UPSC CURRENT AFFAIRS NOTES 03-09-2023

ISRO successfully places Aditya L1 in orbit

The Indian Space Research Organisation (ISRO) successfully launched the observatory that will study the Sun from 1.5 million kilometers away. It is the space organization's maiden expedition to study the Sun.

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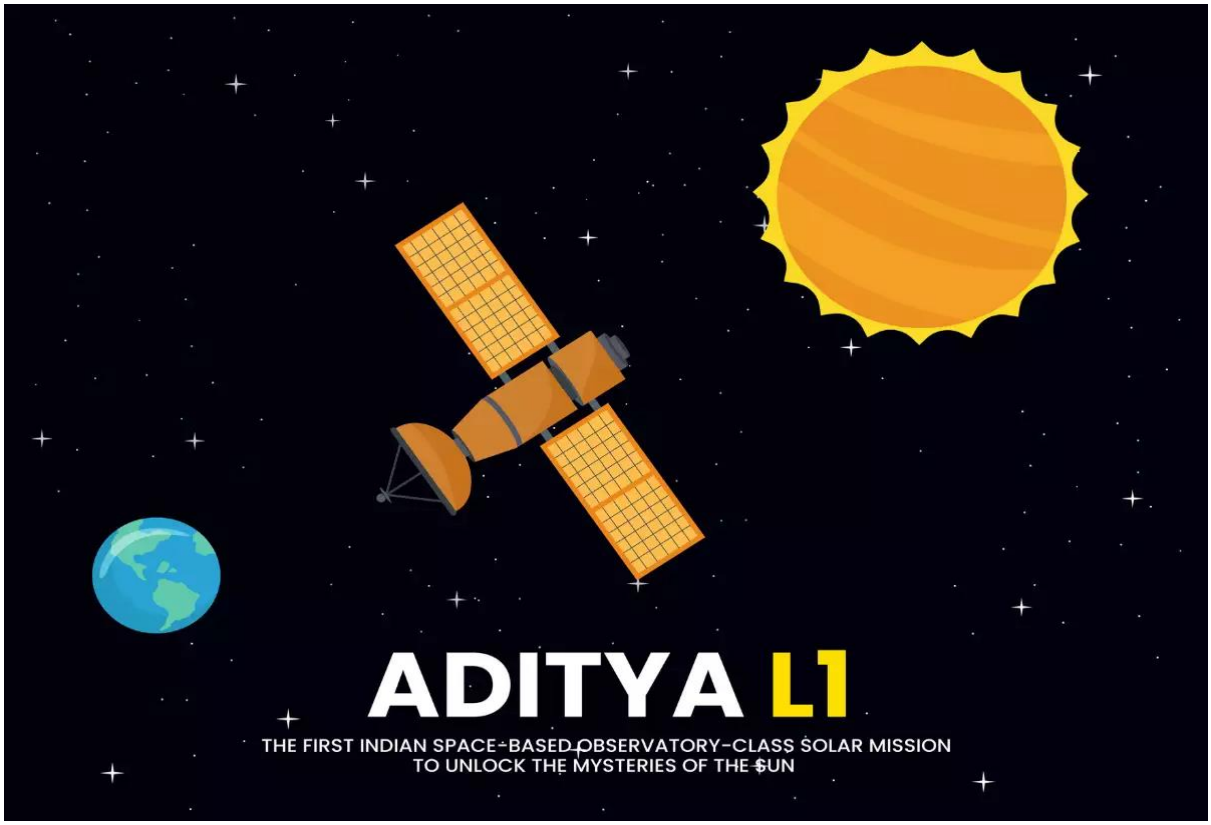


- It is also ISRO's second astronomy observatory-class mission after AstroSat (2015).
- It took nearly 63 minutes for one of the heaviest configurations of the PSLV to place the spacecraft in a precise elliptical orbit of nearly 235 km x 19,500 km.
- Launched by the PSLV-C57, Aditya-L1 mission aims to study the prospects of the Sun.
- The solar probe was carried into space by the Polar Satellite Launch Vehicle (PSLV) in 'XL' configuration.
- This mission is India's solar mission where the spacecraft will be placed in a halo orbit around the Lagrange point 1 (L1) of the Sun-Earth system.
- **The Lagrange point as defined by NASA refers to positions in space where the gravitational forces of a two-body system like the Sun and Earth produce enhanced regions of attraction and repulsion.**
- There are five Lagrange points -L1, L2, L3, L4, and L5.
- Placing the satellite in a halo orbit around L1 of the Sun-Earth system enables continuous viewing of the Sun without any eclipses or obstructions.
- The mission will span five years and carry seven specialized payloads designed to observe various aspects of solar activity.

Trajectory followed

- The PSLV initially placed the Aditya L-1 in a lower Earth orbit.
- Subsequently, the spacecraft's orbit around the Earth will be raised multiple times before it is put on a path to a halo orbit around the L1 Lagrange point. A spacecraft can orbit about an unstable Lagrange point with a minimum use of thrusters for station keeping.
- Such an orbit is known as a halo orbit as it appears as an ellipse floating over the plane
- A halo orbit, however, is not the usual orbit because the unstable Lagrange point doesn't exert any attractive force on its own.
- The spacecraft will finally be stationed in a halo orbit around the Lagrange point 1 (L1) of the Sun-Earth system, which is about 1.5 million km from the Earth.
- The Aditya L-1 will cover its journey to the L1 point in about four months.

Objectives of the Aditya L-1

To expand our knowledge of the Sun, and how its radiation, heat, flow of particles, and magnetic fields affect us;

- To study the upper atmospheric layers of the Sun called chromosphere and corona;
- While the corona is the outermost layer, the chromosphere is just below it.
- To examine coronal mass ejections (CMEs), which are large expulsions of plasma and magnetic fields from the Sun's corona;
- To analyse the corona's magnetic field and the driver of the space weather;
- To understand why the Sun's not-so-bright corona is a million degree Celsius hot when the temperature on the surface of the Sun is just about 5,500 degree Celsius;
- To help scientists know the reasons behind the acceleration of particles on the Sun, which leads to the solar wind — the constant flow of particles from the Sun;

Payloads

- The spacecraft carries seven payloads. Out of these, 4 will be the remote sensing payloads which will study the sun and remaining 3 will be the payloads to study the L1 in situ.
- Remote sensing payloads which will study the sun:
- Visible Emission Line Coronagraph (VELC) for corona/imaging and spectroscopy.
- Solar Ultraviolet Imaging Telescope (SUIT) for photosphere and chromosphere imaging.
- Solar Low Energy X-ray Spectrometer (SoLEXS), which is a soft X-ray spectrometer for Sun-as-a-star observation; and
- High Energy L1 Orbiting X-ray Spectrometer (HEL1OS), which is a Hard X-ray spectrometer for Sun-as-a-star observation

The payloads to study the L1 in situ

- Aditya Solar wind Particle Experiment (ASPEX), for solar wind/particle analyzer protons and heavier ions with directions;
- Plasma Analyser Package For Aditya (PAPA), for solar wind/particle analyzer electrons and heavier ions with directions; and
- Advanced Tri-axial High Resolution Digital Magnetometers for in situ magnetic field study.

- Why is Aditya-L1 important?

India in the big league

It is the first space-based Indian mission to study the Sun.

So far, only two other space agencies have had their spacecraft reach L1 or the Lagrange point: USA's National Aeronautics and Space Administration (NASA) and the European Space Agency (ESA).

Need to study sun from space

Studying the Sun from space is essential because the Sun emits various forms of radiation, energetic particles, and magnetic fields in all wavelengths.

Earth's atmosphere and magnetic field act as protective shields against harmful solar radiation, making space-based observations crucial for comprehensive understanding.

Understanding space weather

Every planet, including Earth and the exoplanets beyond the Solar System, evolves — and this evolution is governed by its parent star.

The solar weather and environment affect the weather of the entire system.

Variations in this weather can change the orbits of satellites or shorten their lives, interfere with or damage onboard electronics, and cause power blackouts and other disturbances on Earth.

Knowledge of solar events is key to understanding space weather.

DPIIT holds review meeting for wider adoption of PM Gati Shakti National Master Plan in States/UTs

To promote wider adoption of PM GatiShakti National Master Plan (NMP), Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry conducts weekly review meetings with States and Union Territories to monitor and extend support for efficient and effective utilization of their State Master plan (SMP) portals for infrastructure planning and implementation.

A review meeting was convened for the Western and Central Zones States/UTs of India, chaired by Special Secretary (Logistics), DPIIT, Ms. Sumita Dawra at New Delhi on August 31, 2023. The meeting witnessed active participation from States/UTs i.e. **Maharashtra, Goa, Rajasthan, Daman & Diu and Dadar & Nagar Haveli, Gujarat, Madhya Pradesh and Chhattisgarh.**

During the meeting, the Special Secretary (Logistics) stressed upon the importance of utilising the GatiShakti NMP/SMP portal and adopting 'whole of government' approach for infrastructure and social sector planning.

The chair mentioned various **benefits** of PM GatiShakti National Master Plan (NMP) by leveraging data layers and tools for effective, data-driven decision making, that includes:

i. Optimized Route Planning

ii. Enhanced visibility of intersections from forest, economic zones, archaeological sites etc.

iii. Enabling time and cost saving for planning and implementation of infrastructure projects, such as, use of digital surveys on NMP to streamline the preparation of Detailed Project Reports (DPR) with higher accuracy.

She also mentioned that the States/UTs are extensively using the PM GatiShakti approach for planning connectivity to **Industrial Regions**; for selecting the location of **social infrastructure assets**, such as anganwadis, schools, hospitals, etc.

States/UTs are integrating their existing development programmes/schemes with the GIS-based NMP/SMP to achieve better planning. For instance, the **State of UP**, integrated its *Pahunch portal* with the SMP, for effective decision-making about site suitability of new schools, based on various parameters like population, connectivity, teacher-pupil ratio, etc. Similarly, the **Gujarat Government** used the PMGS for planning its *coastal corridor* to promote tourism. **State of Goa** planned the *disaster management/ evacuation route* during floods to minimize loss of life, using the PMGS NMP/SMP portals.

It was further emphasised that the States/UTs must look after the following **parameters** for wider adoption of PM GatiShakti NMP:

i. regular meeting/workings of institutional mechanism at States/UTs level;

ii. ensure quality of data layers on NMP/SMP portal;

iii. usage of SMP for project planning and implementation to facilitate Ease of Logistics, Ease of Living, and Ease of Doing Business; and

The States/UTs are being encouraged to formulate State Logistics Policy (SLPs) aligned with National logistics policy (NLP) to bring holistic focus on 'logistics' in public policy at State level. So far, 22 States have notified their State Logistics policies.

The States/UTs were sensitized about the advantages of utilizing PM GatiShakti NMP/SMP at the **district level** for planning purposes. To enable area-based development, it is essential to adopt PM GatiShakti principles for gap identification, project planning, etc. at grass root level. This is where the involvement of **district-level officers** becomes crucial in implementing the area-based approach for **social and economic planning** within their **districts**.

The approach can streamline several challenges, such as land acquisition, approvals, utility shifting coordination, administrative assistance, and more, expediting and ensuring time-bound project implementation. States/UTs were recommended to identify pilot areas for implementation of planning and analysis through the PM GatiShakti NMP/SMP.

Tool-kits and machineries to artisans under 'Gramodyog Vikas Yojna' distributed in Bhubaneswar, Odisha

The Chairman of the Khadi and Village Industries Commission (KVIC), Ministry of Micro, Small and Medium Enterprises, Shri Manoj Kumar distributed tool-kits and machineries to artisans in a distribution ceremony in Bhubaneshwar (Odisha) on September 01, 2023.

During this event, Electric Wheels were distributed to 100 potters, Footwear Toolkits were provided to 75 Leather Artisans and Paper Massey Machines were given to 60 artisans as a part of the Gramodyog Vikas Yojana. The Member of Parliament from the Bhubaneswar Lok-Sabha Constituency, Smt. Aparajita Sarangi and Shri Manoj Kumar Singh, Member East Zone KVIC were also present on the occasion.

An Artisan Sammelan and a Pottery-Expo organized under the Gramodyog Vikas Yojana was organised at the Kalinga Institute of Industrial Technology campus in Bhubaneshwar. Smt.

Aparajita Sarangi highlighted the commendable achievements of KVIC in the last 9 years under the leadership of the Prime Minister Shri Narendra Modi. She emphasized that KVIC is actively contributing to the realization of the "Atmanirbhar Bharat" vision and playing a vital role in generating employment opportunities in rural India.

Gramodyog Vikas Yojana

It was launched in March 2020. It is one of the two components of the Khadi Gramodyog Vikas Yojana which is a Central Sector Scheme (CSS). The other component of Khadi Gramodyog Vikas Yojana is the Khadi Vikas Yojana (KVY) which includes two new components such as Rozgar Yukt Gaon, Design House (DH)

GVY aims to promote and develop the village industries through common facilities, technological modernization, training etc.

Included Activities:

- Agro-Based & Food Processing Industry (ABFPI)
- Mineral-Based Industry (MBI)
- Wellness & Cosmetics Industry (WCI)
- Handmade Paper, Leather & Plastic Industry (HPLPI)
- Rural Engineering & New Technology Industry (RENTI)

Service Industry

Components:

R &D and Product Innovation: R&D support is given to institutions that intend to carry out product development, new innovations, design development, product diversification processes etc.

Capacity Building: The existing MDTCs (Master Development Training Centers) and institutions of excellence address the capacity building of staff and artisans as part of the Human Resource Development and Skill Training components.

Marketing & Publicity: The village institutions provide market support by way of preparation of a product catalogue, industry directory, market research, new marketing techniques, buyer-seller meetings, arranging exhibitions etc.

What is KVIC?

KVIC is a statutory body established under the Khadi and Village Industries Commission Act, 1956.

The KVIC is charged with the planning, promotion, organisation and implementation of programmes for the development of Khadi and other village industries in the rural areas in coordination with other agencies engaged in rural development wherever necessary.

It functions under the Ministry of MSMEs.

What is the Significance of Village Industries in the Indian Economy?

Employment Generation: Village industries are labor-intensive, providing ample employment opportunities in rural areas. They contribute to reducing unemployment and underemployment, particularly among the rural population.

These industries absorb a substantial workforce, including skilled, semi-skilled, and unskilled workers.

Rural Development: Village industries contribute to the overall development of rural areas. By establishing small-scale enterprises in villages, they help in creating local economic activities, reducing migration to urban areas, and preventing the concentration of population in cities.

Poverty Alleviation: Village industries contribute to poverty alleviation by generating income for rural communities. They provide livelihood options for people who have limited access to formal employment opportunities, particularly in agriculture.

By promoting entrepreneurship and self-employment, these industries empower individuals to improve their socio-economic conditions.

Utilisation of Local Resources: Village industries typically utilize local resources and raw materials available in rural areas. This helps in promoting sustainable development and reducing dependence on external resources.

It encourages the utilisation of locally available skills, traditional knowledge, and natural materials, thus preserving local heritage and culture.

Export Potential: Many village industries produce traditional crafts, handlooms, handicrafts, and other unique products that have high demand in domestic as well as international markets.

The export of these products generates foreign exchange earnings and enhances the country's global trade competitiveness.

What are the Other Initiatives for Development of Village Industries?

Deen Dayal Upadhayay Grameen Kaushalya Yojana

Pradhan Mantri Kaushal Vikas Yojana

Indian Railways achieved freight loading of 634.66 MT between 1st April, 2023 and 31st August, 2023 which is 13.78 MT more than the last year's corresponding period.

In terms of revenue, Indian Railways earned ₹ 1 Lakh Cr. during 1st April, 2023 to 31stAugust,2023.

Indian Railways witnessed highest ever Capex Utilization in the 5 months during 1st April, 2023 to 31stAugust, 2023.

In terms of Freight loading, Indian Railways has achieved 634.66 MT during 1stApril , 2023 to 31stAugust,2023, compared to 620.88 MT over the corresponding period of last year and the revenue achieved is approx. Rs 1 Lakh Cr. Which includes revenue from Freight segment, passenger segment and other sundry revenue.

- The loading of Iron Ore in the same period is 70.84 MT which is 15.56% more than 61.30 MT achieved in the corresponding period of last year.
- In the same period, Pig Iron and Finished Steel loading is 28.42 MT over 26.16 MT achieved in the corresponding period of last year, which recorded a growth of 8.63%.
- The loading of fertilizer in the same period is 24.13 MT over 22.25 MT achieved in the corresponding period of last year, which shows growth of 8.45%.
- In the same period, Cement loading is 63.29 MT over 59.44 MT achieved in the corresponding period of last year, which shows growth of 6.48%.
- The loading of Container services in the same period is 34.31 MT over 32.60 MT achieved in the corresponding period of last year, which shows growth of 5.22%.
- The loading of POL in the same period is 20.59 MT over 19.91 MT achieved in the corresponding period of last year, which shows growth of 3.41%.
- The loading of Coal during the same period is 311.53 MT over 305.39 MT achieved in the corresponding period of last year.
- In addition to above, Automobile transportation by rail has shown a growth of 26% whereas earnings from automobile has shown a jump of 24.5%.
- In the month of August 23, Indian Railways loaded 126.95 MT against 119.33 MT in Aug 22, which shows a growth of 6.38%.

Indian Railways has witnessed approx. 48% Capital expenditure utilization (Highest ever) in the first five months of this Financial Year till August 2023. Indian Railways has made an expenditure of ₹ 1, 15,000 Crores till August 2023. This investment is seen in various infrastructure projects like New Lines, Doubling, Gauge Conversion and enhancing passenger amenities. Safety of the passengers is paramount in Railways. Significant sum has been invested in enhancing the safety related works. The Capex Utilization is approx. 54 % in comparison to the last year corresponding period.

ENTAZIA

FMC India unveiled ENTAZIA biofungicide, its newest product in the market. ENTAZIA biofungicide is an innovative biological crop protection product that contains Bacillus

Subtilis, a beneficial bacterium that can suppress fungal pathogens.

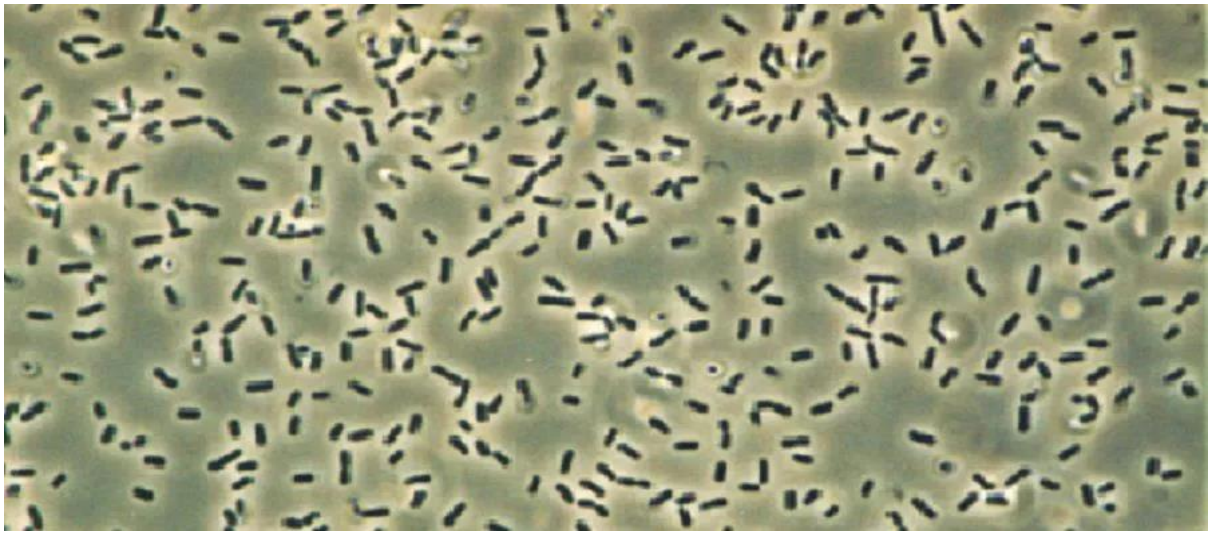
ENTAZIA is a biofungicide crop protection product developed by FMC India. It is specifically formulated with Bacillus subtilis, a naturally occurring bacterium, as its active ingredient. The product is designed to offer farmers an effective and sustainable solution for safeguarding their crops against fungal diseases while ensuring environmental integrity.

ENTAZIA is categorized as a biofungicide, which means it is derived from natural sources and relies on living organisms or their byproducts to control plant diseases. In this case, Bacillus subtilis is utilized for its known capabilities in combating plant pathogens.

FMC India is the entity responsible for the development of ENTAZIA. FMC is a global agricultural sciences company with a focus on delivering innovative and sustainable solutions to the agricultural sector. The development of ENTAZIA underscores FMC's commitment to providing farmers with effective and eco-friendly crop protection options.

Biofungicide

It is a type of biological pesticide that is used to control fungal diseases in plants. Unlike chemical fungicides, which are synthetic compounds, biofungicides are formulated with living organisms or their byproducts. These natural agents help prevent, inhibit the growth of, or suppress fungal pathogens that can damage crops, trees, and other plants.



Examples of microorganisms commonly used in biofungicides include Bacillus spp. (bacteria), Trichoderma spp. (fungi), and mycoviruses (viruses that infect fungi). These organisms have been found to effectively combat a range of fungal pathogens, providing sustainable solutions for disease management in agriculture and horticulture.

Key characteristics and components of biofungicides:

Biofungicides often contain beneficial microorganisms such as bacteria, fungi, or viruses that have antagonistic effects on plant pathogens. These microorganisms may either directly attack the pathogen or stimulate the plant's natural defence mechanisms.

They work through various modes of action. Some directly parasitize or compete with the fungal pathogens for resources, while others produce compounds that inhibit the growth of the pathogens.

They are considered environmentally friendly because they are derived from natural sources and generally have minimal impact on non-target organisms, beneficial insects, and the overall ecosystem.

They are often safer for humans and the environment compared to chemical fungicides, as they do not leave behind harmful residues.

They can be used as part of an integrated pest management (IPM) strategy to reduce the risk of developing resistance to fungal pathogens.

They can be used on a variety of crops, including fruits, vegetables, ornamental plants, and crops.

In some cases, biofungicides are used in combination with chemical fungicides to improve disease control and reduce the amount of synthetic chemicals required.

The use of fungicides aligns with the broader goals of sustainable agriculture and reducing the environmental impact of conventional farming practices. It offers an alternative approach to disease control while minimizing the potential negative consequences associated with the use of chemical fungicides.

Advantages of ENTAZIA

Control of Bacterial Leaf Blight

ENTAZIA harnesses the natural capabilities of Bacillus subtilis to effectively control bacterial leaf blight. Bacterial leaf blight is a serious and common disease that adversely affects rice crops, often leading to significant yield losses in rice cultivation.

Leaf Blight is a generic term used to describe a plant disease that primarily affects the foliage, or leaves, of various plants. It is characterized by a range of symptoms, including leaf discolouration, wilting, and, in severe cases, the death of the affected leaves.

It can be caused by various types of pathogens, including fungi or bacteria. These pathogens infect and damage plant tissues, leading to the manifestation of leaf blight symptoms. The specific causative agents responsible for leaf blight can vary depending on the plant species and the prevailing environmental conditions.

It can affect a wide spectrum of plants, encompassing trees, shrubs, ornamental plants, and crops. The impact and severity of leaf blight can vary greatly depending on the particular plant species and the strain of the pathogen involved. In the context of the discussion about ENTAZIA, bacterial leaf blight in rice is of particular concern, given its potential to cause substantial reductions in rice yields and economic losses for farmers.

Activation of Crop's Defense System

One of the key benefits of ENTAZIA is its ability to activate the innate defence mechanisms of the treated crops against plant pathogens. By doing so, it not only serves as a preventive measure but also acts as a control measure against bacterial leaf blight. Importantly, it achieves these objectives without causing harm to natural predators and parasites, which are integral to maintaining a balanced and sustainable ecosystem.

Promotion of Natural Pest Defense

ENTAZIA fosters the natural pest defence mechanisms within the treated plants. This is achieved by utilizing the naturally occurring Bacillus subtilis to establish a robust line of defense against bacterial leaf blight, thereby contributing to sustainable and environmentally friendly pest management practices.

Enhancement of Plant Microbiome

The application of ENTAZIA promotes a healthy plant microbiome. The plant microbiome refers to the community of microorganisms that interact with plants. A robust and balanced microbiome enhances the resilience of plants to various stress factors and contributes to overall plant growth and vigour.

Integration with Pest Management

ENTAZIA is designed to be compatible with integrated pest management (IPM) programs. It can be integrated seamlessly into such programs alongside FMC's bio-stimulants and synthetic

fungicides. This integrated approach provides additional benefits to plants by addressing multiple facets of crop protection and growth.

FUNGA

The UN wants us all to say it along with ‘Flora & Fauna’.

The initiative to incorporate the term "funga" into discussions about biodiversity alongside "flora and fauna" represents an important step in raising awareness about the significance of fungi in ecosystems and human life

Details

Fungi's Ecological Importance: Fungi play crucial roles in ecosystems as decomposers, mycorrhizal partners with plants, and in nutrient cycling. They are essential for the health and balance of ecosystems, impacting both flora and fauna.

The Power of Language: Language shapes our perception of the world and influences our attitudes and actions. By adding "funga" to discussions about biodiversity, we acknowledge the importance of fungi and emphasize their role in the natural world.

Scientific and Conservation Recognition: The International Union for Conservation of Nature (IUCN) and the United Nations Biodiversity recognize the importance of incorporating fungi into conservation strategies and communication. This recognition can lead to better conservation efforts and policy development.

Holistic Understanding: Recognizing fungi alongside plants and animals promotes a more holistic understanding of ecosystems. It highlights that biodiversity encompasses not only the macroscopic world but also the often overlooked microorganisms like fungi.

Promoting Fungal Conservation: By elevating fungi's status in conservation discussions, there is a greater likelihood of efforts to protect and conserve fungal diversity, which is critical for maintaining healthy ecosystems.

Indigenous and Local Perspectives: Indigenous and local perspectives on conservation and biodiversity are essential. Language should be decolonized to reflect the values and knowledge of these communities and to avoid harmful practices in the name of conservation.

Introduction to Fungi

Fungi are eukaryotic microorganisms that belong to their own kingdom, distinct from plants, animals, and bacteria.

They are characterized by their heterotrophic mode of nutrition, cell walls made of chitin, and a unique life cycle involving spore formation.

Key Characteristics

Heterotrophic: Fungi are unable to produce their own food and obtain nutrients by absorbing organic matter from their environment.

Cell Wall: Unlike plants, fungi have cell walls composed of chitin, a tough polysaccharide.

Growth Forms: Fungi can exist as single-celled yeasts, multicellular molds, or elaborate fruiting bodies like mushrooms.

Reproduction: They reproduce both sexually and asexually through the formation of spores.

Diversity: Fungi exhibit a wide range of forms, sizes, and ecological roles.

Fungal Taxonomy

Zygomycota: Includes common bread molds.

Ascomycota: Contains sac fungi and yeasts.

Basidiomycota: Includes mushrooms, toadstools, and rusts.

Glomeromycota: Arbuscular mycorrhizal fungi that form symbiotic associations with plants.

Chytridiomycota: Aquatic fungi known for their flagellated spores.

Microsporidia: Intracellular parasites, often causing diseases in animals.

Examples of Common Fungal Species

- **Saccharomyces cerevisiae:** Brewer's yeast used in baking and brewing.
- **Agaricus bisporus:** Common edible mushroom.
- **Penicillium:** Source of penicillin and blue cheese.
- **Mycobacterium tuberculosis:** The causative agent of tuberculosis.
- **Candida albicans:** An opportunistic human pathogen causing yeast infections.

Fungal Structure and Function

Cellular Structure

Fungi have a well-defined cellular structure, with nuclei, mitochondria, and other organelles. The cell wall, made of chitin, provides rigidity and protection.

Reproduction

Fungi reproduce both sexually and asexually through the formation of spores. Sexual reproduction involves the fusion of specialized sexual structures. Asexual reproduction occurs through the budding of yeasts or the formation of spores in molds.

Nutrition and Ecology

Fungi play critical roles in nutrient cycling as decomposers, breaking down dead organic matter. Mycorrhizal fungi form symbiotic relationships with plant roots, aiding in nutrient absorption. Some fungi are parasitic, causing diseases in plants and animals.

Fungi in Nature

Ecological Roles

Decomposers: Fungi recycle organic matter, releasing nutrients back into ecosystems.

Mutualists: Mycorrhizal fungi form beneficial partnerships with plants.

Pathogens: Fungal diseases can impact plants, animals, and humans.

Symbiotic Relationships

Mycorrhizae: Fungi enhance plant nutrient uptake while receiving sugars from plants.

Lichens: Symbiotic associations between fungi and photosynthetic partners (algae or cyanobacteria).

Decomposers and Recyclers

Fungi are essential in breaking down complex organic compounds like lignin and cellulose.

This decomposition process is crucial for soil formation and nutrient cycling.

Pathogenic Fungi

Human and Plant Diseases

Fungal pathogens can cause diseases in humans (e.g., athlete's foot, candidiasis) and plants (e.g., rusts, powdery mildews).

Opportunistic fungal infections can be severe in immunocompromised individuals.

Fungal Pathogens in Agriculture

Crop diseases caused by fungi can result in significant economic losses.

Effective management strategies include crop rotation and fungicides.

Beneficial Fungi

Importance in Food Production

Yeasts are used in baking, brewing, and fermenting various food products.

Fungi are essential in cheese production (e.g., Penicillium molds in blue cheese).

Biotechnological Application

Production of antibiotics (e.g., penicillin) and enzymes for industrial processes.

Genetic engineering and bioremediation applications.

Environmental Remediation

Fungi can degrade pollutants and contaminants, contributing to environmental cleanup efforts.

Fungal Diversity

Mushrooms and Toadstools

Fungi in the Basidiomycota phylum produce the familiar mushroom and toadstool fruiting bodies.

Yeasts and Molds

Yeasts are unicellular fungi used in fermentation and biotechnology.

Molds form multicellular, filamentous structures often seen on decaying food.

Cryptomycota and Other Lesser-Known Groups

Ongoing research reveals new fungal groups, expanding our understanding of fungal diversity.

Reproduction and Life Cycle

Asexual and Sexual Reproduction

Asexual reproduction involves the rapid production of spores, allowing fungi to colonize new areas.

Sexual reproduction combines genetic material from different mating types, increasing genetic diversity.

Spore Formation and Dissemination

Spores are the reproductive units of fungi, dispersed by wind, water, or animals.

Germination of spores leads to the growth of new fungal mycelia.

Fungal Interactions with Humans

Culinary Uses (Edible Mushrooms)

Many cultures worldwide incorporate mushrooms into their cuisines.

Edible mushrooms like Agaricus bisporus and Shiitake (Lentinula edodes) are popular.

Mycophobia and Mycophilia

Mycophobia refers to the fear or aversion to mushrooms and fungi.

Mycophilia represents an affinity or interest in mushrooms and mycology.

Mycotoxins and Food Safety

- Some fungi produce mycotoxins that can contaminate food, posing health risks.
- Proper food storage and monitoring are essential for food safety.

Scientific Study of Fungi

Mycology as a Field of Science

- Mycologists study fungi and their biology, taxonomy, and ecology.
- Advances in DNA sequencing have revolutionized fungal taxonomy.

Emerging Fungal Diseases and Global Threats

- Emerging fungal diseases in wildlife and amphibians highlight the need for monitoring and research.
- Fungal threats to agriculture and food security are of global concern.

Agriculture Infrastructure and Development Cess (AIDC)

The Government recently exempted imports of LPG, liquified propane and liquified butane from 15 percent Agriculture Infrastructure and Development Cess (AIDC).

It is a tax that the government imposes on the commercial production of agricultural produce.

The cess is imposed at a specific rate on the value of these goods.

Purpose:

The primary objective of AIDC is to provide financial support for the development of agricultural infrastructure in India.

The funds collected through this cess will be utilised for the creation and maintenance of agricultural infrastructure such as cold storage facilities, warehouses, and market yards.

It aims to enhance the overall efficiency of the agricultural sector and improve farmers' income.

Collection: The AIDC is collected by the government at the point of sale or import of the applicable goods.

Cess

- Cess is a form of tax charged/levied over and above the base tax liability of a taxpayer.
- A cess is usually imposed additionally when the state or the central government looks to raise funds for specific purposes.
- For example, the government levies an education cess to generate additional revenue for funding primary, secondary, and higher education.
- Cess is not a permanent source of revenue for the government, and it is discontinued when the purpose of levying it is fulfilled.
- It can be levied on both indirect and direct tax

Difference between tax and cess

- Cess is different from taxes such as income tax, GST, excise duty, etc., as it is charged over and above the existing taxes.
- While all taxes go to the Consolidated Fund of India (CFI), cess may initially go to the CFI but has to be used for the purpose for which it was collected.
- If the cess collected in a particular year goes unspent, it cannot be allocated for other purposes.
- The amount gets carried over to the next year and can only be used for the cause it was meant for.
- The central government does not need to share the cess with the state government either partially or in full, unlike some other taxes.

Red Blood Cells (RBCs)

Red blood cells exposed to oxygen deficiency protect against myocardial infarction (heart attack), according to a new study.

- RBCs, or erythrocytes, are one of the components of blood. (The others are plasma, platelets and white blood cells.)
- They deliver oxygen to the tissues throughout the human body.
- Oxygen turns into energy, and tissues release carbon dioxide.
- RBCs also transport carbon dioxide back to the lungs to be exhaled.
- They are made in the bone marrow.
- They typically live for about 120 days, and then they die.

Hemoglobin:

RBCs contain a protein called haemoglobin, which binds to oxygen in the lungs, forming oxyhemoglobin.

Haemoglobin also helps carry carbon dioxide back to the lungs as carbaminohemoglobin.

Shape:

RBCs are biconcave, disc-shaped cells with a dimple in the center on both sides. This unique shape increases the surface area of the cell, allowing for efficient gas exchange.

It is covered with a membrane composed of lipids and proteins and lacks a nucleus.

What does a low RBC count mean?

A low RBC count, known as anaemia, can cause fatigue, shortness of breath, dizziness and other symptoms. If untreated, anaemia can lead to serious complications.

In many cases, anaemia occurs when people don't eat a nutrient-rich diet.

It can also be caused by pregnancy and certain medical conditions such as bleeding disorders and kidney disease.

Choosing foods that are rich in iron and other vitamins and minerals can help raise the RBC count.

What is Sickle cell anemia?

It is an inherited blood disorder.

It affects haemoglobin, the molecule in red blood cells that delivers oxygen to cells throughout the body.

People with this disease have atypical haemoglobin molecules called haemoglobin S, which can distort red blood cells into a sickle, or crescent, shape.

These sickle cells also become rigid and sticky, which can slow or block blood flow.

The cause of Sickle cell disease is a defective gene called a sickle cell gene.

A person will be born with sickle cell disease only if two genes are inherited—one from the mother and one from the father.

Treatments:

The only cure for this disease is bone marrow or stem cell transplantation.

However, there are treatments that can help relieve symptoms, lessen complications, and prolong life.