

Is monkeypox a sexually transmitted infection?

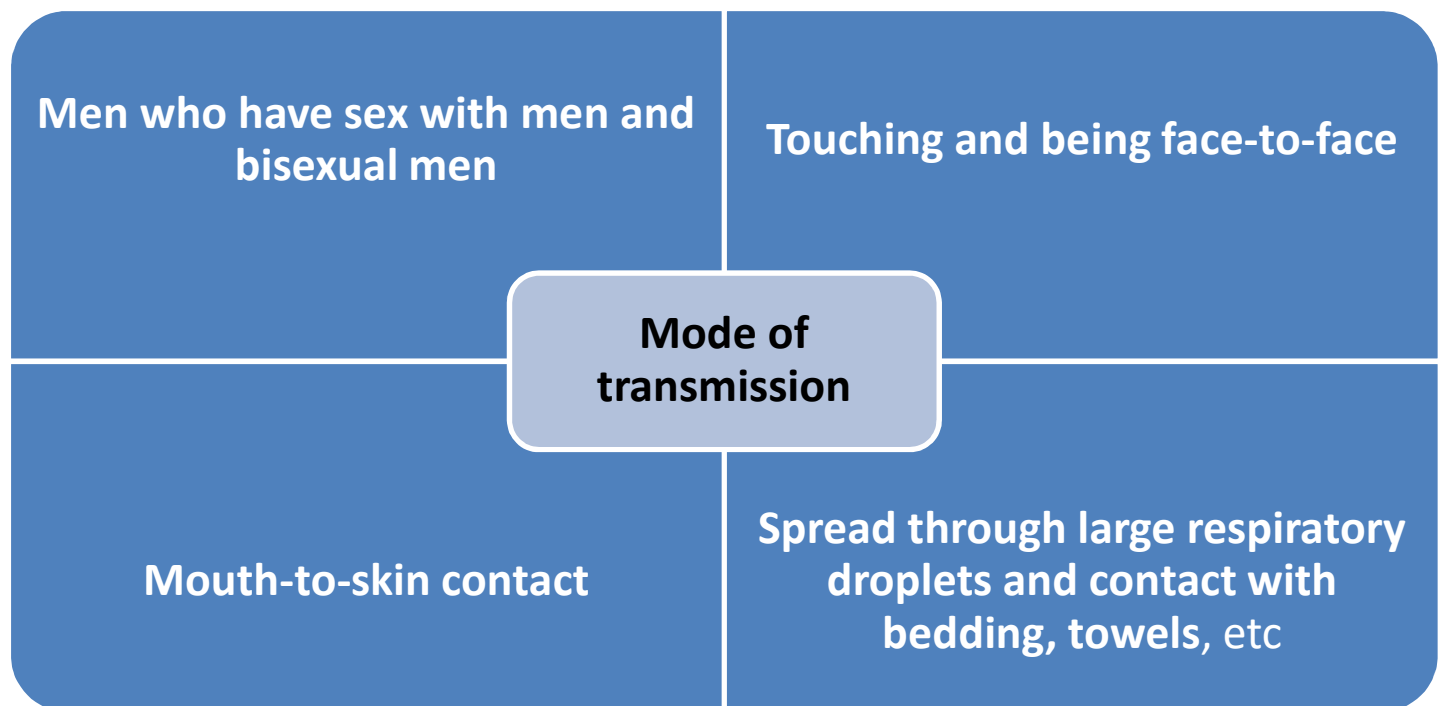
(GS Paper 3, Science and Tech)

Why in news?

- Europe has been worst affected with over 704 Monkeypox cases, as per the European Centre for Disease Prevention and Control.
- Monkeypox cases have been detected in 18 countries in Europe, mainly in the U.K., Spain and Portugal. The U.S. has confirmed 45 cases of monkeypox virus cases.

Mode of transmission:

- Most of the cases reported so far have been in **men who have sex with men and bisexual men**. However, the risk of monkeypox virus is not restricted to men who have sex with men.
- People who **closely interact with someone who is infectious**, including health workers, household members and sexual partners are at greater risk for infection. This includes **touching and being face-to-face**. Monkeypox can spread through close skin-to-skin contact during sex, including kissing, touching, oral and penetrative sex with someone who has symptoms.
- The WHO stresses that it is currently not clear if monkeypox virus can spread through semen or vaginal fluids.
- Monkeypox rashes are sometimes found on genitals and in the mouth, which is likely to contribute to transmission during sexual contact. **Mouth-to-skin contact** could cause transmission where skin or mouth lesions are present.
- The virus can also **spread through large respiratory droplets and contact with bedding, towels**, etc. that a person with monkeypox infection has used.



Virus in semen:

- A recent study found the virus in the seminal fluid of four men who tested positive for monkeypox virus. The researchers have ruled out the possibility of sample contamination. Based on the findings, they say, although these findings cannot be considered definitive evidence of infectivity, they demonstrate viral shedding whose efficiency in terms of transmission cannot be ruled out.
- Direct contact is the primary route of monkeypox virus transmission. The presence of the virus in the seminal fluid in all four men cannot be considered as proof of sexual transmission unless proven that virus transmission could not have happened any other way.

- **In the case of HIV**, besides sexual route of virus transmission, the virus can be transmitted from the mother to the child (vertical transmission) during pregnancy, labour, delivery or breastfeeding and also through injection drug use. Yet, HIV is called a sexually transmitted disease.
- HIV spread is predominantly sexual/parenteral, while monkeypox is mainly direct contact.
- Though most of the cases have been reported in men who have sex with men and presenting with lesions mostly seen in the anal and genital areas as well as the mouth, **monkeypox is not considered to be sexually transmitted.**
- Instead, intimate, skin-to-skin contact is considered key to transmission. Even if other studies find infectious monkeypox viruses in the seminal fluid, it is unlikely that monkeypox would be called as a sexually transmitted infection.

Sexually transmitted?

- So far the data on the 800 plus cases of monkeypox happening in non-endemic countries point at sexual contact (intimacy through sex) playing an important role in transmission. Whether this is happening through semen, vaginal secretions or skin-to-skin contact is semantics.
- Virologist adds that **definition of sexually transmitted infections is not clear** and it is important to clarify this while trying to contain a large outbreak. They cite **scabies, herpes, syphilis, pubic lice “crabs”**, which are STIs that are transmitted through close contact.
- The reason why it is important to use the correct terminology and highlight the mode of spread which may be important is that it allows for targeted interventions to stop an outbreak.
- A lot of the cases in the present monkeypox outbreak have clustered in sexual networks. Therefore, it is important to highlight this in communication while providing caveats that this is not the sole mechanism of spread.

Question of stigma:

- Calling any disease that spreads through sexual contact an STI is not intended to stigmatise. It is intended to identify and address risk factors and offer interventions to help folks manage their risk.
- Calling an infection an STI is not intended to be stigmatising. It allows for people to understand how they could be exposed and potentially infected, it also helps with tracing partners, notifying them so they are aware of their exposures to seek treatment.

A network of spiking neurons demonstrated

(GS Paper 3, Science and Tech)

Why in news?

- Using the **phenomenon of quantum tunnelling**, IIT Bombay researchers have demonstrated, for the first time, a spiking neuron network that is highly compact and shows potential for brain-scale implementation.
- The research demonstrates the **use of a 36-member network of spiking neurons** in a speech recognition module.

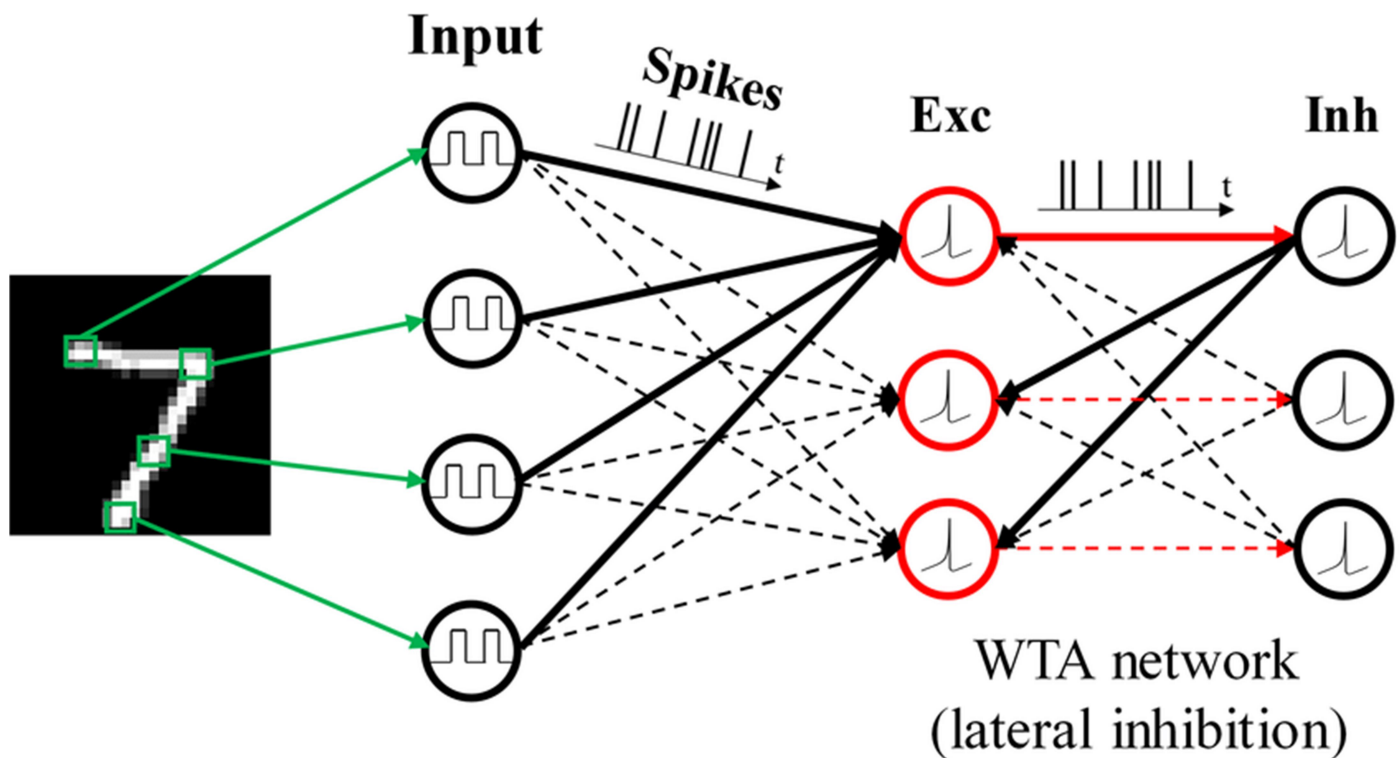
Energy efficient mode:

- The inter-disciplinary work showed that their concept of a neuron could be realised and that it **works in an energy efficient mode** with low power requirement, suitable for emulating the brain.
- In second generation, artificial neural networks, neurons represent their state in eight-bit precision. This does not mimic biological systems.
- Instead in a spiking neural network, the next step, the neuron’s output state is “spike” (equivalent to a “one”) or “no spike” (equivalent to a “zero”). This has a binary representation and is closer to the natural workings of neurons in the brain. If such a neural network should also occupy less space and consume little power, it could meet the decadal challenge of brain scale computing.

Making hardware circuit:

- First, the algorithm of (audio) processing had to be developed. While mathematically the algorithm may be framed in an ideal situation, in actuality, the developer faces non-linearities and other variables.

- In the next step which involved developing the hardware circuit, researchers used the standard technology with a different applied voltage pattern to operate the technology in the quantum-tunnelling-dominant regime.
- While the group was hoping at least one neuron would work well, the whole network sprang to life. Comparing this spiking neural network with existing state-of-the-art technology is encouraging.



Future Prospects:

- The researchers show that they have achieved 5,000 times lower energy-per-spike at a similar area, 50 times less area at a similar energy-per-spike, and ten times lower standby power at a similar area and energy-per-spike compared to the state-of-the-art benchmarks.
- Such overall performance improvement makes our neuron a promising candidate to enable brain-scale computing.

Heterologous booster vaccine & its advantages

(GS Paper 3, Science and Tech)

Context:

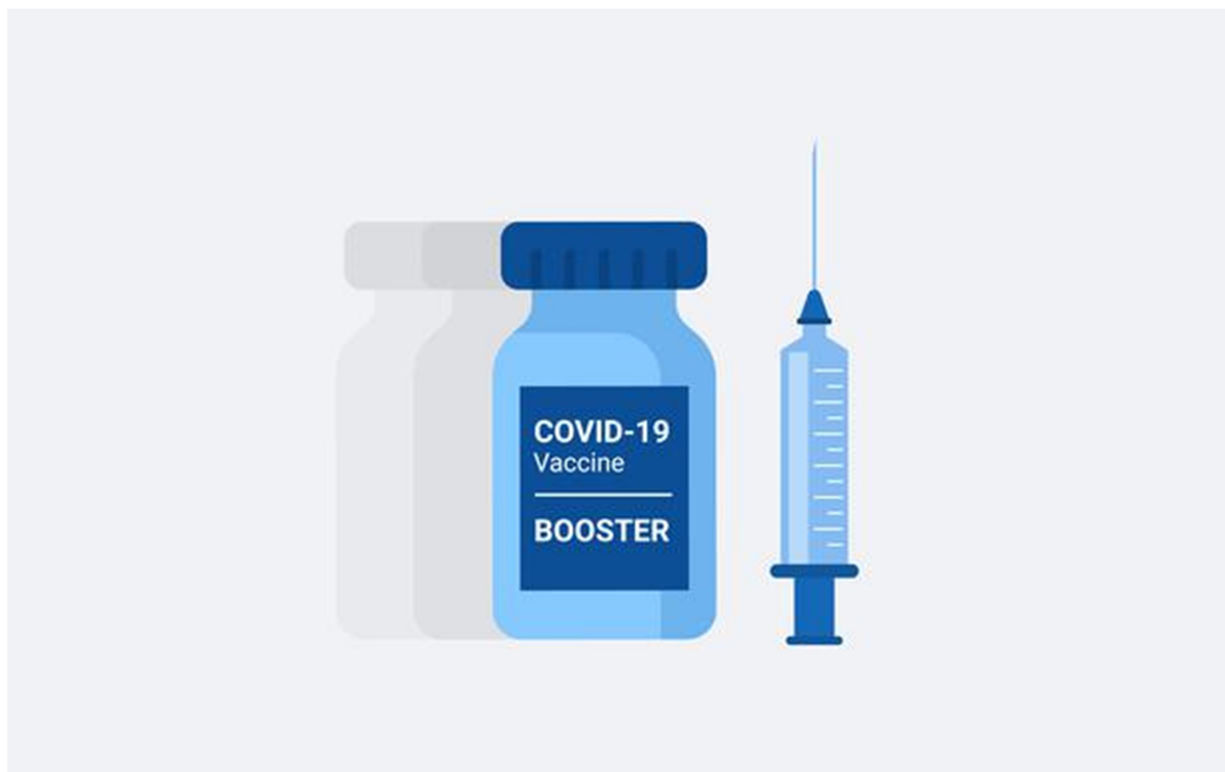
- With the number of COVID-19 cases increasing, a certain sense of guarded concern has naturally crept into pandemic control activities.
- With the number of cases, rising by the thousands on a daily basis, (on June 11, in a span of 24 hours, over 8,000 fresh cases were reported), repeat infections, **breakthrough infections for those who have had the double dose of vaccine**, the debate about getting a booster or precaution dose has gotten shriller.

Vaccine strategy

- Currently, the government supports vaccination through its healthcare network only for senior citizens, with or without co-morbidities, and certain categories including frontline workers and healthcare workers.
- It has given the private sector the go-ahead to vaccinate eligible groups with the precaution dose for a price.
- The debate has also increasingly called to question the appropriate vaccine to use in the precautionary dosage, whether it should be **homologous, the same vaccine that was administered as primary dose**, or if it should be heterologous, **any vaccine other than the primary dose**, for a better immune response.

Are heterologous booster shots better?

- There is a growing body of scientific evidence to prove that when heterologous doses are used as booster shots, the immune response is more efficient.
- A recent study clearly shows the immunogenicity and safety of heterologous AZ/BNT vaccination and encourages further studies on heterologous vaccination schedules.
- Heterologous prime-boost strategies may offer immunologic advantages to extend the breadth and longevity of protection provided by the currently available vaccines.
- Demonstrating with the AstraZeneca base vaccine supplemented by an mRNA vaccine booster, they concluded that “the heterologous boost immunisation strategy provides an immune response that may prove to be beneficial for durable prevention and control of COVID-19.”
- Many countries have restricted vaccine boosters to people at high risk of SARS-CoV-2 infection or related complications, including older adults, healthcare workers, and individuals with underlying health conditions, making it all the more important to prioritise the use of appropriate vaccines that would also enable a fair and equitable distribution of the doses.



Other advantages

- The researchers pointed out that an option to use heterologous booster vaccines could simplify the logistics of administering such vaccines, since the booster formulation could be administered regardless of the primary series.
- Since the first introduction of a vaccine for COVID-19 several more vaccines have entered the market. More options are now available across the spectrum, made from various vaccine candidates.
- While their availability in numbers might be low, the fact that there are more vaccines available in the market is likely to level the playing field.

Way Ahead

- It is now clear that, in a world where vaccine equity is a utopia, scientists can only strive for how to best use the available vaccines to reach for a maximum attainable benefit.
- A mix and match vaccination strategy, including inactivated vaccines for priming and heterologous boosters thereafter, seems to be a realistic policy.

- It would be prudent for governments, including in India, to switch to a heterologous booster regimen to allow more persons eligible for the vaccine and able to pay for it access it in the market.
- As a community health move, it will also be easy for health administrators to deploy newer vaccines in the market as part of the public vaccination programme.
- Shortages of vaccines will not be an issue when the reliance on just a few vaccines disappears.

India's high economic stakes high in West Asia (GS Paper 3, International Relation)

Why in news?

- The diplomatic fallout from the provocative and communally charged comments made by two erstwhile spokespersons of the ruling party in India forced the government into firefighting mode after **several West Asian nations** including Qatar, Kuwait, Iran, Bahrain, Oman, Iraq, Saudi Arabia and the UAE as well as the **57-nation Organisation of Islamic Cooperation (OIC)** and the **six-member Gulf Cooperation Council (GCC)** took strong exception to the remarks denigrating Islam and the Prophet Muhammed.
- In response, Indian officials strenuously asserted that the government stood by the country's traditional values and respected all religions.
- It also tasked its diplomats to reach out to individual OIC member states and reassure them on India's position of an 'inclusive' approach to all communities.



What prompted the government response?

- India's **cultural, economic and trade ties with the countries of the West Asian** region are deep and abiding.

Historical ties:

- Starting with **maritime trade**, the exchange of goods, services and cultures between the people of the Gulf region including those on the western shores of the Arabian Sea and the people of India's southern and western States reaches back several millennia and significantly predates even the foundation of the Islamic faith.
- The West Asian region also served as a **land trade bridge to Greece, Rome and other early European empires** and a flourishing trade in spices, cloth, silk and indigo in exchange for gold and silver is well recorded.
- In a more contemporary historical context, the British colonial era saw the advent of even a loose common monetary system with the rupee serving as legal tender in several Gulf states till the middle of the 20th

century. It was also the discovery and subsequent commercial exploitation of oil in the Gulf region during the colonial era that started to alter the balance of trade flows between India and the countries in the region.

Current situation:

- Today, the countries of the West Asian region collectively account for well over a sixth of India's total bilateral merchandise trade and contribute about three fifths of India's crude oil supplies. The region is also a major provider of jobs and economic opportunities to Indian workers, professionals and entrepreneurs and houses about 89 lakh Indians.
- These non-resident Indians (NRIs) annually send home about \$40 billion, and account for more than 55% of the country's total remittance inflows.
- Investments from sovereign wealth funds and other large investors from the GCC have also climbed steadily in recent years.
- It is the sizeable and rapidly growing economic interconnectedness that the government is keen to insulate from any fallout over this sensitive and potentially disruptive issue.

Why is India so dependent on West Asian countries for its energy needs?

- Domestic crude production, which has been declining over the years, meets less than a fifth of the country's oil requirement, forcing India to take recourse to imports to fill the gap of more than 80%.
- Out of India's total imports of crude oil, **the share of the Gulf countries has remained fairly steady at about 60% over the last 15 years.**
- In 2020-21, the top oil exporter to India was Iraq, with a share of more than 22%, followed by Saudi Arabia, about 18%. The UAE, Kuwait and Oman were other Gulf countries among the top-10 suppliers of crude oil to India in the fiscal year ended March 2021.
- A large proportion of India's refineries have also historically been predominantly configured to process the sulphur-heavy sour grades of crude that are produced in the Gulf region and with the sweeter (low sulphur) grades of oil such as Brent proving comparatively costlier, India's crude purchases have over the last two decades gradually shifted to being more weighted towards the Oman and Dubai sour grades.
- While the ratio of sour grades to sweet grades was 57:43 in the fiscal year ended March 2001, the proportion of sour crude to Brent had increased to 75.62:24.38 in the 12 months ended March 2022.

How reliant is India on the region for non-oil trade?

- Over the five years from 2017 through 2021, Iran and the GCC member states comprising the UAE, Saudi Arabia, Bahrain, Oman, Kuwait and Qatar accounted for a 15.3% share of India's cumulative two-way merchandise trade of \$3.98 trillion in that period.
- Of the \$609 billion of exports and imports that the seven countries accounted for in this period, the UAE contributed the lion's share of \$277.4 billion, or almost 7%, making it one of India's largest trading partners. Saudi Arabia was next with \$153 billion.

Comprehensive Economic Partnership Agreement (CEPA):

- The region is today a key market for several Indian commodities ranging from tea and basmati rice to electrical equipment, apparel, and machinery.
- Reflecting this importance, India and the UAE signed the CEPA in February with the aim of increasing the total value of bilateral trade in goods to more than \$100 billion in five years and getting services trade to exceed \$15 billion over the same period.
- The trade pact will provide Indian exporters preferential market access on '99% of the country's exports to the UAE in value terms, particularly from labour-intensive sectors such as gems and jewellery, textiles, leather, footwear, sports goods, plastics, furniture, agricultural and wood products, engineering products, pharmaceuticals, medical devices, and automobiles', according to a Ministry of Commerce and Industry release.
- With the CEPA now serving as a framework, the government is actively pursuing a broader FTA (Free Trade Agreement) with the GCC as a whole. With the region serving as a key hub to markets in Africa, India is keen to gain tariff-free access for its exports not just to the Gulf region but also to countries across Africa.

What else is at stake?

- The West Asian region provides among the largest number of overseas jobs for Indians, with nearly 89 lakh Indians living and working in the Gulf economies.
- The UAE, which comprises the seven emirates of Dubai, Abu Dhabi, Sharjah Ajman, Umm Al-Quwain, Fujairah and Ras Al Khaimah, accounts for the largest share of NRIs in the region and is home to more than 34 lakh Indians. Saudi Arabia with close to 26 lakh and Kuwait with over 10 lakh are the other large providers of jobs and economic opportunities for Indians.
- Indians are today ubiquitous by their presence across a vast range of job categories in the region spanning construction labour to oil industry workers, nurses and doctors in the medical sector to the hospitality industry and finance professionals.
- The remittances that they sent back home in 2017 accounted for about 55% of the total \$68.97 billion in inward remittances received in India from across the world that year.

SEBI's concerns around crypto assets (GS Paper 3, Indian Economy)

Why in news?

- The Securities and Exchange Board of India (SEBI), which regulates the securities and commodities market, has reportedly told the Parliamentary Standing Committee on Finance led by Jayant Sinha that regulation of crypto assets would be difficult given the nature of technology that sustains them.
- It was reported that the Reserve Bank of India had also shared its worries about cryptocurrencies with the committee.



What exactly did the SEBI tell the committee?

- SEBI has essentially flagged the problems with regulating crypto assets because they “are maintained in decentralised distributed ledgers, which are nested in computer nodes spread all across the globe.”
- Crypto assets is usually used as an umbrella term to encompass cryptocurrencies (e.g., Bitcoin, Ether) as also non-currency tokens such as utility tokens (which provide a certain utility within an ecosystem) and non-fungible tokens (which help establish ownership of unique items), among others.

- The underlying technology for crypto assets is the same, distributed ledgers that aren't controlled by any one entity.

What else did SEBI say?

- SEBI has elaborated upon the possible need for different regulators to deal with different aspects of a crypto asset market. Crypto exchanges, for instance, represent one such aspect. These exchanges, in case of a cross-border transaction, in effect enable the use of a cryptocurrency as a bridge to convert one nation's official currency to another.
- These exchanges could be **brought under the regulatory purview of the RBI**. The idea is to implement what are called **KYC/AML/CFT** (Know Your Customer/Anti-Money Laundering/Combating of Financing of Terrorism) norms. For some years now, the RBI has implemented a set of these guidelines in regulating banks so as to prevent them from being used by criminal elements.
- The subscribers or customers of crypto assets form another important part of the market. SEBI has suggested that the Consumer Protection Act of 2019 be invoked to make sure their interests are safeguarded. It has also sought clarity on whether cryptocurrencies can be legally classified as securities. Right now, they aren't.
- SEBI has said that crypto assets are not part of the definition of what constitutes as securities under the Securities Contracts (Regulation) Act of 1956, also known as SCRA. It is to be noted that what constitutes as securities under the SCRA is what is used under the SEBI Act.

Why is this important?

- In December 2021, it was widely reported that the government was looking to get SEBI to regulate crypto assets by bringing in legislation around that time.
- Though such a legislation, the Cryptocurrency and Regulation of Official Digital Currency Bill, 2021 did not materialise at that time, the talk that the government wants to treat cryptocurrencies as digital assets, rather than as currencies, has not ebbed.

Has SEBI also flagged issues about celebrity endorsements?

- Yes. It has proposed to the committee that celebrities should not be allowed to endorse cryptocurrencies.
- Given that crypto products are unregulated, prominent public figures including celebrities, sportsmen, etc, or their voice shall not be used for endorsement/advertisement of crypto products.
- It was also mentioned in that report that they must be held responsible for making any endorsement of crypto products.

What did the RBI tell the committee?

- The committee that cryptocurrencies can lead to "dollarisation" of a part of the economy. This was against India's sovereign interest.
- Almost all cryptocurrencies are dollar-denominated and issued by foreign private entities, it may eventually lead to dollarisation of a part of our economy which will be against the country's sovereign interest.
- They linked this to a possible undermining of RBI's ability to regulate money supply in the economy.

What has been the stance of the government?

- Over the last few years, the government's stance has definitely changed. But there is still ambiguity around what it really wants to do. A Bill that was sought to be introduced last year signalled its intention to ban cryptocurrencies outright. It, however, didn't see the light of day.
- The idea that the administration doesn't consider cryptocurrencies desirable has been made clear from time to time for some years now.
- It started as statements in the Budget but then an inter-ministerial report recommended an outright ban. Such currencies were and are considered problematic as they can easily evade official scrutiny, bypass and weaken the monetary system, and fuel illegal trade. Around this time, an RBI circular sought to bar banks from dealing in such currencies, only for the Supreme Court to strike it down.
- The cryptocurrency industry saw a window of hope earlier when Finance Minister imposed a tax for the first time on crypto assets. The tax, at 30%, was seen at first to settle the question of legality of such currencies. But, she indicated that taxability was an issue that is not to be linked to legitimacy.

- Legislative clarity is still awaited. Meanwhile, the Sinha-led committee has in recent months been holding extensive conversations with the financial regulators, who being statutory bodies.
- The committee also met with representatives of the crypto industry. The Bill aims to set up a facilitative framework for creation of the official digital currency to be issued by the RBI.