

Current Affairs : 13 July 2022

NASA'S WEBB TELESCOPE AND THE FIRST LOOK AT THE UNIVERSE FROM 13 BILLION YEARS AGO

In News:

- NASA recently announced that its James Webb Space Telescope (JWST) has produced the deepest and sharpest infrared image of the distant universe ever seen, heralding a major event in astronomy.
- The JWST is the largest and most powerful telescope ever built.

James Webb Space Telescope (JWST):

- JWST is a space telescope jointly developed by NASA, the European Space Agency (ESA) and the Canadian Space Agency (CSA).
- It was launched on December 25, 2021, and is currently at a point in space known as the Sun-Earth L2 Lagrange point, approximately 1.5 million km beyond Earth's orbit around the Sun.
 - L2 is **one of the five points** in the orbital plane of the Earth-Sun system, which is directly behind Earth in the line joining the Sun and the Earth.
 - It is where the gravitational forces of the two large bodies cancel each other out and it would be shielded from the Sun as it goes around the Sun, in sync with the Earth.
 - Objects placed at these positions are relatively stable and require minimal external energy or fuel to keep themselves there and so many instruments are positioned here.

Goals:

- To look back around 13.5 billion years to see the first stars and galaxies forming out of the darkness of the early universe.
- To compare the faintest, earliest galaxies to today's grand spirals and understand how galaxies assemble over billions of years.
- To see where stars and planetary systems are being born.
- to observe the atmospheres of extrasolar planets (beyond the solar system) and perhaps find the building blocks of life elsewhere in the universe.

Significance:

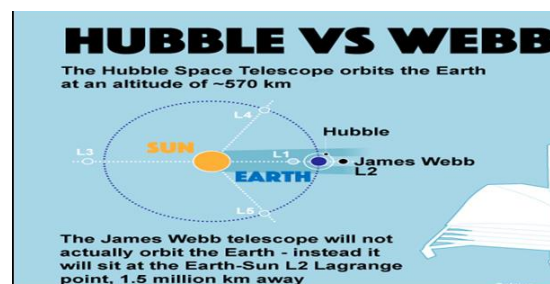
- It will be a giant leap forward in the quest to understand the Universe, as it will examine every phase of cosmic history - from the Big Bang to the formation of galaxies, stars and planets to the evolution of the Solar System.

JWST Vs Hubble:

- JWST is planned to succeed the Hubble Space Telescope as NASA's flagship astrophysics mission.
- **Wavelength:**
 - JWST will study the universe primarily in the infrared, whereas Hubble will focus on the optical and ultraviolet wavelengths.
 - This means, JWST will outperform Hubble in terms of infrared resolution and sensitivity, allowing it to see **distant objects** that are very dim at visible wavelengths of light.
 - Thus, while Hubble can see "toddler galaxies," JWST will be able to see "**baby galaxies.**"
- **Size:**
 - JWST primary mirror (approx. 6.5 metres in diameter) gives it a significantly larger collecting area than the Hubble mirror, which has a diameter of 2.4 metres.
- **Orbit:**
 - Hubble orbits the Earth at a height of approx. 570 kms. JWST, on the other hand, does not orbit the Earth, rather, it is located at the Earth-Sun L2 Lagrange point.
 - This means that JWST will orbit the Sun along with the Earth, but will stay fixed at the same spot in relation to the Earth and the Sun.
 - JWST's solar shield will block the light from the Sun, Earth and Moon, helping it to stay cool, which is important for an infrared telescope.

News Summary:

- **What has JWST captured?**
 - Thousands of galaxies, including the faintest infrared objects ever observed, have appeared



for the first time in Webb's view, all captured in a relatively small area.

- From 13 billion years ago, this is the oldest documented light in the universe's history.
- Because the Universe is 13.8 billion years old, the image goes almost all the way back to the beginning, with many more images to come.
- **What can be seen in the image?**
- NASA describes the image as "Webb's First Deep Field," and it shows galaxies that were previously invisible to us.
- The image, captured by Webb's Near-Infrared Camera (NIRCam), depicts the galaxy cluster SMACS 0723 as it appeared 4.6 billion years ago.
- The galaxy cluster's combined mass acts as a gravitational lens, magnifying much more distant galaxies behind it.
- This will aid researchers in learning more about the masses, ages, histories, and compositions of galaxies as Webb searches for the universe's earliest galaxies.

NATIONAL EMBLEM OF INDIA

Prime Minister Narendra Modi unveiled a 6.5-metre-tall National Emblem on the roof of the under-construction Parliament building here. The emblem, which is made of bronze, weighs 9,500 kg. A steel structure of 6,500 kg was made to support the weight of the emblem.



About:

- The National emblem of India is an adaptation of the Lion Capital of Ashoka at Sarnath, an ancient sculpture dating back to 280 BCE during the reign of the Maurya Empire.
- The statue is a three dimensional emblem showing four lions.
- Following the end of British rule on 15 August 1947, the newly independent Dominion of India adopted an official state emblem on 30 December 1947. It later became the emblem of the Republic of India.

- On 26 January 1950, a representation of the Lion Capital of Ashoka placed above the motto, Satyameva Jayate, was adopted as the State Emblem of India.
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AI-BASED MANDARIN TRANSLATION DEVICES FOR ARMY

Indian soldiers patrolling on the Line of Actual Control (LAC), when they come face to face with Chinese soldiers, will soon be able to understand Mandarin and reply instantly.



About:

- This will be possible with the help of a 600gm Artificial Intelligence (AI) based device developed by an Indian start-up and currently under advanced trials with feedback from the Army.
 - This was one of the 75 AI-enabled products and applications unveiled by Defence Minister Rajnath Singh at the ‘AI in defence’ symposium.
 - It is an offline hand-held language translation system which works based on AI. It has been tested in the forward areas and Army has given lot of assistance. Its performance will improve as more and more data comes from the field.
 - It is bidirectional with a range of 5-10 feet and gives converts Mandarin to English.
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JAMES WEBB SPACE TELESCOPE IMAGE

NASA unveiled images from the James Webb Space Telescope, the largest and most powerful orbital observatory ever launched.



About:

- The pictures, designed to peer farther than before with greater clarity to the dawn of the universe,

What looks much like craggy moonlit mountains is the edge of a nearby, young, star-forming region NGC 3324 in the Carina Nebula. Captured in infrared light by the Near-Infrared Camera (NirCam) on NASA's James Webb Space Telescope, this image, among many revealed at the Webb's High Resolution Imaging and Spectroscopy Instrument (HRS&I) debut, shows the jagged, rocky cliffs, the Region is actually the edge of a gigantic, gaseous cavity within NGC 3324, roughly 7,600 light-years away. •NASA

were hailed by NASA as milestone marking a new era of astronomical exploration.

- Nearly two decades in the making, the \$9 billion infrared telescope was launched on December 25, 2021. It reached its destination in solar orbit nearly 1 million miles from Earth a month later.
- The crowning debut image was a “deep field” photo of a distant galaxy cluster, SMACS 0723, revealing the most detailed glimpse of the early universe recorded to date.
- Among the other Webb subjects were two enormous clouds of gas and dust blasted into space by stellar explosions to form incubators for new stars — the Carina Nebula and the Southern Ring Nebula, each thousands of light years away from Earth.
- The collection also included fresh images of another galaxy cluster known as Stephan’s Quintet, first discovered in 1877.

CHILD LABOUR

The Centre does not have any data on child labour in the country and a reason for this is the drying up of budgetary provisions meant for the National Child Labour Project (NCLP), which had been monitoring the issue for about three decades.

About:

- Since the NCLP was merged with the Samagra Shiksha Abhiyan in 2016, the labour Ministry has no records of child labour. The currently available data is of the 2011 Census, which says the country has more than a million child labourers.
- Education Ministry also does not have a mechanism to find out the number of children engaged in child labour.
- Though India has a legislation, the Child Labour (Prohibition and Regulation) Act, since 1986 the menace of child labour is continue unchecked.



IMPACT OF INFLATION ON INDIA'S POOR

The impact of inflation on India's poor would be negligible as per a United Nations Development Programme report on 'Addressing the Cost of Living Crisis in Developing Countries', which also looked at the ripple effects of the Russia-Ukraine war such as energy and food market disruptions.

HOW ARE THEY PLACED
AVERAGE POVERTY IMPACT
(% of country's population falling into poverty at each poverty line)

	LOW IMPACT			MEDIUM IMPACT			HIGH IMPACT		
	\$1.90	\$3.20	\$5.50	\$1.90	\$3.20	\$5.50	\$1.90	\$3.20	\$5.50
	0.00%	0.02%	0.04%	0.20%	0.76%	0.88%	2.94%	3.09%	3.72%
Argentina									
Australia									
Brazil									
China									
Denmark									
India									
Italy									
Malaysia									
Russia									
S Africa									

Source: UNDP

About:

- While soaring food and energy prices could push up to 71 million people around the world into poverty, the UNDP said in the report that the chances of those in India earning \$1.9 a day slipping into poverty due to this upturn would be zero, while the impact would be a

mere 0.02% and 0.04% if a poverty line of \$3.30 or \$5.50 a day was assumed, respectively.

- A recent comparative assessment of price and income support measures shows that targeted transfers helps poorer households cope with price spikes.

Government Initiatives

- India's 'well-tailored' programmes carried out over the past two years to support people and ensure they don't run the risk of slipping into poverty seemed to have made an impact.
- The Centre has allocated more than 1,000 lakh tonnes of foodgrains from April 2020 till September this year, over and above the food security quota and had provided support of ₹1,500 to 20 crore women Jan Dhan account holders in the first three months of the pandemic.