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
Availability	Limited to few countries.	Nearly ***1000 times more abundant***
Cost	Expensive	Relatively ***cheaper*** & can also be extracted from seawater
Energy density	Relatively ***higher***	*Relatively lower*
Performance	Relatively ***higher***	*Relatively lower*
Charging speed	Slow charge rate	Relatively ***faster***
Rechargeability	***Longer lifespan*** and can be recharged more times than sodium batteries	*Shorter lifespan* and can be recharged lesser times than lithium batteries
Operating temperature	Lower range and cause fire at higher temperatures	***Higher range*** and so can be used in extreme temperatures without the risk of thermal runaway
Safety	It must be always stored with minimum charge, increasing fire risks.	It can be stored at zero volt, making it ***safer***.
Environmental impact	Require rare metals and minerals, thus less environment friendly	Relatively ***environment friendly*** as they use abundant and easily available material
Applications	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 18th) 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 *chhatri (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 1st 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 Sentinal-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 2nd most significant factor.
- *Economic shocks* were the 3rd 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]