UPSC CURRENT AFFAIRS NOTES
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Breathless in Mumbai: Climate Change Has Made It Harder to Breathe in Mumbai

Among Indian metro cities, Delhi gets the most attention for its notoriously high pollution levels. But it has been evident for some time now that bad air problems affect large parts of the country.

The winter deterioration in air quality in Mumbai is fast becoming an annual talking point, just like it has been in Delhi for the past decade.

Current Situation of Mumbai's Air Quality

For most of October, the Air Quality Index (AQI) in Mumbai has registered moderate or poor. The city has not had a single good air day this month.

In the first few days of this month, the pollution was much more intense than what the AQI indicated because a layer of haze blanketed major parts of the Mumbai sky, leading to reduced visibility.

However, there is a thin silver lining; the basket of pollutants is dominated by coarser particles which can cause irritation but are less harmful than finer particles like PM2.5.

Mumbai's Geographical Advantage: Natural Cleaning Mechanism

The coastal city has a natural cleaning mechanism. Strong surface winds (moving from the land towards the sea) lead to faster dispersal of pollutants, and the strong sea breeze (moving from the sea towards the land) sweeps away these particles from the land.

This wind reversal cycle is a feature of the city for most parts of the year and repeats every three to four days during this time of the year.

When the wind is directed towards the sea, the dust particles get swept away. This acts as a natural cleansing mechanism.

Reasons Behind Mumbai's Worsening Air Quality Despite Natural Cleaning Mechanism.

Unfavourable Meteorological Conditions

Meteorological conditions play a role in pollution. But it should be clear that the weather or climate cannot generate air pollution.

Air quality deteriorates mainly due to anthropogenic sources of emissions, whether local or distant. Meteorological conditions only help to manoeuvre the pollutants in the air.

Due to La Nina- A Climate Change Phenomenon

Last winter Mumbai experienced record-breaking particulate pollution which was largely related to the unusual triple dip La Nina conditions which is linked to climate change.

An abnormal drop in surface temperature in the Pacific Ocean had a significant effect on coastal wind speeds around Mumbai.

There was hardly any wind reversal from across the Arabian Sea, which would otherwise occur every two to three days and disperse pollutants in the air.

In other words, the emission from various anthropogenic sources was not cleaned up and the city experienced its worst air of the decade.

Delayed Withdrawal of Monsoon

La Nina has gone this year. However, the withdrawal of the monsoon was delayed till October.

Things get complicated in the city if the withdrawal of the monsoon is delayed. The withdrawal time of monsoon always plays a critical role in Mumbai's air quality.

The withdrawal is always followed by an anticyclonic circulation that was right above Mumbai and the surrounding regions during the initial days of October.

This led to weak ventilation in the city. In recent years, the city has witnessed some strong and longer spells of bad air quality, that defies the basic scientific understanding of a usual environment.

Disruption in Mumbai's Wind Patterns

Sometimes, when the wind cycle gets temporarily disrupted for some reason, it has an impact on the city's air quality.

The last two years have shown that this geographical advantage no longer offers reliable protection.

Last year saw the longest spell of poor air quality in the city, extending from November to January. On some days, Mumbai's air was more polluted than Delhi.

The transport level winds, much above the surface in the atmosphere, were moderately fast and were blowing towards Mumbai from Lonavala and Khandala in the Sahyadri ranges, around 2,040 ft above sea level.

These chilly moderate winds are capable of transporting pollutants towards Mumbai.

Dust Emissions

The fact that PM10 continues to be the major pollutant in the city and the visibility of Mumbai's residents has been impacted.

It suggests that the major blame for the current worsening of air quality should be ascribed to coarser particles, largely a result of dust emissions.

Many development and construction activities undertaken across the city include the coastal corridor, work on the Metro and other digging activities.

Unfavourable weather conditions exploit the emissions from such sources to create pollution.

Way Forward

Long-Term Mitigation Planning

The festival season this year will reach its peak around mid-November when winter will set in. It would be a concern if the festivities lead to an increase in emissions. However, that would still be a short-term issue, lasting for two or three days.

The government needs to prioritise long-term mitigation planning based on mapping airsheds areas where pollutants get trapped because climate change is leading to extreme and unusual weather events and precipitating changes in the ecosystem.

Address the Root Cause of the Problem

India's Coastal regions are highly vulnerable and hence, Mumbai needs to be extra-attentive.

There is a need to address the root cause of the problem which is anthropogenic emissions from the source.

Understanding and Accepting the Problem Using Scientific Data

The battle against air pollution could prove long and difficult, but it should be addressed using science.

Understanding and accepting the problem is half the solution. There is a need to own the data coming from reliable scientific sources rather than living in denial.

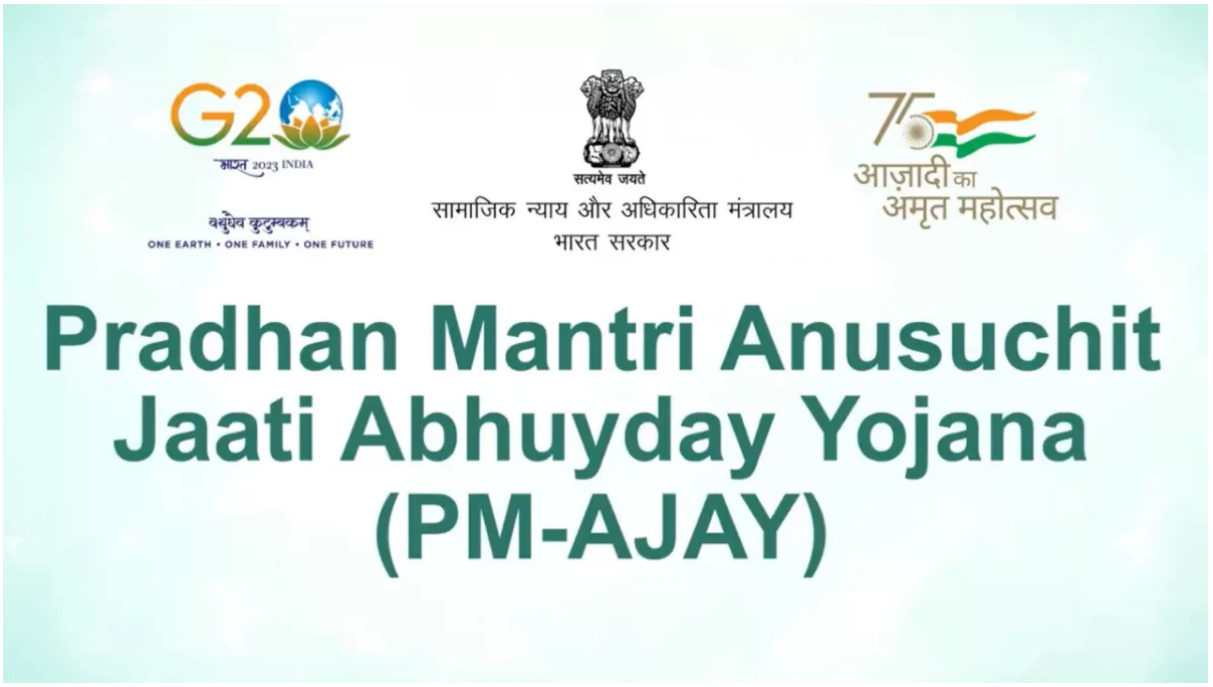
Implementation of Short- and Medium-Term Solutions

Cordoning off construction sites with green curtains, regular spraying of water to dampen dust particles and prevent them from becoming airborne, faster implementation of fossil fuel-less transportation and ensuring smooth traffic flow check pollution in the short-term.

Transitioning to electric vehicles, addressing solid waste management, cleaning up dumping grounds and industrial toxin management can improve air quality in the medium term.

PRADHAN MANTRI ANUSUCHIT JAATI ABHUYDAY YOJANA (PM- AJAY)

Pradhan Mantri Anusuchit Jaati Abhuyday Yojana (PM-AJAY) is implemented to reduce poverty among Scheduled Caste (SC) communities by generating additional employment opportunities through skill development, income-generating schemes, and various initiatives.



Pradhan Mantri Anusuchit Jaati Abhuyday Yojana (PM-AJAY)

PM-AJAY is a comprehensive scheme by the Ministry of Social Justice & Empowerment with the primary goal of uplifting Scheduled Caste (SC) communities by addressing poverty and improving socio-economic indicators.

The scheme launched in the financial year 2021-22, consolidates three centrally sponsored schemes:

Pradhan Mantri Adarsh Gram Yojana (PMAGY)

Special Central Assistance to Scheduled Castes Sub Plan (SCA to SCSP)

Babu Jagjivan Ram Chhatrawas Yojana (BJRCY)

The Scheme has three components:

Development of SC Dominated Villages into "Adarsh Gram"

This component focuses on the transformation of villages predominantly inhabited by Scheduled Castes into models or "Adarsh Grams."

The aim is to improve the overall living conditions, infrastructure, and quality of life in these villages.

Grants-in-Aid for District/State-Level Projects

This component provides grants-in-aid for projects at the district and state levels that are designed to enhance the socio-economic well-being of the Scheduled Castes.

The projects may include various initiatives, such as the construction of hostels or residential schools, comprehensive livelihood projects that involve skill development, infrastructure development, and financial assistance for loans used by beneficiaries to generate income and assets.

Construction of Hostels in Educational Institutions

Under this component, hostels are constructed in higher educational institutions that are highly ranked according to the National Institutional Ranking Framework (NIRF) of the Government of India.

Additionally, hostels may be constructed in schools funded, either fully or partially, by the Central, State, or Union Territory governments, subject to recommendations from the Ministry of Education. This aims to provide better access to education for students from Scheduled Castes.

Objectives of the Adarsh Gram (formerly known as the Pradhan Mantri Adarsh Gram Yojana)

Adequate Infrastructure: The program aims to provide the entire necessary infrastructure required for socio-economic development in SC-dominated villages. This infrastructure may include roads, schools, healthcare facilities, clean drinking water, sanitation, and other amenities that contribute to improving the overall quality of life in these villages.

Improvement in Socio-Economic Indicators: The scheme seeks to address and improve socio-economic indicators, often referred to as monitorable indicators. The primary goal is to reduce disparities between SC and non-SC populations

and raise the level of these indicators to at least the national average. Some specific socio-economic indicators that are to be improved include:

Food and Livelihood Security for BPL SC Families: The program aims to ensure that all Below Poverty Line (BPL) SC families have access to adequate food and livelihood opportunities. This includes measures to alleviate poverty and enhance income-generating activities for SC families.

Education for SC Children: The objective is to ensure that all SC children complete their education at least up to the secondary level. This focus on education is crucial for breaking the cycle of poverty and improving opportunities for SC youth.

Maternal and Infant Mortality: The scheme aims to address factors that contribute to maternal and infant mortality rates in SC communities. Improved healthcare, prenatal care, and access to medical services are part of this objective.

Elimination of Malnutrition: Particularly among children and women, the program aims to eliminate malnutrition in SC communities. This includes ensuring access to proper nutrition and healthcare to combat malnutrition-related health issues.

By focusing on these objectives, the Adarsh Gram Component aims to uplift and empower SC communities, eliminate disparities, and improve the overall quality of life for Scheduled Caste individuals and families in SC-majority villages in India.

Grants-in-aid for District/State-level Projects for Socio-Economic Betterment of SCs

The Grants-in-aid for District/State-level Projects for Socio-Economic Betterment of SCs is a scheme aimed at promoting the socio-economic development of Scheduled Castes (SCs) in India.

This scheme encompasses various types of projects with a focus on improving the livelihoods and overall well-being of SCs.

Types of Projects

Comprehensive Livelihood Projects: These projects aim to create a holistic ecosystem for generating sustainable income and social advancement for the Scheduled Castes. They may involve a combination of the following elements:

Skill Development: Providing skill development courses in line with the norms of the Ministry of Skill Development and Entrepreneurship (MSDE).Related Facilities and Infrastructure: Supporting the infrastructure and facilities needed for conducting skill development activities by the government.

Grants for Asset Creation/Acquisition: Projects should have provisions for acquiring or creating assets that are necessary for livelihood generation. Financial assistance, in the form of loans, may be provided to beneficiaries for such asset acquisition or creation, with a maximum limit of Rs. 50,000 or 50% of the asset cost, whichever is lower, per beneficiary or household.

Infrastructure Development: Developing infrastructure related to the project, including hostels and residential schools.

Other Infrastructure Development: This component encompasses various infrastructure development projects in SC-majority villages that are designed to uplift the socio-economic conditions of these areas.

Special Provisions

Up to 15% of the total grants are allocated exclusively for viable income-generating economic development schemes or programs for SC women.

Up to 30% of the total grants are earmarked for infrastructure development.

At least 10% of the total funds are dedicated to skill development initiatives.

The scheme also aims to promote SC women cooperatives engaged in the production and marketing of consumer goods and services.

Long Valley Caldera

More than 2,000 earthquakes have been identified rumbling across the Long Valley Caldera in the last few years by scientists at the California Institute of Technology (Caltech). It is located in the Eastern Sierra Nevada Mountains of California, United States of America (USA).

It is a dormant supervolcano. It was formed by a super-eruption about 760,000 years ago that blasted 140 cubic miles of magma, covering much of east-central California in hot ash that was blown as far away as present-day Nebraska. It has been unleashing earthquake swarms on a regular basis since 1978, raising concerns that it might be at risk of erupting. It is a depression created after a volcano releases the majority of the contents of its magma chamber in an explosive eruption. Without any structural support below, the land around the erupting volcanic vent or vents collapses inwardly, creating the bowl-shaped caldera.

A caldera-causing eruption is the most devastating type of volcanic eruption.

These are formed by the inward collapse of a volcano.

Calderas may have parts of their sides missing because land collapses unevenly.

Types of Calderas

Crater-Lake Calderas: It is a result from the collapse of a stratovolcano after a Plinian eruption, the most explosive type of volcanic eruption.

Plinian eruptions release massive amounts of lava, volcanic ash, and rocks.

Shield Volcano Calderas: These calderas do not result from singular explosive eruptions.

They instead subside in gradual stages, due to the episodic release of lava. This less-explosive release of lava, known as lava fountaining, is characteristic of shield volcanoes. As a shield volcano periodically releases lava, it produces nested or terraced depressions rather than a large bowl-shaped caldera.

It is composed of dormant and active shield volcanoes.

Resurgent Calderas:

These are the largest volcanic structures on Earth.

They are not associated with one particular volcano, but instead result from the widespread collapse of vast magma chambers.

This caldera collapse is produced by incredibly destructive eruptions known as pyroclastic sheet flows, the likes of which have not occurred in historic times.

Subscriber Identification Module (SIM)

The Subscriber Identification Module (SIM) cards are the ID cards of the cellular world, and they have evolved in step with cellular networks.

It is an integrated circuit, or a microchip, that identifies the subscriber on a given network.

In order for a mobile phone to connect to any cellular network that follows the Global System for Mobile Communications (GSM) standard, a SIM card is mandatory.

This relationship is established using a unique authentication key a piece of data that a user needs to ‘unlock’ access to the network. Every SIM card stores this data, and it is designed such that the user can’t access it through their phone.

Instead, signals sent by the phone into the network are 'signed' by the key, and the network uses the signature to understand whether the phone’s connection is legitimate.

SIM cards also store information about its own ID number (the integrated circuit card identifier), the IMSI, the subscriber’s location area identity (i.e. their current location), a list of preferred networks (to whom the subscriber can connect when roaming), and, emergency numbers.

How does a SIM card work?

SIM cards are designed according to the ISO/IEC 7816 international standard maintained by the International Organisation for Standardisation and the International Electrotechnical Commission. It applies to electronic identification cards, including smart cards.

In this standard, the card itself consists of the integrated circuit, which is glued to a silicon substrate on the top side. On the other side of the substrate are metal contacts, which form the gold coloured side of the SIM card.

Wires connect the integrated circuit from its bottom side to the metal contacts on the top side, and the contacts interface with the phone's data connectors.

The metal contacts have a segmented appearance. Each segment is called a pin and has a specific purpose.

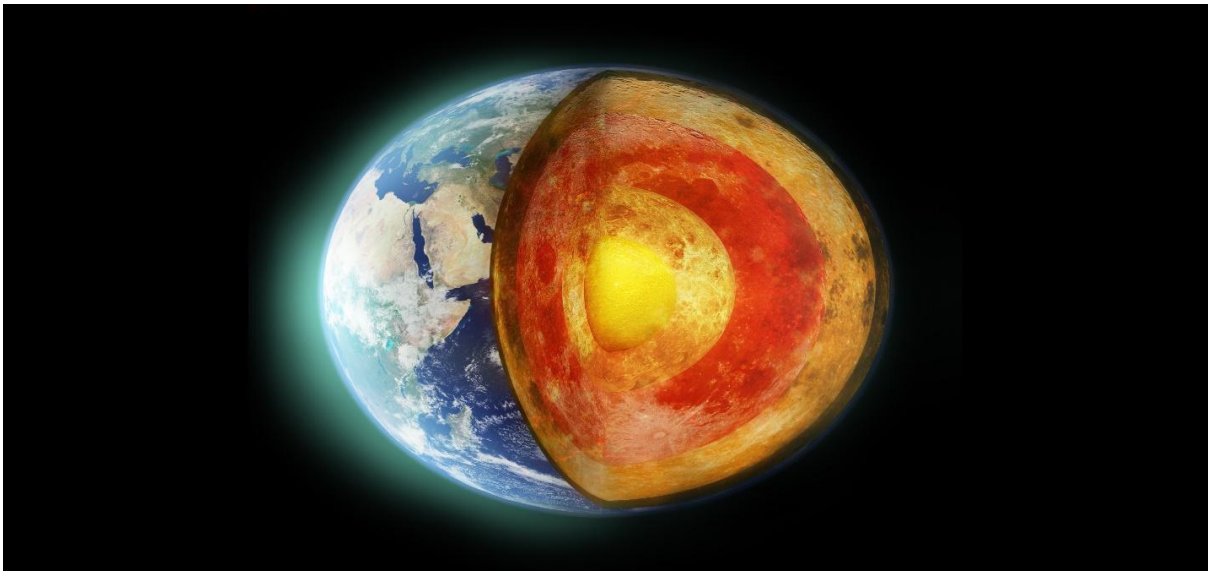
When a subscriber dials a recipient's number, the phone sends data via the network signed by the key on the SIM card to a telephone exchange.

If the recipient is connected to the same exchange, the network establishes their identity, and the call is routed to them.

If the recipient is 'located' elsewhere, a computer connected to the network routes the call there according to the most optimal route.

EARTH'S CORE LEAKING

The discovery of unusually high levels of helium-3 (^3He) in 62-million-year-old lava rocks on Baffin Island has the potential to reshape our understanding of the Earth's deep interior.



The presence of high concentrations of helium-3 challenges the long-held belief that the Earth's core is encapsulated and chemically stable, not transferring materials to the planet's outer layers. This finding suggests that there might be a connection between the Earth's core and its surface.

Helium-3 Origin

Helium-3 is a primordial substance created shortly after the Big Bang. It is typically found in small quantities at the Earth's surface and is believed to have been trapped within the Earth during its formation.

The discovery of significant amounts of helium-3 in volcanic rocks suggests that it may be escaping from the Earth's core, which was not previously considered.

Dynamic Earth Interior

If the Earth's core is indeed leaking helium-3, it implies that the deep interior of our planet is more dynamic than previously thought. This challenges the traditional notion of a stable and isolated core and suggests that elements can move between the metallic core and the rocky portions of the Earth.

Further Research

The discovery raises many questions about the Earth's internal processes. Scientists will likely conduct further research to determine if other elements also escape from the core and how these elements migrate to the Earth's surface.

This research could lead to a better understanding of the Earth's formation and evolution.

Potential Paradigm Shift

The findings have the potential to revolutionize our knowledge of the Earth's deep interior and its interaction with the surface. It may lead to a paradigm shift in our understanding of Earth's geology and how materials are exchanged between different layers of the planet.

Earth's Interior

The Earth's interior is divided into several layers, each with its unique characteristics. These layers are identified based on differences in composition, temperature, pressure, and physical properties.

The main layers of the Earth's interior, from the outermost to the innermost, are the crust, mantle, outer core, and inner core.

Crust

The Earth's crust is the outermost layer and is relatively thin compared to the other layers. It is primarily composed of solid rock and is divided into two main types:

Continental Crust: This is thicker and less dense than oceanic crust. It consists of a variety of rock types, including granite.

Oceanic Crust: This is thinner and denser than continental crust and is mainly composed of basalt.

Mantle

The mantle lies beneath the crust and is much thicker, extending to a depth of about 2,900 kilometres (1,800 miles).

It is composed of solid rock, but it is partially molten and can flow over very long time scales. This flow in the mantle is responsible for the movement of tectonic plates.

The mantle's upper part is known as the asthenosphere, which is partially molten and is responsible for the movement of tectonic plates. The lower mantle is mostly solid and experiences high pressures and temperatures.

Outer Core

The outer core lies beneath the mantle and extends to a depth of about 2,300 kilometres (1,430 miles).

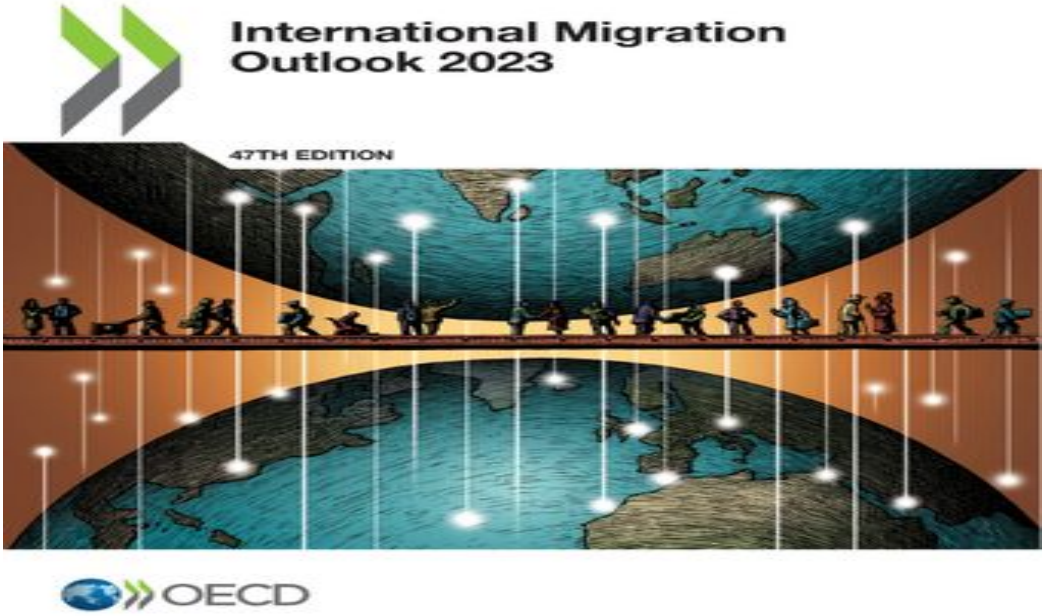
It is composed of liquid iron and nickel and is responsible for generating the Earth's magnetic field through the geodynamo process. The movement of the molten outer core creates electric currents that produce the magnetic field.

Inner Core

The inner core is the Earth's innermost layer and extends to a depth of about 1,200 kilometres (745 miles). Despite the immense pressure and temperature, the inner core is solid due to the high-pressure conditions. It is primarily composed of iron and nickel. The temperature at the inner core's boundary can reach up to 5,700 degrees Celsius (10,300 degrees Fahrenheit), which is hotter than the surface of the sun.

International Migration Outlook 2023

Recently, the ‘International Migration Outlook 2023’ was released by the Organisation for Economic Co-operation and Development (OECD).



Key findings of the International Migration Outlook 2023:
India saw the highest migration flows to Organisation for Economic Co-operation and Development (OECD) countries in 2021 and 2022.
In terms of nationalities, 0.13 million Indian citizens acquired the nationality of an OECD country in 2021.
Inflows of refugees from Ukraine reached the highest level on record, OECD wide, due to the ongoing Russia Ukraine war; more than 10 million people have become either internally displaced or refugees in the OECD region.
In terms of workers, migration flows from India (+172 percent), Uzbekistan (+122 percent), and Turkey (+240 percent) rose sharply, making them primary countries of origin after Ukraine.

Key facts about OECD
It is an international organisation of 38 countries committed to democracy and the market economy.
Its members typically democratic countries that support free- market are economies.
It was established on December 14, 1960, by 18 European nations, plus the United States and Canada.

Goal:
To shape policies that foster prosperity, equality, opportunity, and well-being for all.

It publishes economic reports, statistical databases, analyses, and forecasts on the outlook for economic growth worldwide.
The organisation also seeks to eliminate bribery and other financial crimes worldwide.
It maintains a so-called "black list" of nations that are considered uncooperative tax havens.
India is one of the many non-member economies with which the OECD has working relationships in addition to its member countries.
Headquarters: Paris, France.

UMEED scheme

A self-help group (SHG) recently launched a flower nursery as part of the UMEED scheme in Budgam.

The UMEED scheme under the Jammu and Kashmir Rural Livelihoods Mission (JKRLM) is a centrally sponsored scheme to encourage women to be self-dependent and self-sufficient.

The main objective of the scheme is to help the rural poor across Jammu and Kashmir.

It also encourages women to make small savings so that their Self-Help Groups (SHGs) eventually become bankable at a reduced rate of interest.

It helps women entrepreneurs exhibit and market their products.

It is implemented by the Jammu & Kashmir State Rural Livelihoods Society.

Jammu and Kashmir Rural Livelihoods Mission (JKRLM):

It is a poverty alleviation programme focusing on women empowerment through self-managed and sustainable institutional platforms of women, financial inclusion, and sustainable livelihoods.

The Mission aims to reduce poverty by building strong grass-root institutions for the poor in Jammu and Kashmir, engaging them in gainful livelihood interventions and ensuring appreciable improvements in their income on a sustainable basis.

Under the National Flagship Programme of the Government of India, the National Rural Livelihoods Mission (NRLM) is implemented in J&K as JKRLM popularly known as UMEED.

The scheme provides rural women with various platforms (self-help groups), Village Organization, Cluster Level Federation and Block Level Federations) at the block level.

Article 142 of the Indian Constitution

The Supreme Court recently directed sale of ancestral property of a man to pay arrears of maintenance of Rs. 1.25 crore to his wife under its inherent powers under Article 142.

It deals with the Supreme Court's power to exercise its jurisdiction and pass an order for doing complete justice in any cause or matter pending before it.

It provides the apex court with a special and extraordinary power and is meant to provide justice to litigants who have suffered traversed illegality or injustice in the course of legal proceedings.

Article 142(1) states that “The Supreme Court in the exercise of its jurisdiction, may pass such decree or make such order as is necessary for doing complete justice in any cause or matter pending before it, and any decree so passed or

order so made shall be enforceable throughout the territory of India in such manner as may be prescribed by or under any law made by Parliament and, until provision in that behalf is so made, in such manner as the President may by order prescribe".

Article 142 allows the Supreme Court to deliver justice in exceptional cases where existing provisions or laws are not applicable.

If a legislative enactment seeks to make unenforceable the decree or order of the Supreme Court made under Article 142 in relation to the cause and the parties between whom it was made, such law would be void for contravening Article 142 [8].

Significant cases where Article 142 was invoked:

Babri Masjid Case: The article was used in the Ram Janmabhoomi-Babri Masjid land dispute case and was instrumental in the handover of the disputed land to a trust to be formed by the union government.

Bhopal Gas Tragedy: The SC invoked its plenary powers in the Union Carbide vs Union Government case and intervened to provide compensation to victims of the deadly Bhopal Gas Tragedy.