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Brood X Cicadas

- Recently, Swarms of these insects have been spotted in a number of American states. These are part of a group named Brood X. The cicadas in Brood X number in billions and come out of their underground homes every 17 years. **Brood X started emerging in May and will be around until the end of June, specifically when ground temperatures reach about 17-18°C.**
- The term 'brood' refers to a population of cicadas that is isolated from other populations because of differences in their year of emergence or locality. **Brood X is the largest brood of 17-year cicadas and is found in Pennsylvania, northern Virginia, Indiana and eastern Tennessee.**
- Among periodical cicadas, there are seven species. There are also some annual cicadas, which come out every year. **Cicadas live underground for extended periods of time, typically 13 or 17 years. Some periodical cicadas become adults about 17 years.** When they come out, they shed their exoskeleton (outer skin) to take their winged form.
- Cicadas feed on roots of trees both underground and above it. Some cicadas will be eaten by frogs, fish, birds or raccoons. But they come out in such huge numbers that many will be able to mate and ensuring survival of their species. Male cicadas produce the loudest sounds in the insect world.





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Project O₂ for India

- **The Office of Principal Scientific Adviser, Government of India has launched 'Project O₂ for India'.** Its objective is to enable stakeholders working to augment the country's ability to meet the rise in demand for medical oxygen.
- Under this Project, a National Consortium of Oxygen is enabling the national level supply of critical raw materials such as Zeolites, setting up of small oxygen plants, manufacturing compressors, final products, i.e. oxygen plants, concentrators and ventilators.
- The consortium is not only looking forward to providing immediate to short-term relief but also working to strengthen the manufacturing ecosystem for long-term preparedness.
- **In November 1999, Cabinet Secretariat established the Office of the Principal Scientific Adviser** to the Government of India. The PSA's office aims to provide pragmatic and objective advice to the Prime Minister and cabinet on matters related to science, technology and innovation.
- **A.P.J. Abdul Kalam was the first Principal Scientific adviser** and the current is K. Vijay Raghavan. The 9-member Prime Minister's Science, Technology Innovation Advisory Council (PM-STIAC) is headed by the Principal Scientific Advisor to the Government of India.



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Vaccine Tourism

- In India, the term 'vaccine tourism' became popular late last year when reports emerged of **several tourism company offering packages to the US with the additional benefit of a vaccine shot.** A couple of days ago, reports emerged of a Dubai-based tour operator offering a 24-day package tour from Delhi to Moscow that has included two shots of the Russian Sputnik-V vaccine.
- In fact, vaccine tourism is an emerging trend in countries where vaccines are in short supply, or where certain groups are still restricted from being inoculated. **There are only a few countries in the world (parts of the US, Russia, Slovakia, Zimbabwe, etc) that don't restrict their vaccination policy to local residents.**
- **Currently, it is not illegal to travel to a foreign country to get vaccinated if air travel is allowed.** However, the idea of vaccine tourism is gaining momentum in India. There may be no need for anyone from India to go abroad for vaccination since all eligible Indians will be vaccinated in the country by the end of this year, at the most reasonable rates possible.
- It is said that Russia and the Maldives are already working on programs to offer people abroad the chance to get vaccinated during a visit; similar offerings are sprouting in the US and Europe as well.

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Fortified Rice Bran Oil

- **The process of adding micronutrients to the oil to increase the nutritional value of edible oil is called oil fortification.** All types of edible oils such as soybean, palmolein, groundnut and mustard etc. can be fortified.
- **Fortification does not affect the taste, texture and 'shelf life' of edible oils.** Fortification of oil can help the malnourished and economically weaker sections to achieve the required nutritional level.
- Rice bran oil has many health benefits. This oil lowers cholesterol levels due to its low trans-fat content and high mono unsaturated and poly unsaturated fat content. It also acts as an immunity booster. **The high amount of vitamin 'E' included in it reduces the risk of cancer.**
- The American Heart Association and the World Health Organization have recommended it as a good substitute for other edible oils. According to FSSAI, fortified oils can help a person meet 25 to 30 percent of the recommended dietary intake for vitamins 'A' and 'D'.
- NAFED has e-launched Fortified Bran Rice Oil. NAFED's Rice Bran Oil will be fortified to ensure that it contains additional nutrients and vitamins.



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Operation Olivia

- Every year, the **Indian Coast Guard's** 'Operation Olivia', **initiated** in the early 1980s, **helps protect Olive Ridley turtles as they congregate along the Odisha coast** for breeding and nesting from November to December.
- Round-the-clock surveillance is conducted from November till May utilising Coast Guard assets such as fast patrol vessels, air cushion vessels, interceptor craft and Dornier aircraft to enforce laws near the rookeries. **The Orissa Marine Fisheries Act empowers the Coast Guard as one of its enforcement agencies.**
- Olive Ridley turtles are mainly found in the Pacific, Atlantic and Indian Oceans. **Gahirmatha Marine Sanctuary in Odisha is the largest breeding and nesting place for sea turtles in the world.** These turtles travel thousands of kms for food and breeding. The Olive Ridley (*Lepidochelys olivacea*) is listed as vulnerable under the International Union for Conservation of Nature's Red list.
- **World Sea Turtle Day is celebrated on 16 June every year** to educate people on the need to conserve the world's Sea turtles and their habitats. Turtles are found in India, in the coastal states of Odisha, Chennai, and Maharashtra.
- All five species of sea turtles found in India are included in Schedule I of the Indian Wildlife Protection Act, 1972, and in the Appendix I of the Convention of International Trade in Endangered Species of Wild Fauna and Flora which prohibits trade in turtle products by signatory countries.



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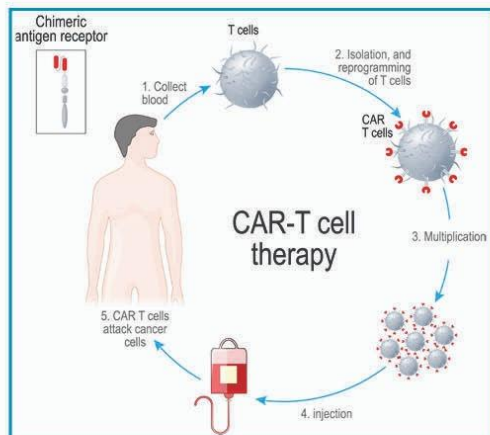


Blue Water Operations with a Green Footprint

- **Indian Navy has adopted a comprehensive 'Indian Navy Environment Conservation Roadmap' for synergising the aim of 'Blue Water Operations with a Green Footprint'.** Further, viability of setting up urban forests concepts such as Miyawaki forests is being emphasised to match the theme of World Environment Day 2021- 'Ecosystem Restoration'
- Indian Navy commissioned one of its largest solar plant with a capacity of 3MW at Indian Naval Academy (INA), Ezhimala in July 2020. Another 2MW solar power plant was installed at Naval Station Karanja, Mumbai in July 2020. With this, **the overall installed solar plant capacity at Naval Stations is 11 MW.**
- **The installation of SPVs are in line with Navy's objective of fulfilling 'Jawaharlal Nehru National Solar Mission'.** With a view to reduce the overall carbon footprint and to bring down the effects of global warming, Indian Navy is 'Geared Up and Committed' to march towards pursuance of Green Initiatives, realizing the national aim, to ensure a 'Greener and Cleaner future for our next generations'.
- **A mangrove plantation drive was conducted** by Southern Naval Command, Kochi in association with Kerala Forest Department along the Venduruthy channel on the occasion of 'World River day', **in which approximately 200 saplings were planted.** Also as a part of 'International Coastal Clean-up Day' celebrations various Naval units undertook Coastal Clean-up Drives.

Chimeric Antigen Receptor T-cell Therapy

- The 4th June, 2021 was a historic day for Tata Memorial Hospital, IIT Bombay team and cancer care in India as the first CAR-T cell therapy (a type of gene therapy) was done. The CAR-T cells were designed and manufactured at Bioscience and Bioengineering (BSBE) department of IIT Bombay.
- The **Chimeric Antigen Receptor T-cell (CAR-T) therapy** has emerged as a breakthrough in cancer treatment. Clinical trials conducted globally **have shown promising results in end stage patients, especially in patients suffering from Acute Lymphocytic Leukemia.**
- Till now this technology was not available in India. CAR-T cell therapy costs 3-4 crore (INR). The manufacturing complexity is a major reason for the therapy cost. In order to promote and support development of CAR-T cell technology against cancer and other diseases, BIRAC and DBT have taken initiatives.
- **The CAR-T cells were developed with support from Biotechnology Industry Research Assistance Council through National Biopharma Mission.** BIRAC is a not-for-profit Section 8, Schedule B, Public Sector Enterprise, set up by Department of Biotechnology.





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AgriStack

- The Department of Agriculture, Cooperation and Farmers Welfare, **entered into a Memorandum of Understanding (MoU) with Microsoft Corporation** to start a pilot project in 100 villages of Uttar Pradesh, Madhya Pradesh, Gujarat, Haryana, Rajasthan and Andhra Pradesh. The MoU requires Microsoft **to create a 'Unified Farmer Service Interface' through its cloud computing services.**
- The **AgriStack is a collection of technologies and digital databases** proposed by the Central Government **focusing on India's farmers and the agricultural sector.** The central government has claimed that these new databases are being built to primarily tackle issues such as poor access to credit and wastage in the agricultural supply chain.
- Under AgriStack', the government aims to provide 'required data sets' of farmers' personal information to Microsoft to develop a farmer interface for 'smart and well-organized agriculture'. The digital repository will aid precise targeting of subsidies, services and policies, the officials added.
- Under the programme, each farmer of the country will get what is being called an FID, or a farmers' ID, linked to land records to uniquely identify them.
- Alongside, the government is also developing a unified farmer service platform that will help digitise agricultural services delivery by the public and private sectors.

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The Great Barrier Reef

- **The UNESCO World Heritage Committee has recommended that the Australia's Great Barrier Reef should be added to a list of "in danger" World Heritage Sites.** It was recommended to add to the list because of the impact of climate change. **It is the world's biggest single structure made by living organisms.**
- The Reef 2050 Long-Term Sustainability Plan is the Australian and Queensland Government's framework for protecting and managing the Great Barrier Reef by 2050. Despite Reef 2050, the coral reef ecosystem has suffered three major bleaching events since 2015 due to severe marine heatwaves.
- The reef is located in the Coral Sea (North-East Coast), off the coast of Queensland, Australia. **It is the world's most extensive and spectacular coral reef ecosystem** composed of over 2,900 individual reefs and 900 islands. **It was selected as a World Heritage Site in 1981.**
- This reef structure is composed of and built by billions of tiny organisms, known as coral polyps. Polyps are tiny, soft-bodied organisms. At their base is a hard, protective limestone skeleton called a calicle, which forms the structure of coral reefs. These polyps have microscopic algae living within their tissues. The corals and algae have a mutualistic (symbiotic) relationship.





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India Plastic Challenge – Hackathon 2021

- Ministry of Environment, Forest and Climate Change announced the ‘India Plastic Challenge- Hackathon 2021’ to spur innovation and entrepreneurship in area of tackling plastic waste pollution and elimination of single use plastic.
- **It is a unique competition calling upon start-ups, entrepreneurs and students of Higher Education Institutions to develop innovative solutions to mitigate plastic pollution and develop alternatives to single use plastics.**
- Government of India has taken effective measures to manage plastic waste government has already banned import of plastic waste in the country. Considering the adverse impacts of littered single use plastic items on both terrestrial and aquatic ecosystems **Prime Minister gave a clarion call to phase out single use plastics by 2022.**
- **Ministry of Environment brought out Plastic Waste Management Rules, 2016, for handling plastic waste in an environmentally sound manner. Under the rules plastic carry bags below 50 microns have been banned.** Further, the Ministry has issued a draft notification in March 2021 for amending the Plastic Waste Management Rules, 2016, with respect to prohibiting identified 12 single use plastic items such as disposable plastic cutlery etc.

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Project Seabird

- The largest naval infrastructure project for India, **Project Seabird involves the creation of a naval base at Karwar on the west coast of India.** INS Kadamba is an Indian Navy base located near Karwar in Karnataka.
- The first phase of construction of the base was completed in 2005. INS Kadamba is currently the third-largest Indian naval base and is **expected to become the largest naval base in the eastern hemisphere after the completion of expansion Phase.**
- During the Indo-Pakistan War of 1971, the Indian Navy faced security challenges for its Western Fleet in Mumbai Harbour due to congestion in the shipping lanes from commercial shipping traffic, fishing boats and tourists.
- Upon completion, it will provide the Indian Navy with its largest naval base on the west coast and also the largest naval base east of the Suez Canal. **The Navy's lone aircraft carrier INS Vikramaditya is based at Karwar.**



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Solar Thermal Forward Osmosis

- **Solar thermal forward osmosis system is used to clean sea (saline) water.** Recently, this method has been used in the 'Naripayyur' village of the drought-prone Ramanathapuram district located in the south-east corner of Tamil Nadu. With this, 20 thousand liters of clean drinking water will be available to the villagers daily.
- The Ramanathapuram district is severely affected by the scarcity of drinking water due to salinity and poor sources of ground water. It has a 265 km long coastline, which is about 1/4 of the total length of the coast line in the state.
- Tamil Nadu IIT Madras in collaboration with Empereal – KGDS Renewable Energy **have successfully established and demonstrated this system to address prevalent and emerging water challenges in Mission Mode in the village.** The initiative has been supported by the Department of Science and Technology (DST).
- The FO system facilitates high recovery, low energy consumption, potential for resource recovery, especially in solutions of high osmotic pressure, less fouling of the membrane because of low pressure operation, easier and more effective cleaning of the membrane, longer membrane life and lower operating costs.
- This technique RO Operates at about 2 bar of pressure as against 50 bar of pressure. Also, **it is highly energy efficient as compared to other technologies.**



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