Japan to Flush Fukushima Wastewater

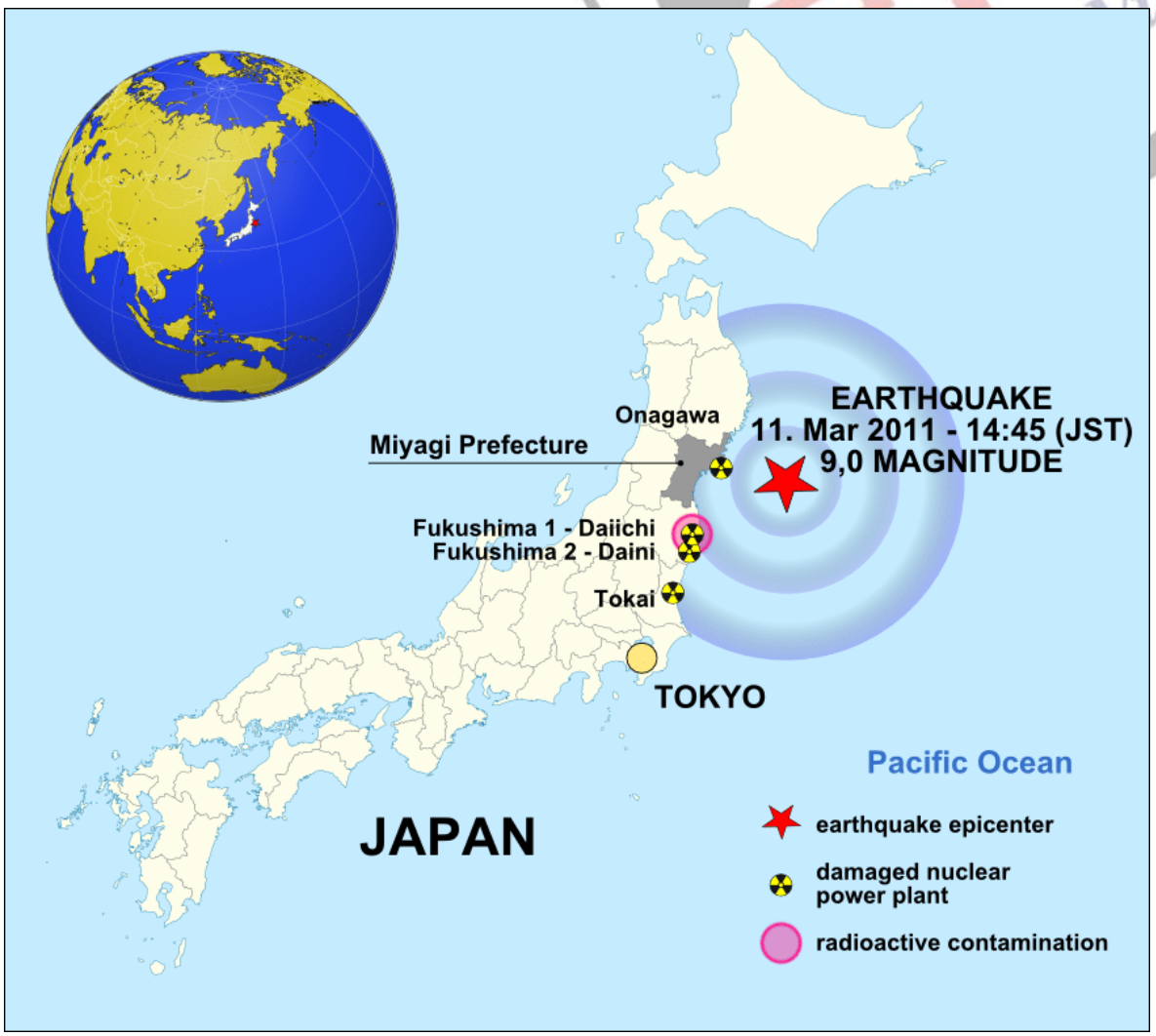
Prelims: Pacific Ocean, Tsunami, Radioactive Pollution in Water.

Mains: Issues with Nuclear Energy and Nuclear Disaster.

Why in News?

Japan is expected to start flushing 1.25 million tons of wastewater from the embattled Fukushima nuclear power plant into the Pacific Ocean in 2023, as part of a USD 76-billion project to decommission the facility.

- The project received the Japanese cabinet's approval in **2021 and could take three decades to complete.**



What is the Background?

- In March 2011, after a magnitude 9 **earthquake**, a **tsunami flooded the Fukushima Daiichi** nuclear power **plant in Okuma** and damaged its diesel generators.
- The loss of power **suspended coolant supply to reactors at the facility;** the tsunami also disabled backup systems.
- Soon, radioactive materials leaked from reactor pressure vessels, **exploded in the facility's upper levels,** and exposed themselves to the **ambient air, water, soil, and local population.**
- Winds also carried **radioactive material thrown up into the air into the Pacific.** Since then, the **power plant and its surrounding land have been uninhabitable.**
- The water that the Japanese government wants to flush from the plant was **used to cool the reactors,** plus rainwater and groundwater.
- It contains radioactive **isotopes from the damaged reactors and is thus itself radioactive.** Japan has said that it will release this water into the Pacific Ocean over the next 30 years.

What are the Concerns of Releasing Water?

- There is no known threshold below which radiation can be considered safe, therefore any discharge of **radioactive materials will increase the risk of cancer and other known health impacts** to those who are exposed.
- Water released can be poisonous to the fish and anyone who happens to live in the vicinity of the discharge point can be caught precarious.
- Tokyo Electric Power Company (TEPCO) **hasn't removed tritium** from the water because this is very difficult to do.
    - Tritium is **"easily absorbed by the bodies of living creatures"** and "rapidly distributed via blood.
- There were **other radionuclides in the water** that TEPCO's treatment procedure couldn't entirely remove.
    - These include **isotopes of ruthenium and plutonium,** which could persist for longer in the bodies of marine creatures and on the seafloor.

Why Flushing Instead of Treating Water?

- The TEPCO which operates the Fukushima facility, initially planned to treat the wastewater but because of lacking enough room for the water-tanks, it decided to release the water.
- Also, Japan cannot store water for longer than discharge it, because of **Tritium's half-life** (12-13 years).
    - **Half-life is the** time a radioactive material takes **for its quantity to be halved through radioactive decay.**

Way Forward

- A representative of the Pacific Islands Forum, the bloc of Oceania countries including Australia, has called it **"simply inconceivable" based on their experience with "nuclear contamination".**
- There should be more studies to understand the **precise composition of each tank before it is flushed** and for more details about TEPCO's water-treatment process.
- In addition, **the water can be stored for a longer period of time before discharging it,** due to Tritium's half-life of 12-13 years. Further, storing the water for a longer time will reduce the amount of other radioactive isotopes present in the water, thus reducing **its radioactivity.**

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q1. The function of heavy water in a nuclear reactor is to (2011)

(a) Slow down the speed of neutrons
(b) Increase the speed of neutrons

(c) Cool down the reactor
(d) Stop the nuclear reaction

Ans: (a)

Exp:

- **Heavy water (D_2O), also called Deuterium Oxide,** is water composed of Deuterium (Hydrogen isotope) **with a mass double that of regular water (H_2O).**
- Heavy water occurs naturally, although it is much less common than regular water.
- It is commonly **used in nuclear reactors as a neutron moderator,** i.e., to slow down the speed of neutrons.
- **Therefore, option (a) is the correct answer.**

Mains

Q. With growing energy needs should India keep on expanding its nuclear energy programme? Discuss the facts and fears associated with nuclear energy. **(2018)**

Source: TH