Prelim Bits 14-12-2021 | UPSC Daily Current Affairs

Atlantification

A recent study has found that Atlantification started at the beginning of the 20th century. The Arctic has warmed by 2 degrees Celsius since 1900.

- Long ago, the Arctic and the Atlantic oceans existed in harmony, with warm and salty Atlantic waters gently flowing into the Arctic.
- The Arctic had a layered nature - sea ice on top, cool freshwater in the middle, and warm, salty water at the bottom - that helped hold the boundary between the polar ocean and the warmer Atlantic.
- But everything changed when the larger Atlantic Ocean began flowing faster than the Arctic Ocean could accommodate.
- This weakened the distinction between the layers and transformed Arctic waters into something closer to the Atlantic.
- This process is called Atlantification. It is part of the reason why the Arctic is warming faster than any other ocean.
- Atlantification is not a new invasion of the Arctic. But what's new is that the properties of the Arctic are changing.

New Study

- Recent study found that the researchers extracted a yardlong sediment core from the seafloor of Kongsfjorden, a glacial fjord in the east end of the Fram Strait.
- [Fram Strait is a gateway between the Norwegian archipelago Svalbard and Greenland, where Arctic and Atlantic waters mingle.]
- This sediment archived 800 years of historical changes in Arctic waters.
- Researchers sliced up the core at regular intervals and identified the samples' foraminifera - single-celled organisms that build intricate shells around themselves using minerals in the ocean.
- **Process** - When foraminifera die, their shells drift to the seafloor and accumulate in layers of sediment.
- The creatures are crucial clues in sediment samples; by identifying which foraminifera are present in a sample and analyzing the chemistry of their shells, scientists can glean the properties of past oceans.
- Researchers noticed a sudden, massive increase in the concentration of foraminifera that prefer salty environments - a sign of Atlantification, around 1907 give or take a decade.
- This is far earlier than anyone had documented.
- Additionally, a molecular biomarker could pinpoint a specific year, 1916, when coal mining began in Kongsfjorden.
- Since the foraminiferal shift occurred just before this marker, the researchers estimate Atlantification began
- The authors are not sure of the precise reasons behind the early Atlantification. If human influences are the cause, the whole system is much more sensitive to greenhouse gases than we previously thought.

Reference

1. https://indianexpress.com/article/technology/science/this-ocean-invaded-its-neighbour-earlier-7650349/
2. https://www.carbonbrief.org/explainer-how-atlantification-is-making-the-arctic-ocean-saltier-and-warmer

Satellite Broadband Service

- Broadband essentially means a wide bandwidth, high-capacity data transmission technique, using a broad range of frequencies.

Terrestrial Broadband Service	**Satellite Broadband Service**
Broadband services are delivered directly via optical fibre or cables or mobile networks.	Broadband services are delivered directly via satellites instead of optical fibre or mobile networks.
We don't need a dish antenna to access broadband services, so even a normal mobile handset can be used.	We will need a dish antenna just like we do for TV services, so a normal mobile handset cannot directly access satellite broadband. This is because a clear line of sight to the satellite is needed to access satellite broadband.

- Satellite Service is super-fast and does not need wires or towers to connect to the World Wide Web.
- **Advantage -** High-speed internet services can be provided in **remote areas** (in the middle of the ocean, in rugged unreachable terrain such as the Himalayas), where terrestrial networks cannot be set up.
- This is especially pertinent to India (with a wide range of geography), given that 20-25% of the Indian population resides in areas where it is extremely hard for terrestrial operators to set up shop.
- **Availability in India** - Now, VSAT operators offer satellite broadband services at a very limited capacity in India in a few remote locations.
- The utilisation of satellite services is restricted to minimal applications - such as disaster management, defence, scientific locations, etc.
- Key hurdles are **high latency** of these services, which means that real-time transmission is hard.
- But this hurdle can be overcome with the ISRO's high throughput Geostationary Equatorial Orbit (GEO) satellites, which can beam high-speed internet up to 300 gigabytes per second.
- The launch of the constellation of Low earth orbit (LEO) satellites very close to the earth's surface will reduce the latency of satellite broadband.
- Example - Elon Musk's Starlink, Sunil Bharti Mittal backed OneWeb and the Canadian satellite major Telesat.
- **Related Links** - Internet from the Sky

Reference

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2. https://telecom.economictimes.indiatimes.com/news/no-wires-or-towers-satellite-broadband-promises-to-be-the-next-big-thing-in-india/82240201

Stand-Off Anti-Tank Missile

Defence Research and Development Organisation (DRDO) and Indian Air Force (IAF) flight-tested the Helicopter launched Stand-off Anti-tank (SANT) Missile from Pokhran ranges.

- The SANT missile is an **indigenous stand-off weapon** designed and developed by Research Centre Imarat (RCI), Hyderabad in coordination with other DRDO labs and participation from industries.
- It is equipped with a state-of-the-art millimetre wave (MMW) seeker which provides high precision strike capability from a safe distance.
- So, the weapon can neutralise targets in a range up to 10 kms.
- It will strengthen the indigenous defence capabilities and the arsenal of IAF.

Reference

1. https://pib.gov.in/PressReleasePage.aspx?PRID=1780481
2. https://economictimes.indiatimes.com/news/defence/india-flight-tests-helicopter-launched-stand-off-anti-tank-missile/articleshow/88228660.cms

Log4Shell Vulnerability

A new vulnerability named Log4Shell is being touted as one of the worst cyber security flaws to have been discovered.

- Log4Shell vulnerability, which is officially known as CVE-2021-44228, is a critical log4j Vulnerability.
- [CVE number is the unique number given to each vulnerability discovered across the world].
- This vulnerability **impacts an open-source logging library** Log4j2 version (common logging library used by applications across the world).

  Logging lets developers see all the activity of an application.

- Tech companies (like Apple, Microsoft, Google), enterprise applications (from CISCO, CloudFare, Amazon and others) and even government agencies all rely on this open-source logging library.
- Log4Shell vulnerability could allow a remote hacker to control java-based web servers and launch arbitrary 'remote code execution' (RCE) attacks on a system with software using the log4j2 Java library.
- It could potentially let the users to run malicious software on a device or servers. It allows a hacker to take control of a system.
- The flaw can be exploited either over HTTP or HTTPS (the encrypted version of browsing), which adds to the problems.

Reference

1. https://indianexpress.com/article/explained/log4j-vulnerability-cybersecurity-7671367/
2. https://www.radware.com/security/threat-advisories-and-attack-reports/log4shell-critical-log4j-vulnerability/

Gramin Agricultural Markets

The government programme to convert 22,000 rural haats into Gramin Agricultural Markets (GrAMs) had barely 6% of the conversion target, since its launch in 2019.

- In the Budget announcement 2018-19, the Government of India has announced to upgrade the existing 22,000 rural haats into GrAMs.
- Gramin Agricultural Markets (GrAMs) are village level retail agricultural markets in India, which help farmers in selling their produce locally.
- These markets are in close proximity of the farm gate that promote and service a more efficient transaction of the farmers' produce across the agricultural sub-sectors.
- GrAMs will facilitate the retail agricultural marketing in the country.
- **Objectives** - The farmer-producers may sale their agri-produce directly to the consumers without having to go through the market regulations.
- Aggregation of small lots of farmer-producers through an institutional mechanism for gaining enhanced bargaining power and subsequent sale either at the GrAMs via an online trade platform.
- Ministry of Rural Development (MoRD) will strengthen physical infrastructure of these GrAMs using Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) and other Schemes.
- Further, the Government has announced to set up of an Agri-Market Infrastructure Fund with a corpus of Rs. 2000 crore for developing and upgrading agricultural marketing infrastructure in the 22000 GrAMs.
- GrAMs will be linked to e-NAMs to sell their produce nationally.

Reference

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2. https://pib.gov.in/PressReleasePage.aspx?PRID=1607344
3. https://dmi.gov.in/Documents/Final_GrAM_Guidelines_final_03012019.pdf

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