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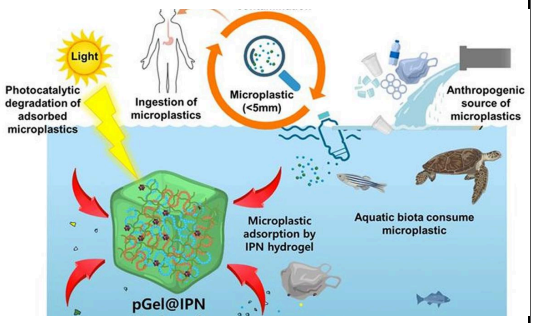
National and International News

Hydrogel



Context:

- Researchers from the **Indian Institute of Science (IISc) have developed a sustainable hydrogel designed to combat the issue of microplastic pollution in water sources.**

Key points:

- The hydrogel developed by **IISc researchers features a unique three-layer polymer architecture**.
- It consists of **chitosan, polyvinyl alcohol, and polyaniline,** forming an **interpenetrating polymer network (IPN).**
- Nanoclusters of a substance called **copper substitute polyoxometalate (Cu-POM)** are embedded into the polymer matrix, serving as catalysts for breaking down microplastics under UV light.
- The hydrogel efficiently **adsorbs and degrades significant amounts of microplastics from water.**
- To monitor the removal and degradation of microplastics, **a fluorescent dye is incorporated into the hydrogel.**
- The effectiveness of the hydrogel was demonstrated in tests, where it **removed approximately 95% and 93% of two different types of microplastics in near-neutral pH water.**
- The material was also tested for its durability and stability under various conditions and was found to be strong and stable.

What are microplastics?

- Microplastics are **tiny plastic particles that pose significant threats to human health and the environment.**
- They can enter our bodies through water consumption, **potentially leading to various illnesses.**
- These particles are not only harmful to human health but also pose dangers to **aquatic and terrestrial life.**
- They have been found in remote areas such as **polar ice caps and deep ocean trenches**, highlighting the extent of their environmental impact.

Queqiao-2

Context:

- The **China National Space Administration (CNSA) recently announced the successful launch of the Queqiao-2 satellite.**

Key points:

- It serves as a **communications relay satellite between ground operations on Earth and future lunar probe missions** on the far side of the moon, planned to operate until at least **2030.**
- The satellite features a 4.2-meter-diameter (13.8-foot) parabolic antenna, **one of the largest deployed beyond Earth's orbit.**
- Queqiao-2 will support **China's Chang'e-6 lunar far-side sample return mission**, as well as future Chang'e-7 and -8 missions.
- It carries **three scientific instruments: an Extreme Ultraviolet Camera (EUC), a Grid-based Energetic Neutral Atom Imager (GENA), and the Lunar Orbit VLBI EXperiment (LOVEX), a very long baseline interferometer.**
- Additionally, the mission includes deploying two **experimental CubeSats, Tiandu-1 and Tiandu-2, which will orbit the Moon to test navigation and communication technologies.**

Iran-Israel ties

Context:

- In a recent development, **Iran reportedly carried out attacks on Israel on April 12** in response to Israeli airstrikes on an Iranian consulate in Syria, which resulted in the death of senior Iranian military commanders.
- **The incident has amplified concerns over a potential wider conflict in the Middle East between the two nations.**

Background:

- Iran-Israel relations were once **cordial before the 1979 Islamic Revolution.**
- As one of the first Muslim-majority countries to recognize **Israel's formation in 1948**, Iran shared common interests with Israel, such as opposing Arab hostility.
- However, **following the revolution, Iran's regime adopted an anti-Israel stance, viewing the country as an occupier of Palestinian land.**
- Consequently, Iran-Israel relations soured, with both countries engaging in proxy conflicts and strategic attacks.

Issues:

- Given **Iran's lack of recognition of Israel's legitimacy** and the overt hostility between the **two nations since the early 1990s**, they have engaged in

shadow wars and proxy conflicts, particularly in Syria and Yemen.

- Both countries have **ties to organizations involved in ethnic and religion-based conflicts in the region.**
- The nuclear programs of **both nations have further heightened tensions,** with Israel viewing Iran's nuclear program as a threat to its existence, and **Iran being subjected to various sanctions by the United States.**
- **Iran is believed to provide funding and support to several militant groups in the region that oppose Israel and the United States. These include Hezbollah in Lebanon and Hamas in the Gaza Strip**.
- As the rivalry between the t**wo nations persists, the involvement of the United States as Israel's strong ally** has exacerbated **Iran's insecurity, increasing the potential for unwanted Western interference in the region.**
- The recent incidents of **targeted attacks, assassinations, and cyberattacks between Iran and Israel underscore the delicate and unstable nature of the situation**.
- As tensions escalate, the international community remains concerned about the **potential for a wider regional conflict between the two adversaries.**

Impact on India:

- The intensifying conflict **between Israel and Iran has far-reaching implications for India,** which has deep equities in the region, including a large diaspora, robust economic partnerships, and a burgeoning strategic role.
- **A potential escalation could significantly impact India's people, economic interests, and strategic needs.**
- India's reliance on the **West Asia region for 80% of its oil supplies renders the country vulnerable to the ramifications of a potential conflict on energy prices.**
- Although India has mitigated the impact of oil prices in the **context of the Russia-Ukraine war by securing discounted Russian oil, the Iran-Israel conflict could have adverse effects.**
- India's strategic relationship with major Arab countries, including **Iran and Israel, is a vital factor in the country's foreign policy.**
- New Delhi has balanced its **strategic ties with both nations, but the widening conflict could force India to abandon its ambivalent position.**

India ties with Israel:

	• India's strong **strategic relationship with Israel,** particularly in defense and security, has deepened over the past decade. • Israel has emerged as a **key defense supplier for India, joining the ranks of the US, France, and Russia.** Moreover, both countries share concerns about **extremism and terrorism.** **India ties with Iran:** • Despite maintaining a strategic partnership with Israel, India has managed to **preserve its strategic relationship with Iran.** • Tehran has been a significant supplier of crude oil to India, though this **relationship has faced obstacles due to sanctions.** • Both nations also share apprehensions regarding **terrorism originating from Pakistan and Afghanistan.** • Additionally, the **Chabahar project serves as an essential economic gateway to Afghanistan and Central Asia.** **Way forward:** • The path forward in this **tumultuous situation necessitates diplomatic efforts from global leaders to promote de-escalation and return to the path of diplomacy.** • India's position advocating for an **immediate cessation of violence** is crucial in restoring peace to the volatile region. • Pressures from world leaders, such as **US President Joe Biden's statement that the US would not partake in any Israeli counteroffensive against Iran,** may contribute to de-escalating the conflict and establishing peace.
Igla-S	**Context:** • India has recently taken delivery of a fresh **consignment of Igla-S air defense systems from Russia, intended for deployment along the Line of Actual Control (LAC).** • This procurement fulfills an order placed last year to address the current needs of the Indian Army. **Key points:** • The initial batch comprises **24 Igla-S Man Portable Air Defense Systems (MANPADS) along with 100 missiles,** with plans for the remainder to be manufactured in India under a larger agreement. • This acquisition **aims to bolster the Indian Army's Very Short Range Air Defense (VSHORAD)**

capabilities, particularly in the challenging terrain of high mountainous regions bordering the north.

- The Igla-S system boasts **an enhanced interception range of up to 6 km, providing a significant upgrade over the older Igla-1M systems.**

About:

- The **Igla-S is a portable defense system,** operable by either an individual or a crew.
- It is specifically engineered to **intercept low-flying aircraft** and can also detect and eliminate airborne **threats like cruise missiles and drones.**
- As reported by The Defense Post, the Igla-S air defense system is composed of several components, including the 9M342 missile, the 9P522 launcher, the 9V866-2 mobile test station, and the 9F719-2 test set.
- These systems are primarily deployed in **new air defense units stationed in high mountainous regions along the northern border.**

India's Tree Cover Loss and Carbon Emissions Since 2000: Insights from Global Forest Watch

Context:

- India has lost **2.33 million hectares of tree cover since 2000**, which is equivalent to a **six percent decrease during this period.**
- This loss has resulted in an **average release of 51.0 million tons of carbon dioxide** equivalent into the atmosphere annually.
- The **Global Forest Watch (GFW) project, which monitors forest changes using satellite data**, reported that **India lost 414,000 hectares of humid primary forest between 2002 and 2023, accounting for 18 percent of its total tree cover loss in that period.**

Key points:

- From **2001 to 2022, forests in India emitted 51 million tons of carbon dioxide equivalent per year but also removed 141 million tons per year,** resulting in a net carbon sink of 89.9 million tons per year.
- However, the loss of forests accelerates climate change, **as forests act as both a sink and a source for carbon.**
- Tree cover loss in India includes **both human-caused loss and natural disturbances**, such as logging, fire, disease, or storm damage, which may not always meet the definition of deforestation.
- **The data indicates that 95 percent of tree cover loss in India from 2013 to 2023 occurred within natural forests.**

	• **Five states in India accounted for 60 percent of all tree cover loss between 2001 and 2023,** with **Assam, Mizoram, Arunachal Pradesh, Nagaland, and Manipur** experiencing significant losses. • **Assam** had the highest tree cover loss at 324,000 hectares, compared to an **average of 66,600 hectares, followed by Mizoram, Arunachal Pradesh, Nagaland, and Manipur.** • According to the **Food and Agriculture Organisation**, India's deforestation rate was 668,000 hectares per year between **2015 and 2020**, the **second-highest worldwide.** • Additionally, from 2002 to 2022, **Odisha had the highest rate of tree cover loss due to fires**, followed by Arunachal Pradesh, Nagaland, Assam, and Meghalaya. The GFW cautions against comparing old and new data, especially before and after 2015, due to changes in the data over time from algorithm adjustments and improved satellite data. The project refers to tree cover **when discussing forest extent, loss, and gain,** as it is easily measurable using satellite imagery. **However, the existence of tree cover does not always indicate a forest, and tree cover loss or gain does not always imply forest loss or gain.**