DAILY CURRENT AFFAIRS 20-09-2024

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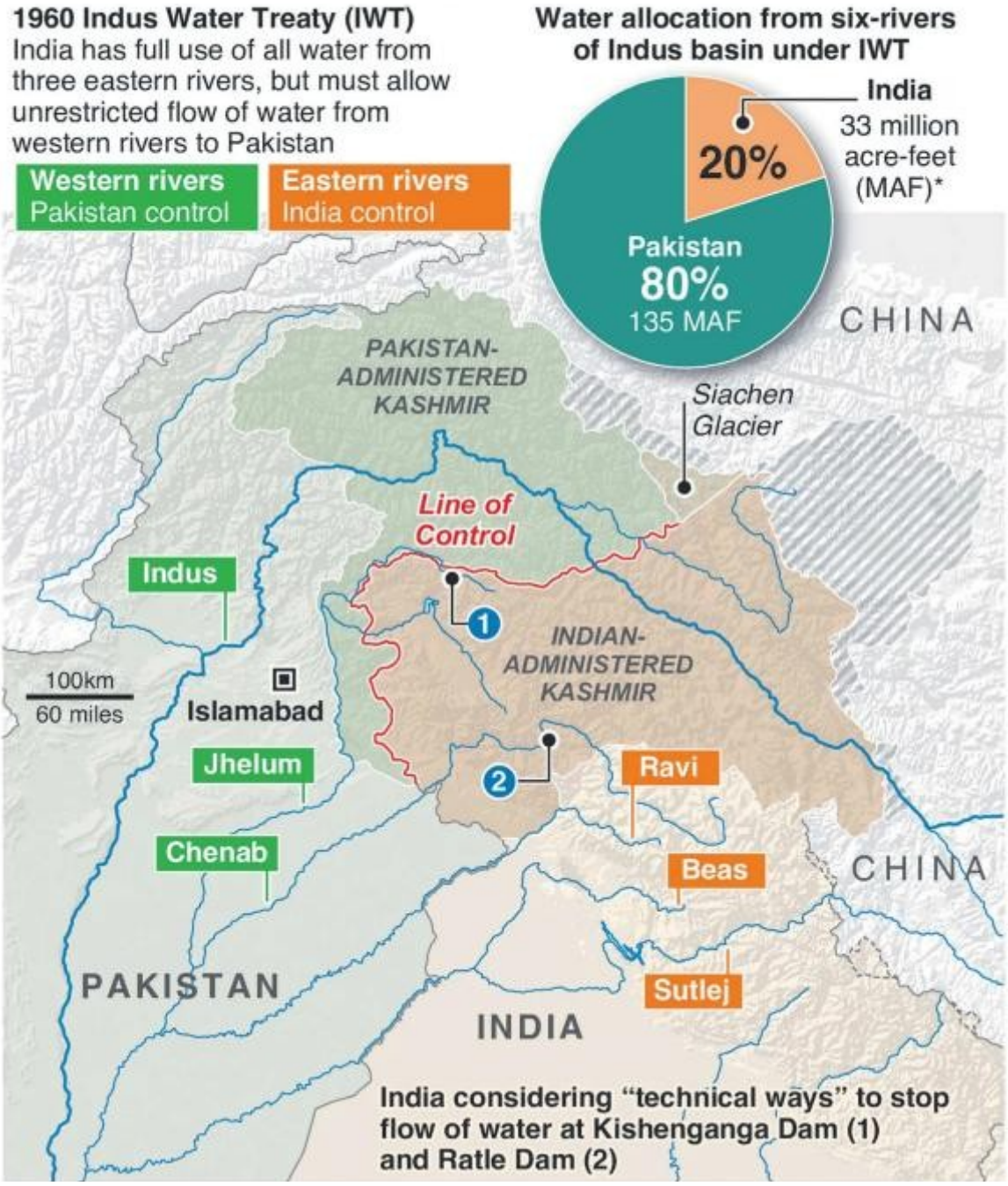
Indus water treaty

Syllabus: GS-1; Geography- Rivers of India, GS-2; International relations

Context

- *India has issued a notice to Pakistan seeking modification of the more than six-decade-old Indus Waters Treaty (IWT) that governs the sharing of waters of six rivers in the Indus system between the two countries.*



About

- *The Indus Water Treaty (IWT) is a water-distribution agreement between India and Pakistan, brokered by the* **World Bank and signed on September 19, 1960.**
- *It aims to resolve disputes over the use of the waters of the* **Indus River system**, *which is vital for both countries, particularly for agriculture.*

Key Features:

Division of Rivers:

- *The Indus River system comprises six rivers:* **Indus, Jhelum, Chenab, Ravi, Beas, and Sutlej.**
- *The treaty allocates the* **three eastern rivers (Ravi, Beas, Sutlej) to India and the three western rivers (Indus, Jhelum, Chenab) to Pakistan**.
- *India can use the waters of the western rivers for limited purposes, such as domestic use, irrigation, and hydroelectric power generation, without interfering with Pakistan's water supply.*

Rights of India:

- *India is permitted to use the waters of the western rivers in a "***non-consumptive"** *manner (i.e., without affecting the quantity of water flow downstream).*
- *India can build storage up to 3.6 million acre-feet on the western rivers, with restrictions on how much water can be diverted for irrigation and other purposes.*

Establishment of a Permanent Indus Commission:

- *The treaty established the* **Permanent Indus Commission,** *which includes one commissioner from each country.*
- *The commission is responsible for facilitating cooperation and exchanging information on river flows, irrigation, and usage.*
- *The commission serves as the first line of communication for dispute resolution.*

Dispute Resolution Mechanism:

- *The treaty provides a three-stage process for resolving disputes: first through the Permanent Indus Commission, then through a neutral expert, and finally through the International Court of Arbitration, if necessary.*

Duration and Modifications:

- *The Indus Water Treaty is considered a perpetual treaty, which means it does not have an expiration date.*
- *Both countries need mutual consent for any modifications or amendments.*

- *Despite the hostility and wars between India and Pakistan, the treaty has largely survived and remained functional.*

Importance of the Treaty:

- *The IWT has been hailed as one of the most successful water-sharing treaties in the world.*
- *It has survived multiple conflicts between the two nations, including wars in* **1965, 1971, and Kargil in 1999.**
- *Water resources are crucial for both nations' agricultural and economic activities, especially in the Punjab region, which spans across both countries.*

Current Challenges:

- **Tensions:** *India and Pakistan have at times accused each other of violating the treaty. For instance, Pakistan has raised concerns about Indian hydropower projects on the western rivers (like the Kishanganga and Ratle projects), which Pakistan fears may reduce its water supply.*
- **Climate Change:** *The flow in the Indus River system is highly dependent on glacial melt and monsoon rainfall, which are susceptible to climate change, thus threatening water security for both countries.*
- **India's Stance:** *Following several terror attacks originating from Pakistan, India has debated revisiting the terms of the treaty, arguing that Pakistan's actions are incompatible with peaceful cooperation.*

One Nation One Election

Syllabus: GS-2; Elections

Context

- *The* **Union cabinet** *has accepted a high-level committee's recommendations on 'One Nation, One Election' for holding simultaneous polls for the Lok Sabha, state assemblies and local bodies in a phased manner after a countrywide consensus-building exercise.*

About

- *The concept of "One Nation, One Election" refers to holding* **simultaneous elections for the Lok Sabha (national parliamentary elections) and all state legislative assemblies across India.**
- *The idea aims to* **reduce the frequency of elections** *and ensure a synchronized electoral cycle, thereby improving governance and administrative efficiency.*

Historical Background

- *India followed the practice of simultaneous elections until 1967, when state governments began dissolving prematurely, resulting in the staggered election cycles we see today.*
- *The idea of "One Nation, One Election" has been periodically proposed by various committees and government bodies, most recently by the Law Commission in 2018.*

Rationale Behind One Nation, One Election

- **Cost Efficiency:** *The conduct of elections at different times leads to significant expenditure on resources, including security, polling infrastructure, and manpower. A single election cycle would help curb these costs.*
- **Governance Focus:** *Frequent elections disrupt normal governance, with governments and bureaucrats being pulled into election mode. Simultaneous elections would allow uninterrupted governance and policy implementation.*
- **Reduced Political Fatigue***: Continuous elections often mean a non-stop campaign environment, affecting political discourse and stability. One election cycle could alleviate this burden and encourage more focused debates on governance.*
- **Decreased Voter Fatigue***: Voters are required to participate in multiple elections in a short span. One synchronized election could lead to greater voter engagement and turnout.*

Challenges

- **Constitutional Amendments:** *Implementing this policy would require major amendments to the Constitution, especially provisions relating to the dissolution of state assemblies and the Lok Sabha.*
- **Logistical Complexity:** *Conducting simultaneous elections across the entire country would require massive logistical coordination and resources, including security, voting machines, and electoral staff.*
- **Federal Concerns:** *Some argue that simultaneous elections could undermine the autonomy of state governments by imposing a fixed term, even in cases where a government loses its majority mid-term.*
- **Impact on Regional Parties:** *Simultaneous elections might shift focus to national issues, which could disadvantage regional parties that thrive on local concerns.*

Way Forward

- *The idea of "One Nation, One Election" requires extensive consultations with political parties, constitutional experts, and stakeholders to ensure a smooth transition.*
- *Pilot testing in some states or regions and drafting detailed legislative frameworks could serve as a roadmap.*

Conclusion

- *While "One Nation, One Election" promises several potential benefits, such as cost savings and improved governance, it also presents significant legal, logistical, and political challenges.*
- *A balanced approach that considers these aspects is essential for any meaningful implementation.*

Silicon Carbide (SiC)

Syllabus: GS-3; Science and technology

Context

- *India's first silicon carbide manufacturing facility will be established in Odisha*

About

- *Silicon Carbide (SiC) is a compound of silicon and carbon with the chemical formula SiC.*
- *It occurs naturally as the* **mineral moissanite** *but is more commonly manufactured artificially.*
- *It is widely used in various industries due to its hardness, thermal stability, and semiconductor properties.*

Properties

- **Hardness:** *One of the hardest materials, just below diamond on the Mohs scale.*
- **High thermal conductivity***: Efficient in dissipating heat.*
- **High melting point:** *Approximately 2,730°C.*
- **Semiconducting properties:** *Used as a semiconductor in electronics, particularly for high-temperature and high-voltage applications.*
- **Chemical resistance***: Highly resistant to corrosion and oxidation.*

Applications

- **Electronics:** *SiC is used in power electronics (high-voltage and high-temperature conditions), making it crucial for electric vehicles, renewable energy systems, and aerospace.*
- **Abrasives:** *Due to its hardness, SiC is commonly used in grinding, cutting, and polishing tools.*
- **Ceramics:** *SiC is used to produce durable ceramics, which can withstand high temperatures and mechanical stress.*
- **LEDs and Optoelectronics:** *SiC is used as a substrate material in light-emitting diodes (LEDs) and other optoelectronic devices.*
- **Automotive industry:** *SiC-based electronics are essential for improving the efficiency and performance of electric vehicles, specifically in EV inverters.*

Advantages Over Silicon (Si)

- *SiC can operate at higher voltages, temperatures, and frequencies compared to silicon, making it ideal for power applications.*
- *It helps reduce energy losses, making devices more efficient, which is important for energy conservation and sustainability.*

India and Silicon Carbide:

- **Research and development:** *Indian institutions are exploring SiC for its potential in electronics and clean energy applications.*
- **Make in India***: With the push for indigenous manufacturing of semiconductors, SiC can play a significant role in India's efforts to become self-reliant in critical technologies.*

Environmental Impact

- *SiC contributes to the development of energy-efficient devices, reducing carbon emissions in sectors like energy generation and electric transportation.*
- *However, the production process requires high energy input and involves the use of raw materials that need careful sourcing to minimize environmental degradation.*

Challenges

- **High production cost:** *The cost of producing SiC-based devices is still higher compared to traditional silicon devices.*
- **Material challenges:** *The growth of high-quality, defect-free SiC crystals is complex and costly.*

Future Prospects

- *SiC is considered key to the future of* **green technology***.*

- *With advancements in production techniques, its cost is expected to decrease, making it more widely used.*
- *SiC devices are projected to dominate the* **power electronics industry**, *especially in electric vehicles and renewable energy sectors.*

Venus & its Missions

Syllabus: GS-3; Science and Technology

Context

- *Recently, The Union Cabinet, chaired by Prime Minister Narendra Modi, approved the Venus Orbiter Mission (VOM), named Shukrayaan-1, designed to explore the mysteries of Venus.*

About

- *Venus is the second planet from the Sun and is often referred to as Earth's "sister planet" due to its similar size, mass, and composition. However, its extreme environmental conditions make it vastly different from Earth.*

Key Characteristics of Venus

- **Size**: *Almost identical in size to Earth, with a diameter of 12,104 km (compared to Earth's 12,742 km).*
- **Mass:** *About 81.5% of Earth's mass.*
- **Orbit and Rotation:**
  - *Orbital Period: Venus takes about 225 Earth days to complete one orbit around the Sun.*
  - *Rotation: It has a retrograde rotation, meaning it spins in the opposite direction to most planets in the solar system. A day on Venus (its rotation period) is about 243 Earth days, making its day longer than its year.*
- **Atmosphere:** *Venus has an incredibly dense atmosphere, composed primarily of carbon dioxide (96.5%) and nitrogen (3.5%), with thick clouds of sulfuric acid. The atmospheric pressure on Venus' surface is about 92 times that of Earth's.*
- **Temperature:** *Venus is the hottest planet in the solar system with surface temperatures around 465°C (869°F) due to a runaway greenhouse effect.*
- **Surface:** *The planet has volcanic plains, vast lava flows, and mountain ranges. It has a dry and rocky surface, and its extreme atmospheric conditions prevent liquid water from existing.*

Exploration of Venus

Venera Program (USSR)

- *Period: 1961-1983*
- *Details: The Soviet Union's Venera series was the first set of missions designed to explore Venus. Notably, Venera 7 (1970) was the first spacecraft to land on Venus and send data back to Earth. Venera 9 (1975) was the first mission to send images from the surface of another planet. These missions provided groundbreaking data on Venus' surface and atmosphere.*

Pioneer Venus Program (NASA)

- *Period: 1978-1992*
- *Details: The Pioneer Venus Orbiter studied the atmosphere and mapped the surface of Venus using radar. It provided valuable data on Venus' ionosphere, clouds, and surface characteristics. The Pioneer Venus Multiprobe released small probes to gather data on the planet's atmosphere as they descended.*

Magellan (NASA)

- *Period: 1989-1994*

- *Details: Magellan was a radar mapping mission that provided detailed surface maps of Venus. It showed that the planet's surface is mostly volcanic, with few impact craters, suggesting the planet is geologically active.*

Venus Express (ESA)

- *Period: 2005-2015*
- *Details: The European Space Agency's Venus Express mission focused on studying Venus' atmosphere and climate. It observed the planet's thick clouds and revealed the structure and dynamics of its atmosphere, including its mysterious super-rotating winds.*

Akatsuki (JAXA - Japan)

- *Period: 2010-Present*
- *Details: Japan's Akatsuki mission is currently studying Venus' weather patterns and atmosphere. It aims to understand why Venus' climate is so different from Earth's, despite the two planets being similar in size and composition.*

Upcoming Missions to Venus

VERITAS (NASA)

- *Planned Launch: 2029 (Estimated)*
- *Details: NASA's VERITAS (Venus Emissivity, Radio Science, InSAR, Topography, and Spectroscopy) mission will map Venus' surface in high resolution, study its geology, and investigate whether Venus has active volcanoes and plate tectonics.*

DAVINCI+ (NASA)

- *Planned Launch: 2030 (Estimated)*
- *Details: The DAVINCI+ mission (Deep Atmosphere Venus Investigation of Noble gases, Chemistry, and Imaging) will explore Venus' atmosphere, focusing on its composition, especially noble gases, to understand how Venus' atmosphere formed and evolved. It will also attempt to land on Venus and capture images of its surface.*

EnVision (ESA)

- *Planned Launch: Early 2030s*
- *Details: The EnVision mission by the European Space Agency aims to map Venus' surface and monitor geological activity. It will complement the VERITAS mission by providing additional radar and spectroscopic data.*

Significance of Venus Exploration

- **Comparative Planetology:** *Studying Venus helps scientists understand how terrestrial planets evolve, particularly those with similar sizes and compositions to Earth.*
- **Climate Studies***: Venus' runaway greenhouse effect provides insight into climate change, atmospheric dynamics, and the long-term sustainability of planetary atmospheres.*
- **Search for Life***: Although Venus is extremely inhospitable, there have been debates about whether microbial life could exist in the planet's upper atmosphere, where temperatures are more moderate.*

Future Prospects

- *Renewed interest in Venus stems from its potential to teach us about planetary habitability, atmospheric science, and geological processes.*
- *The study of Venus' atmosphere could also provide analogies to understanding exoplanets in distant solar systems.*
- *Venus, despite its hostile conditions, remains a key target for understanding the evolution of rocky planets, climate dynamics, and planetary habitability.*

Elongated Tortoise

Syllabus: GS-3; Environment and Ecology

Context

- *A critically endangered species, the* **elongated tortoise (Indotestudo elongata***), was spotted in Haryana's Damdama area during a research survey in the Aravallis.*

Habitat and Distribution

- **Geographic Range:** *The elongated tortoise is found across Southeast Asia, including countries like India, Nepal, Bhutan, Bangladesh, Myanmar (Burma), Thailand, Laos, Cambodia, Vietnam, and parts of southern China.*
- **Preferred Habitat:** *It inhabits forests, woodlands, and scrublands, often preferring areas with dense foliage and access to water. It is found at both low and moderate elevations.*
- **Climate:** *They thrive in warm, humid climates with distinct wet and dry seasons.*

Diet

- **Omnivorous:** *Although primarily herbivorous, the elongated tortoise is an opportunistic feeder.*

Behavior

- **Diurnal:** *The elongated tortoise is mostly active during the day (diurnal), although it may also be active at night during cooler periods.*
- **Sheltering:** *They often hide under leaves, logs, or in burrows to avoid extreme temperatures or predators.*
- **Solitary Nature:** *Elongated tortoises are generally solitary animals, except during mating season.*

Conservation Status

- **IUCN Status:** *The elongated tortoise is listed as Critically Endangered on the IUCN Red List, mainly due to habitat loss, illegal wildlife trade, and over-harvesting for food and the pet trade.*

Threats

- **Deforestation:** *The destruction of their natural habitats due to agriculture and urbanization is a major threat.*
- **Poaching:** *They are often captured for local consumption, traditional medicine, and for the exotic pet trade.*
- **Climate Change:** *Changes in temperature and rainfall patterns can affect their reproductive cycles and habitat availability.*

Conservation Efforts

- **Protected Areas:** *Many countries have established wildlife reserves and protected areas where the elongated tortoise can live without the pressure of human encroachment.*
- **Breeding Programs:** *Captive breeding and reintroduction programs are in place in some countries to help bolster wild populations.*

- **International Trade Regulations:** *The species is protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), making it illegal to trade wild-caught individuals.*