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MINISTRY OF SCIENCE AND TECHNOLOGY

MK Yadav Sir

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DTE

Jan 9

EUCALYPTUS SNOUT BEETLE

(Syllabus: GS Paper 3 – Env and Eco)

Scientists characterise a natural pathogenic fungi to help save eucalyptus forests from devastating pest

Context: Scientists have found a natural remedy to protect eucalyptus forest plantations from a pest, eucalyptus snout beetle, which is known to cause serious damage to eucalypts.

Eucalyptus Snout Beetle

- **About:** It is a leaf-feeding beetle that is a major defoliator of eucalypts
- **Scientific name:** Gonipterus platensis
- **Found**: Australia but occurs in many countries throughout the world where eucalypts are grown.
- Feed: Leaves, buds and shoots, resulting in stunted growth and deflation and causing heavy losses.
- **Cause**: Damage over vast areas as it had a great flight capability and gets transferred with transport of forest products.

Study on Natural Pathogenic Fungi

- In the recent research initiative, scientists collected fungi from naturally infected beetles, enhancing the pathogen's ability to adapt more efficiently to environmental conditions.
- **Bio-pesticide for Sustainable Forestry**: The fungi, sourced from the infected beetles, hold potential for the development of a bio-pesticide.
  - This bio-pesticide aligns with the principles of sustainable forestry, utilizing integrated pest management strategies to maintain ecological balance.
- **Global Applicability**: Researchers suggest that the fungi could find utility beyond the initial context, especially in countries where the insect infestation poses significant threats.
- **Biological Insecticides**: Prior to this, researchers had evaluated five biological insecticides, featuring active ingredients such as Beauveria bassiana, Metarhizium anisopliae, and a combination of Brevibacillus laterosporus, Bacillus licheniformis, and Bacillus chitinosporus.
- **Effectiveness of B. bassiana**: The study's findings highlighted the exceptional efficacy of B. bassiana, exhibiting 100% mortality rates through both contact and ingestion.

THE HINDU

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50 YEARS OF PROJECT TIGER

Syllabus GS Paper 3 – Env and Eco)

A look at Project Tiger, 50 years on

The Indian government's violations of the Wildlife (Protection) Act and the Forest Rights Act have exacerbated conflicts in tiger reserves between the forest bureaucracy and forest-dwellers, ultimately endangering India's tigers and the people who coexist with them

FULL CONTEXT

C.R. Bijoy

In 1973, Project Tiger introduced India's tiger reserves, whose status has since rapidly ascended. From an administrative category constituted and administered by the forest bureaucracy, tiger reserves became a statutory category in 2006. Today, they are hailed worldwide as India's conservation success story, especially in this age of climate change.

The origins of Project Tiger

In 1972, India enacted the Wildlife (Protection) Act (WLPA), which introduced new spaces within notified forests called 'National Parks', where the rights of forest-dwellers were removed and vested with the State government. It also created 'Wildlife Sanctuaries', where only some permitted rights could be exercised. Project Tiger was the result of this development.

There were nine tiger reserves in 1973 over 9,115 sq. km; today there are 54 in 18 States, occupying 78,135.956 sq. km. Critical Tiger Habitats (CTH) cover 42,913.37 sq. km, or 26% of the area under National Parks and Wildlife Sanctuaries. As of 2022, the camera-trap method indicated there were 3,167-3,925 tigers in India. The government created the CTHs to vouchsafe a part of India's forests for tiger-centric agendas. Beyond each CTH would be a Buffer Area – a mix of forest and non-forest land. But even though the latter had an inclusive, people-oriented agenda, the overall 'fortress conservation' approach to protecting tigers displaced people who had coexisted with tigers for generations.

A change of operations

In 2005, Prime Minister Manmohan Singh appointed a five-member Tiger Task Force to crack the mystery of vanishing tigers despite spending huge money on them. They found the approach of using guns, guards, and fences not effective in protecting tigers, and that the increasing conflict between the forest/wildlife bureaucracy and those who coexist with the tigers was a recipe for disaster. The group asserted that "the protection of the tiger is inseparable from the protection of the forests it roams in. But the protection of these forests is itself inseparable from the fortunes of the people who, in India, inhabit forest areas."

So, in September 2006, Parliament amended the WLPA to create the National Tiger Conservation Authority (NTCA) and a tiger conservation plan. To ensure that CTHs remained inviolate; the Act only modified forest-dwellers' use of the forest – mostly tribals – and planned to relocate them if required. Four months later, the government also enacted the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, also known as the FRA. The FRA recognised all customary and traditional forest rights on forest land, including in tiger reserves. Under the Act, the habitation-level Gram Sabha was to democratically determine and demarcate the forest rights that the FRA recognised. The Gram Sabhas became the authority to protect, conserve, and manage forests, wildlife, and biodiversity within their customary and traditional boundaries. As a result, the FRA secured the livelihoods of at least 20 crore Indians in 1.79 lakh villages.

Importantly, the FRA introduced a 'Critical Wildlife Habitat' (CWH), like the CTH under WLPA, with one difference – once a CWH had been notified, it couldn't be diverted for non-forest purposes.

The government planned to notify the FRA Rules on January 1, 2009, and operationalise the Act. But on November 16, 2007, the NTCA gave the Chief Wildlife Wardens 13 days to submit a proposal to delineate CTHs of around 800-1,000 sq. km each. As a result, the government ended up notifying 26 tiger reserves in 12 States as per Section 38 (V) of the WLPA, without complying with its provisions. Of the 25,548.54 sq. km thus notified, 91.77% encompassed CTHs. And except for Simlipal in Odisha, the CTHs had no Buffer Area. (They were added in 2012 after the Supreme Court rapped the NTCA and set it a three-month deadline.) Today, India bears the brunt of this error.

India's basis for CTHs

Originally, tiger reserves were to be created in a democratic process and "on the basis of scientific and objective criteria". The tiger conservation plan was similarly required to "ensure the agricultural, livelihood, development and other interests of the people living in tiger-bearing forests or a tiger reserve." The basis for the CTH is evidence of the irreversible damage to wildlife that human activities have wrought. With this in mind, the Indian government has a responsibility to ascertain whether forest-dwellers and tigers could reasonably coexist. If not, it needs to modify the forest-dwellers' rights accordingly and relocate them if necessary. Only then can a CTH be established without affecting "the rights of the Scheduled Tribes or such other forest dwellers". Similarly, the Buffer Area outside the CTH is to promote human-animal coexistence while recognising the livelihood, developmental, social, and cultural rights of the local people. Its geographical limits are to be determined on the basis of objective criteria with inputs from the concerned Gram Sabha as well as an expert committee.

The problem is that all of India's tiger reserves have been notified without meeting these requirements. The government hasn't obtained informed consent from forest-dwelling Scheduled Tribe communities and other traditional communities. The result: both tigers and forest-dwellers have been trapped in a tough spot.

Relocation and rehabilitation

The WLPA only allows "voluntary relocation on mutually agreed terms and conditions" satisfying requirements in the law. Once the FRA recognises people's rights under it, the State acquires those rights according to the terms of the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (LARR) Act 2013. No relocation can happen without the consent of the affected communities. The LARR also requires the rehabilitation package to provide financial compensation as well as secure livelihoods to those relocated.

Under the LARR, the government needs to compensate relocated people by paying them twice the market value of the land, the value of assets attached to the land including trees and plants, a subsistence allowance for a year, and a one-time financial assistance for relocation. It also needs to provide building materials, belongings, cattle, and a one-time resettlement allowance. Each family is to be provided land and a house. The resettlement plan also includes the provision of alternative fuels, fodder, and non-timber forest produce resources on non-forest land, electric connections, roads, drainage and sanitation, safe drinking water, water for cattle, grazing land, ration shops, panchayat buildings, post offices, a seed-cum-fertilizer storage facility, basic irrigation, burial or cremation ground, anganwadis, schools, health centres, veterinary service centres, community centre, places of worship, and separate land for tribal institutions.

However, the Union and State governments have limited themselves to provisions in the 2008 Revised Guidelines for the Ongoing Centrally Sponsored Scheme of Project Tiger 2008 and subsequent guidelines. This entails a compensation of ₹10 lakh – revised in April 2021 to ₹15 lakh – as a cash or relocation/rehabilitation 'package'. This is not a substitute for the total compensation, resettlement, and relocation as required by the law.

As of 2018, there were 2,808 villages in CTHs. The Union Environment Ministry stated in the Lok Sabha that as on July 12, 2019, there were 57,386 families in these CTHs, of which 42,398 remained inside 50 tiger reserves.

Tigers versus people

Tiger reserves experience the most resistance to the recognition of forest rights.

In March 2017, the NTCA refused to recognise rights under FRA in the CTHs "in the absence of guidelines for notification of critical wildlife habitat" , which the Environment Ministry was to issue. Both the WLPA and the FRA require forest-dwellers' rights to be recognised inside CTHs. The Environment Ministry issued the guidelines in January 2018 and NTCA withdrew the ban order two months later.

The FRA provides for 13 basic government public utilities (as described earlier), each of which can fell up to 75 trees over forest land smaller than one hectare. The Gram Sabha's consent is mandatory for such diversion of land. But on October 28, 2020, the Environment Ministry insisted that the National Board for Wildlife, a statutory body under WLPA, must issue a wildlife clearance if these diversions are from National Parks and Wildlife Sanctuaries. The law, however, only requires such clearances for projects that also require environmental clearances, none of which these public utilities are.

With further increase in tigers and tiger reserves, and tiger corridors to link them up, India's tiger terrain is set to become a hotspot for conflict.

C.R. Bijoy examines natural resource conflicts and governance issues.

THE GIST

- There were nine tiger reserves in 1973 over 9,115 sq. km; today there are 54 in 18 States, occupying 78,135.956 sq. km. Critical Tigar Habitats (CTH) cover 42,913.37 sq. km, or 26% of the area under National Parks and Wildlife Sanctuaries.
- Originally, rigar reserves were to be created in a democratic process and "on the basis of scientific and objective criteria". The tigar conservation plan was similarly required to "ensure the agricultural, livelihood, development and other interests of the people living in tigar-bearing forests o a tigar reserve."
- The problem lies in the fact that India's tigar reserves have been notified without meeting these requirements. The government hasn't obtained informed consent from forest-dwelling Scheduled Tribe communities and other traditional communities.

Context: Tiger Reserves are hailed worldwide as India's miraculous success story in environment and forest conservation, especially in this age of climate change.

Project Tiger

- **Ministry**: It is a **Centrally Sponsored Scheme** of Ministry of Environment.
- **Launched in**: 1973 for **in-situ conservation** of wild tigers in designated tiger reserves.
- The **National Tiger Conservation Authority** (NTCA) has an overarching supervisory role, performing functions as provided under the **Wildlife (Protection) Act, 1972.**
- **Expansion of Tiger Reserves**: In 1973, there were only nine Reserves covering 9,115 sq. km.
- Currently, there are 54 Reserves in 18 States, occupying 78,135.956 sq. km. This constitutes 2.38% of India's total land area.
- **Critical Tiger Habitats (CTH)**: It was created to secure part of India's forests for tiger-centric agendas.
  - This represents 26% of the area under National Parks and Wildlife Sanctuaries.
- **Evolution of Tiger Census Methods**: The first tiger census in 1972 used the pug-mark method, counting 1,827 tigers.
  - As of 2022, the more reliable camera-trap method estimates 3,167-3,925 tigers.
  - India's tiger population is growing at a rate of 6.1% per year.
- **Tiger Conservation status:** IUCN – Endangered, CITES – Appendix I, WPA, 1972 – Schedule I.

NEW INDIAN EXPRESS

Jan 9

COUNTER DRONE TECHNOLOGY

(Syllabus: GS Paper 3 – Sci and Tech)

With rising use of drones, DRDO develops own counter technology

Context: As per the report recently tabled by a parliamentary standing committee, the DRDO "is developing an indigenous counter-drone technology.

Counter Drone Technology

- **About:** The DRDO is currently in the process of developing an indigenous counter-drone technology. This technology boasts the capability to conduct counter-attacks, encompassing detection, soft kill, and hard kill functions against all types of drones.
- **Demonstrations**: The counter-drone system, having reached a state of readiness for production, has already been showcased to armed services and various internal security agencies as part of its demonstration phase.
- **Technology Transfer**: To facilitate the production of the counter-drone system, the technology has been successfully transferred to Bharat Electronics Limited, located in Bengaluru. This company serves as the designated production agency for the system.
- **TAPAS Unmanned Aerial Vehicle**: Developed for Intelligence in Surveillance, Reconnaissance, and Target Acquisition (ISTAR), the Medium Altitude Long Endurance (MALE) unmanned aerial vehicle TAPAS is a notable achievement in DRDO's technological endeavors.
- **Innovative Battery Development**: The DRDO, in collaboration with a private vendor, has successfully developed a Lithium Ion-based battery with an indigenous battery management system.
    - This cutting-edge battery technology is currently employed on the TAPAS UAV.

SEA DRAGON - 24
(Syllabus: GS Paper 2 – IR)

Indian Navy's P8I Aircraft Joins Exercise Sea Dragon-24 in Guam

Context: Indian Navy's P8I aircraft landed at Guam, a US island territory in Western Pacific, to participate in Exercise Sea Dragon - 24.

Exercise Sea Dragon - 24

- **About:** A joint operation every other year for allies to practice finding submarines with long-range aircraft.
- **Aim:** To enhance synergy and interoperability amongst participating navies from US, Australia, South Korea and Japan through professional interactions on ground and in air.
- **Organized by**: United States Navy
- **Participant**: US, Australia, South Korea, India and Japan.

About P8I Aircraft

- **Indigenous Aircraft**: The P8I aircraft is a long-range maritime reconnaissance aircraft featuring advanced sensors, radars, and anti-submarine warfare capabilities.
- **Anti-Submarine Warfare Focus**: Specifically designed for anti-submarine warfare, the aircraft excels in detecting, tracking, and engaging enemy submarines and other maritime threats.
- **Multi-Lateral ASW Exercise**: This marks the third edition of the coordinated multi-lateral Anti-Submarine Warfare (ASW) exercise tailored for Long Range Maritime Reconnaissance ASW aircraft.
- **Inaugural Event**: The inaugural session of this exercise took place in 2015, establishing it as a recurring event to enhance the capabilities and collaboration of Long Range MR ASW aircraft.

UNIFIED PAYMENTS INTERFACE

(Syllabus: GS Paper 3 – Economy)

India, Sri Lanka discuss early launch of UPI

PRESS TRUST OF INDIA
Colombo, January 9

SIX MONTHS AFTER it was announced by the prime ministers of both countries, India has discussed the early launch of the UPI payment system with Sri Lanka and reiterated its support in the cash-strapped island nation's debt restructuring process.

In July 2023, Prime Minister Narendra Modi and Sri Lanka President Ranil Wickremesinghe signed an agreement on Unified Payments Interface (UPI) acceptance in Sri Lanka during Wickremesinghe's two-day visit to India.

The latest discussion took place on Monday during a meeting between the High Commissioner of India Santosh Jha with the Governor of the Central Bank of Sri Lanka (CBSL), Dr Nandalal Weerasinghe.

Context: Recently, the prime ministers of both countries announced that India has discussed the early launch of the UPI payment system with Sri Lanka and reiterated its support in the cash-strapped island nation's debt restructuring process.

Unified Payments Interface UPI

- **About**: UPI is a system that powers multiple bank accounts into a single mobile application (of any participating bank), merging several banking features, seamless fund routing & merchant payments into one hood.
- **Developed by**: National Payments Corporation of India in 2016.
- **Participants in UPI**: Payer Payment Service Provider (PSP), Payee PSP, Remitter Bank, Beneficiary Bank, NPCI, Bank Account holders, and Merchants.
- **Global Recognition of UPI**: UPI had already established itself in countries like Singapore, Bhutan, Nepal, and the UAE.
- **International Adoption of Indian Payment Systems**: France, UAE, Saudi Arabia, Bahrain, Singapore, Maldives, Bhutan, and Oman.
- **Benefits of UPI**
  - Single click Two Factor authentication
  - Universal Application for transaction
  - No risk of storing customer's virtual address like in Cards.
  - Safer, Secured and Innovative

NHRC Issues Notice to Telangana Govt on Student Suicide

Context: National Human Rights Commission (NHRC) has issued a notice to the Telangana Government over the reported suicide of a female student.

National Human Rights Commission (NHRC)

- **About:** It is an independent statutory body.
- **Establishment**: On 12 October, 1993.
  - The statute under which it is established is the Protection of Human Rights Act (PHRA), 1993 as amended by the Protection of Human Rights (Amendment) Act, 2006.
- **Mission**: The **Commission is responsible for spreading of human rights awareness** amongst the masses and encouraging the efforts of all stake holders in the field of human rights literacy not only at the national level but at international level too.
- **Appointment**: By the President on the recommendations of a six-member committee
  - Consisting of the **Prime Minister** as its head, the **Speaker of the Lok Sabha**, the **Deputy Chairman of the Rajya Sabha,** leaders of the **Opposition in both the Houses** of Parliament and the **Union Home Minister**.
- **Composition**: Chairperson, five full-time Members and seven deemed Members.
- **Tenure:** A term of three years or until they attain the age of 70 years, whichever is earlier.
- **Removal**: They can only be **removed upon proven charges of misconduct** or incapacity, substantiated through an inquiry overseen by a Supreme Court Judge.

DTE Jan 9

ROCK GLACIERS
(Syllabus: GS Paper 1 – Geography)

Over 100 active permafrost structures identified in Jhelum basin, can cause catastrophic disasters in future: Study

Context: The Kashmir Himalayas are dotted with permafrost structures called 'rock glaciers', with significant ice volumes within, a new study mapped.

Rock Glaciers/Permafrost

- **About**: A rock glacier is a mass of rock, ice, snow, mud, and water that moves slowly down a mountain under the influence of gravity. It typically form in mountainous regions where there is a combination of permafrost, rock debris, and ice.
- **Composition**: It consist of a mass of ice covered by rock debris, or it might consist of a mass of rock with interstitial ice. A gradient of compositions between these two states also exists.
- **Appearance of Rock Glaciers**: Unlike ice glaciers, rock glaciers often **exhibit minimal visible ice at the surface, making them inconspicuous** when observed from a short distance.
- **Subtle Movement**: The gradual movement of rock glaciers, typically ranging from a few centimeters to a few meters per year, plays a crucial role in camouflaging their true nature. This slow motion effectively conceals the rock glacier's identity, especially when viewed from the ground at a close proximity.
- **Characteristics**: Rock glaciers often originate in cirques or at the periphery of expansive talus slopes, conforming to the contours of their valleys and terminating in tongue-shaped ends.
    - The **presence of arcuate and linear ridges**, particularly behind the tongue, serves as indicators of the underlying moving ice.
- Despite their **variability, rock glaciers typically exhibit modest dimensions**, with a large one measuring around fifty meters in thickness and a few kilometers in length.

TRIBUNE Jan 9

NANOPLASTICS

(Syllabus: GS Paper 2 – Sci and Tech)

Plastic bottle can have 3.7 lakh toxic particles

Nanoplastics in bottles pose a health risk, says US study

Context: Scientists have found that the average litre of bottled water contains nearly a quarter million invisible pieces of ever-so-tiny nanoplastics.

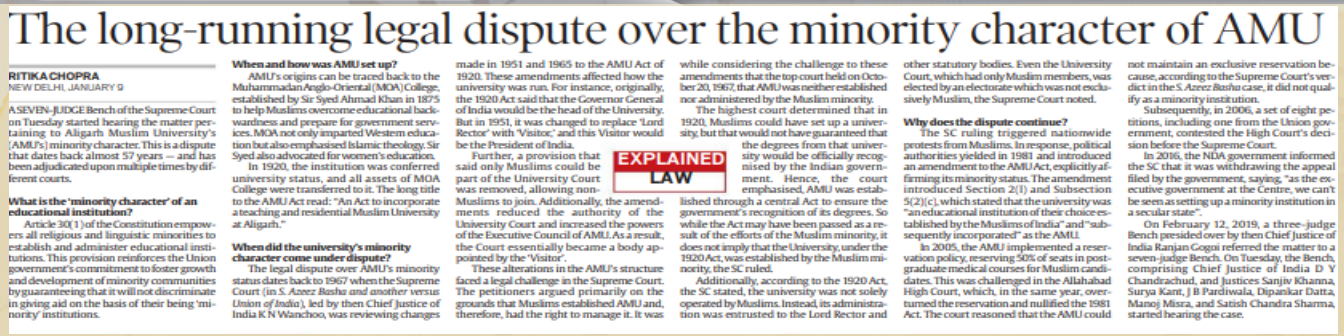
Nanoplastics

- **About**: Nanoplastics are polymer-based particles (e.g. Polyethylene terephthalate (PET) or polystyrene) in the nanometre size range.
- **Size**: Ranging from 1 nm to 1 µm.
  - They are directly released to the environment or secondarily derived from plastic disintegration in the environment.
- **Ubiquitous presence**: They've been found in the air we breathe, the water we drink, and even our food.
- **Potential health risks**: Their small size allows them to potentially cross biological barriers and enter cells, raising concerns about potential health impacts.
- **Ecological effects**: They can harm marine life, disrupt ecosystems, and potentially affect biodiversity.
- **Impacts**:
  - **Marine life**: Nano-plastics can be ingested by fish and shellfish, potentially entering the food chain and impacting human health.
  - **Ecosystem disruption**: They can alter nutrient cycles, affect plankton growth, and disrupt delicate ecological balances.

INDIAN EXPRESS Page 13

MINORITY EDUCATIONAL INSTITUTE

(Syllabus: GS Paper 2 – Governance)



The long-running legal dispute over the minority character of AMU

RITIKA CHOPRA
NEW DELHI, JANUARY 9

A SEVEN-JUDGE Bench of the Supreme Court on Tuesday started hearing the matter pertaining to Aligarh Muslim University's (AMU's) minority character. This is a dispute that dates back almost 57 years — and has been adjudicated upon multiple times by different courts.

What is the 'minority character' of an educational institution?

Article 30(1) of the Constitution empowers all religious and linguistic minorities to establish and administer educational institutions. This provision reinforces the Union government's commitment to foster growth and development of minority communities by guaranteeing that it will not discriminate in giving aid on the basis of their being 'minority' institutions.

When and how was AMU set up?

AMU's origins can be traced back to the Muhammadan Anglo-Oriental (MOA) College, established by Sir Syed Ahmad Khan in 1875 to help Muslims overcome educational backwardness and prepare for government services. MOA not only imparted Western education but also emphasised Islamic theology. Sir Syed also advocated for women's education.

In 1920, the institution was conferred university status, and all assets of MOA College were transferred to it. The long title to the AMU Act read: "An Act to incorporate a teaching and residential Muslim University at Aligarh."

When did the university's minority character come under dispute?

The legal dispute over AMU's minority status dates back to 1967 when the Supreme Court (in *S. Azeez Basha and another versus Union of India*), led by then Chief Justice of India K N Wanchoo, was reviewing changes made in 1951 and 1965 to the AMU Act of 1920. These amendments affected how the university was run. For instance, originally, the 1920 Act said that the Governor General of India would be the head of the University. But in 1951, it was changed to replace 'Lord Rector' with 'Visitor,' and this Visitor would be the President of India.

EXPLAINED LAW

Further, a provision that said only Muslims could be part of the University Court was removed, allowing non-Muslims to join. Additionally, the amendments reduced the authority of the University Court and increased the powers of the Executive Council of AMU. As a result, the Court essentially became a body appointed by the 'Visitor'.

These alterations in the AMU's structure faced a legal challenge in the Supreme Court. The petitioners argued primarily on the grounds that Muslims established AMU and, therefore, had the right to manage it. It was while considering the challenge to these amendments that the top court held on October 20, 1967, that AMU was neither established nor administered by the Muslim minority.

The highest court determined that in 1920, Muslims could have set up a university, but that would not have guaranteed that the degrees from that university would be officially recognised by the Indian government. Hence, the court emphasised, AMU was established through a central Act to ensure the government's recognition of its degrees. So while the Act may have been passed as a result of the efforts of the Muslim minority, it does not imply that the University, under the 1920 Act, was established by the Muslim minority, the SC ruled.

Additionally, according to the 1920 Act, the SC stated, the university was not solely operated by Muslims. Instead, its administration was entrusted to the Lord Rector and other statutory bodies. Even the University Court, which had only Muslim members, was elected by an electorate which was not exclusively Muslim, the Supreme Court noted.

Why does the dispute continue?

The SC ruling triggered nationwide protests from Muslims. In response, political authorities yielded in 1981 and introduced an amendment to the AMU Act, explicitly affirming its minority status. The amendment introduced Section 2(l) and Subsection 5(2)(c), which stated that the university was "an educational institution of their choice established by the Muslims of India" and "subsequently incorporated" as the AMU.

In 2005, the AMU implemented a reservation policy, reserving 50% of seats in post-graduate medical courses for Muslim candidates. This was challenged in the Allahabad High Court, which, in the same year, overturned the reservation and nullified the 1981 Act. The court reasoned that the AMU could not maintain an exclusive reservation because, according to the Supreme Court's verdict in the *S. Azeez Basha* case, it did not qualify as a minority institution.

Subsequently, in 2006, a set of eight petitions, including one from the Union government, contested the High Court's decision before the Supreme Court.

In 2016, the NDA government informed the SC that it was withdrawing the appeal filed by the government, saying, "as the executive government at the Centre, we can't be seen as setting up a minority institution in a secular state".

On February 12, 2019, a three-judge Bench presided over by then Chief Justice of India Ranjan Gogoi referred the matter to a seven-judge Bench. On Tuesday, the Bench, comprising Chief Justice of India D Y Chandrachud, and Justices Sanjiv Khanna, Surya Kant, J B Pardiwala, Dipankar Datta, Manoj Misra, and Satish Chandra Sharma, started hearing the case.

Context: Recently, a seven-judge Bench of the Supreme Court commenced the hearing on the issue related to Aligarh Muslim University's minority character.

'Minority Character' of an Educational Institution

- **Article 30(1)**: Article 30(1) of the Constitution empowers religious and l**inguistic minorities to establish and administer educational institutions**, reinforcing the Union government's commitment to non-discriminatory aid for minority institutions.
- **Origins and Evolution of AMU:** The origins of AMU can be traced back to the establishment of the Muhammadan Anglo-Oriental (MOA) College in 1875 by Sir Syed Ahmad Khan.
  - Initially aimed at overcoming educational backwardness among Muslims, the institution **evolved into AMU in 1920, emphasizing both Western education** and Islamic theology, with advocacy for women's education.
- **University Status:** In 1920, the institution attained university status, with all assets of MOA College transferred to it.
- The AMU Act incorporated a **teaching and residential Muslim University at Aligarh.** However, the dispute over the university's minority character arose in 1967 during a legal review of amendments to the AMU Act in 1951 and 1965.

Legal Dispute and Changes to AMU Act

- The legal dispute, initiated in 1967 by the Supreme Court in S. Azeez Basha versus Union of India, scrutinized amendments made in 1951 and 1965 to the AMU Act of 1920.
- These changes altered the university's governance structure, including replacing the 'Lord Rector' with the 'Visitor' (President of India), allowing non-Muslims in the University Court, and diminishing the authority of the University Court while enhancing the powers of the Executive Council of AMU.

THE HINDU Page 1

SQUARE KILOMETER ARRAY

(Syllabus: GS Paper 3 – SCI & TECH)

India & giant radio telescope

India has decided to join the Square Kilometer Array (SKA) project. What is this international scientific collaboration, what will it do, and how will joining it with full member status help India's scientists?

Prototype antennas for the SKA-Low telescope being installed at the Murchison Radio-Astronomy Observatory (MRO) in Australia. ICRAR. (Right) SKA-MPI, the Max Planck Society-funded prototype dish, is assembled at the South African site. SARAO

AMITABH SINHA

INDIA HAS decided to formally join the Square Kilometer Array (SKA) project, an international scientific collaboration working to build the world's largest radio telescope.

India had already been contributing to the project for several years, but full member status, which offers greater scientific opportunities to use the upcoming facility, requires countries to sign and ratify an international treaty meant for this purpose, and also make a financial commitment. India has approved Rs 1,250 crore for the project, which includes its funding contribution for the construction phase.

The decision to join SKA as a full member ensures India's participation in yet another international mega science project in the most advanced areas of scientific research. India has already decided to build a gravitational wave detector to join the international LIGO (Laser Interferometer Gravitational Wave Observatory) network, and is a full member of the ITER project, which is working to harness energy from nuclear fusion. It also has a strong participation in the Large Hadron Collider (LHC), the world's largest and most powerful particle accelerator that is running some of the most exciting experiments in particle physics.

The Square Kilometer Array

The SKA will not be a single large telescope, but a collection of thousands of dish antennas operating as a single unit. The name, Square Kilometer Array, comes from the original intention to create one square kilometre (one million square metre) of effective area for collecting radio waves. This was meant to be achieved by installing thousands of smaller antennas in a specific array design that would make them function like a single radio telescope. As of now, it appears that the US$ 2.4 billion project (2021 prices) would eventually have a lesser collecting area than one square kilometre, but the original name has been retained.

The antennas, about 200 of which are in South Africa and more than 130,000 in Australia, are being installed in sparsely populated locations, chosen to ensure they are as far away from human activities as possible. This has been done in order to minimise signal interference from undesirable Earth-based sources. Construction at both the sites began in December 2022, and the first phase of the project is expected to be completed by next year.

Once operational, SKA would be between 5 and 60 times more powerful than the most advanced existing radio telescopes functioning in comparable frequency ranges.

What's in it for India

Though none of the SKA facilities would be located in India, there are immense science and technology gains for the country by participating in the project as a full member. In this regard, SKA offers opportunities similar to the LHC or the ITER, which too are located on foreign soil but have brought rich dividends to the Indian scientific community.

Radio astronomy is something in which India already has highly developed capabilities. The Giant Meterwave Radio Telescope (GMRT) near Pune is one of the most advanced — and sought-after — facilities in the world, which has been producing remarkable scientific results. There are other similar facilities in Ooty, Nainital and Bengaluru. The SKA, which will become the most promising tool for research in the most pressing scientific questions in astronomy, offers the next logical step forward for Indian scientists working in this area.

Full member status would provide India preferential access to the SKA facilities. Most existing telescopes operate under an open-use policy which allows research groups from any country to get time on the facility through competitive bidding by making a scientific case. This is how the GMRT also works. But there is a growing argument that countries that contribute to building any large international project should have priority access to that facility. This is likely to be the case with the SKA. Member countries will get preferential allocation of time on the radio telescope, roughly in proportion to their contribution to the project, and only limited time slots would be available through competitive bidding.

There are technology benefits as well. The SKA would work on highest-end technologies, including electronics, software, materials science and computing. The intellectual properties generated by the project, though owned by the SKA Observatory, would be accessible to all the member countries. This can offer huge learning opportunities for scientists, academics and even private industry.

Participating in the project is also expected to result in expanding the science and technology base in this area, along with capacity building and training opportunities. The Indian participation in the project is being led by Pune-based National Centre for Radio Astrophysics (NCRA), but 22 institutions are collaborating on SKA-related activities in the country. These include not just leading research institutions and some IITs and IISERs, but also a couple of universities and colleges. A few private companies are also involved.

India's involvement

India has been involved in the SKA project right from its inception in the 1990s, and contributed to the design and development of the telescope as well as in negotiating the SKA Observatory Convention, the international treaty that established the facility as an intergovernmental organisation. The main contribution has come in the development, and operation, of the Telescope Manager, the 'neural network' or the software that will run the entire facility.

There are plans to set up an SKA regional centre in the country that will be part of the global network to process and store data and make it available for the scientific community.

Indian scientists have identified several areas of research for which they want to use the SKA telescopes. These include studies relating to the evolution of the early universe, the formation and evolution of galaxies, neutron star physics, and solar sciences. More than 150 scientists, researchers, and students from over 30 different Indian institutions, including a few private companies, have been participating in ongoing science activities related to the SKA.

Context: India had decided to formally join the **Square Kilometer Array (SKA) project**, an international scientific collaboration working to build the world's largest radio telescope.

Square Kilometer Array (SKA) project

- **About:** An **intergovernmental international radio telescope** project being built in Australia (low-frequency) and South Africa (mid-frequency).
  - The SKA cores are being **built in the southern hemisphere**, where the view of the Milky Way galaxy is the best and radio interference at its least.
  - This will **not be a single large telescope**, but a collection of thousands of dish antennas operating as a single unit.
  - The name, Square Kilometer Array, comes from the original intention to create one square kilometre (one million square metre) of effective area for collecting radio waves.
  - This was meant to be achieved by installing thousands of smaller antennas in a specific array design that would make them function like a single radio telescope.
- **Location:** Meerkat National Park, South Africa and Murchison Radio-astronomy Observatory, Australia.
- **India's participation**: India's participation: India had already been contributing to the project for the past several years, but the full member status, which offers greater scientific opportunities to use the upcoming facility, requires countries to sign and ratify an international treaty, and also make a financial commitment.
  - India has approved Rs 1,250 crore for the project, which includes its funding contribution for the construction phase.

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