

ECONOMY**Transport and Marketing Assistance Scheme**

Recently, the Ministry of Commerce and Industry has revised the Transport and Marketing Assistance (TMA) scheme for specified agriculture products. It will be effected on or after 1st April, 2021, up to 31st March, 2022.

Key Points**About:**

- It was launched in 2019, for providing financial assistance for the transport and marketing of agricultural products to boost exports of such commodities to certain countries in Europe and North America.
- 1. In the year 2018, the government approved an Agriculture Export Policy with an aim to double the shipments to USD 60 billion by 2022.
- 2. APEDA (Agricultural and Processed Food Products Export Development Authority) works towards expanding the export potential of Indian agricultural and food products.
- Under the TMA, the government reimburses a certain portion of freight charges and provides assistance for the marketing of agricultural produce. The assistance, at notified rates, will be available for export of eligible agriculture products to the permissible countries, as specified from time to time.
- The revised scheme has included dairy products among other agriculture products in its purview and increased the rates of assistance. Rates of assistance have been increased, by 50% for exports by sea and 100% through the air.
- TMA would be reimbursed through the Regional Authorities of DGFT (Directorate General of Foreign Trade).

Objective:

- To provide assistance for the international component of freight and marketing of agricultural produce.
- To mitigate the disadvantage of higher cost of transportation of export of specified agriculture products due to trans-shipment.
- To promote brand recognition for Indian agricultural products in the specified overseas markets.

2. Creating Methanol from Coal

Recently, the first Indigenously Designed High Ash Coal Gasification Based Methanol Production Plant has been opened in Hyderabad. With this, Government owned engineering firm BHEL (Bharat Heavy Electricals Limited) has successfully demonstrated a facility to create methanol from high ash Indian coal.

Key Points**About:**

- Methanol is utilized as a motor fuel, to power ship engines, and to generate clean power all over the world. However, the majority of worldwide methanol production is derived from natural gas, which is a relatively easy process.
- Since India doesn't have much of the natural gas reserves, producing methanol from imported natural gas leads to outflow of foreign exchange and is uneconomical because of higher prices.
- The next best option is to utilise India's abundant coal. However, due to the high ash percentage of Indian coal, most internationally accessible technology will not be adequate.
- To address this issue, BHEL successfully demonstrated a facility to create 0.25 TPD (Ton per Day) Methanol from high ash Indian coal using a 1.2 TPD Fluidized bed gasifier. The methanol purity of the crude methanol produced is between 98 and 99.5%.
- This is part of NITI Aayog's 'Methanol Economy' programme that is aimed at reducing India's oil import bill, greenhouse gas (GHG) emissions, and converting coal reserves and municipal solid waste into methanol.
- Also this in-house capability will assist India's coal gasification mission and coal-to-hydrogen production for Hydrogen Mission.

NITI Aayog's Methanol Economy Programme:

- About Methanol: Methanol is a low carbon, hydrogen carrier fuel produced from high ash coal, agricultural residue, CO₂ from thermal power plants and natural gas. It is the best pathway for meeting India's commitment to COP 21 (Paris Agreement).

- Methanol vis-a-vis-Petrol and Diesel: Although slightly lower in energy content than petrol and diesel, methanol can replace both these fuels in the transport sector (road, rail and marine), energy sector (comprising boilers, process heating modules, tractors and commercial vehicles) and retail cooking (replacing LPG [partially], kerosene and wood charcoal).
- **Environmental and Economic Impact:**
 1. Blending of 15% methanol in gasoline can result in at least 15% reduction in the import of gasoline/crude oil. In addition, this would bring down GHG emissions by 20% in terms of particulate matter, NOx, and SOx, thereby improving the urban air quality.
 2. The Methanol Economy will also create close to 5 million jobs through methanol production/application and distribution services.
 3. Additionally, Rs 6000 crore can be saved annually by blending 20% DME (Di-methyl Ether, a derivative of methanol) in LPG. This will help the consumer in saving between Rs 50-100 per cylinder.
- **Initiatives Taken:**
 1. The Bureau of Indian Standards has notified 20% DME blending with LPG, and a notification for M-15, M-85, M-100 blends has been issued by the Ministry of Road, Transport and Highways.
 2. In October 2018, Assam Petrochemicals launched Asia's first canister-based methanol cooking fuel programme. This initiative is in line with the Prime Minister's vision of striving towards the provision of a clean, cost-effective and pollution-free cooking medium.
 3. Five methanol plants based on high ash coal, five DME plants, and one natural gas-based methanol production plant with a capacity of 20 MMT/annum, in a joint venture with Israel, have been planned to be set up.
 4. Three boats and seven cargo vessels are being built by the Cochin Shipyard Limited for Inland Waterways Authority of India to use methanol as a marine fuel.

Way Forward

- India, with 125 Billion Tonnes of proven Coal reserves and 500 million tonnes of Biomass generated every year has a huge potential for ensuring energy security based on alternate feedstock and fuels.
- However, Methanol does not get the same attention from the government as EV (Electric Vehicles), even though the former can come in faster. There is significant work needed to implement the Methanol Economy holistically.
- The development of methanol based technology can turn energy-importing India into an energy exporting country.

SCIENCE & TECHNOLOGY

Lunar Science Workshop 2021: ISRO

Recently, the Lunar Science Workshop 2021, was conducted by Indian Space Research Organisation (ISRO) to commemorate the completion of two years of operation of Chandrayaan-2 orbiter in lunar orbit. According to the ISRO, the observations of the Chandrayaan-2 orbiter payloads have yielded discovery-class findings. The Chandrayaan-3 mission is likely to be launched late next year.

Key Points

About the Chandrayaan-2:

- **Lunar Exploration:** It is the second spacecraft in the Indian series of Lunar exploration satellites. It comprised an orbiter, lander named Vikram and rover named Pragyan to explore the unexplored South Polar region of the Moon.
- **Launch:** It was launched on 22nd July, 2019 from the Sriharikota spaceport by GSLV Mk-III.
 1. It was inserted into a lunar orbit in August, 2019.
 2. The orbiter and lander modules were separated as two independent satellites in September, 2019.
- **Failure of Lander:** Vikram lander's descent was as planned and normal performance was observed up to an altitude of 2.1 km from Lunar surface in September, 2019.
 1. Subsequently, communication from the lander was lost and the lander had a hard landing on the lunar surface. The six-wheeled Pragyan rover was accommodated inside the Vikram lander.
 2. A successful soft-landing would have made India the fourth country after the erstwhile Soviet Union, the United States, and China to do so.
- **Role of Orbiter:** The orbiter, placed in its intended orbit around the Moon, provided the understanding of the Moon's evolution and mapping of minerals and water molecules in polar regions, using its eight advanced scientific instruments.

1. The precise launch and optimised mission management have ensured a long life of almost seven years for the orbiter instead of the planned one year.

Findings of Chandrayaan-2 Orbiter:

- **Detection of Argon-40:** The mass spectrometer CHandra's Atmospheric Compositional Explorer 2 (CHACE 2) conducted first-ever in-situ study of the composition of the lunar neutral exosphere from a polar orbital platform. It detected and studied the variability of the Argon-40 at the middle and higher latitudes of the Moon, depicting the radiogenic activities in the mid and higher latitudes of the Lunar interior.
- **Detection of Chromium and Manganese:** Chandrayaan-2 Large Area Soft X-ray Spectrometer (CLASS) payload has detected minor elements of chromium and manganese through remote sensing.
- **Observations of Microflares of the Sun:** The observations of microflares of the Sun, during the quiet-Sun period, which provide important clues on the coronal heating problem of the Sun, were made by the Solar X-ray Monitor (XSM) payload.
- **Detection of the Hydration Features:** The first-ever unambiguous detection of the hydration features of the Moon was achieved by Chandrayaan-2 with its Imaging Infra-Red Spectrometer (IIRS) payload, which captured clear signatures of Hydroxyl and water-ice on the lunar surface.
- **Detection of the Subsurface Water-ice:** The Dual Frequency Synthetic Aperture Radar (DFSAR) instrument detected signatures of the subsurface water-ice, and achieved high resolution mapping of the lunar morphological features in the polar regions.
- **Imaging the Moon:** Imaging the moon from 100 km lunar orbit with "best-ever" achieved resolution of 25 cm with its Orbiter High Resolution Camera (OHRC).
- **Geological Findings:** The Terrain Mapping Camera (TMC 2) of Chandrayaan-2, which is conducting imaging of the Moon at a global scale, has found interesting geologic signatures of lunar crustal shortening, and identification of volcanic domes.
- **Study of Moon's Ionosphere:** The Dual Frequency Radio Science (DFRS) experiment onboard Chandrayaan-2 has studied the ionosphere of the Moon, which is generated by the solar photo-ionisation of the neutral species of the lunar exosphere.

HISTORY

Thamirabarani Civilisation: Tamil Nadu

The Thamirabarani civilisation in Tamil Nadu is at least 3,200 years old, reveals carbon dating done on organic material retrieved from archeological excavations in Sivakalai, Thoothukudi district. Carbon Dating: The determination of the age or date of organic matter from the relative proportions of the carbon isotopes carbon-12 and carbon-14 that it contains.

Key Points

Thamirabarani River:

- The shortest river in the state (Tamil Nadu), the Thamirabarani starts in Pothigai hills of the Western Ghats in the Ambasamudram taluk, flows through Tirunelveli and Thoothukudi districts and empties at Korkai (Tirunelveli district) into the Gulf of Mannar (Bay of Bengal).

Significance of the Findings:

- It could lead to evidence that there was a city civilisation (Porunai River (Thamirabarani) civilization) in south India as long back as 3,200 years ago, the later part of the Indus Valley Civilisation.
 - Also, archaeological excavations would be carried out in other States and countries in search of Tamil roots.
2. In the first phase, studies would be undertaken at the ancient port of Muziris, now known as Pattanam, in Kerala, to establish the ancientness and culture of the Chera empire.
 3. Research would be conducted at Quseir al-Qadim and Pernica Anekke in Egypt, which were once part of the Roman empire, as well as in Khor Rori in Oman, to establish the Tamils' trade relations with these countries. Potsherds bearing Tamil scripts have been found in these countries.
 4. Studies would also be conducted in Southeast Asian countries, such as Indonesia, Thailand, Malaysia and Vietnam, where King Rajendra Chola had established supremacy.
- ✓ The three ruling houses of Tamil India, the Pandyas, Cheras, and Cholas, fought for supremacy of southern India and Sri Lanka. These dynasties promoted early literature on the Indian subcontinent and built important Hindu temples.

- ✓ Sangam literature, which was written over a period of six centuries (3rd BCE – 3rd CE) contains references to various Chola, Chera and Pandya kings.

Other Recent Findings:

- A silver punch marked coin was recently excavated from Keezhadi (Tamil Nadu) which bore the symbols of the sun, the moon, the taurine and other geometrical patterns. Studies on this found the coin to date back to the 4th century BC, which is before the time of the ancient Maurya empire (321-185 B.C.E).
- Archaeological excavations are being done at numerous places such as Kodumanal, Keeladi, Korkai, Sivakalai, in Tamil Nadu. As per the carbon dating of artefacts, the Keeladi civilisation dates back to 6th century BC.

IMPORTANT FACTS FOR PRELIM

ATL Space Challenge 2021

Recently, NITI Aayog’s Atal Innovation Mission (AIM) in collaboration with ISRO (Indian Space Research Organisation) and CBSE (Central Board of Secondary Education) has launched ‘ATL Space Challenge 2021’. Earlier, the Union cabinet in June 2020 decided to open up the space sector for private sector participation, and cleared the creation of a new entity, Indian National Space Promotion and Authorization Centre (IN-SPACe), to encourage private companies to use India’s space infrastructure.

Key Points

About:

- This is to ensure that students of classes 6 to 12 are given an open platform where they can innovate and enable themselves to solve digital age space technology problems.
- Students from both ATL (Atal Tinkering Labs) and non-ATL schools can submit their entries in the space challenge. School teachers, ATL In-charges and mentors may support the student teams. Under the ATL initiative, schools receive a grant for setting up such labs to encourage students to give shape to their ideas and come up with innovative experiments on their own in these laboratories.
- It aligns with the World Space Week 2021 which is observed from 4th -10th October each year, to celebrate the contributions of space science and technology.
- This comes against the backdrop of India’s push to move up in the Global Innovation Index (GII, released by the World Intellectual Property Organisation) rankings.



Atal Innovation Mission:

- AIM is Government of India’s flagship initiative to promote a culture of innovation and entrepreneurship in the country.
- It’s objective is to develop new programmes and policies for fostering innovation in different sectors of the economy, provide platform and collaboration opportunities for different stakeholders, create awareness and create an umbrella structure to oversee the innovation ecosystem of the country.
- **Major Initiatives:**
 1. **Atal Tinkering Labs:** Creating problem solving mindset across schools in India.

2. **Atal Incubation Centers:** Fostering world class startups and adding a new dimension to the incubator model.
3. **Atal New India Challenges:** Fostering product innovations and aligning them to the needs of various sectors/ministries.
4. **Mentor India Campaign:** A national mentor network in collaboration with the public sector, corporates and institutions, to support all the initiatives of the mission.
5. **Atal Community Innovation Center:** To stimulate community centric innovation and ideas in the unserved /underserved regions of the country including Tier 2 and Tier 3 cities.
6. **Atal Research and Innovation for Small Enterprises (ARISE):** To stimulate innovation and research in the MSME industry.

DAILY ANSWER WRITING PRACTICE

Qns. Compare between El-Nino and La-Nina. How does El-Nino impact Indian Monsoon? Can better prediction models help mitigate its adverse impact? (250 words)

Ans:

Introduction

El Niño and La Niña represent opposite extremes in the El Niño Southern Oscillation (ENSO). The ENSO cycle refers to the coherent and sometimes very strong year-to-year variations in sea-surface temperatures, rainfall, surface air pressure, and atmospheric circulation that occur across the equatorial Pacific Ocean. El Niño refers to the above-average sea-surface temperatures that periodically develop across the east-central equatorial Pacific. It represents the warm phase of the ENSO cycle. La Niña refers to the periodic cooling of sea-surface temperatures across the east-central equatorial Pacific. It represents the cold phase of the ENSO cycle.

Body

Similarities:

- They both originate in the same equatorial location – eastern equatorial Pacific Ocean, so in this way they are similar.
- Together, El Niño and La Niña are part of a natural cycle that can significantly impact not only global weather, climate, and ocean conditions but also food production, human health, and water supply.
- These systems typically last about one to two years, with the cycle alternating every three to seven years.
- El Niño and La Niña affect not only ocean temperatures, but also how much it rains on land.
- Both events are related to extreme weather events. Depending on which cycle occurs (and when), this can mean either droughts or flooding. Typically, El Niño and its warm waters are associated with drought, while La Niña is linked to increased flooding.
- Both El Niño and La Niña are being impacted due to climate change events and global warming.

How El-Nino impact Indian Monsoon

- El Nino, characterized by warming of surface temperatures in the Pacific Ocean, is associated with lower than normal monsoon rainfall in India.
- El Nino has been found to impact almost half the world triggering droughts in Australia, India, southern Africa and floods in Peru, Ecuador, the United States, the Gulf of Mexico, and the Colorado River basin.
- El Nino affects the flow of moisture-bearing winds from the cooler oceans towards India, negatively impact the summer (south-west) monsoon.
- After all, the south-west monsoon (June-September) accounts for over 70% of the country's annual rainfall and irrigates over half of the crop land.
- The rain-fed kharif crops are heavily dependent on the monsoon and the quantity of rainfall determines agricultural production.
- El Niño years tend to be drier than average, but one of the strongest El Nino of the century (1997-98) produced a monsoon season with above-average rainfall for India.
- Researchers also believe that even the location of the warming in the Pacific may possibly have an influence on the monsoon.

Can better prediction models help mitigate its adverse impact?

- Understanding the main mechanisms of ENSO has given us the ability to operationally forecast it a season or more ahead.

- Recently, South Korea's fastest supercomputers, Aleph conducted climate model simulations to understand ENSO's response to global warming.
- They noticed sea-surface temperature anomalies at CO₂-doubling conditions and it became robust at CO₂ quadrupling.
- Machine Learning has helped in the skill enhancement of forecasts for weather and particular climate phenomena, such as the ENSO in the tropical Pacific.

Conclusion

Just as for weather forecasts, the future evolution of the atmosphere can be predicted by knowing the observed atmosphere and ocean state at a given time and applying the equations of motion. Impact-based information with long-lead times may also substantially support the shift towards more anticipatory and preventative risk management, as urged in several international frameworks such as the Sendai Framework for Disaster Risk Reduction.

DAILY QUIZ

Q1. Pratas Island lies in the:

- a. Indian ocean
- b. East China Sea
- c. South China Sea**
- d. Java Sea

Q2. The LEMOA or the Logistics Exchange Memorandum of Agreement is a Military agreement between Armed Forces of India and the:

- a. United Kingdom
- b. Russia
- c. France
- d. United States**

Q3. Consider the following pairs:

1. Boko Haram: Somalia
2. Taliban: Afghanistan
3. Houthis: Yemen

Which of the given above pairs is/are correctly matched?

- a. 1 and 2 only
- b. 2 and 3 only**
- c. 1 and 3 only
- d. 1, 2 and 3

Q4. Consider the following statements about Indian antelope:

1. It is native to and found mainly in India, while it is locally extinct in Pakistan and Bangladesh.
2. It is active mainly during the day.
3. In India, hunting of Indian antelope is prohibited under Schedule I of the Wildlife Protection Act of 1972.

Which of the given above statements is/are correct?

- a. 1 and 3 only
- b. 2 and 3 only
- c. 1 and 2 only
- d. 1, 2 and 3**

Q5. In which one of the following states is Velavadar Blackbuck Sanctuary located?

- a. Odisha
- b. Tamil Nadu
- c. Madhya Pradesh
- d. Gujarat**