in the Companies Act (2013) to include donations made by companies through Social Stock Exchanges (SSEs).

Corporate Social Responsibility (CSR)

- **Meaning:** It is a law in India, that **mandatorily obliged** corporates in the country have to do social work.
  - **It suggests:** The responsibility of the corporations operating within society to contribute towards economic, social and environmental development that creates positive impact on society at large.
- **Statutory Backing:** Under the **Companies Act, 2013,** introduced in April 2014.
- **Four types of CSR are prevalent:** Ethical responsibility, environmental responsibility, economic responsibility and philanthropic responsibility.
- **CSR Applicability in India:** Under Section 135 of the Act, certain companies are required to comply with CSR provisions.
  - **Objective**: It aims to promote responsible business practices and contribute towards the welfare of society. The criteria for CSR applicability are based on the company's net worth, turnover, and profit.
  - **CSR applicability criteria, if a company:**
    - ✓ **Net worth:** More than Rs 500 crore or,
    - ✓ **Turnover:** More than Rs 1,000 crore or,
    - ✓ **Net profit:** More than Rs 5 crore.
- **CSR Committee:** Every company to which CSR criteria are applicable shall constitute a Corporate Social Responsibility (CSR) Committee.
  - The CSR Committee should consist of **3 or more directors**, out of which at least **1 director must be an independent director.**

Importance of Corporate Social Responsibility

- CSR helps companies be socially responsible and give back to society.
- It improves the company's reputation.
- CSR activities attract and retain employees.
- It helps build long-term stakeholder relationships.
- CSR can have a positive impact on the environment.
- It can also benefit the communities in which the company operates.

PIB June 14

TRADITIONAL MEDICINES
(Syllabus: GS Paper 2 – Health)

WHO Designates CCRAS-NIIMH, Hyderabad as Collaborating Centre for Traditional Medicine Research

Context: Recently, the World Health Organization (WHO) has designated the National Institute of Indian Medical Heritage, Hyderabad as a WHO Collaborating Centre for 'Fundamental and Literary Research in Traditional Medicine'.

Traditional Medicines

- **About**: It is the sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures.
- **Uses**: These skills are used in the maintenance of health as well as in the prevention, diagnosis, improvement, or treatment of physical and mental illness.
- **Literature and Records**: Some traditional medicine systems are supported by huge volumes of literature and records of the theoretical concepts and practical skills.
- **Global Used**: The most widely used traditional medicine systems today include those of China, India, and Africa.

WHO's Perspective on Traditional Medicine

- **Global Centre and Collaboration**: WHO has established the Global Centre for Traditional Medicine in India to enhance traditional medicine's integration with modern science.
  - India hosts 58 WHO Collaborating Centres, including the National Institute of Indian Medical Heritage (NIIMH).
- **Gujarat Declaration**: World Health Organization (WHO) has released the outcome document of first WHO Traditional Medicine Global Summit 2023 in form of **"Gujarat Declaration".** The declaration reaffirmed global commitments towards indigenous knowledges, biodiversity and traditional, complementary and integrative medicine. WHO underlined that the application of rigorous scientific methods is needed to better understand, assess and, where appropriate, apply more holistic, context-specific, complex and personalized approaches for health and well-being for all.

Efforts by India

- **Ministry of AYUSH**: India's Ministry of AYUSH promotes Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homeopathy for holistic health and well-being.
  - It oversees the development of safe, effective, and quality traditional medicines accessible to the public.
- **Digital Initiatives and Portals:** AMAR Portal, SAHI Portal, e-Books of Ayush, NAMASTE Portal and Ayush Research Portal.

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