

## Prelim Bits 25-04-2024 | UPSC Daily Current Affairs

### Sodium-ion battery vs Li-ion battery

South Korean researchers have developed a high power hybrid sodium-ion battery that can be charged in seconds.

	Lithium battery	Sodium battery
<b>Availability</b>	Limited to few countries.	Nearly <b>1000 times more abundant</b>
<b>Cost</b>	Expensive	Relatively <b>cheaper</b> & can also be extracted from seawater
<b>Energy density</b>	Relatively <b>higher</b>	<u>Relatively lower</u>
<b>Performance</b>	Relatively <b>higher</b>	<u>Relatively lower</u>
<b>Charging speed</b>	Slow charge rate	Relatively <b>faster</b>
<b>Rechargeability</b>	<b>Longer lifespan</b> and can be recharged more times than sodium batteries	<u>Shorter lifespan</u> and can be recharged lesser times than lithium batteries
<b>Operating temperature</b>	Lower range and cause fire at higher temperatures	<b>Higher range</b> and so can be used in extreme temperatures without the risk of thermal runaway
<b>Safety</b>	It must be always stored with minimum charge, increasing fire risks.	It can be stored at zero volt, making it <b>safer</b> .
<b>Environmental impact</b>	Require rare metals and minerals, thus less environment friendly	Relatively <b>environment friendly</b> as they use abundant and easily available material
<b>Applications</b>	For portable devices and electric vehicles	For large scale energy storage applications

- **Sodium-ion hybrid energy storage (SIHES) cells** - It is a hybrid battery with high energy and high power density.
- It can be possible with integrated anode materials typically used in batteries with cathodes suitable for super capacitors.
- The combination helped the battery to achieve high storage capacities and rapid charge-discharge rates.

#### Reference

[WION| Lithium-ion Batteries Vs Sodium-ion Batteries](#)

## Organ Donation

Centre asks states to monitor, inspect organ transplants involving foreigners.

- It is a surgical procedure that involves removing an organ, tissue, or group of cells from one person (the donor) and transplanting it into another person (the recipient).
- **In India** - It is regulated by the [Transplantation of Human Organs and Tissues Act, 1994](#), and Rules, 2014
  - Organs from deceased donor are anonymously allocated to people waiting for a transplant.
  - Organs from living donor can be donated only if they (donor and recipient) are close relatives or share a close bond and want to donate altruistically.
- **Altruistic donations** - Allowed from *distant relatives, in-laws, or long-time friends* after ensuring there is no financial exchange.
- **Commercial trading is not allowed** under Indian laws.

**Form 21** is a key document considered by the Authorisation Committee, which approves the transplants, to show that the donor and recipients are indeed related and there is no commercial trading of organs.

- **Donations from close relatives** - Require documents establishing their identities, family trees, and pictures to prove the donor-recipient relationship and they are also *interviewed*.
- **Donations from unrelated persons** - Require **documents and photographic evidence** to prove their long-term association or friendship which are *examined by an external committee* to prevent illegal dealings.
- **Authorisation Committee** - It oversees and approves organ transplant procedures for non-relative donors and recipients.
- **Issues involving foreigners** - In Delhi, poor Myanmar nationals were allegedly paid to donate kidneys.
- **Centre's directions** - The states shall ensure a **NOTTO ID** is generated for both living & deceased donor and recipient.
- For living-donor transplant, it shall be generated at the earliest, maximum within 48 hours after the transplant surgery is done.
- States are required to devise a system for regular inspection of all transplant and retrieval centres to monitor the
  - Quality of transplantation, post-operative follow up of donors and recipients, and outcomes of transplantation.

### Quick Facts

- **National Organ and Tissue Transplant Organization (NOTTO)** - It is set up under Directorate General of Health Services, Ministry of Health and Family Welfare to monitor transplantation procedures at national level that has 2 divisions

- National Human Organ and Tissue Removal and Storage Network
- National Biomaterial Centre
- In 2024, Delhi High Court has prescribed an ideal **timeline of 6-8 weeks** to complete transplantation process from living donors.
- Kerala organized **Transplant Games**, a competitive sporting event for organ transplant recipients and donors under the ambit of World Transplant Games Federation (WTGF), a non-profit organization.
- In 2023, Tamil Nadu (TN) has won the **best performing state award** for organ donations that was organised by NOTTO and TN based NGO, MOHAN Foundation has also received the award for best NGO working in organ donations.

## References

1. [The Indian Express| Organ Transplantation involving Foreigner's](#)
2. [Indian Express| Organ Donations in India](#)

## Rumi Darwaza & General Wali Kothi

*A heritage exhibition was organised on the occasion of World Heritage Day (April 18<sup>th</sup>) with the theme 'Discover and experience diversity' by the Lucknow circle of Archaeological Survey of India (ASI).*

- **Rumi Darwaza** - Often called the **Turkish Gate** due to its resemblance to Bab-i-Humayun gateway in Turkey.
- **Located in** - **Lucknow**, *between Bara Imambara and Chhota Imambara.*
- **Constructed in** - **1784**, during the reign of **Nawab Asaf-ud-Daula**.
- It was initiated as a part of the **Food for Work program** during the period when the city was suffering from a severe famine.
- **Architecture** - The design, which resembles *Mughal, Roman and Turkish styles* later known as *Awadhi architecture* or the **Lucknow School of Architecture**.
- Unlike traditional Mughal monuments that often used red sandstone, it primarily relies on *bricks with a lime coating*.
- The structure's pinnacle is decorated with a *chhatra (umbrella)* was illuminated by a huge lantern and the beautiful flower buds carved on the arch's sides would release little water jets.
- It stands tall at a *height of 60ft*, it served as the **entrance to Old Lucknow City** in the past.



## General Wali Kothi

- **Located in** - **Lucknow**, on the *right bank or River Gomti* (tributary of River Ganga).
- **Period** - During the reign of **Nawab Saadat Ali Khan**.
- **Residential place** - The 1<sup>st</sup> resident of this Kothi (house) was Shas-ud daulah, Nawab Saadat Ali Khan's elder son and chief of the army.

- It rose to fame during the reign of Nawab Wajid Ali Shah, whose brother Hashmat Ali the army chief started to live in the kothi.
- Since Hashmat dressed as a general, the place got associated with him as 'general sahib ki kothi'.
- **Structure** - It is a *double floor* and well ventilated palace reflecting typical **British architectural style**.
- It has a number of *Roman arches* decorated with *serpent head motifs*.
- **Renovation** - It was used the Uttar Pradesh State police till 2006-07 when **Archaeological survey of India** got it vacated and initiated restoration work.



## References

1. [Hindustan Times| Rumi Darwaza](#)
2. [Times of India| History of General Wali Kothi](#)

## Sinking China

*A recent research reported that big cities in China are sinking under their weight, suffering from moderate to severe subsidence.*

- **Study** - A systematic national-scale satellite assessment of land subsidence in 82 of China's major cities *from 2015 to 2022*.
- **Technology used**
  - Space-borne Sentinel-1 Interferometric Synthetic Aperture Radar (InSAR)
  - Ground-based GPS data.
- InSAR uses highly precise radar pulses to measure the change in distance between the satellite and the ground surface.
- **Findings** - ***Nearly 50% of major cities are sinking.***
  - 45% of examined urban lands are subsiding faster than 3 millimeters (mm) per year
  - 16% are subsiding faster than 10mm per year
- The sinking is due to a range of factors, including ***groundwater extraction and the weight of the built environment.***
- It could affect roughly one-third of the nation's urban population.
- By 2120, *22-26% of China's coastal lands* will have a relative *elevation lower than sea level*, because of the combined effect of city subsidence and sea-level rise.
- **Recommendations** - Long-term and sustained control of ground water extraction.

### Land subsidence

- It refers to the gradual sinking or settling of the Earth's surface.
- **Causes** - It typically occurs when the ground collapses or compacts due to various factors
  - The withdrawal of underground fluids (such as water, oil, or natural gas)
  - Mining activities
  - Natural processes like erosion or dissolution of underground rocks
  - Human activities like construction or the extraction of resources

## Reference

[India Today| Big Cities of China are sinking](#)

## Global Report on Food Crisis (GRFC)

*The 2024 edition of Global Report on Food Crisis (GRFC) was released.*

- **Preparation** - It is produced **annually** by the Food Security Information Network (FSIN).
- **Launched by** - The Global Network Against Food Crises (GNAFC).
- **GNAFC** - A multistakeholder initiative that includes UN organizations, the EU, the United States Agency for International Development, and NGO's working together to tackle food crises.

***Integrated Food Security Phase Classification (IPC)** is a standardised scale developed by UN's Food and Agriculture Organization for improving food security analysis and decision making.*

- **2024 report** - It analysed a population of 1.3 billion in 2023 across 59 countries.
- **Food crisis** - *Nearly 282 million people* faced high levels of acute food insecurity in 59 countries in 2023.
- It was *marginally lower than in 2022*, but the number of people affected increased by 24 million since 2022, marking the *5 consecutive year of rising numbers*.
- Overall, *1 in 5 people* assessed were in need of critical urgent action.

***Acute food insecurity** is when a person's inability to consume adequate food puts their lives or livelihoods in immediate danger.*

- **Vulnerable areas** - The conflict hotspots in 2023, notably *Palestine (Gaza Strip) and Sudan* shows the high correlation between displacement and acute food insecurity.
- Sudan became the world's biggest internal displacement crisis.
- The **Gaza Strip** became the area with the most severe food crisis in the last 8 years of GRFC reporting.
- **Causes** - *Conflict / insecurity* became the primary driver in 20 countries, directly affecting 135 million people.
- *Extreme weather* being the 2<sup>nd</sup> most significant factor.
- *Economic shocks* were the 3<sup>rd</sup> main driver in 21 countries, mostly low-income and import-dependent, where decreasing global food prices did not transmit.
- **Positive signs** - *Food security improved in 17 countries* with comparable data between 2022 and 2023, resulting in 7.2 million fewer people facing high levels of acute food insecurity.

## Reference

[Down To Earth| Global Report on Food Crisis 2024](#)



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