CHINESE ROCKET DEBRIS FALLS INTO SEA AGAIN — WHY DOES THIS HAPPEN?

In News:

- Recently, large fragments of China's Long March 5B rocket plunged uncontrolled into the south-central Pacific Ocean. This was reported by the US Space Command.
- The fragments were stages of the rocket used to deliver the third and final module of the Tiangong space station.

Chinese space station

- Tiangong is China's new space station.
  - In May 2021, China launched Tianhe, the first of the orbiting space station's three modules.
  - The country aims to finish building the station by the end of 2022.
  - In June 2021, China had launched three astronauts into orbit to begin occupation of the country's new space station.
- Tiangong will be much smaller than the International Space Station (ISS), with only three modules compared with 16 modules on the ISS.

Background:

- Few days back, China had launched its Long March 5B rocket to deliver the third and final module of the Tiangong space station.
  - China currently relies on the Long March 5B to carry its heaviest payloads to space.
  - For the latest mission, the rocket carried **Mengtian,** a science laboratory module, to Tiangong.
- The rocket broke up during re-entry and plunged uncontrolled into the south central Pacific Ocean.
- One of the pieces was left over from the core stage of the rocket that was about 30 metres long and weighed between 17-23 tonnes.

Associated Danger

- Such was the danger that the air navigation authority of Spain shut down parts of its airspace for about 40 minutes in view of the uncontrolled entry of remains from the Chinese space object.
- However, security analysts claim that the chances of humans being hit were minuscule.
- What was worrying though, is the fact that the rocket stage did not by design have a system to ensure it fell in a designated place on Earth.

Previous instances of uncontrolled returns

- The recent incident was the fourth time something like this had happened with a Chinese rocket.
  - In May 2020, during the rocket's first deployment, fragments had landed in Ivory Coast, causing some damage to buildings;
  - Debris from the second and third flights had plunged into the Indian Ocean and near the Philippines respectively.
- China also faced criticism after using a missile to destroy one of its defunct weather satellites in 2007.
  - This had created a field of debris that other governments said might jeopardise other satellites.

2015-22 ON TRACK TO BE THE EIGHT WARMEST YEARS ON RECORD: WMO

In News:

- State of the Global Climate report 2022 has been released by the World Meteorological Organization (WMO).
  - The estimate for 2022 is part of the provisional State of Global Climate Report that the WMO publishes every year. The final report for this year is due only in April next year.
  - The provisional report is meant to update climate negotiators on the latest trends and nudge them towards more urgent action.
- As per the report, the global mean temperatures for 2022 are currently estimated to be about 1.15 degree Celsius higher than pre-industrial times.

World Meteorological Organization (WMO)

- It is an intergovernmental organization with a membership of 193 Member States and Territories.
- It was established by the ratification of the WMO Convention in 1950.
- WMO became the specialised agency of the United Nations for meteorology (weather and climate), operational hydrology and related geophysical sciences a year later.
  - The UN Economic and Social Council is the parent organization of WMO.
- WMO is headquartered at Geneva.

Functions

- WMO is dedicated to international cooperation and coordination on
  - the state and behaviour of the Earth's atmosphere, its interaction with the land and oceans,
  - the weather and climate it produces, and
  - the resulting distribution of water resources.
- It facilitates and promotes
  - the establishment of an integrated Earth System observation network to provide weather, climate and water-related data
  - the creation of standards for observation and monitoring
  - the provision of weather, climate and water-related services - to reduce disaster risks and contribute to climate change adaptation etc.
  - the coordination of research and training in meteorology and related fields

News Summary: Key highlights of the report

- **Global mean temperature in 2022**
  - The global mean temperature in 2022 is currently estimated to be about 1. 15 (1. 02 to 1. 28)^{0}C above the pre-industrial level (1850-1900 average).
  - This makes it difficult to meet the goal of keeping warming within 1. 5^{0}C goal by the end of the century.
- **Eight warmest years on record**
  - Fuelled by ever-rising greenhouse gas concentrations and accumulated heat, the past eight years (2015-22) are on track to be the eight warmest on record.
  - The report says that the year 2022 will possibly be the fifth or sixth warmest year.

- The warmest year on record so far has been 2016, when the global mean temperatures were measured to be about 1.28 degree Celsius higher than pre-industrial times.

- **Vulnerable population most affected**
  - The report flagged how global warming made every heatwave more intense and life-threatening especially for vulnerable populations.
  - An upsurge in climate change impacts can be seen as sea level rise accelerates, European glaciermelt shatters records and extreme weather causes devastation.
- **Impact of climate change**
  - The rate of sea level rise has doubled since 1993. It has risen by 10mm since January 2020 to a new record high this year.
  - The past two and ahalf years alone account for 10% of the overall rise in sea level.
  - The impact of rise in temperature can also be seen in:
  - record breaking rain in July and August that led to flooding in Pakistan;
  - large parts of Europe sweltered in repeated episodes of extreme heat;
  - UK saw a new national record in July, when the temperature topped more than 40^0C for the first time.

MALARIA

In October 2021, the World Health Organization (WHO) for the first time recommended the large-scale use of a malaria vaccine for children living in areas with moderate-to-high malaria transmission. The RTS,S/AS01 (Mosquirix) was developed by GlaxoSmithKline.

About:

- It took more than 30 years and approximately $700 million for this breakthrough.
- Malaria kills nearly 600,000 people every year, the majority of whom are children under the age of five in sub-Saharan Africa.
- Malaria is a disease caused by the **Plasmodium parasite**.
- The parasite can be spread to humans through the bites of infected mosquitoes.

- There are many different types of plasmodium parasite, but only 5 types cause malaria in humans.
  - **Plasmodium falciparum** – mainly found in Africa, it's the most common type of malaria parasite and is responsible for most malaria deaths worldwide.
  - **Plasmodium vivax** – mainly found in Asia and South America, this parasite causes milder symptoms than Plasmodium falciparum, but it can stay in the liver for up to 3 years, which can result in relapses.
  - **Plasmodium ovale** – fairly uncommon and usually found in West Africa, it can remain in your liver for several years without producing symptoms.
  - **Plasmodium malariae** – this is quite rare and usually only found in Africa.
  - **Plasmodium knowlesi** – this is very rare and found in parts of Southeast Asia.
- **Transmission:**
  - The plasmodium parasite is spread by female Anopheles mosquitoes, which are known as "night-biting" mosquitoes because they most commonly bite between dusk and dawn.

PARTIAL STUBBLE BURNING

This year many farmers are not burning the paddy stubble completely and are instead resorting to partial burning or burning only the loose straw.

About:

- After harvesting, farmers opting for partial burning let the loose straw dry for a couple of days and then they set these dumps on fire to prepare the field for the next crop.
- In such cases, the standing stubble, which is mostly green, does not get burnt fully but it gets scorched close to those places in the field where loose straw is burnt.
- And in the case of air pollution, it will be around 40-50% less as they only burn around 50% to 60% of the total stubble in such cases.

Stubble management machines:

- The state has distributed 1.05 lakh stubble management machines and a large number of individual farmers and groups of farmers have purchased these machines on subsidy.
- Farmers who do not have these machines but want to manage the stubble, get these on rent from farmers groups and cooperative societies.
- However, even after having three main machines such as Happy Seeder, Smart Seeder and Super seeder, many farmers are resorting to partial burning.
- The three machines ensure that there is no need for partial burning even after harvesting as stubble clearing is not required to sow wheat.

TOTAL LUNAR ECLIPSE

A total lunar eclipse will occur on 8 November, 2022. The eclipse is visible from all places of India at the time of Moonrise.

About:

- An eclipse of the Moon (or lunar eclipse) can only occur at Full Moon – when Earth is located directly between the Sun and the Moon –, and only if the Moon passes through some portion of Earth's shadow.
- That shadow is composed of two cone-shaped components -
  - The outer or penumbral shadow is a zone where the Earth blocks part but not all of the Sun's rays from reaching the Moon.
  - The inner or umbral shadow is a region where the Earth blocks all direct sunlight from reaching the Moon.
- **Types:**Astronomers recognize three basic types of lunar eclipses –
- **Penumbral Lunar Eclipse:**The Moon passes through Earth's penumbral shadow. These events are of only academic interest because they are subtle and hard to observe.
- **Partial Lunar Eclipse:**A portion of the Moon passes through Earth's umbral shadow. These events are easy to see, even with the unaided eye.
- **Total Lunar Eclipse:**The entire Moon passes through Earth's umbral shadow. These events are quite striking due to the Moon's vibrant red colour during the total phase (totality).

RISAT-2 SATELLITE MAKES RE-ENTRY INTO EARTH'S ATMOSPHERE

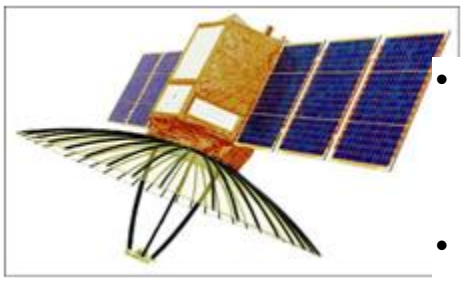
In News:

- ISRO's radar-imagining satellite Risat-2 that re-entered the Earth's atmosphere and splashed in the Indian Ocean on October 30 was India's first dedicated 'spy' or reconnaissance satellite.

About RISAT series of Satellites:

- Radar Imaging Satellite or RISAT is a series of Indian radar imaging reconnaissance satellites built by the Indian Space Research Organisation (ISRO).
- The first satellite, named RISAT-2, was launched in 2009.
  - It was bought from Israel for USD 110 million largely for surveillance purposes.
- In 2012, ISRO then launched what was India's first indigenous all-weather radar imaging satellite, known as RISAT-1.
  - RISAT-1 provided all-weather surveillance using synthetic aperture radars (SAR).
  - Before the launch of RISAT-1, India depended on images from a Canadian satellite as the existing domestic remote sensing spacecraft was not able to take pictures of the earth during cloud cover.

About RISAT-2:



- RISAT-2 was India's first satellite with a synthetic aperture radar (SAR), which possesses 24-hour, all-weather monitoring capability.
- With a bid to boost its intelligence acquisition after the 26/11 terror attacks on Mumbai (2008), India had acquired a high-precision spy satellite from Israel.
- It was a 300kg all-weather spy satellite put into the orbit, to help security agencies keep a vigil on the country's borders round-the-clock, especially hostile neighbours and help in anti-infiltration and anti-terrorist operations.
- Risat-2 provided beneficial payload data for over 13 years.

Significant Contribution:

- Images from the satellite helped security and intelligence agencies plan the **surgical strike in 2016** on terror launchpads in Pakistan-Occupied Kashmir (PoK) and the **Balakot aerial strike** in February, 2019.
- The satellite was also used in rescue missions as it was to search and locate the wreckage of the helicopter crash that claimed the life of the then Andhra Pradesh CM Y S Rajasekhara Reddy and fellow passengers in September, 2009.

INDIAN BLACK HONEYBEE

A new species of endemic honeybee has been discovered in the Western Ghats. The finding has been published in the September issue of Entomon, a peer-reviewed journal brought out by the Association for Advancement of Entomology.

About:

- The new species has been named Apis karinjodian and given the common name Indian black honeybee.
- It is after a gap of more than 200 years that a new species of honeybee has been spotted in the Western Ghats.
- The last honeybee described from India was Apis indica in 1798 by Fabricius. Although Fabricius named the Indian bee Apis indica, it was not considered a valid species till now.
- The research team restored the status of Apis indica based on a new measure for species discrimination in honeybees termed 'Radio-Medial Index (RMI)'.
- While proving the distinct identity of Apis indica, led to the discovery of Apis karinjodian.
- Apis karinjodian has evolved from Apis cerana morphotypes that got acclimatised to the hot and humid environment of the Western Ghats.
- The distribution of Apis karinjodian ranges from the central Western Ghats and Nilgiris to the southern Western Ghats, covering the States of Goa, Karnataka, Kerala and Tamil Nadu.

EK JANAKI AMMAL

November 5 marks the 125th birth anniversary of Edavalath Kakkat Janaki Ammal.

About:

- She was born in Thalassery in Kannur district of Kerala in 1897.
- She was a pioneering botanist and the **first Indian woman to be awarded a PhD in the botanical sciences.**

- Janaki Ammal is known widely for her contributions to science – in the field of genetics, cytology, evolution, and more.
- She was invited by the then Prime Minister Jawaharlal Nehru to reorganise the Botanical Survey of India in 1951.
- Her association with the Save the Silent Valley movement – a campaign to stop a hydroelectric project from flooding the Silent Valley forest in Palakkad district of Kerala – was well-known.

SEEMA DARSHAN PROJECT

Prime Minister Narendra Modi has urged the citizens to visit Nadabet and other border areas as part of Seema darshan to further tourism.

About:

- It was initiated with the aim to provide an opportunity to the people so that they can visualize the life and work of the Border Security Force (BSF) personnel on our border.

Nadabet:

- It is located in the Rann of Kutch region. It is also known as the 'Wagah of Gujarat'.
- The access provided to civilians at Nadabet to view the fenced international border with Pakistan at 'Zero Point'.
- Nadabet played a key role in the 1971 Indo-Pakistan War. It was in this region that the BSF not only stalled the enemy trying to invade from the west, but also captured 15 enemy posts.
- During the war, the BSF had captured 1,038 square km of Pakistan territory in Nagarparkar and Diplo areas. The area was returned to Pakistan after the Shimla Agreement was signed.

Jaislamer:

- BSF has set up a unique memorial museum named Seema Darshan to create awareness about the duties of BSF to the general public and the incidents of bravery at Sam sand dunes in Jaislamer.