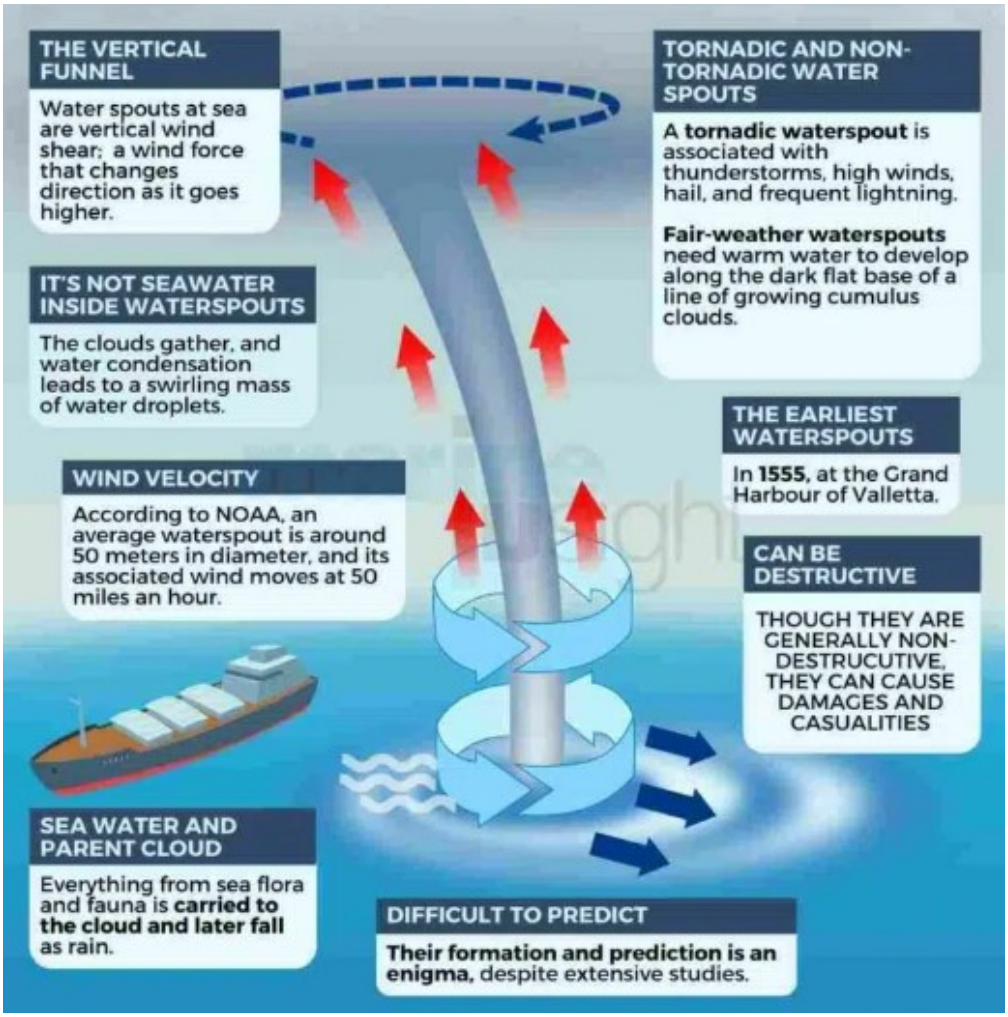
UPSC Daily Current Affairs | Prelim Bits 21-08-2024

Waterspout

A luxury yacht in Mediterranean Sea was hit and sank by a violent storm, could be a waterspout off the coast of Sicily, Italy.

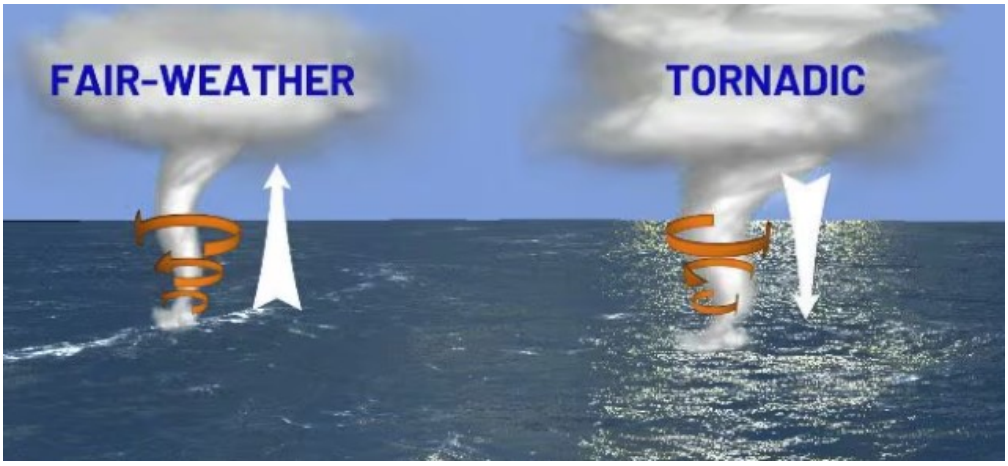
- **Waterspout –** It is essentially a tornado over water that is a large column of air and mist rotating over a water body.



- **Favourable Condition** - They occur when there are ***high levels of humidity and relatively warm water temperatures*** compared to the overlying air.
- **Size & Physical characteristics-** The average waterspout can be around 165 feet in diameter, with wind speeds of 100 kilometres per hour.
- **Duration -** It typically ***lasts for around 5 minutes*** and occasionally it

can last up to 10 minutes.

- **Occurrence -** Although waterspouts are more ***common in tropical*** waters, they can appear ***anywhere***.
- **Types of waterspouts -** Tornadic waterspouts and Fair-weather waterspouts.



- **Tornadic Waterspouts –** They are actual tornadoes that form ***over water or move from land to water.***
  - They are accompanied by severe thunderstorms, high winds and seas, large hail, and frequent dangerous lightning.
  - Tornadic waterspouts develop ***downward*** in a thunderstorm.
  - They can be large and may lead to considerable destruction.
- **Fair-weather waterspouts –** They form ***over only water*** usually along the dark flat base of a line of developing cumulus clouds.
  - It develops on the surface of the water and works its way upward.
  - This type of waterspout is generally not associated with thunderstorms.
  - **Favourable condition** - They are formed during fair weather.
  - **Movement** - Fair weather waterspouts form in light wind conditions so they normally move very little.
  - Typically, fair weather waterspouts dissipate rapidly when they make landfall, and rarely penetrate far inland.
  - They are less dangerous and usually small.
- **Increased frequency of occurrence –** With increase in sea surface temperature, the frequency of waterspouts is increasing.
- The best way to avoid a waterspout is to move at a 90-degree angle to its apparent movement.

References

1. IndianExpress | Waterspouts

2. NOAA | Waterspouts

'2+2' dialogue of India and Japan

Recently, India and Japan held the 3rd edition of the "2+2" Foreign and Defence Ministerial Dialogue.

- **Objective-** The dialogue focused on deepening defence cooperation and ensuring a ***free, open, and rules-based Indo-Pacific*** amidst China's growing military presence in the region.

Key Outcomes of the meeting

- **ASEAN Outlook on the Indo-Pacific (AOIP) -** Both the countries strongly supported ASEAN's unity and the ASEAN Outlook on the Indo-Pacific (AOIP).
- It emphasizes principles like openness, transparency, inclusivity, and respect for international law.
- **Special Strategic and Global Partnership-** It aims to strengthen bilateral security and defence cooperation under Japan's 2022 National Security Strategy, recognizing it as a key pillar of the ***Japan-India Special Strategic and Global Partnership.***
- **Women, Peace, and Security (WPS) -** Emphasized the role of women in conflict prevention and peacebuilding, welcoming increased participation in peacekeeping operations.
- **Defence Cooperation-** India aims to become a developed nation by ***2047,*** with a strong focus on building domestic defence capabilities.
- It discussed future cooperation in space, cyber, and defence equipment and technology, and explored coordination for security assistance to third countries.
- **Quad Cooperation-** The meeting valued the cooperation within the Quad and committed to advancing it further for both the countries.
- **Defence Exercises-** It commended the progress in defence ties since September 2022, highlighting Japan's first air visit, participation in ***Tarang Shakti, and the 'Veer Guardian 2023' exercise.***
- They agreed to reaffirm the importance of multilateral defence efforts in the Indo-Pacific and their commitment to ongoing exercises like ***Dharma Guardian, JIMEX, and Malabar.***

India holds ministerial-level dialogues with only a few countries, including the United States, Australia, and Russia.

- **Significance**- The "2+2" dialogue is aimed at further deepening ***bilateral security and defence cooperation*** between India and Japan.
- It is a strategic plan adopted by the Association of Southeast Asian Nations (ASEAN) in 2019.
- The defence partnership with Japan is seen as crucial for ensuring freedom, inclusivity, and transparency in the Indo-Pacific region.

ASEAN Outlook on the Indo-Pacific (AOIP)
• Aim - To promote cooperation with external partners in the Indo-Pacific region. • It also aims to address geopolitical tensions and the growing influence of major powers in the region. • **Principles** - The AOIP's guiding principles include ASEAN centrality and ASEAN-led mechanisms, such as the East Asia Summit (EAS), as platforms for dialogue and implementation of cooperation. • **Key areas -** The AOIP promotes cooperation in 4 key areas - Maritime cooperation, Economic, Connectivity, and Sustainable development. • The AOIP also serves as a platform for - The public, state-owned enterprises, and private sectors of ASEAN Member States, and - ASEAN's external partners to engage in constructive discussions, cooperate on projects, and - Enhance collaboration in the Indo-Pacific region

References

1. The Hindu | '2+2' dialogue
2. PIB | 2+2 Ministerial Dialogue
3. MOFA | 2+2 Foreign and Defence Ministerial Meeting

Drug delivery method using polymeric nanoparticles

Recently, scientists at Agharkar Research Institute (ARI) under the Department of Science & Technology (DST) have developed a nanoparticle-based drug delivery system.

- It is a unique method developed of drug delivery using ***Nikkomycin-loaded polymeric*** nanoparticles.

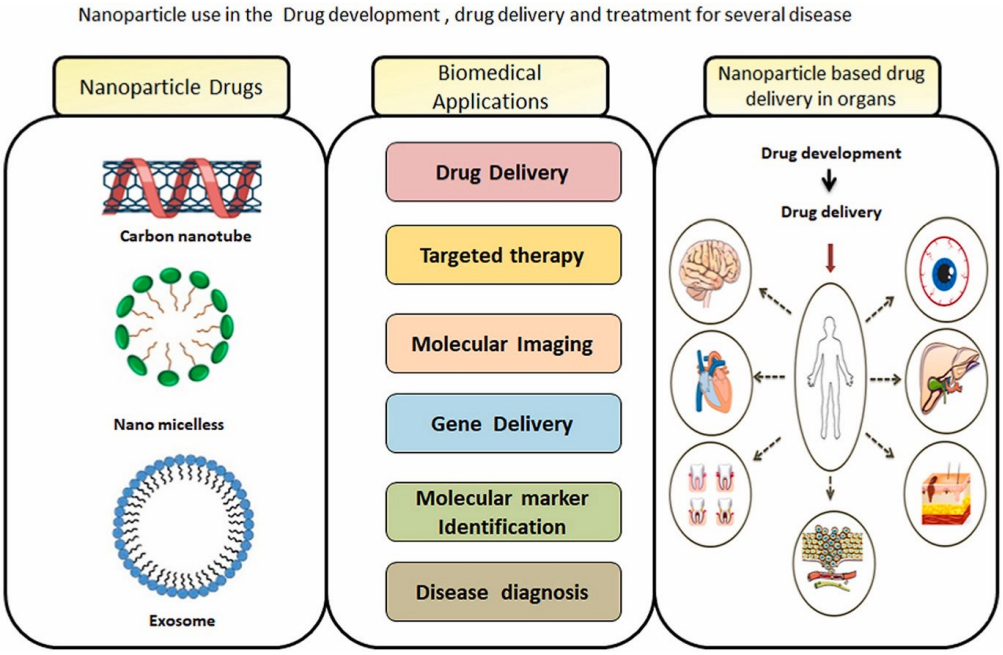
- **Nikkomycins-** Nikkomycins are nucleoside amide antibiotics produced by ***Streptomyces tendae Tü 901*** and are known to show antifungal, anti-insecticidal, and acaricidal activities.
- They work by interfering with the building of the fungal cell wall which results in the fungal cell breaking open.
- The specific agent nikkomycin Z has weak activity against ***Aspergillus fumigatus*** which may be of benefit when used with other medications.
- The drug-loaded nanoparticles were effective in disrupting the growth of ***Aspergillus species***.

Aspergillus fumigatus is a species of fungus in the genus Aspergillus and is one of the most common Aspergillus species to cause disease in individuals with immunodeficiency.

- **Streptomyces-** It is the largest genus of actinobacteria comprising high GC (guanine and cytosine) content in their genomic DNA.
- They are Gram-positive saprophyte and abundant in soil, water (fresh and sea), and air.
- One can also find this group of bacteria in association with plants and animals.
- ARI have used a chitin synthesis fungicide, Nikkomycin, produced by the bacterial Streptomyces spp. to develop Nikkomycin loaded polymeric nanoparticles.
- **Polymeric Nanoparticles**- It refers to solid particles composed of macromolecular polymers, with particle size ranging from 10 to 1000 nm.
- It can protect the encapsulated macromolecules from enzymatic degradation and change the dynamic behavior and tissue distribution of the encapsulated drugs in vivo.
- **Chitin -** Chitin is the most abundant aminopolysaccharide polymer occurring in nature and is the building material that gives strength to the exoskeletons of crustaceans, insects, and the cell walls of fungi.
- Chitin is absent in the human body, making this a targeted approach.
- The nanoformulation developed was found to be free of cytotoxic and hemolytic effects.
- The ARI team is hopeful about the method’s application in development of inhalation nanoformulations against pulmonary aspergillosis.
- **Benefits** - It may benefit patients with asthma, cystic fibrosis, HIV, cancer, lung diseases, and those on long-term corticosteroid medications.
- Nanoparticles enable controlled and effective drug release, with polymeric

nanoparticles being the most advanced delivery method.

- **Safety and potential applications-** The Nano formulation was free of cytotoxic and hemolytic effects, indicating safety for use.



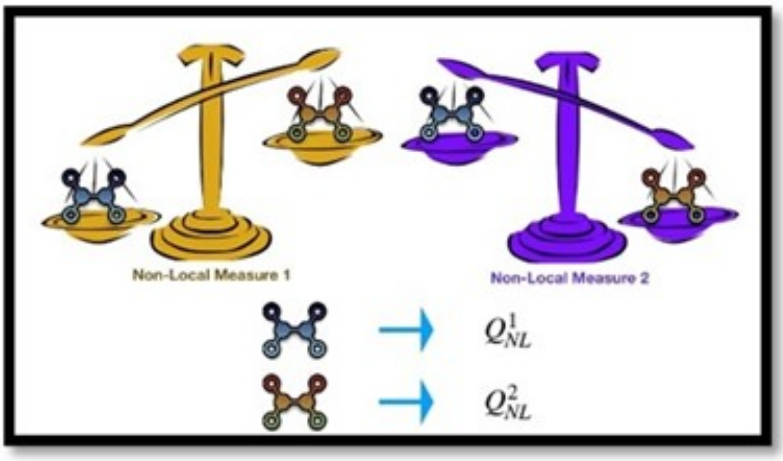
Reference

PIB | Nanoparticle-based drug delivery system

Quantum nonlocality

Recent research has revealed that it is impossible to create a universal standard for measuring non-local quantum correlations, a key finding in quantum mechanics.

- **Quantum Nonlocality-** It describes a connection between distant physical objects that does not allow for faster-than-light communication.
- It is often associated with entangled states, which violate ***Bell inequalities***, a way to test whether nature agrees with Einstein's local realism or with the standard quantum mechanical interpretation.



- **Bell's Theorem-** It was introduced by physicist ***John Stewart Bell in 1964***, it challenged the ***concept of 'local realism' in classical physics.***
- Bell's theorem showed that quantum systems with multiple distant parts exhibit correlations that cannot be explained by local realism.
- This theorem was confirmed by experiments and earned the 2022 Physics Nobel Prize.
- **Application-** Quantum nonlocality has been significant in natural sciences and has applications in secure communication, random number generation, and cryptographic key creation.
- **Finding-** The study noted that the nature of nonlocality varies depending on the type of correlation, meaning there is ***no single, universal resource in quantum nonlocality.***
- Each non-local resource is unique and capable of performing specific tasks that others cannot.
- **Implications-** The discovery expands the potential applications of quantum nonlocality and adds complexity to the understanding of quantum mechanics.

References

1. PIB | Quantum nonlocality
2. Azoquantum | Non-Local Quantum

National Financial Reporting Authority (NFRA)

The NFRA is set to meet with key financial regulators to adopt the revised International Standard of Audit 600 (ISA 600).

NFRA

Aspect	Explanation
Establishment	• NFRA was established in 2018 under the Companies Act, 2013.
Purpose	• It is an independent regulator setup to oversee and enforce compliance with accounting and auditing standards.
Jurisdiction	• NFRA has authority over auditors of listed companies, large unlisted companies, and companies with securities listed on any stock exchange in India or abroad.
Composition	• Chairperson who will be appointed by the Central Government and a maximum of 15 members.
Functions	• Set standards, monitor compliance, investigate misconduct, and impose penalties.
Significance	• Aims to enhance transparency and accountability in financial reporting.
Recent Activities	• Currently focusing on adopting revised International Standard of Audit 600 (ISA 600).

ISA 600

Aspect	Explanation
Aim	• To close auditing gaps that have caused major lapses and to ensure auditors gather sufficient evidence and evaluate component auditors' work.
Objectives of ISA 600	• Tighten oversight on auditors, especially regarding reliance on subsidiary audit reports. • Enhance group auditor's supervision and review of component auditors' work and documentation. • Improve communication, oversight, and ethical requirements between group and component auditors.
Audit Lapses and Malfeasance	• Auditors have been found shielding behind subsidiary audit reports, allowing malfeasance, such as siphoning off funds from listed companies. • Reliance on subsidiary audits has been a recurring problem in lapses at companies like Reliance Capital, IL&FS, and CG Power.

Legal Framework	• The revised standards require adoption by financial regulators like ICAI, NFRA, and SEBI before implementation in India. • The Chartered Accountants Act, 1949, considers disclosing information acquired during professional engagement without client consent as professional misconduct.

References

1. Business Standard | ISA 600
2. NFRA | About NFRA