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MINISTRY OF SCIENCE AND TECHNOLOGY



MK Yadav Sir

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THE HINDU Page 1

DIRECT TAX

(Syllabus: GS Paper 3 – Economy)

Direct tax kitty picks up pace, up 20.25% by Feb. 10

Net direct tax collections increase from ₹14.7 lakh cr. on Jan. 10 to hit ₹15.6 lakh cr. by Saturday; the Finance Minister had pegged revised estimates for direct taxes for this year at ₹19.5 lakh cr.

Vikas Dhoot
NEW DELHI

India's net direct tax collections picked up pace over the past month to rise 20.25% year-on-year by February 10, compared to a 19.4% uptick on the same date in January, show data released by the Finance Ministry on Sunday.

Growth in the Personal Income Tax (PIT) revenues continued to outstrip Corporate Income Tax (CIT), with a 26.91% uptick in net PIT collections vis-à-vis a 13.6% rise in CIT inflows so far this year.

From ₹14.7 lakh crore on January 10, net direct tax collections, that are calculated by deducting refunds from gross tax inflows, had hit ₹15.6 lakh crore by Saturday, making up 80.23% of the revised estimates for direct taxes for this year.



Higher expectations

Finance Minister Nirmala Sitharaman, in her interim Budget for 2024-25, had raised her hopes for the direct tax kitty for this year, pegging revised estimates at ₹19.5 lakh crore, from the ₹18.23 lakh crore originally estimated for 2023-24.

"We are quite hopeful of meeting the Revised Estimates for the current year, as the asking rate is 17% growth for the next two months. But we don't know how Advance Tax will come through, so let us see how much we are able to achieve because it is the product of the collections which will be made in the month of February and March and refunds which will be issued," Central Board of Direct Taxes chairperson Nitin Gupta told *The Hindu* last week.

"The provisional figures of direct tax collections continue to register steady growth. Direct tax collections up to February 10, 2024 show that gross collections are at ₹18.38 lakh crore, which is 17.30% higher than the gross collections for the corresponding period of last year," the Ministry said in a statement.

CONTINUED ON » PAGE 10

Context: India's net direct tax collections picked up pace over the past month to rise 20.25% year-on-year by February 10, compared to a 19.4% uptick on the same date in January, as per data released by the Finance Ministry

Direct Tax

- **About:** This tax is imposed directly on the taxpayer and is paid directly to the government by the individuals or entities subjected to it.
  - The responsibility for levying and collecting direct taxes, as well as formulating other policies related to direct taxes, lies with the Central Board of Direct Taxes (CBDT).
- **Types of Direct Tax**
  - **Income Tax:** Income tax is a tax charged on the annual income of an individual or business earned in a financial year.
  - **Corporation Tax**: A corporate tax, also called corporation tax or company tax, is a direct tax imposed by a jurisdiction on the income or capital of corporations or analogous legal entities.
  - **Dividend Distribution Tax (DDT):** Dividend signifies the allocation of profits to a company's shareholders.
    - ✓ This tax is a specific tax imposed on the dividends disbursed to shareholders by the corporation.
  - **Securities Transaction Tax**: It is a tax on gains made on the domestic stock exchange on securities such as equities, options, and futures.
  - **Alternate Minimum Tax:** It is a direct tax applied to the buying and selling of securities listed on recognized stock exchanges in India.
  - **Minimum Alternate Tax**: MAT is a provision in Direct tax laws to limit tax exemptions availed by companies, so that they pay at least a minimum amount of corporate tax to the government.

INDIAN EXPRESS

Page 11

NAZOOL LAND

Syllabus GS Paper 1 & 3 – History & Economy)

Haldwani violence: what is Nazool land



Police check documents of commuters during a curfew at Banbhoolpura area in Haldwani on Sunday. PTI

ASAD REHMAN
LUCKNOW, FEBRUARY 11

VIOLENCE ERUPTED in Uttarakhand's Haldwani district Thursday (February 8) after the administration conducted a demolition drive at the site of a mosque and madrasa, allegedly on Nazool land, killing five and injuring at least 12.

What is Nazool land? How is such land used? And was the land where the demolition drive took place, Nazool land?

What is this land?

Nazool land is owned by the government but most often not directly administered as state property. The state generally allots such land to any entity on lease for a fixed period, generally between 15 and 99 years.

In case the lease term is expiring, one can approach the authority to renew the lease by submitting a written application to the Revenue Department of the local development authority. The government is free to either renew the lease or cancel it – taking back the Nazool land.

In almost all major cities of India, Nazool land has been allotted to different entities for a variety of different purposes.

How did Nazool land emerge?

During British rule, kings and kingdoms which opposed the British frequently revolted against them, leading to several battles between them and the British Army. Upon defeating these kings in battle, the British would often take their land away from them.

After India got Independence, the British vacated these lands. But with kings and royals often lacking proper documentation to prove prior ownership, these lands were marked as Nazool land – to be owned by the respective state governments.

How does the government use Nazool land?

The government generally uses Nazool land for public purposes like building schools, hospitals, Gram Panchayat buildings, etc. Several cities in India have also seen large tracts of land denoted as Nazool land used for housing societies, generally on lease.

How is Nazool land governed?

While several states have brought in government orders for the purpose of framing rules for Nazool land, The Nazool Lands (Transfer) Rules, 1956 is the law mostly used for Nazool land adjudication.

Is the Uttarakhand land where the mosque and madrasa were located registered as Nazool land?

As per the Haldwani district administration, the property where the two structures are situated is registered as the Nagar Nigam's (Municipal Council's) Nazool land. The administration says that for the last 15-20 days, a demolition drive has been underway in connection with Nagar Nigam properties to free roads from traffic congestion.

"A notice, issued on January 30, required the encroachment to be removed within three days or for ownership documents to be provided. On February 3, several locals visited the Nagar Nigam to discuss with our team. They submitted an application and requested time to appeal to the High Court, agreeing to abide by the court's decision," the DM said, insisting that the demolition took place after the court's go ahead.

However, Shakeel Ahmad, Councillor of Ward Number 31, where the incident took place, said that the locals had requested the administration to wait till the next date of hearing in the High Court on February 14.

Context: Recently, violence erupted in Uttarakhand's Haldwani district after the administration conducted a demolition drive at the site of a mosque and madrasa, allegedly on Nazool land, killing five and injuring many more.

Nazool Land

- **About:** It is owned by the government but most often not directly administered as state property.
- **Allotted:** The state generally allots such land to any entity on lease for a fixed period, generally between 15 and 99 years.
- **Government Discretion**: The government holds the authority to decide whether to renew or cancel the lease, ultimately leading to the repossession of Nazool land.
- **Nazool Land Allocation Across India**: Nazool land has been allocated to various entities for diverse purposes in nearly all major cities across India.
- **Nazool land governed**: While several states have brought in government orders for the purpose of framing rules for Nazool land, The Nazool Lands (Transfer) Rules, 1956 is the law mostly used for Nazool land adjudication.
- **Government use Nazool land**: The government generally uses Nazool land for public purposes like building schools, hospitals, Gram Panchayat buildings, etc.

How did Nazool land emerge?

- **British Colonial Era**: Kings and kingdoms opposing British rule engaged in frequent revolts and battles against the British Army.
    - British victories often resulted in the confiscation of lands from defeated rulers.
- **Post-Independence Transition**: After India gained independence, the British vacated the seized lands.
- **State Government Ownership**: Lands without clear ownership documentation were categorized as Nazool lands. These lands were then designated for ownership by the respective state governments.

PIB Feb 11

SWATI PORTAL

(Syllabus: GS Paper 2 – Govt Scheme)

'SWATI' (Science for Women-A Technology & Innovation) Portal launched in New Delhi to create a single online portal representing Indian Women and Girls in STEMM (Science, Technology, Engineering, Mathematics & Medicine)

Context: The Principal Scientific Advisor to the Government of India recently launched the "Science for Women-A Technology & Innovation (SWATI)" Portal, aimed at creating a single online portal representing Indian Women and Girls in STEMM (Science, Technology, Engineering, Mathematics & Medicine).

Science for Women-A Technology & Innovation (SWATI)" Portal

- **About**: The Portal is a complete interactive database; and the first-of-its-kind in India which is developed, hosted and maintained by the National Institute of Plant Genome Research (NIPGR).
- **Objective**: To scale up the effort exponentially to include each and every Indian woman in science, across all career stages and subjects, spanning both Academia and the Industry
- **Knowledge Dissemination Enhancement**: Facilitating the spread of knowledge, this initiative contributes to the advancement of fundamental science and emphasizes the pivotal role of innovation and entrepreneurship in fortifying Atmanirbhar Bharat.
- **Empowering Innovation and Entrepreneurship**: Highlighting the significance of innovation and entrepreneurship, this effort strengthens the foundation of self-reliant India, fostering growth and development.
- **'Women in Science'**: Providing a dedicated platform, the initiative creates an opportunity to discuss and formulate a roadmap for empowering and advancing women in the field of science.
- **Promoting 'Science for Women'**: Addressing gender-specific considerations, the initiative aims to foster inclusivity and gender equality by exploring ways to enhance the role of science in the lives of women.
- **The various Sections in the portal include Icons** - Awardees & Directors, Secretaries Academy Presidents; Faculty-Indian Universities, Autonomous organizations including S&T Ministry/ CSIR/ DBT/ DST/ CSIR/ MHRD/ UGC/ GATI/ KIRAN; Research fellows- Post docs, JRFs, SRFs, technical Staff; Students-PhD Scholars, Research Interns, Graduates, Post graduates, Undergraduates; WiS Entrepreneurs, Startups, Business & Science Administrators; STEMM background professionals in alternate career

ALL INDIA RADIO

Feb 11

NARI SHAKTI VANDAN BILL

(Syllabus: GS Paper 3 – Polity)

Parliament passes Nari Shakti Vandan Bill and this will result in large participation of women in Parliament & state legislatures in coming years: Vice Prez Dhankhar

Context: Vice President Jagdeep Dhankhar recently announced that the Parliament has passed the Nari Shakti Vandan Bill, indicating a promising surge in women's participation in both Parliament and state legislatures in the upcoming years.

Nari Shakti Vandan Bill

- **About:** The 73rd and 74th Amendments in 1993 introduced reservations for women in panchayats and municipalities, but similar provisions were not extended to the Lok Sabha and state legislative assemblies.
  - Attempts to introduce reservations for women in Parliament were made through bills in 1996, 1998, 1999, and 2008, but they lapsed due to various reasons.
- **Also known as:** Women's Reservation Bill
- **Duration of Reservations**: The bill suggests a 15-year timeframe for the reservation policy and includes specific quotas for Scheduled Castes (SCs) and Scheduled Tribes (STs) within the reserved seats for women.
- **Key Features of the Bill:**
- **Reservation of Seat :** Reservation of one-third of all seats for women in Lok Sabha, state legislative assemblies, and the Legislative Assembly of the National Capital Territory of Delhi.
- **Commencement of reservation**: After the publication of the census conducted following the bill's commencement.
  - The reservation is proposed for a period of 15 years, with provisions for extension by Parliament.
- **Rotation of Seats:** The bill proposes the rotation of seats reserved for women after each delimitation, as determined by a law made by Parliament.

Current Representation

- Women constitute 15% of the 17th Lok Sabha and approximately 9% on average in state legislative assemblies.
- The 2015 Report on the Status of Women in India highlighted the inadequate representation of women in political decision-making roles and within political parties.

PIB

Feb 11

SANGEET NATAK AKADEMI

(Syllabus: GS Paper 1 – Art and Culture)

Sangeet Natak Akademi to set up Dakshin Bharat Sanskritik Kendra in Hyderabad

Context: Sangeet Natak Akademi recently announced plans to set up the first-of-its-kind Dakshin Bharat Sanskritik Kendra in Hyderabad.

Sangeet Natak Akademi

- **About**: The national level academy for performing arts set up by the Government of India.
- **Origin**: It was set up by the Indian education ministry on 31 May 1952 and became functional the following year, with the appointment of its first chairman, Dr. P. V. Rajamannar.
- **Chairman Appointment**: By the President of India for a term of five years.
- **Nodal Ministry**: Ministry of Culture
- **Current Status**: It is presently an Autonomous Body of the Ministry of Culture, Government of India and is fully funded by the Government for implementation of its schemes and programmes.
- **Functions**: The academy functions as the apex body of the performing arts in the country to preserve and promote the vast cultural heritage of India expressed in music, dance and drama.
- **Honour:** 1,00,000/- (Rupees one lakh) besides a Tamrapatra and Angavastram.

Akademi presently has five centres:

- **Kutiyattam Kendra**, Thiruvananthapuram for preserving and promoting the age-old Sanskrit theatre of Kerala, Kutiyattam.
- **Sattriya Kendra**, Guwahati for promoting the Sattriya traditions of Assam.
- **North-East Centre**, Guwahati for preserving the traditional and folk performing art traditions of north-eastern India.
- **North-East Documentation Centre,** Agartala for festival and field documentation in the North-east.
- **Chhau Kendra**, Chandankiyari for promoting the Chhau Dances of eastern India.

TIMES OF INDIA

Page 2

FIRE-CAPPED TIT

(Syllabus: GS Paper 2 – Env nd Eco)

Birds reverse-migrate to city, watchers see end of winter

Kushagra.Dixit@timesgroup.com

Pic courtesy: Udiyaman Shukla



Fire-capped tit, a song bird, spotted for the first time at Aravali

New Delhi: Birders have spotted the trail of species flying back home suggesting reverse migration as the season changes from winter to summer.

According to the experts, generally reverse migration begins towards the end of Feb or by first week of March, but this year the pattern suggests otherwise.

The birders' claims followed the spotting of a species called fire capped tit, a songbird that prefers forests over wetlands, breeds in the Himalayas and migrates down to southern India like the Ghats and Kerala during winter.

The bird was spotted in the Aravalli region, along with similar species like the black redstart, suggesting arrival of summer.

"The fire capped tit is a Himalayan bird which flies down south towards Western Ghats and Kerala around Sept, and is back around Feb-end and March. On Sunday, birder Udiyaman spotted one at the Aravalli Biodiversity Park, which suggests a prelude to reverse migration which is still 10-15 days early. For this year, the winter has also almost ended," birder Major General Arvind Yadav said.

80 SPECIES OF BIRDS SPOTTED FROM OCT

Shukla said there could be two reasons for the early reverse migration. "The winters were not very harsh in central India. So, the bird could have started moving early. The other hypothesis could be that though this species is generally found in flocks, it is possible that the one I spotted was an early bird and the major population is still down south or in central India and will start to arrive by the end of Feb... We have spotted this bird multiple times in Bhondsi, but this is the first time it has been spotted here in Aravalli Biodiversity Park. These birds breed in the Himalayas during summer and have a melodious song, which I recorded," he said.

He pointed out that the black redstart that breeds in the Himalayas, Central Asia and Europe was spotted in large numbers. "Their presence suggests that those which had gone further south must have come back," Shukla said.

The region receive over 80 species of birds from Oct. About 40 species make a pit stop in the region.

Context: Birders have spot- ted the trail of species flying back home suggesting reverse migration as the season changes from winter to summer.

- According to the experts, generally reverse migration begins towards the end of Feb or by first week of March, but this year the pattern suggests otherwise.

Fire-capped Tit

- **Habitat and Migration Patterns**: The fire-capped tit, a forest-dwelling bird, breeds in the Himalayas and migrates to southern India, including the Western Ghats and Kerala, during winter.
- The recent spotting in Aravalli, along with the black redstart, suggests the arrival of summer.
- **Early Signs of Reverse Migration**: An early sighting of the fire-capped tit in Aravalli, hinting at a premature reverse migration, possibly 10-15 days ahead of the usual schedule.
- **Early Reverse Migration**: Mild winters in central India may have prompted the bird to start moving early.
- The early sighting might be of an individual bird, and the main population is expected to arrive later, possibly by the end of February.
- **Presence of Black Redstarts**: The black redstarts, which breed in the Himalayas, Central Asia, and Europe, were spotted in large numbers, indicating a return of those that had migrated south.
- **Diverse Bird Species in the Region**: The Aravalli region witnesses the arrival of over 80 bird species from October, with around 40 species making a pit stop in the area.
- **Local Breeding and Melodious Song:** The fire-capped tit breeds in the Himalayas during summer and is known for its melodious song, as recorded by birder Shukla during the recent sighting in Aravalli.

ALL INDIA RADIO

Feb 11

SWAMI DAYANAND SARASWATI

(Syllabus: GS Paper 1 – History)

PM Modi urges people to convert faith of Swami Dayanand Saraswati about India into self-confidence during Amrit Kaal

Context: Prime Minister of India urged people to convert the faith of Swami Dayanand Saraswati about India, into self-confidence during Amrit Kaal.

Swami Dayanand Saraswati

- **About**: He was an Indian philosopher, social leader and founder of the Arya Samaj.
- **Vision**: Classless and casteless society.
- **Belief in Infallible Vedas**: He regarded the Vedas as infallible and unquestionable.
- **Slogan**: He coined the powerful slogan "Back to the Vedas" to emphasize the importance of returning to Vedic principles.
- **Author**: Dayanand wrote "Satyarth Prakash," serving as the moral and spiritual cornerstone of the Arya Samaj.
- **Swaraj Movement**: He was the first to advocate for Swaraj (self-rule) with the rallying cry "Indian for India."
- **Advocate of Women's Rights**: Dayanand was a steadfast supporter of women's rights, championing their cause in various social and religious spheres.
- **Educational System Transformation**: Implemented a comprehensive reform of the education system, earning recognition as a visionary in modern India.
- **DAV Schools (1886)**: Founded the Dayanand Anglo Vedic (DAV) schools in 1886 to actualize the visionary ideals of Swami Dayanand Saraswati.

Arya Samaj

- **Foundation and Ideology**: Arya Samaj, established on 10 April 1875 by the ascetic Dayanand Saraswati, is a monotheistic Hindu reform movement in India. It advocates principles and practices rooted in the unquestionable authority of the Vedas.
- **Pioneering Proselytization**: Arya Samaj holds the distinction of being the first Hindu group to actively engage in proselytization, marking a significant departure from traditional practices within Hinduism.
- **Advocacy for Civil Rights**: Since the 1800s, Arya Samaj has been actively involved in campaigning for the advancement of civil rights in India. This reflects the movement's commitment to broader social and political issues beyond religious reform.

INDIAN EXPRESS Page 6

PM SVANIDHI

(Syllabus: GS Paper 3 – Economy)

PM-SVANidhi boosted annual income of street vendors by ₹23,000: Study

DAMINI NATH
NEW DELHI, FEBRUARY 11

A STUDY that evaluated the impact of the PM Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi), a small working capital loan scheme for street vendors, has found that the first tranche of ₹10,000 led to an additional annual income of ₹23,460 for each beneficiary, *The Indian Express* has learnt.

The study, commissioned by the Union Ministry of Housing and Urban Affairs, was carried out between January and June last year by the Centre for Analytical Finance of the Indian School of Business (ISB). The report will be used by the Ministry for its own assessment of PM SVANidhi and is not likely to be made public, sources said.

PM SVANidhi was launched in 2020 to help street vendors resume their livelihood impacted by the Covid-19 lockdown, by offering them affordable working capital loans. To begin with, a beneficiary can avail ₹10,000 and, upon its repayment, ₹20,000. After repaying the second loan, a beneficiary is entitled to apply for a third loan of ₹50,000.

Data on the PM-SVANidhi portal, as seen on Saturday, showed that 60.65 lakh first-term loans, 16.95 lakh second-term loans and 2.43 lakh third-term loans have been disbursed so far under the scheme.

The ISB study covered 5,141 vendors across 100 urban local bodies in 22 states, the report said. For 95% of those surveyed, the PM-SVANidhi loan was their first-ever bank loan, while for 72% of them said it was the first business loan, the report said.

According to the study, 94% of those beneficiaries who had availed the first loan of Rs 10,000 said they used it to make "business investments". It was 98% in case of those who had availed the second loan.

The first loan resulted in an additional income of ₹1,955 per month, or ₹23,460 in total during the loan's one-year duration, the report said, adding this was in line with the estimates of marginal returns of small businesses in many parts of the world, it said.

In the sample, the study found 13.9% of all the loans disbursed had been classified as non-performing assets (NPAs), meaning no payments had been made for three months and more. The NPAs were the highest during Covid-19 pandemic and declined over time, with only 9% of loans disbursed in 2022 turning into NPA.

The study also found that the debt-to-income (DTI) ratio of the beneficiaries (9%) was lower than what was expected of small businesses, reflecting the "high creditworthiness" of the vendors.

The study found that after the launch of PM SVANidhi, there had been no significant improvement in the street vendors getting formal credit from other sources — only 9% of the beneficiaries had loans from other financial institutions.

Context: A study that evaluated the impact of the PM Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi), a small working capital loan scheme for street vendors, has found that the first tranche of `10,000 led to an additional annual income of `23,460 for each beneficiary.

PM Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi)

- **Launched:** June 01, 2020
- **Nodal Ministry**: Ministry of Housing and Urban Affairs
- **Objective**: Offering cost-effective **working capital loans to street vendors**, enabling them to revive their livelihoods impacted **by the Covid-19 lockdown**.
- **Lending Agencies**: Microfinance Institutions, Non-Banking Financial Companies, Self Help Groups

Eligible for the Loan

- Vendors with vending experience dating back to or **before March 24, 2020**, and possessing a vending certificate are eligible for the loan.
- The **Street Vendors Act 2014 mandates** Town Vending Committees, consisting of local authorities and area vendors, to issue vending certificates following a comprehensive survey of all vendors.

Key Points of Study

- **Commissioned by**: Union Ministry of Housing and Urban Affairs
- **Conducted by:** Centre for Analytical Finance of the Indian School of Business (ISB)
  - Executed between January and June of the previous year
- **Loan Disbursement Statistics**: Data from the PM-SVANidhi portal indicates:
  - More than 60 lakh first-term loans and about 2.5 lakh third-term loans have been disbursed.
- **Scope and Demographics of ISB Study**: Encompassed 5,141 vendors across 100 urban local bodies in 22 states
  - 95% of surveyed individuals considered PM-SVANidhi loan their first-ever bank loan
  - 72% reported it as their initial business loan experience.
- **Utilization of Loans**: 94% of beneficiaries using the first loan of `10,000 allocated funds for "business investments"
  - For those availing the second loan, the percentage increased to 98%.
- **Impact and Additional Income**: The first loan resulted in an additional income of `1,955 per month
  - Totaling `23,460 during the loan's one-year duration
  - Aligning with global estimates of marginal returns for small businesses.

HINDUSTAN TIMES Feb 11

KALASA-BHANDURI PROJECT

(Syllabus: GS Paper 3 – Env and Eco)

National Wildlife Board defers decision on Karnataka's Kalasa-Bhanduri project

Context: The National Board for Wildlife (NBWL) has deferred the decision on diverting forest land from the Kali and Sahyadri tiger reserves for the construction of a part of the Karnataka government's Kalasa Nala water diversion scheme.

Kalasa-Bhanduri Project

- **About:** The project entails building dams and a canal system to divert water from the Mahadayi River in Goa to the Malaprabha River basin in Karnataka.
- **Project Goals**: The primary objective is to fulfill the drinking water requirements of Belagavi, Dharwad, Bagalkot, and Gadag districts in Karnataka.
- **Project History**: Originally proposed in the early 1980s, the project has faced delays due to disputes among Karnataka, Goa, and Maharashtra.
- **Barrages and Diversion**: The plan involves constructing barrages on Kalasa and Bhanduri streams, diverting water towards the drought-prone districts of Karnataka.

Mahadayi River

- **Origin and Flow:** Rising in Karnataka's Belagavi district, the river travels 35 km in Karnataka and 82 km in Goa, ultimately reaching the Arabian Sea at Panaji.
- **Alias in Goa**: Known as Mandovi in Goa, the Mahadayi is a rain-fed river shared by Karnataka and Goa for their water needs.
- **Ecological Significance**: The Salim Ali Bird Sanctuary, situated on Chorao Island in the Mandovi River, highlights the ecological importance of the region.
- **Major Tributaries**: The river is fed by several tributaries, including Kalasa Nala, Bhanduri Nala, Surla Nala, Haltar Nala, Poti Nala, Mahadayi Nala, Pansheer Nala, Bail Nala, and Andher Nala.

THE HINDU SCIENCE

BRUMATION

(Syllabus: GS Paper 3 – Env and Eco)

Brumation: winter is coming for reptiles

Arkatapa Basu

Is an alligator lying still underwater, with its snout alone sticking out, alive or dead? If this is the situation, there's a third possibility: brumation. This is the name to describe a period of dormancy or slowed activity in reptiles, much like hibernation in mammals. It typically occurs during colder months, when temperatures drop and food becomes scarce. Reptiles enter a state of brumation to conserve energy and survive these adverse environmental conditions.

During brumation, reptiles may retreat to underground burrows, rock crevices or other sheltered areas where temperatures are relatively more stable. Their metabolism slows significantly, allowing them to go weeks or even months without eating. This period of reduced activity allows reptiles to conserve energy and minimise their resource requirements.

Researchers have observed instances of brumation in various reptilian species across habitats. Such species include box turtles and painted turtles, which burrow into the mud at the bottom of ponds or lakes. Snakes may seek refuge in underground dens or caves while lizards may hide under rocks or within vegetation. Brumation is crucial for reptiles



During brumation reptiles can slow metabolism significantly, allowing them to go weeks or even months without eating. GETTY IMAGES/ISTOCKPHOTO

to survive cold climes and endure challenging environmental conditions, until they can reemerge to feed and reproduce in more favourable climes.

Context: Is an alligator lying still underwater, with its snout alone sticking out, alive or dead?

Brumation:

- **About:** Brumation is a state of dormancy or slowed activity observed in reptiles during colder months, akin to hibernation in mammals.
- **Ideal ambient temperature for brumation**: Between 40 and 50 degrees Fahrenheit.
- **Brumation depend on**: Reptile's particular species, age, gender and geographical location.
- **Survival Strategy in Adverse Conditions**: Reptiles enter brumation to conserve energy and endure harsh environmental conditions, such as dropping temperatures and scarce food resources.
- **Behavioral Changes**: During brumation, reptiles seek refuge in underground burrows, rock crevices, or other sheltered areas with stable temperatures. Their metabolism slows significantly, allowing them to go extended periods without eating.
- **Diverse Species and Brumation Habits**: Researchers have documented instances of brumation in various reptilian species, such as box turtles, painted turtles, snakes, and lizards. Each species exhibits unique behaviors, like burrowing into mud, seeking refuge in underground dens, or hiding within vegetation.
- **Energy Conservation for Survival**: The significant slowing of metabolism during brumation enables reptiles to conserve energy, helping them endure the cold climate and challenging environmental conditions.
- **Importance of Brumation**: Brumation is a crucial strategy for reptiles to survive adverse conditions, ensuring they can reemerge later to feed and reproduce in more favorable climates.

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