INTERNATIONAL RELATION (DEFENCE COOPRATION)

Strains on India-Russia defence cooperation

❖ **CONTEXT: As the war in Ukraine stretches over four months with no end in sight, it has given rise to apprehensions on Russia's ability to adhere to timely deliveries of spares and hardware.**

❖ **What is the status of India-Russia defence cooperation?**

- When the war began in February, it stated that the Indian armed forces have stocks of spares and supplies for eight to ten months and the expectation was that the war would end quickly. However, as it stretches on with no clear endgame, there are apprehensions on Russia's ability to adhere to the timelines for both spares as well as new deliveries.
- Responding to questions on this issue in early May, Army Chief acknowledged the Army's dependency on certain weapon systems specially in the area of air defence, rockets, missiles and certain tanks from Russia and Ukraine and as far as the immediate impact was concerned "the supply chain of certain spares and ammunition has got impacted to some extent, but we have adequate stocks to last for a reasonable period of time and also looking at certain alternative mitigation measures and identifying alternate sources from friendly foreign countries while in the long term, this is also an opportunity for the private industry to step up production and meet the requirements.
- The Defence Ministry and Services have carried out assessments on the possible impact on timely deliveries due to Western sanctions on Russia. While some timeline lapses and shipping delays were possible, there would not be any dent on the Army's operational preparedness along the borders especially the Line of Actual Control.
- In addition, the armed forces have also made significant emergency procurements in the last two years since the standoff in Eastern Ladakh and have stocked up on spares and ammunition. Therefore, there shouldn't be any immediate urgency for spares and other requirements, officials noted. Russia has assured India that it would adhere to delivery timelines. However, as the war stretches on there are apprehensions that it could have an impact as the Russian industry would be caught up in replenishing the inventories of their own armed forces.

❖ **What is the status of deals underway/new deals pending with Russia?**

- The defence trade between India and Russia has crossed $15 billion since 2018, in the backdrop of some big deals including the $5.43 billion S-400 long range air defence systems.
- Other major contracts currently under implementation are construction of four additional stealth frigates in Russia and India, licensed production of the Mango Armor-piercing fin-stabilised discarding sabot (APFSDS) rounds for the T-90S tanks as also additional T-90S tanks, AK-203 assault rifles among others.
- However, there is some delay. For instance, the delivery of the second regiment of the S-400 is delayed by a few months as also the operationalisation of the agreement for the manufacture of 6.1 lakh AK-203 rifles at Korwa, Amethi in Uttar Pradesh.
- There are also several big ticket deals currently under negotiation but several of them have been deferred by the Defence Ministry as part of the review of all direct import deals. This is in conjunction with efforts to push the 'Make in India' scheme in defence.
- Russian deals have also been deferred including the one for 21 MiG-29 fighter jets for the Indian Air Force (IAF) along with the up gradation of 59 existing Mig-29 jets estimated to cost ₹7,418 crore and the manufacture of 12 SU-30 MKI aircraft at an estimated ₹10,730 crore by Hindustan Aeronautics Limited (HAL).
- Another long pending deal for the manufacture of 200 K-226T utility helicopters in India is also under reconsideration due to the fact that the indigenous Light Utility Helicopter is now ready, as well as cost concerns.
- In addition, a deal for six Ka-31 early warning helicopters and a bigger deal for Igla-S very short range air defence systems have also been deferred though the Army inducted a small number of Igla-S systems brought under emergency procurement.

❖ **What is the status of payments?**

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- With Russia being shut out of the global SWIFT system for money transfers, India and Russia have agreed to conduct payments through the Rupee-Rouble arrangement. With several big ticket deals including the S-400 under implementation, there are large volume of payments to be made.
- The Central banks of the two countries had extensively discussed this issue, and small payments have been resumed and work is on to resolve larger payments. For the two countries, payments by the Rupee-Rouble arrangement is not new.
- For instance, for the S-400 air defence systems signed in October 2018, with the looming threat of U.S. sanctions under CAATSA (Countering America's Adversaries Through Sanctions Act), the two sides had worked out payments through the Rupee-Rouble exchange.
- The delivery schedule got slightly delayed as the payment was tied up. However, at that time Russia was within the SWIFT system.
- While India continues to remain Russia's largest arms buyer with a major chunk of legacy hardware from Russia and the Soviet Union, the volume of imports has reduced in the last decade.

PRELIMS

1. The functioning of the National Investigation Agency

❖ **CONTEXT: The National Investigation Agency (NIA) has taken over the probe into the June 28 killing of tailor Kanhaiyya Lal (48) in Rajasthan's Udaipur over a social media post supporting suspended Bharatiya Janata Party (BJP) leader Nupur Sharma.**

❖ **What is the NIA?**

- It is a central agency mandated to investigate all the offences affecting the sovereignty, security and integrity of India, friendly relations with foreign states, and the offences under the statutory laws enacted to implement international treaties, agreements, conventions and resolutions of the United Nations, its agencies and other international organisations. These include terror acts and their possible links with crimes like smuggling of arms, drugs and fake Indian currency and infiltration from across the borders.
- The agency has the power to search, seize, arrest and prosecute those involved in such offences.
- Headquartered in Delhi, the NIA has its branches in Hyderabad, Guwahati, Kochi, Lucknow, Mumbai, Kolkata, Raipur, Jammu, Chandigarh, Ranchi, Chennai, Imphal, Bengaluru and Patna.

❖ **When did the NIA come into being?**

- In the wake of the 26/11 Mumbai terror attack in November 2008, the then government decided to establish the NIA. In December 2008, it introduced the National Investigation Agency Bill.
- Agency deal with only eight laws mentioned in the schedule and that a balance had been struck between the right of the State and duties of the Central government to investigate the more important cases. The Bill was passed by the Lok Sabha and the Rajya Sabha.
- The agency came into existence on December 31, 2008, and started its functioning in 2009.
- Till date, the NIA has registered 447 cases.

❖ **What are the scheduled offences?**

- The list includes the Explosive Substances Act, Atomic Energy Act, Unlawful Activities (Prevention) Act, Anti-Hijacking Act, Suppression of Unlawful Acts against Safety of Civil Aviation Act, SAARC Convention (Suppression of Terrorism) Act, Suppression of Unlawful Acts Against Safety of Maritime Navigation and Fixed Platforms on Continental Shelf Act, Weapons of Mass Destruction and their Delivery Systems (Prohibition of Unlawful Activities) Act and relevant offences under the Indian Penal Code, Arms Act and the Information Technology Act.
- In September 2020, the Centre empowered the NIA to also probe offences under the Narcotic Drugs and Psychotropic Substances Act that are connected to terror cases.

❖ **How wide is NIA's jurisdiction?**

- The law under which the agency operates extends to the whole of India and also applies to Indian citizens outside the country; persons in the service of the government wherever they are posted; persons on ships and aircraft registered in India wherever they may be; persons who commit a scheduled offence beyond India against the Indian citizen or affecting the interest of India.

❖ **How does the NIA take up a probe?**

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- As provided under Section 6 of the Act, State governments can refer the cases pertaining to the scheduled offences registered at any police station to the Central government (Union Home Ministry) for NIA investigation.
- After assessing the details made available, the Centre can then direct the agency to take over the case. State governments are required to extend all assistance to the NIA.
- Even when the Central government is of the opinion that a scheduled offence has been committed which is required to be investigated under the Act, it may, suo motu, direct the agency to take up/over the probe.
- Where the Central government finds that a scheduled offence has been committed at any place outside India to which this Act extends, it can also direct the NIA to register the case and take up investigation.
- While investigating any scheduled offence, the agency can also investigate any other offence which the accused is alleged to have committed if the offence is connected to the scheduled offence.

2. <u>Saving Chenkurinji from climate change</u>

❖ **CONTEXT: A tree species endemic to the Agasthyamala Biosphere Reserve. Belonging to the Anacardiaceae family, the tree was once abundant in the hills on the southern parts of the Aryankavu Pass in Kerala's Kollam district, but its presence has been fast receding from the area over the years.**

- The Shendurney Wildlife Sanctuary derives its name Chenkurinji (Gluta travancorica), a species endemic to the Agasthyamala Biosphere Reserve. Belonging to the Anacardiaceae family, the tree was once abundant in the hills on the southern parts of the Aryankavu Pass in Kerala's Kollam district, but its presence has been fast receding from the area over the years.
- Gluta travancorica is very susceptible to climate change and the present condition of the species is quite bad with low regeneration performance.
- Though there are seemingly enough number of the tree, most are not productive, generating a negative trend in its population.
- The majority of the trees is old with poor flowering and fruiting rates.
- Though the flowering usually happens in January, of late, the species has reported a tendency to extend the process due to climate change. "It's an adaptation strategy to increase the chances of germination and maintain a minimum viable population.
- Though the tree is also seen inside the shola forests near Ponmudi, effective pollination hardly takes place in the habitat. The population in the habitat is facing inbreeding depression and we had earlier collected albino seedlings, an indication of endangerment.

❖ **Medicinal properties**

- The tree was widely seen in places such as Pandimala, Vilakkumaram and Rosemala in the past.
- It's reported to have medicinal properties and is used to lower blood pressure and treat arthritis.
- The heartwood is quite sturdy with deep red colour, and several trees were felled for wood during earlier days.
- Since the conservation measures in the past were not totally successful, the forest department is launching 'Save Chenkurinji', a campaign to be implemented in various areas coming under the Achencoil forest division.
- As part of the campaign, the department looks to plant thousands of saplings in the ghat sectors of Kollam and Pathanamthitta. The officials have identified 75 schools where Chenkurinji will be grown.

3. <u>India adds 540 species to faunal database</u>

❖ **CONTEXT: India added 540 species to its faunal database in 2021 taking the total number of animal species to 1,03,258. The country also added 315 taxa to the Indian flora during 2021, taking the number of floral taxa in the country to 55,048.**

- Of the 540 faunal species, 406 are new discoveries and 134 new records to India. Thirteen new genera were also discovered in 2021. Among the new species discovered is one species from mammal, 35 reptiles and 19 species of pisces.

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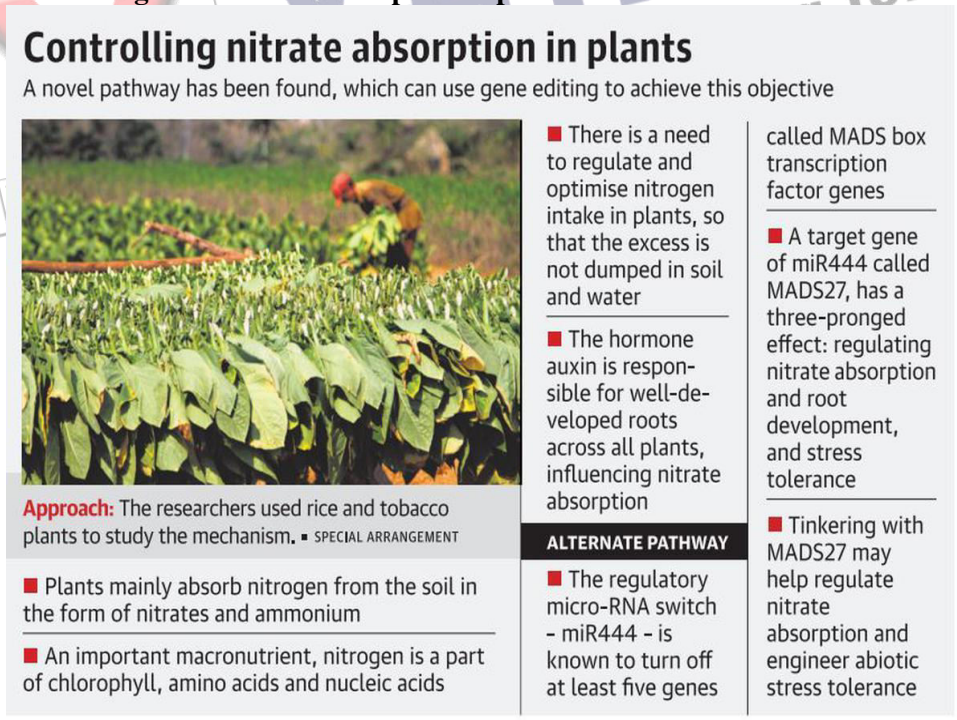
- The new mammal species discovered is Crocidura narcondamica, a white-toothed shrew, from Narcondam Island of the Andaman and Nicobar group of islands.
- Among the reptiles discovered in 2021, notable is Boiga whitakeri, or Whitaker's cat snake, from the Western Ghats in Tamil Nadu.
- The most number of new discoveries was from the faunal group Hymenoptera, an order of insects, comprising the sawflies, wasps, bees, and ants, in which 80 species, including one new genus, were discovered.
- ZSI had contributed to 68% of the animal discoveries in 2021.
- With 1.03 lakh species of fauna, India contributes to 6.1% of faunal diversity in the world.
- The 315 taxa of flora added to India consist of 298 species and 17 intraspecific taxa as new to Indian flora.
- Of these, 204 taxa are new to science and 125 taxa are new distributional records from India.
- "Forty-three per cent novelties published in various national and international journals are of vascular plants; rest are non-vascular in nature.
- This volume records 135 angiosperms, four pteridophytes, 9 bryophytes, 28 lichens, 98 fungi, 29 algae and 12 microbes.
- According to the BSI, regions such as the Western Ghats and the northeastern regions have contributed 28% of the total discoveries.
- In State-wise analysis, the most number of discoveries were made from Kerala with 51 taxa followed by Maharashtra and Arunachal Pradesh.
- In 2021, the floral discoveries include wild relatives of many potential horticultural, agricultural, medicinal, and ornamental plants such as begonia, impatiens (Balsams), legumes, zingibers and orchids.

4. <u>New pathway to regulate nitrate absorption in plants</u>

❖ **CONTEXT: Researchers led by those from the National Centre of Biological Sciences, Tata Institute of Fundamental Research, Bengaluru (NCBS-TIFR), have found a new pathway that regulates nitrate absorption in plants.**



- The gene MADS27, which regulates nitrate absorption, root development and stress tolerance, is activated by the micro-RNA, miR444, therefore offers a way to control these properties of the plant.
- The researchers studied this mechanism in both rice (monocot) and tobacco (dicot) plants.

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- Nitrogen is one of the most important macronutrients needed for development of a plant. It is a part of chlorophyll, amino acids and nucleic acids, among others. It is mostly sourced from the soil where it is mainly absorbed in the form of nitrates and ammonium by the roots.
- Nitrates also play a role in controlling genome-wide gene expression that in turn regulates root system architecture, flowering time, leaf development, etc.
- Thus, while a lot of action takes place in the roots to absorb and convert nitrogen into useful nitrates, the absorbed nitrates in turn regulate plant development apart from being useful as a macronutrient.

❖ **Nitrate overuse**

- The presence of nitrates is important for the plant development and also for grain production. However, the overuse of nitrates in fertilizers, for instance, can lead to the dumping of nitrates in the soil which leads to accumulation of nitrates in water and soil. This accumulation adds to soil and water pollution and increased contribution to greenhouse gases.
- To avoid this, there should be optimal use of nitrates. Also, since the whole process of nitrate absorption takes place in the roots, a well-developed root system is needed for this to take place optimally.
- At one level, it is known that the hormone auxin is responsible for well-developed roots across all plants. A number of genes are known to help with auxin production, improved nitrate transport and assimilation in plants.

❖ **Regulatory switches**

- In addition to this route, several gene regulatory switches that regulate nitrate absorption and root development, such as the micro-RNA, miR444, are known in monocot plants, such as rice.
- The micro-RNA 'miR444' is specific to monocots. When this is not made, its target, MADS27, is produced in higher abundance, and it improves biosynthesis and transport of the hormone auxin, which is key for root development and its branching
- This regulatory miR444 switch is known to turn off at least five genes called MADS box transcription factor genes. The speciality of the MADS box transcription factors is that they function like switch boxes of their own. They bind to their favourite specific DNA sequences and they switch the neighbouring genes "on."

❖ **Three-pronged effect**

- The researchers have studied a target gene of miR444 called MADS27, a transcription factor which hasn't been studied well before. This transcription factor has a three-pronged effect on the plant.
- First, it regulates nitrate absorption by switching "on" proteins involved in this process.
- Second, it leads to better development of the roots by regulating auxin hormone production and transport.
- Third , it helps in the abiotic stress tolerance by keeping the main stress player proteins "on."
- This is a new finding with a three-pronged effect and it provides an alternate means of regulating and optimising nitrate absorption.

❖ **Dicot plants**

- The researchers carried out the study on dicot plant like on tobacco plants and found MADS27 works to improve three factors — nitrate absorption, root development and stress tolerance — with the help of RNA analysis and after finding to which part of the genome this transcription factor binds.
- According to the researchers, the gene MADS27 appears to be an excellent candidate to modify, in order to develop nitrogen use efficiency, which is something that helps the plant absorb more nitrates, and to engineer abiotic stress tolerance.
- Tinkering MADS27 expression by genome editing is the next step, so that the modified plants are acceptable to use directly.
- The larger goal of this study is to understand how epigenetics plays a role in regulating expression of such important genes.

5. <u>India's largest floating solar plant , and why it is significant</u>

❖ **CONTEXT: India's largest floating solar plant is now fully operational at Ramagundam in <u>Telangana</u>'s Peddapalli district**.

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- The 100-megawatt (MW) floating solar power photovoltaic project was commissioned by the National Thermal Power Corporation, the country's foremost public-sector power generator.
- As of July 1 2022, following the commissioning of the plant, the total commercial operation of floating solar capacity in the southern region has risen to 217 MW.
- The 100MW floating solar plant spread over 500 acres of the NTPC's reservoir at Ramagundam is built at a cost of Rs 423 crore through Bharat Heavy Electricals Limited on an EPC (engineering, procurement and construction) contract. Having moved past fossil fuels to hydro-, nuclear and renewable energy sources for power generation, the NTPC has set a target of producing 60GW (gigawatts) capacity through renewable energy sources, constituting nearly 45 per cent of its overall power generation capacity, by 2032.

❖ **What are floating solar plants?**

- Solar plants or solar farms can be either ground-mounted or set up on the surface of water bodies.
- Though these floating farms are a bit more expensive than the traditional ones mounted on land surfaces, there are advantages as well.
- At a time when large tracts of land are unavailable, floating farms do not require land to be acquired for the installation of photovoltaic panels. They are more efficient as the presence of water underneath helps them keep cool.
- They also reduce water evaporation, thereby saving more water for hydropower generation.

❖ **How are these panels kept floating?**

- At Ramagundam, the solar modules are placed across 500 acres on floaters manufactured with high-density polyethene material that keeps floating irrespective of water-level fluctuations.
- The entire spread is divided into 40 blocks, each having a capacity of 2.5 MW. Each of these blocks consists of a floating platform and an array of 11,200 solar modules. The floating platform consists of an inverter, transformer, and a high-tension circuit breaker.

❖ **How is the project unique?**

- This project is unique because all the electrical equipment from the inverter, transformer, high-tension panel to supervisory control and data acquisition are also set up on floating ferro-cement platforms.
- The entire floating system is anchored through special high-modulus polyethylene ropes to the dead weights (concrete blocks) placed in the balancing reservoir bed. The generated power is evacuated up to the existing switch yard through 33KV underground cables.

❖ **How does it help the environment?**

- The solar panels floating on the water surface will reduce the evaporation rate and thereby help water conservation. Also, with a minimum land requirement, mostly for associated evacuation arrangements, available land can be put to better use unlike in the case of ground-mounted solar farms, which require large land surface areas.
- At Ramagundam, approximately 32.5 lakh cubic metres per year of water evaporation can be avoided.
- The waterbody underneath the solar modules helps in maintaining their ambient temperature, thereby improving their efficiency and generation.
- Similarly, coal consumption of 1,65,000 tons can be avoided per year; carbon dioxide emissions of 2,10,000 tons per year can be avoided, according to the NTPC.

❖ **Future expansions**

- The commercial operation of a 92MW floating solar plant at Kayamkulam in Kerala and a 25MW floating solar plant at Simhadri in Andhra Pradesh were announced by the NTPC earlier. Even at its Ramagundam reservoir, the public-sector undertaking has currently utilised only about 500 acres of the spread to generate 100 MW.
- At present, NTPC Ramagundam has a traditional ground-mounted solar farm too, spread across 50 acres along the national highway, generating 10MW power. With land not easily available, there is a scope for expansion to generate another 400 MW in the same reservoir. Meanwhile, the Telangana government is also learnt to be keen on using the technology of floating solar farms at its many mega reservoirs to promote clean energy. The state and the NTPC had held a round of talks earlier.

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ANSWER WRITTING

Q. How was India benefited from the contributions of Sir M.Visvesvaraya and Dr. M. S. Swaminathan in the fields of water engineering and agricultural science respectively?

The British rule in India neglected modernisation of Indian agriculture and little was done to improve irrigation system. After independence, India did not have enough to feed its burgeoning population and it was forced to subsist on "ship to mouth" existence.

At these junctures,two personalities-Sir M Visvesvaraya and MS Swaminathan- emerged who revolutionised their respective fields of knowledge, contributing enormously to India's development.

Sir M. Visvesvaraya's contribution in the field of water engineering

- He is remembered as India's most prolific civil engineer, dam builder, economist, statesman, and can be counted among the last century's foremost nation-builders.
- He played an instrumental role in the construction of the Krishna Raja Sagara Lake and dam in 1924. This dam not only became the main source of water for irrigation for the nearby areas, but is also the main source of drinking water for several cities.
- Visvesvaraya was, among other things, responsible for the building and consolidation of dams across the country. He invented the Block System -automated doors that close in the conditions of overflow, and also designed Hyderabad's flood management system.
- He is recognised for his brilliance and creativity in harnessing water resources, designing and constructing dams and bridges, and revolutionising the irrigation system in India.
- Due to his outstanding contribution to the society, Government of India conferred 'Bharat Ratna' on this legend in the year 1955.

Dr. M.S. Swaminathan's contribution to agriculture science

- A plant geneticist by training, Professor Swaminathan's contributions to the agricultural renaissance of India have led to his being widely referred to as the scientific leader of the green revolution movement.
- Recognized worldwide for his basic and applied research in genetics, cytogenetics, radiation and chemical mutagenesis, food and biodiversity conservation, he conceptualized ever-green revolution movement in agriculture.
- Swaminathan is the visionary who took India from the bondage of 'Ship to Mouth' existence to the freedom of 'Right to Food' through home grown food.
- Apart from serving as head of various national and international institutions, he headed the **National Commission on Farmers (NCF)** constituted in 2004 to address the nationwide calamity of farmer suicides in India.

India needs to adhere to the visions of these two men, especially when our agrarian challenges are mounting due to erratic rainfall, cycles of floods and droughts, unsustainable practices and other endemic issues.

MCQs

1. With reference to National Investigation Agency (NIA) consider the following statements
   1. NIA can probe offences under the Narcotic Drugs and Psychotropic Substances Act
   2. It is a non statutory body constituted under government resolution
   3. It's Jurisdiction is confined within the geographical territory of India

   Choose the incorrect statement using the codes given below
   a) 1 and 2
   b) 2 and 3
   c) 1 and 3
   d) All of the above
2. India's largest floating solar plant established in which of the following state?
   a) Telengana
   b) Andhra Pradesh
   c) Odisha
   d) Maharashtra
3. Chenkurinji (Gluta travancorica) a plant species recently seen in news due climate change severely affect it's regeneration performance as it is very susceptible to climate change. It is endemic to which of the following?

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a) Southern part of Western Ghats
b) Himalayan foothills
c) Andanman and Nicober island
d) Sundarban

4. Aryankavu Pass is often in news is associated with which of the following?
a) Eastern Ghats
b) Aravallis
c) Garo hills
d) Western Ghats

5. The term "MADS Box" frequently is associated with of the following?
a) WTO subsidy
b) Genetic sequence
c) Robotics
d) European Union grants to low income countries

6. Consider the followings
1. K-226T utility helicopters - Russia
2. Ka-31 early warning helicopters - USA
3. Igla-S very short range air defence systems – Israel
4. P-51 Mustang – USA
How may above pairs is /are correctly matched?
a) Only one pair
b) Only two pairs
c) Only three pairs
d) All the four pairs

7. India has recently agreed to a "Partnership for Green and Sustainable Development" with which of the following countries?
a) France
b) Germany
c) Denmark
d) Russia

8. Land Degradation Neutrality Fund (LDN Fund) recently seen in news is associated with which of the following?
a) UNFCC
b) IMF
c) UNCCD
d) World Bank

9. "Kai chutney " recently seen in news for its demand to get GI tag as a food item is associated with which of the following state?
a) Andhra Pradesh
b) Tamilnadu
c) Odisha
d) West Bengal

10. Gold Tranche" (Reserve Tranche) refers to
a) a loan system of the World Bank
b) one of the operations of a Central Bank
c) a credit system granted by WTO to its members
d) a credit system granted by IMF to its members

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