



CURRENT AFFAIRS



Argasia Education PVT. Ltd. (GST NO.-09AAPCAI478E1ZH)
Address: Basement C59 Noida, opposite to Priyagold Building gate, Sector 02,
Pocket I, Noida, Uttar Pradesh, 201301, CONTACT NO:-8448440231

Date -2 September 2023

ADITYA-L1 MISSION

This article covers "Daily Current Affairs" and the topic details "Aditya-L1 Mission". The topic "Aditya-L1 Mission" has relevance in the Science and technology section of the UPSC CSE exam.

For Prelims:

Mission Overview?

About Lagrange Point?

For Mains:

GS 3: Science and technology

Objectives of Aditya-L1 mission?

Why in the news:

On Friday, the Indian Space Research Organisation (ISRO) initiated a countdown lasting 23 hours and 40 minutes for the launch of India's inaugural solar observatory mission, Aditya-L1. This mission is set to be launched aboard the Polar Satellite Launch Vehicle (PSLV) from the Satish Dhawan Space Centre in Sriharikota, with a scheduled liftoff time of 11:50 am today.

About Aditya-L1 mission:

- Aditya-L1, **India's inaugural space mission to study the Sun**, was conceived in January 2008 by the Advisory Committee for Space Research. This spacecraft will be positioned in a special orbit around a point called **Lagrange point 1 (L1)**, which is about **1.5 million kilometers from Earth**.
- What's special about this orbit is that it allows Aditya-L1 to continuously **observe the Sun without any interruptions like eclipses or occultations**. This is a big advantage because it enables real-time monitoring of solar activities and their impact on space weather.
- **Aditya-L1 will be launched using the Polar Satellite Launch Vehicle (PSLV) XL**. It will take approximately 109 Earth days to reach this special orbit around the L1 point.

Payloads:

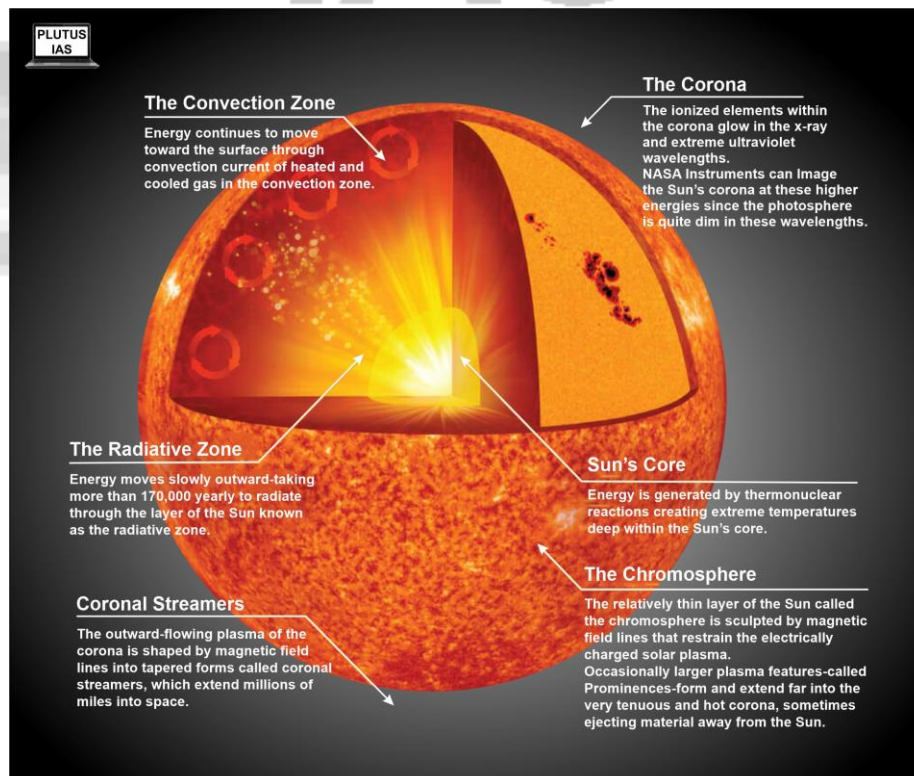
The Aditya-L1 spacecraft is equipped with **seven specialized instruments** designed to observe different aspects of the Sun, including its **photosphere, chromosphere, and the outermost layer called the corona**. These instruments utilize various techniques, including electromagnetic and particle detection, as well as magnetic field measurement.

The seven payloads on board Aditya-L1 include:

- **Visible Line Emission Coronagraph (VLEC):** Used for imaging and spectroscopy of the corona.
- **Solar Ultraviolet Imaging Telescope (SUIT):** Captures images of the photosphere and chromosphere in both narrow and broadband ultraviolet.
- **Solar Low Energy X-ray Spectrometer (SoLEXS):** Performs soft X-ray spectroscopy, observing the Sun as a star.
- **Aditya Solar wind Particle Experiment (ASPEX):** Analyzes solar wind and particles, including protons and heavier ions, with directional capabilities.
- **High Energy L1 Orbiting X-ray Spectrometer (HEL1OS):** Conducts hard X-ray spectroscopy to observe the Sun as a star.
- **Plasma Analyser Package for Aditya (PAPA):** Studies solar wind and particles, including electrons and heavier ions, with directional measurements.
- **Advanced Tri-axial High-Resolution Digital Magnetometers:** Measures the in-situ magnetic field in three dimensions (Bx, By, and Bz).

Objectives of Aditya-L1 mission:

- **Investigating the dynamics of the upper solar atmosphere**, specifically the chromosphere and corona.
- Researching the processes related to **chromospheric and coronal heating**, as well as the physics of partially ionized plasma. This involves studying the initiation of phenomena like coronal mass ejections (CMEs) and solar flares.
- Gathering in-situ **data on particles and plasma in the solar environment**, contributing to the understanding of particle dynamics originating from the Sun.
- **Mapping the magnetic field topology** and obtaining magnetic field measurements in the solar corona.
- **Examining the drivers for space weather**, including the origin, composition, and dynamics of the solar wind.



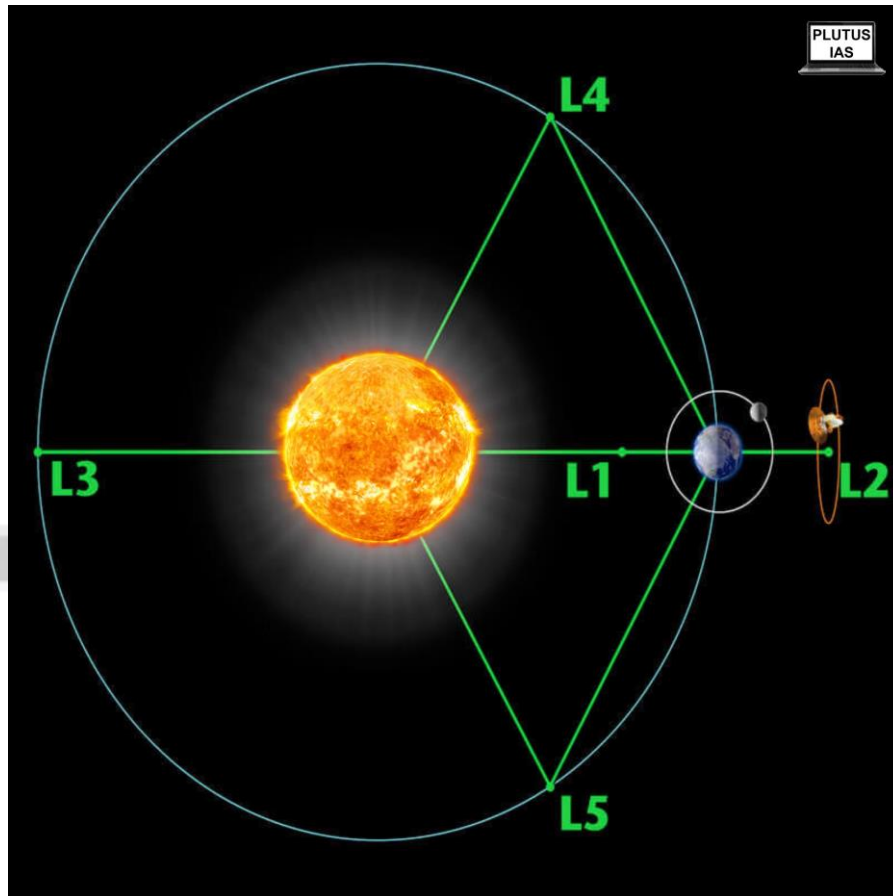
Challenges associated with Aditya-L1:

- **Vast Distance:** The considerable separation between the Sun and Earth poses a significant challenge for the mission in terms of covering such extensive distances.
- **Mechanical Complexity:** The inclusion of moving components in the satellite design heightens the risk of potential collisions with other satellites orbiting in space.
- **Extreme Environmental Conditions:** Despite its remote positioning relative to the Sun, Aditya-L1 faces the daunting task of enduring the incredibly intense temperatures and radiation associated with the Sun's vicinity.

These challenges underscore the complexity of this pioneering mission and the need for careful planning and execution to achieve its scientific objectives.

Lagrange Points:

- Lagrange Points, also known as Lagrangian Points or L-points, are specific locations in space where the gravitational forces of two large celestial bodies, such as a planet and a star, create points of equilibrium. At these points, the gravitational pull from each body is balanced in such a way that an object placed there will remain relatively stationary with respect to the two larger bodies.
 - The concept of Lagrange Points was developed by the Italian-French mathematician Joseph-Louis Lagrange in the late 18th century. These points are often denoted as L1, L2, L3, L4, and L5.
1. **L1 (Lagrangian Point 1):** This point is located between the two larger bodies, along the line connecting their centers. It is on the side of the smaller body facing the larger one. L1 is significant for its stable position and direct line of sight to both bodies. It's commonly used for space observatories and missions that require continuous observation, such as solar observatories.
 2. **L2 (Lagrangian Point 2):** Positioned on the line connecting the two larger bodies but on the opposite side of the smaller body, L2 is also stable and has applications in astronomy and space exploration. Instruments placed here can observe distant objects with minimal interference from Earth's atmosphere.
 3. **L3 (Lagrangian Point 3):** Located on the line passing through the two larger bodies but beyond the larger body, L3 is less commonly used due to its instability. It is often considered for certain types of observations, although the need to deal with the constant movement of spacecraft at this point makes it less practical.
 4. **L4 and L5:** These points form an equilateral triangle with the two larger bodies, creating stable regions where gravitational forces create a balance between centripetal and centrifugal forces. Objects placed at L4 or L5 are in stable orbits and are sometimes called Trojan points.
- **Significance of Lagrange Points:**
 - **Reduced Fuel Consumption:** Spacecraft placed at Lagrange Points can utilize minimal thrust to maintain their position due to the gravitational balance, resulting in reduced fuel consumption and longer mission lifetimes.
 - **Space Observatory Locations:** Lagrange Points are used as strategic locations for space observatories, allowing them to observe the cosmos without interference from Earth's atmosphere or magnetic field.
 - **Gateway Points:** Lagrange Points can serve as potential "gateways" for future interplanetary missions, enabling spacecraft to access different regions of space with less energy.



Other missions to the sun:

Mission Name	Agency	Objective
DSCOVR (2015)	NOAA (USA)	To monitor solar wind and coronal mass ejections from the Sun, as well as to monitor Earth's climate.
Parker Solar Probe (2018-2025)	NASA	To conduct close-range study of the solar corona and gather critical data about the Sun's outer atmosphere and the solar wind.
Solar Orbiter (2020)	ESA	To study solar and heliospheric physics, providing insights into the Sun's behavior and its effects on the solar system.
CuSP (2022)	NASA	To study particles and magnetic fields in the solar environment, contributing to a deeper understanding of the Sun's magnetic dynamics and solar wind interactions.

Source:

<https://www.thehindu.com/news/national/aditya-l1-launch-live-updates-sept-2/article67262515.ece>

Q.1 Consider the following statements:

1. Lagrange points are locations in space where the gravitational forces of two massive bodies counteract the centrifugal force experienced by a smaller object.

2. In the Earth-Sun system, there exist a total of 5 Lagrange points.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

ANSWER: C

Q.2 Consider the following statements regarding Aditya L1 Mission :

1. The central objective of the mission is the examination of the lunar and solar atmospheres along with their magnetic fields.
2. The Aditya-L1 mission is a collaborative effort led by the Indian Space Research Organization (ISRO) in partnership with the Japan Aerospace Exploration Agency (JAXA).

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

ANSWER: D

Q.3 Examine the importance of India's Aditya-L1 mission within the broader context of space exploration. Additionally, assess the potential scientific, technological, and societal advantages that may arise from the successful accomplishment of the Aditya-L1 mission.

Rishabh

RASHTRIYA GOKUL MISSION (RGM)

This article covers "Daily Current Affairs" and the topic details "Rashtriya Gokul Mission (RGM)". The topic "Rashtriya Gokul Mission (RGM)" has relevance in the "Economy" section of the UPSC CSE exam.

For Prelims:

What is Rashtriya Gokul Mission (RGM) and its Ministry?

For Mains:

GS2: Government Policies & Interventions

GS3: Economics of Animal Rearing

What is Rashtriya Gokul Mission (RGM) and its need?

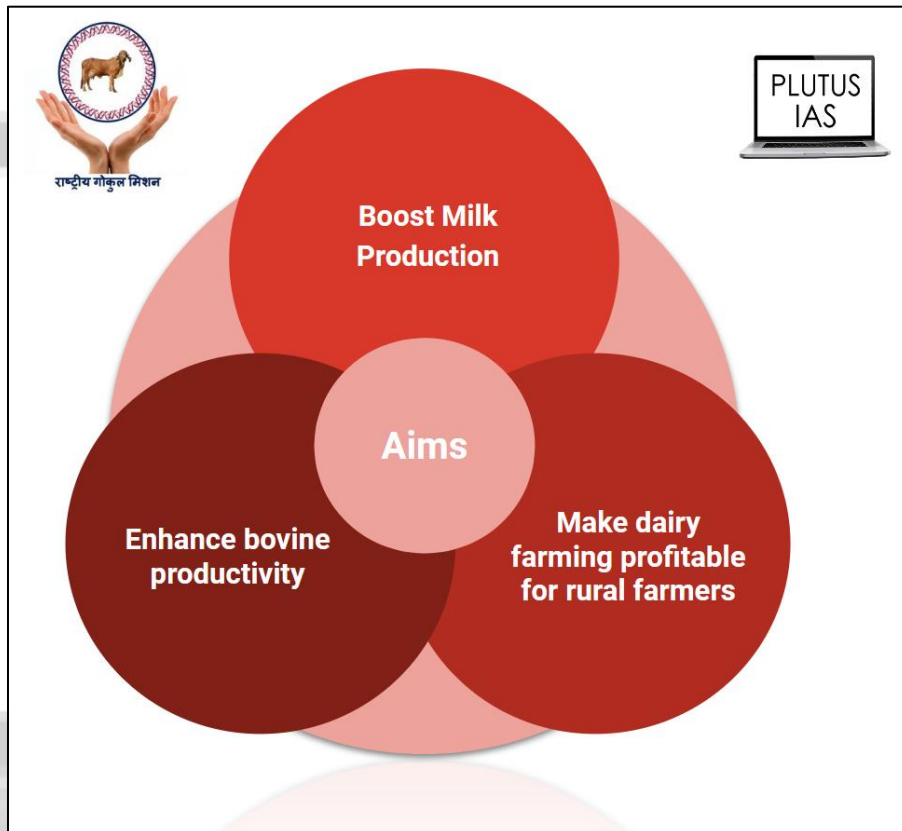
What are its components and significant Initiatives?

Why in the news?

The Rashtriya Gokul Mission (RGM) has garnered attention in recent news due to its significant impact on India's agricultural and dairy sectors.

Rashtriya Gokul Mission (RGM)

- The Rashtriya Gokul Mission (RGM), operational since December 2014, focuses on developing and conserving indigenous bovine breeds in India under the **Department of Animal Husbandry and Dairying**.
- It aims to **boost milk production, enhance bovine productivity, and make dairy farming more profitable** for rural farmers.
- It was Integrated into the Rashtriya Pashudhan Vikas Yojna in 2021 with a budget of Rs. 2400 crore.
- RGM has the potential to significantly benefit small farmers, empowering women involved in livestock farming.



Conservation of Indigenous Breeds: The Need of the Hour

- **Rich Bovine Population in India:** India is home to the most cattle, followed by Brazil, China, and the United States. India boasts a vast bovine population, with a total of 299.6 million, comprising 190.9 million cattle and 108.7 million buffaloes. Remarkably, approximately 80% of these cattle are indigenous breeds, often referred to as non-descript breeds.
- **Inherent Robustness and Resilience:** Indigenous bovine breeds in India exhibit inherent robustness and resilience. They have adapted to the diverse climates and environmental conditions in their respective breeding regions.
- **Quality of Milk:** Milk from indigenous bovine breeds is characterized by its high fat and Solid-Not-Fat (SNF) content. This quality makes them valuable for dairy production.
- **Climate Change Resilience:** Research indicates that indigenous breeds are likely to be less impacted by climate change compared to exotic breeds. They have evolved to withstand regional climate fluctuations, making them a sustainable choice for the future.

- **Threatened Indigenous Breeds:** Despite their unique advantages, several indigenous breeds, such as Punganur, are facing the threat of extinction. The overall population of indigenous breeds is declining.

Objectives:

- **Enhancing Productivity with Advanced Technologies**
- **Promotion of High Genetic Merit Bulls**
- **Strengthening Artificial Insemination Services**
- **Scientific Conservation of Indigenous Breeds**

Funding Pattern:

- The Rashtriya Gokul Mission operates on a 100% grant-in-aid basis for most of its components.
- **Exceptions:**
 - **Accelerated Breed Improvement Programme:** Farmers receive a subsidy of Rs 5000 per IVF pregnancy as a government share.
 - **Promoting Sex Sorted Semen:** Participating farmers receive a subsidy covering up to 50% of the cost of sex-sorted semen.
 - **Establishment of Breed Multiplication Farms:** Entrepreneurs can access a subsidy covering up to 50% of the capital cost, with a maximum limit of Rs. 2.00 crore per project.

Components of RGM:

- **Availability of High Genetic Merit Germplasm**
 - Bull Production Programme
 - Support to Semen Stations: Strengthening existing semen stations.
 - Implementation of IVF Technology
 - Breed Multiplication Farms
- **Extension of Artificial Insemination Network**
 - Establishment of MAITRIs
 - Nationwide Artificial Insemination Programme
 - Use of Sex Sorted Semen for Assured Pregnancy
 - Implementation of National Digital Livestock Mission (Livestack)
- **Development and Conservation of Indigenous Breeds**
 - Assistance to Gaushalas, Gosadans, and Pinjrapole
 - Administrative expenditure/operation of Rashtriya Kamdhenu Aayog
- **Skill Development**
- **Farmers Awareness**
- **Research Development and Innovation in Bovine Breeding**

Duration, Scope and Area of Operation:

- The Rashtriya Gokul Mission (RGM) will be implemented **nationwide** from **2021-2022 to 2025-26**.
- **Scope:** All components related to genetic improvement of the bovine population, as detailed in the program guidelines, are eligible for funding under RGM.

Implementing Agencies (IAs):

- These include state livestock development boards, state milk federations, central frozen semen production and training institutes, central cattle breeding farms, central herd registration schemes, the National Dairy Development Board, Indian Council of Agricultural Research (ICAR) and its institutes, central universities, and government veterinary universities.

Significant Initiatives under RGM:

- **Awards for Encouraging Farmers and Breeder Societies:**
 - **Gopal Ratna awards** recognize **farmers** maintaining the best herd of indigenous breeds and practicing optimal management practices.
 - **Kamdhenu awards** are given to **institutions**, trusts, NGOs, Gaushalas, or well-managed Breeders' Societies.
- **Gokul Gram:**
 - RGM aims to establish **integrated cattle development centers** known as 'Gokul Grams.' These centers focus on the development of indigenous breeds, including up to 40% nondescript breeds.
 - **20 Gokul Grams have been sanctioned** for 13 states with an allocated budget of Rs 197.67 crores.
- **National Kamdhenu Breeding Centre:**
 - Two "National Kamdhenu Breeding Centres" (NKBC) are being established under RGM as **Centers of Excellence for the holistic and scientific development and conservation of indigenous breeds.**
 - Rs. 25 crore each has been released to **Madhya Pradesh and Andhra Pradesh** for the establishment of NKBC.
- **"E-Pashu Haat" – Nakul Prajnan Bazaar:**
 - E-Pashu Haat is an **e-market portal connecting breeders and farmers**, providing a platform for the trade of disease-free bovine germplasm, including semen, embryos, calves, heifers, and adult bovines. It enhances accessibility to quality breeding materials.
- **Pashu Sanjivni:**
 - Pashu Sanjivni is an **Animal Wellness Programme** that involves providing **Animal Health cards** with UID identification. It involves uploading data on a National Database to monitor and improve animal health.
- **Advanced Reproductive Technology:**
 - RGM includes advanced reproductive technologies like In-vitro Fertilisation (**IVF**) and Multiple Ovulation Embryo Transfer (**MOET**) techniques. It aims to improve the **availability of disease-free female bovines.**
- **National Bovine Genomic Center for Indigenous Breeds (NBGC-IB):**
 - NBGC-IB will be established to select breeding bulls of high genetic merit at a young age using precise gene-based technology. This technology-driven initiative will contribute to **improving the genetic quality of indigenous breeds.**
- **Animal Husbandry Infrastructure Development Fund (AHIDF):**

- It has been introduced to encourage eligible entities (EEs) to invest in various areas, including –
 - dairy and meat processing,
 - animal feed plants
 - breed improvement technology
 - breed multiplication farms
 - technology-assisted model farms
- **Breed Multiplication Farms (BMF):**
 - These farms aim to provide farmers with high genetic merit heifers of cattle and buffalo breeds.
 - Government offers a 50% capital subsidy (up to Rs. 2.00 Crore) to interested entrepreneurs for constructing cattle sheds, acquiring equipment, and procuring elite bull mothers.
- **e-GOPALA**
 - It offers farmers across the country a **platform to effectively manage their livestock**. This includes facilitating the purchase and sale of disease-free germplasm in various forms such as semen and embryos.
 - Additionally, e-GOPALA ensures the availability of high-quality breeding services like Artificial Insemination, veterinary first aid, vaccinations, and treatments for animals.
 - It also provides guidance to farmers on animal nutrition and the use of suitable Ayurvedic or ethno-veterinary medicines for animal care.

These initiatives under the Rashtriya Gokul Mission collectively promote the conservation, development, and sustainable management of indigenous bovine breeds, fostering their long-term viability and contribution to India’s agriculture sector.

Sources:
[Press Information Bureau \(pib.gov.in\)](http://pib.gov.in)

Q1. With reference to Rashtriya Gokul Mission (RGM), consider the following statements:

1. Rashtriya Gokul Mission (RGM) aims to boost milk production by developing and introducing better foreign bovine breeds in India.
2. India has the largest population of cattle in the world, followed by China.
3. RGM is implemented by the Ministry of Agriculture and Farmers Welfare.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 3 only
- (d) None

Answer: (d)

Q2. Consider the following pairs :

Initiative	Aim of the Scheme
1. Gopal Ratna Awards	Acknowledge NGOs for their role in indigenous breed conservation.
2. Kamdhenu Awards	Recognize Gaushalas maintaining the best indigenous

	breed herds and practising optimal management.
3. Gokul Gram	Establish Centres of Excellence for holistic and scientific development and conservation of indigenous breeds.
4. National Kamdhenu Breeding Centre (NKBC)	Establish integrated cattle development centres to focus on the development of indigenous breeds

How many of the abovementioned are correctly matched?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All Four

Answer: (a)

Q3. Discuss the significance and objectives of the Rashtriya Gokul Mission (RGM) in India's agriculture sector. How does RGM address the challenges posed by climate change and declining populations of indigenous breeds?

Gaurav Nikumbh

PLUTUS
IAS