# CURRENT AFFAIRS OCTOBER 2020

# Table of Contents

**1. NIN Revises Ideal Weight:**

- The **National Institute of Nutrition-ICMR has redefined the ideal weight of Indian adult men and**
- The reference has been made concerning the **age 19-39 years** instead of 20-39 years.
- **As per the revised standards, the body weight for the adult male has been put at 65kg and for females 55kg.** Earlier, for males, it was 60kg and for females, it was 50kg.
- Along with this, the NIN has revised the reference height for the weight. While it was 5.6 feet (171cm) for a man and 5 feet (152cm) for a woman, **it is now 5.8 feet (175cm) for a man and 5.3 feet (162cm) for a woman.**
- **The Body Mass Index (BMI) for an Indian man or woman will now be measured based on the revised standards.**
- The ideal weight is based on the data sourced by the National Family Health Survey-4(NFHS-4,2015-16), Indian Academy of Pediatrics (IAP 2015), National Nutrition Monitoring Bureau (NNMB, 2015-16), the World Health Organisation (WHO, 2006-07).
- **The NIN has prepared 'Recommended Dietary Allowances 'and 'Nutrient Requirements'.**
- The nodal agency also included **Estimated Average Requirements (EARs) and Tolerable Upper Limits of nutrients for the first time.**

**Recommended Dietary Allowances (RDA):**

- **RDA is referred to as the daily dietary nutrient intake level.**
- This would be sufficient to meet the nutrient requirements for all healthy individuals.
- EARs are the daily nutrient intake levels of the population.
- For a moderately active man, the cereal-legume-milk composition of the diet has improved to 3:1:2.5 compared to earlier 11:1:3.
- It is within the given low cost window to meet daily protein requirements.
- **For an adult man, the visible fat intake for sedentary, moderate and heavy activity has been set at 25gm, 30gm and 40gm per day.**
- **Similarly, for adult women, the recommended visible fat is 20gm, 25gm and 30gm per day.**

**Intake of Fiber:**

- **The NIN, for the first time, has recommended fiber based on energy.**
- **The level of about 40gm/2000 kcal has been considered as a safe intake for an individual.**
- The **EAR for carbohydrates** has been set at **100gm/day for ages 1 and above with RDA of 130gm/day.**
- Due to the emerging concerns of hypertension, **a safe sodium intake of 2000mg/day is recommended.** This amounts to **5 gm/day of salt.**
- **Potassium intake of 3510 mg/day has been recommended.**
- To obtain sufficient amounts of **anti-oxidant nutrients such as beta-carotene, vitamin C and certain non-nutrients like polyphenols and flavonoids a minimum of 400gm/ day of fruits and vegetables is recommended.**
- The polyphenols and flavonoids protect against chronic diseases.
- To obtain Vitamin E, the intake of fruits and vegetables must be complemented with a sufficient amount of vegetable oil.
- **For an adult man, the water required from beverages range from 32-58ml per kg body mass.**
- **For women, the water required from beverages ranges from 27-52ml per kg body mass.**
- The water ranges recommend with the sedentary working group at the lower end and heavy working group at the higher end of the range.

- The water need for children is greater than 60ml per kg of body mass.
- For adolescent boys, the water requirement ranges from 47-60ml per kg body mass and for girls 39-49 ml per kg body mass.
- Based on working intensity, for pregnant women the water required from beverages ranges from 2.1 to 3.2 litres per day.
- Irrespective of gender for old age, the water requirement from beverages is 33ml per kg body mass for sedentary activity and moderate activity 38ml per kg body mass.
- The calcium intake for an adult man and woman has been revised to 1000mg/day. Earlier, it was 600mg/day. For a lactating woman, an additional 200mg/day has been recommended.
- For post-menopausal women, the recommended calcium intake now is 1200mg/day.
- The National Institute of Nutrition (NIN) has delivered a comprehensive guide for bodily standards for the Indian population. The revised standards come at a time the standard of living of Indians are increasing and the nutrition intake is not limited to cereals alone.
- For the exercise, for the first time, **NIN took into account data from both rural and urban areas.** This is against the earlier practice of collecting only urban data. The previous revision exercise was taken 10 years ago.

**2. Living Fossil Fish Discovered in Kerala:**

- Recently, a r**are bony water fish has been discovered in the paddy fields of Kerala.**
- According to the scientists, **this fish has a lineage going back to Gondwanaland.**
- It has survived even after parting of the Asian and African continents some 120 million years ago.
- The **discovery of this new fish family is done by the researchers from the Indian Institute of Science, Education and Research (IISER) Pune, Nirmalagiri College in Kerala, Kerala University of Fisheries and Ocean Studies (KUFOS), Natural History Museum in London and Berne, Senckenberg Natural History Collections, Germany.**
- The **new fish family is named as *Aenigmachannide.***
- The scientific team traced the primitive characteristics by conducting CT Scans and detailed analysis of the specimen.
- The researchers concluded that the fish is a living fossil.
- The researchers said that the discovery is unique as the fish specimen remains primitive in many ways and not displayed any evolutionary characteristics.
- The fish has a long and elongated body and was sighted post sunset.
- This fish was sighted in the paddy fields of Mallapuram district in north Kerala.
- The newly discovered fish family has remained subterranean.
- Its sister species have evolved and thrived in the surface water bodies found in the west, central Africa and Asia regions.
- The aquifers in the state of Kerala have a wealth of relic fauna.
- The subterranean ecosystems are facing threats due to indiscriminate extraction and pollution of groundwater.
- This is not the first time in Kerala that new species are discovered in the landscape that has been changed by human beings. Many species of frogs, snakes and amphibians have been discovered in Kerala in human habitations in the recent past.
- Adorned with evergreen forests, Kerala is blessed with rich faunal diversity. Further research in the state will surely reveal more new species adding to the species richness of India. But, discoveries such as this in a human habitation is a cause for concern.

- The threat of human-induced landscape change can threaten the very existence of the species. For policymakers and conservationists, it is thus a huge task to protect these animals from getting extinct.



**3. China's Climate Change Commitment and What India Can Learn:**

- China made an unexpected announcement when the UN climate change conference is not happening due to the pandemic.
- Speaking at the UN General Assembly, China made two promises that are to be carbon net-zero by 2060 and advanced the deadline for reaching emissions peak.
- According to Climate Action Tracker, the Chinese goals would lower global warming projections for 2100 by about 0.2 degrees Celsius to 0.3 degrees Celsius.

**China's Promises:**

- China announced to become carbon net-zero by 2060.
- Net-zero is a country's emissions compensated by absorptions and removal of greenhouse gases from the atmosphere.
- More carbon sinks can increase absorption such as forests, where the removal involves technologies such as carbon capture and storage.
- The second promise, China announced an important change in China's already committed target for reaching the emissions peak.
- It advanced the deadline from "by 2030" to "before 2030".
- China will not allow its greenhouse gas emissions to grow beyond that point.

**Net-Zero:**

- To achieve "climate neutrality" by 2050, there has been a concerted campaign.
- This is referred to as the state of net-zero emissions that would require countries significantly reducing their emissions.
- This can be achieved by increasing land and forest sinks that would absorb the emissions.
- If sinks are not available, countries can use technologies that can remove carbon dioxide and other greenhouse gases physically from the atmosphere.
- The climate change campaign groups say global neutrality by 2050 is the way to achieve the Paris Agreement target to keeping global temperatures from rising beyond 2 degrees Celsius to pre-industrial times.
- The world is headed for a 3 degrees to 4 degree Celsius rise in temperature by 2100.

**Significance of China's Commitment:**

- China accounts for 30% of global emissions and is the world's largest emitter of greenhouse gases.
- It is more than the combined emissions in the United States, the European Union and India which is the next three biggest emitters.
- China to commit itself to a net-zero target since countries have pledged themselves to such long-term commitments.
- The European Union is the only big emitter to have committed itself to a net-zero emission status by 2050.
- So far, more than 70 countries have made similar commitments.
- China, the United Nations, the European Union and India whose climate actions are crucial for achieving the Paris Agreement as they account for more than half of the global emissions.

- This is followed by countries such as Russia, Brazil, South Africa, Japan and Australia.
- South Africa has declared to become carbon neutral by 2050.

**India's Commitment:**



- India has resisted pressure to make a long-term commitment.
- India has been arguing that the climate change actions it has been taking are in terms of achieving the Paris Agreement.
- India and China have historically played together at the climate change negotiations.
- The Chinese announcement may increase pressure on India to follow and agree to long term commitment even if it is not 2050 net-zero goal.

**4. India's ODF Status - Urban India ODF Free:**

- A recent survey shows that 99% of the Indian cities under urban bodies have become open defecation free (ODF).
- Due to the pandemic, the survey of the urban bodies could not be done in West Bengal.
- India's urban areas are officially becoming open defecation free.
- The West Bengal government's performance is exemplary in the Swachh Bharat Mission.
- In solid waste management, the West Bengal ensured 90% door to door collection and the rate of segregation is increasing rapidly.
- **Quality Council of India is visiting ULBs as third parties and declared more than 20 ULBs as ODF and 75 ULBs have been self-declared ODFs.**
- From a position of zero ODF states and cities in 2014, 99% have today become ODF.
- After completing the assessments in 45 cities of West Bengal, it will become 100%.
- The data shows that of the 4372 cities in India to be made ODF, 4,323 stands declared as ODF which is 99% and 4204 stand as ODF verified cities.
- Open defecation has been a problem in rural areas of India.
- India has claimed that 5,999,963 villages of the country have attained ODF status by the construction of the required toilets under Swachh Bharat Rural Mission.
- The government has spent more than Rs 11 lakh crore in the urban space in the six years.
- This is a quantum jump from Rs 1.55 lakh crore in the urban areas spent in 10 years.
- The Centre's data shows solid waste management processing has gone up to 67% from 1% in 2014.
- The target is to reach 100% by the time India celebrates 75 years of Independence in 2022 in the 500 Indian cities under the **Atal Mission for Rejuvenation and Urban Transformation Scheme (AMRUT).**

**Swachh Bharat Mission:**

- **Launched in the year 2014, Swachh Bharat Mission (SBM) is Central Government's flagship scheme aimed at making India open defecation free.**
- The Mission also has solid waste management as one of its main components.
- The Mission is divided into two components as Swachh Bharat Mission (Urban) and Swachh Bharat Mission (Rural).
- While SBM-Urban is being overseen by the Ministry of Housing and Urban Affairs, the Ministry of Drinking Water and Sanitation is overseeing the SBM-Rural.
- The Mission is being implemented in two phases.

- Under phase I, which lasted till October 2019, the target of the mission was to eradicate manual scavenging, generate awareness about good sanitation practices and augmenting sanitation capacity at the local level.
- By constructing toilets at household levels, the scheme aims to eradicate open defection. Also, construction of community toilets and public toilets are part of the scheme.
- To make states and cities to compete and maintain their cleanliness status, a ranking exercise called **Swachh Survekshan** has also been launched under the SBM-Urban Mission.

**AMRUT:**

**AMRUT (Atal Mission for Rejuvenation and Urban Transformation)** was **launched in the year 2015.**

- The programme is aimed at providing robust sewage networks, tapped drinking water, urban transportation and other amenities in an urban area.
- The projects under the scheme are carried out in Public-Private-Partnership (PPP) model.
- As per the official website of the AMRUT Mission, the purpose of the mission is to
- Ensure tapped water and sewage connection to every household
- Develop greenery and well-maintained parks to increase amenity value of cities
- Reduce pollution by making public transport available and developing non-motorised commuting infrastructure such as walking and cycling tracks

**5. New Discoveries and a Rediscovery:**

- Scientists discovered **two new species of pipeworts from the Western Ghats of Maharashtra and Karnataka.**
- **Pipeworts (Eriocaulon) is a plant group** and are known for their varied medicinal properties.
- The **new species have been discovered in the Western Ghats** which is one of the thirty hot spots of biological diversity in the world.
- The Western Ghats exhibit great species diversity and has around 111 species of pipeworts in India.
- These plants **complete their life cycle within a small period during monsoons.**
- Most of the **pipeworts in India are from the Western Ghats and Eastern Himalayas and 70% of them are endemic to the country.**
- **One pipewort named *Eriocaulon cinereum*** is known for its **anti-cancerous, anti-inflammatory, analgesic and astringent properties.**
- The other pipeworts known as ***E. quinquangulare*** is **used against liver cancer and *E.madayiparense* is an anti-bacterial from Kerala.**
- It is yet to be known the medicinal properties of the newly discovered species.
- The two new species have been f**ound by the scientists from Agharkar Research Institute (ARI), Pune.**
- This is **an autonomous institute of the Department of Science and Technology, Government of India.**
- Researchers studied morphology and its DNA to confirm novelty as the two new species showed different floral characteristics than the earlier species.
- The gene of this species is referred to as 'Taxonomist's nightmare 'as the identification of the species of Eriocaulon is difficult as they look very similar.
- These plants have tiny flowers and seeds making it difficult to distinguish between different species.
- The species from **Sindhudurg district Maharashtra was named *Eriocaulan parvicephalum*** as it is in minute inflorescence size.

- **The species from Kumta, Karnataka was named as *Eriocaulan karaavalense.***
- Researchers are trying to develop DNA barcodes which will enable to identify the species with just a portion of the leaf.

**Rediscovery after 184 Years:**



- Researchers have rediscovered an endangered tree species - ***Madhuca diplostemon*** - 184 years after its first collection.
- Researchers from the **Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI) rediscovered the tree species.**
- **It** has been identified in front of **Koonayil Ayirvalli Siva temple at Paravur in Kollam district.**
- The **International Union for Conservation (IUCN) of Red List of Threatened Species listed the *Madhuca diplostemon* as endangered species.**
- The *Madhuca diplostemon* is a species of **flowering plant from *Sapotaceae* family.**
- **This tree is the only known individual from the species.**
- The species as a highly local **endemic** with a few individuals in the past and removed for temple expansion.
- This species was first discovered by Robert Wight. He was a surgeon-botanist of the East Indian Company.
- His collection from Kollam in 1835 comprises three specimens with immature flower buds.

**Madhuca Diplostemon:**

- The *Madhuca diplostemon* is a flowering plant from *Sapotaceae* family.
- This tree is about 4 m long and its bark is fissured.
- The leaves are arranged spirally and crowded towards the branch tips.

**6. China Seeks Closer Ties With Bangladesh:**

- China and Bangladesh celebrated the 45$^{th}$ anniversary of the establishment of bilateral diplomatic relations.
- China is ready for closer ties with Bangladesh to jointly promote the construction of hits multi-Billion dollar **Belt and Road Initiative (BRI).**
- This will make a strategic partnership of the two countries to new heights.
- With $26 billion Chinese investments and $38 billion funding commitments Bangladesh is one of the largest recipients of China's massive infrastructure financing.
- China has offered zero-tariff treatment to 97% of Bangladesh's exports.
- Now it added 5,161 items to the existing list of 3,095 duty-free products.
- The **Belt and Road Initiative (BRI) seeks to build rail, maritime and road links from Asia to Europe and Africa in a revival of ancient Silk Road trading routes.**
- The BRI is the major bone of contention between India and China.
- One of the portions passes through Pakistan occupied Kashmir.
- China initiated over $60 billion worth projects in Pakistan as part of the China Pakistan Economic Corridor (CPEC), a part of BRI.
- China has stepped up its huge infrastructure investments in Nepal, Bangladesh, Sri Lanka and the Maldives.
- The BRI is China's top priority as it aims to firm up China's global influence.
- The initiatives have attracted allegations from the US of debt diplomacy.
- Sri Lanka handed over its Hambantota Port to a state-run Chinese firm in 2017 for 99 years lease in a debt swap amounting to $1.2 billion.

- Malaysia has deferred several projects under the BRI which cited cost revaluation.
- The closeness of China and Bangladesh can be seen in the way both the countries have worked jointly to fight COVID-19. China had sent a medical team to Bangladesh.

**Unnerving India:**



- It seems China is encircling India with a string of economic partnerships.
- The String of pearls is a concept going around in the diplomatic circles as a strategy by China to counter India's rise in the region.
- As part of the strategy, China would have close economic and military relations with Indian neighbour countries.
- Though the Chinese deny any such strategy, the activities of China in the region lends weight to the strategy.
- China has very close relations with Pakistan and Nepal.
- It has brought Bangladesh, Sri Lanka and the Maldives under its economic influence by financing big-ticket projects in these countries.
- Off late, countries that took Chinese finance are realising the burden of the debt they took.
- India on the other hand is slippery sloppy when it comes to relations with its neighbourhood.
- As recently as in September 2020, when the domestic market necessitated India to ban onion export, Bangladesh raised concern. Indian domestic politics, at times, cause a spoilsport in foreign policy.
- Nepal, with the support of China, is claiming a region of India to be it's own.
- Sri Lanka, embroiled in the Chinese debt is looking for alternatives and India is playing a good neighbour role with that country.
- Until recently, Maldives was under the influence of China and acted against Indian interests. The current democratically elected government is in favour of India, as such the Indian government has announced a credit line for the development of the island nation.
- India already lodged a strong protest against the CPEC in PoK.
- Militarily, the standoff between India and China in Ladakh is unnerving India and the region as a whole.
- Predicting the Chinese intentions is becoming a challenge.

**7. A Vaccine for Rice Plant:**

- Researchers have uncovered a **vaccine to boost the immune system of rice.**
- **Scientists from the Centre for Plant Molecular Biology (CPMB), and Osmania University, Hyderabad** have uncovered a vaccine to boost the immune system of rice.
- Researchers identified the mechanism by which a **bacterium called Xoo (Xanthomonas oryzaepv. Oryzae), which causes a serious bacterial leaf blight disease in rice, infects and causes disease in rice plant.**
- For developing the vaccine, the researchers have identified and developed few molecules which are derived from either Xoo bacterium or the infected rice cell walls.
- They developed new disease control strategies and can use as vaccines that activate the rice immune system.
- It also provides resistance to the plants from subsequent infections by Xoo.
- Researchers carried out biochemical and functional studies on the plant cell wall degrading enzymes secreted by Xoo.
- It has provided key insights into the mechanisms by which the Xoo pathogen interacts with the rice plant and causes the disease.

- Xoo is one of the major disruptors of rice cultivation in the world leading to huge yield losses.
- Researchers are working on a cellulose protein secreted by Xoo.
- This protein has the features of a typical vaccine as it is a potent elicitor of rice immune responses.
- Pre-treatment of a rice plant with this protein provides resistance to rice against Xoo.
- When rice is treated with cellulase, a cell wall degrading enzyme secreted by Xoo will instigate immune response in the rice plant and it further protects the rice from subsequent infections of Xoo.
- Researchers are exploring the rice cell wall degradation products and when the elicitor molecules are identified, will be used as a vaccine to activate the rice immune system.
- The best way to control the disease so far was by introducing the Resistance 'R 'which involves breeding and gene manipulation techniques.
- This is time consuming, laborious and provides only rare specific resistance.
- The elicitor molecule will have the potential to induce a broad spectrum resistance.
- This will be strong against Xoo and other pathogens.
- This study might lead to new ways of reducing yield losses for a crop.

**8. Noble Prize for Medicine:**

- The 2020 Noble Prize for Medicine is awarded to two Americans and a Briton won for identifying the Hepatitis C virus.
- Identification of the virus led to limiting the spread of disease and develop drugs to treat it.
- The discoveries of scientists **Harvey J.Alter, Charles M.Rice and Briton Michael Houghton** showed that there is a chance of eradicating the Hepatitis C virus with new medicines.
- For the discovery, the three shared **10 million Swedish crowns award.**
- **They proved that a blood-borne virus could cause Hepatitis C.**
- Globally, 70 million people are infected with Hepatitis C and 4,00,000 deaths occur each year due to the virus.
- **This is the second Noble Prize for medicine for Hepatitis C.**
- Baruch Blumberg was awarded the Nobel Prize in 1976 for the discovery of a virus that causes blood-borne hepatitis which came to be known as Hepatitis B.

**Research Details:**

- Each scientist found the virus in a differently. Dr. Alter found that blood transfusions are spreading a liver disease which wasn't due to either Hepatitis A or B.
- Dr Houghton created a clone of a new virus from the fragments found in the blood of an infected chimpanzee.
- This virus belongs to the Flavivirus family and named it as Hepatitis C.
- This identification made it possible to develop tests to screen blood bank supplies.
- This reduced the spread of the disease which can cause liver cancer and cirrhosis.
- Dr. Rice was able to use genetic engineering to generate a version of the Hepatitis C virus.
- He demonstrated that it alone could cause symptoms in a chimpanzee comparable to an infection in humans.

**Status of Hepatitis C in India:**

- India has set a target to eliminate Hepatitis C in the country by 2030.
- But now, the 10-year Hepatitis C elimination deadline seems difficult to achieve.

- When the **National Viral Hepatitis Control Programme (NVHCP)** was launched, India has managed to put 50,000 people on treatment since 2018.
- As three scientists won the 2020 Noble Price for Medicine, it was a reminder to India to reach its elimination target.
- **It is estimated that 0.5-1 per cent of the country's population suffers from Hepatitis C.**
- **Hepatitis disease is hard to detect as it is asymptomatic for a longer period before leading to liver cirrhosis or liver cancer.**
- For each year, the WHO estimated 4 lakh global deaths due to Hepatitis C.
- Treatment for Hepatitis C requires oral medication for 12 weeks and in severe patients, it may extend to 24 weeks.
- In Maharashtra, 350 patients have been diagnosed and 180 of them are put on treatment.
- Since 2016, Punjab has enrolled 87,000 patients and 93% of them have been cured.
- Punjab has the burden of the disease due to high-drug abuse and injectable drug usage.
- Before COVID-19, Punjab was recording 900-1000 new cases every month. But in March and April, 2020 cases detection fell to 250-300.
- Now in Punjab treatment centres have been increased in all HIV centres and nine central prisons.
- Currently, it costs Rs. 3000 to treat a hepatitis C patient.

**9. Numerous Super Habitable Planets Identified:**

- Scientists from **Washington University** identified **two dozen planets outside the solar system that may have conditions more suitable for life than the Earth.**
- They have the characteristics of potential super habitable planets.
- The characteristics include being older, larger, slightly warmer, and possibly wetter than the Earth.
- The discovery of these exoplanets signify that life is possible beyond earth and could thrive on planets that circle gradually changing stars with longer life spans than the Sun.
- The super habitable planets are located more than 100 light years away.
- Future observation efforts like **NASA's James Web Space Telescope, the LUVIOR space observatory and the European Space Agency's PLATO Space Telescope will benefit from the discovery.**
- Researchers identified **super habitability criteria** and searched among 4500 for a good one.
- Scientists selected **planet-star systems that are possibly terrestrial planets that are orbiting within the host star's liquid water habitable zone.**
- **They form the Kepler Object of Interest Exoplanet Archive of transiting exoplanets.**
- Scientists observed systems with **K dwarf stars while observing systems with cooler G stars.**
- These systems are cooler, less massive and less luminous than the sun.
- The **super habitable systems have long lifespans of 20 billion to 70 billion years.**

**Super Habitability Criteria:**

- Scientists say that **to be habitable the planet should not be old as old** planets are less habitable. They would have exhausted their geothermal heat and would have no protective geomagnetic fields.
- **A super habitable planet will have more habitable land than earth, longer radioactive decay and stronger gravity so that the planet can retain its atmosphere for a long period of time.**
- Scientists say that slightly warmer temperature, a mean surface temperature of about 5 degree Celsius greater than Earth along with the little moisture would be better for life.

- But scientists have identified that only one out of the 24 planets exhibited four of the critical parameters while the rest do not meet the criteria.
- The star of this planet is named KOI 5715.01.
- It is 3000 light years away from earth. This star is estimated to be 5.5 billion years old or one billion year older than our sun.
- Our sun is estimate to be less than 10 billion years old.
- KOI 5715.01 has 76% the mass of our sun, 77% its radius and 34% its light.
- Researchers say that this makes it much more comfortable for life than our home planet.

**10. India-Myanmar Relations:**

- India gave 3000 packages of antiviral Remedesivir vials to Mynamar to help the country fight COVID-19 pandemic.
- In support for the operationalization of the crucial Sittwe port in Myanmar's Rakhine state by March 2021, a liaison office in Nay Pyi Taw has been established.
- The idea to establish the liaison office in Nay Pyi Taw in Myanmar's capital was conceived in December 2018 and an embassy was established.
- Both countries also agreed to install a bust of Bal Gangadhar Tilak in Mandalay Jail.
- The countries also agreed not not to allow any activities against each other and respect each others commitments.
- Both the countries discussed progress in the ongoing Indian assisted infrastructure projects like the Trilateral Highway and the Kaladan Multi Modal Transit Transport Project.
- They discussed the maintenance of security and stability in their border areas.
- India has expressed appreciation to Myanmar for handing over of 22 cadres of Indian insurgent groups in May 2020.
- India congratulated Myanmar for successfully folding the fourth meeting of the 21st century Panglong Peace Conference.
- India assured to support Myanmar in its democratic transition with its experience in constitutionalism and federalism.
- Under the Rakhine State Development Programme (RSDP), both sides noted the considerable progress on the issue of Rohingya refugees who had fled the Rakhine state.
- The safety of the refugees, their sustainability and speedy return to Myanmar have been discussed.
- Both sides proposed to finalize projects under Phase 3 of the RSDP.
- They have agree to set up a skills training centre in the state.
- Both sides also agreed to upgrade agricultural mechanization under RSDP.
- The visit by the Foreign Secretary and General Narvane shows that the relations between both the countries are cordial. India has keen interest on Myanmar due to the growing influence of China in the country and the presence of insurgent groups in the border areas that are acting against India.
- The Myanmar army has undertook several missions to rid its country of Indian insurgent groups using its soil to launch terrorist activities against India.
- On the economic front, India is undertaking big infrastructure projects like Sittwe port project and multi-modal transportation project. When finished, both these projects will become economic gateway for Indian northeast region.
- Myanmar is crucial for India's Act East Policy as the country is the starting point for connectivity with the ASEAN region. Thus, India try to maintain cordial relations with Myanmar.

**11. Nobel Prize for Black Hole Researchers:**

- Three scientists awarded the **Nobel Prize in Physics for the discovery of one of the most exotic phenomena in the universe - the black hole.**
- **Three scientists, Roger Penrose of Britain, Reinhard Genzel of Germany and Andrea Ghez of the US were awarded with the Prize.**
- **Mr. Roger Penrose** was honoured for showing the **general theory of relativity leads to the formation of black holes.** He is a theoretical physicist, mathematician, science philosopher and best-selling author.
- **Mr Genzel and Ms Andrea** jointly awarded for **discovering an invisible and extremely heavy object governing the orbits of stars at the centre of the galaxy.**
- Genzel works at the **Very Large Telescope facility on Paranal mountain in Chile.**
- Since 1901 when the first Nobel Prizes were handed out, **Ms. Ghez is only the fourth woman to be awarded with a Nobel.** She works at the **Keck Observatory on Hawaii's Mauna Kea.**
- The first women to win the noble prize was Madam Curie in 1903 and was also the first person to receive two Nobel prizes in chemistry in 1911.

**Black Hole:**

- Black Hole refers to a point in the space where the matter is compressed to create a gravity field from which even light cannot escape.
- Way back in 1965 Mr. Penrose used mathematical modelling to prove that black holes can form.
- According to him, the black holes are formed when a heavy star collapses under the weight of its gravity.
- These are direct consequences of Einstein's general theory of relativity.
- Mr. Genzel and Ms. Ghez have led the research since the 1990s and are focusing on a region called Sagittarius A at the centre of the Milky Way.
- They discovered an extremely heavy invisible object using the world's largest telescope, which is around 4 million times greater than the mass of the Sun.
- This invisible object pulls surrounding stars, giving the galaxy its characteristics swirl.
- They made the precise measurements of the orbits of the brightest stars in the area.
- Sagittarius A
- **Sagittarius A is a supermassive black hole that is present at the centre of the Milky Way Galaxy.**
- Photographs of this black hole were capturer by the **Event horizon Telescope project and were released to public recently.**
- **Scientists have collected radiations from outside the event horizon of the black hole and recreated the images with the help of a network of giant telescopes.**
- Blackhole do not radiate anything. So, the **area outside its boundary is called as an event horizon and it is a defining feature of a black hole.**
- **Event horizon is a violent place with vast amounts of gas clouds and plasma swirling.**
- **All kinds of radiations even in invisible light are emitted at the event horizon.**

**Finding a Black Hole:**

- As light cannot pass through it, identifying a black hole is difficult.
- The interaction of matter around a black hole, the accretion disk determines the presence of a black hole.
- The mass and location of a black hole can be determined by the orbits of start closer to it.

- Merger of two black holes create gravitational waves which are disturbances in spacetime.

**12. DRDO Conducts SMART Test:**



- India conducted the flight test of a **Supersonic Missile Assisted Release of Torpedo (SMART)** successfully.
- The **Defence Research and Development Organisation (DRDO) developed the Supersonic Missile Assisted Release of Torpedo (SMART).**
- **Torpedoes are self-propelled weapons and can travel underwater to hit a target but they have limited range.**
- A typical torpedo has a range of about 12-15kms which brings a warship under direct threat of reciprocal attack.

**Missile Development:**

- DRDO undertook the project to build capacity to launch torpedoes assisted by missiles in the mid-2010s.
- The SMART system comprises a modified mechanism where the torpedo is mounted on a supersonic missile system.
- The modifications will take the torpedo to a far longer range than its own.
- With the missile system, a torpedo gains the ability to hit targets hundreds of kilometres away.
- Also, due to the diversity in launch platforms for the missile system it offers flexibility to launch torpedoes from anywhere.

**Test Result:**

- The test was conducted from the Wheeler Island off the coast of Odisha.
- DRDO said that the mission objectives were met perfectly. From the flight of the missile to its designated range and altitude to separation of the nose cone and release of the torpedo and deployment of Velocity Reduction Mechanism (VRM), the test was a test-book launch.
- An anti-submarine torpedo of the light-weight category was used during the launch.
- This test was followed by the test of the nuclear-capable Shaurya missile.
- Shaurya missile is a land-based missile parallel to the submarine launched K-15 missile.

**Significance of SMART:**

- SMART is a game changing technology which shows its demonstration in anti-submarine warfare.
- Couple with the Poseidon 8I anti-submarine aircrafts of the Indian Navy, the SMART system can thwart any threat from submarines thousands of kilometres away from the Indian coast.
- In light of China's growing influence in the Indian Ocean Region, India's anti-submarine warfare capacity building is crucial.
- These warfare consists of deployment of submarines, specialized anti-submarine ships, air assets and state-of-the-art reconnaissance and detection mechanisms.
- After the conclusion of a contract for **Advanced Torpedo Decoy System - Maareech**, the anti-submarine warfare capability got a boost with the SMART missile.
- Mareech system can be fitted to all frontline warships of the Indian Navy.
- DRDO conducted two successful tests of the K family's missiles, which are launched from sea.
- There is a great strategic importance for the capability of launching nuclear weapons from submarine platforms.

- These submarines can survive a first strike by an adversary and can also launch a strike retaliation.

**13. IOWave20 - Mock Tsunami Drills:**



- The **Indian Tsunami Early Warning Centre (ITEWC) at the Indian National Centre for Ocean Information Services (INCOIS)** proposed to conduct tsunami drills.
- This will be the first of the three proposed tsunami exercises to be conducted across the Indian Ocean.
- The exercises will be conducted by simulating an earthquake followed by issuance of warning bulletins to 23 countries.
- The tsunami drills are code named as **'IOWave20'.**
- In **IOWave20** the communication channels are tested instead of a full scale operation because of the physical distancing measures due to Covid-19.
- Also, there will be no community engagement.
- A virtual tabletop exercise will be conducted by the countries across the Indian Ocean and their respective disaster management organisations.
- The mock drill will enable the participating countries to assess their organizational SOPs, policies and plans for tsunami warning and emergency response.
- The IOWave20 consists of sequence of events.
- The **first one** was on 6$^{th}$ October, simulation of an earthquake with 9.1 magnitude in Java region Indonesia at 8am.
- The s**econd simulation** of an earthquake will be on October 13 with a magnitude in Andaman Trench of India at 9.30 am.
- The **third simulation** of an earthquake is on October 20 with 9.0 magnitude in the Makran Trench off-coast of Pakistan at 11.30.
- All the events are limited to an hour. The ITEWC will issue four tsunami bulletins to both national and regional stakeholders during this time.
- The bulletins will be issued through global telecommunications such as systems, e-mail, fax, SMS and website.
- The exercise is organized by the **Indian Ocean Tsunami Warning and the Mitigation System of the Intergovernmental Oceanographic Commission of UNSECO.**
- INCOIS has coordinated the exercise in association with the National Disaster Management Authority (NDMA).
- All disaster management organisations of Costal States, Union Territories, Navy, Coast Guard, National Disaster Response Force (NDRF), critical installations, ports and harbours are participating.
- In the second exercise, entire east coast of India and Andaman and Nicobar Islands will take part.
- West Coast of India and Lakshadweep Islands will take part in the third exercise.
- For the exercise, an information manual on tsunami exercise, bulletins and feedback forms are being prepared. This will be circulated to the stakeholders.
- The feedback from the participants after the exercise is expected to identify and fix any gaps in communication channels and the standard operating procedures.

**14. PLI Scheme for Large Scale Mobile Manufacturing:**

- Sixteen mobile manufacturing and electronic companies are set to get benefits under the **Ministry of Electronics and Information Technology's (MeitY) Production Linked Incentive Scheme (PLI) scheme.**
- **The government has notified the Production Linked Incentive Scheme (PLI) for large scale manufacturing on 1st April 2020.**
- Under the scheme, **4% to 6% incentives are extended to companies on incremental sales (over the base year) of electronic goods in targeted segments, manufactured in India, for five years.**
- **The base year is 2019-20.**
- MeitY approved 16 proposals made by various electronic manufacturing companies.
- The Scheme invites applications from both international and domestic mobile phone and electronic components manufacturing companies.
- The firms include five international mobile phone makers, five domestic firms and an additional six under the specified electronic components segment.
- The international mobile phone manufacturing companies that are eligible under the **Mobile Phone Segment for Invoice Value INR 15,000** and above are Samsung, Rising Star, Foxconn Hon Hai, Pegatron and Wistron.
- The companies like Foxconn Hon Hai, Wistron and Pegatron are contract manufacturers for Apple iPhones.
- Nearly, 60% of the global sales revenue of mobile phones is associated with Apple (37%) and Samsung (22%).
- This scheme is expected to increase the electronics manufacturing base in the country by manifold.
- Indian companies that are approved under the **mobile phone domestic segment** include Lava, Micromax (Bhagwati), Padget Electronics, UTL Neolyncs and Optiemus Electronics.
- The eligible companies under the **Specified Electronic Components Segment** are AT&S, Ascent Circuits, Visicon, Walsin, Sahasra and Neolync.
- The approved companies under the scheme are expected to produce to the tune of Rs. 10,50,000 crore in the next five years.
- Under the Mobile Phone Invoice Rs. 15,000 and above segment, for the next five years, companies proposed production of over Rs. 9,00,000 crore.
- Total production of mobile phones worth Rs. 1,25,000 crore has been proposed by the companies that are approved under the Mobile Phone
- Under the Specified Electronics Components segment, the approved companies proposed production of over INR 15,000 crore.
- Out of the total production, 60% will be contributed by the exports of the order of Rs. 11,000 crore.
- The mobile companies will generate more than 2 lakh direct employment opportunities under the scheme.
- The companies will also generate additional indirect employment of nearly 3 times the direct employment.
- In the case of mobile phones, the domestic value addition is expected to grow from the current 15-20% to 35-40% and for the electronic components 45-50%.
- The **National Policy on Electronics 2019** visually positioned India as a global hub for Electronics System Design and Manufacturing (ESDM).
- India's current electronic manufacturing capacity, be it, component manufacturing or device manufacturing is grossly inadequate compared with the growing demand.
- The Government estimates that by 2022, India will be importing $400 billion worth of electronic goods. To curtail the dependence on imports and make India a global manufacturing hub for

electronics, the government has launched the PLI scheme, which incentivises companies that set their manufacturing units in the country. The scheme will also boost employment as the electronics manufacturing sector is labor-intensive.



**15. LEDs with High Quality White Light:**

- Indian scientists searched for methods to produce high quality white light to design white LEDs.
- In producing **white Light Emitting Diodes (LEDs)**, the colour quality is a key challenge.
- The scientist has **unearthed crucial reaction insights** that can help design white LEDs.
- The study was conducted by **scientists from the Centre for Nano and Soft Matter Sciences (CeNS).**
- Scientists found that **nanocrystals of inorganic chemicals caesium lead halide shows the features of white light emission but nanocrystals prevented them.**
- The capability of white light emission from these crystals can be easily tuned over the entire visible spectrum by varying their halide compositions.
- Scientists observed that inter-particle mixing between the nanocrystals in an LED resulted in single emissions and failed to emit white light.
- **White light needs a red, green and blue spectrum of light.** Once the crystals give a single emission they miss to create white light.
- The halide ions of the crystals migrate from one particle to another even at room temperature.
- The crystals try to form an alloy of nanocrystals and yields a single emission, thus making white light impossible.
- These kinetic reactions help in developing strategies to prevent inter-particle mixing.

**Light Emitting Diodes:**

- The light from an LED is generated when electrons pass through a semiconductor.
- Currently, white light from LEDs are obtained using multiple semiconductors of red, blue and green colour or by layering phosphorous on the semiconductor device.
- Applications of LEDs include illumination, data communication (Li-Fi and fibre optics), display screens, machine vision systems, biological detection - recently, infrared LEDs gained prominence in their ability to detect oxygen saturation levels.

**16. Rising Nitrous Oxide Emissions Threatening the Climate Goals:**

- Researchers conducted a study on the **growing use of nitrogen fertilizers** in the production of the food.
- Globally, for the production of food, the use of **nitrogen fertilizers is increasing the concentrations of nitrous oxides.**
- Rising nitrous oxide emissions are a risk for achieving climatic goals and **Paris Accord.**
- Scientists formed an international consortium under the roof of the **Global Carbon Project and the International Nitrogen Initiative** to conduct the study.
- Scientists from 48 research institutes in 14 countries participated in the consortium.
- The study points out that the nitrous oxide has risen 20% from pre-industrial levels.
- The growth of nitrous oxide emission has accelerated over the decades due to the emissions from various human activities.
- **The important key factor for the increase in atmospheric nitrous oxide comes from agriculture.**
- Researchers say that the growing demand for food for humans and feed for animals will further increase the nitrous oxide emissions globally.

- **The countries in East Asia, South Asia, Africa and South America are the largest contributors to global nitrous oxide emissions.**
- **In India, China and the USA, emissions from synthetic fertilizers dominate the release.**
- In Africa and South America, the emissions from the application of livestock manure as fertilizers dominate the release.
- As per the study, the current nitrous oxide emissions are not compatible with the pathways Paris climate goals.
- The Paris Climate Agreement was signed by 195 nations to avoid the worst climate impacts.
- **The major aim of Paris Accord is to keep the temperature rise below 2 degree Celsius above pre-industrial levels and also to pursue efforts to limit the temperature rise even further to 1.5 degree Celsius.**
- The current emissions increases above 3 degree Celsius worldwide which is twice the temperature target of the Paris Accord.
- To avoid the worst of climate impacts, there is a need to find opportunities to mitigate the emission of nitrous oxide worldwide.

**Nitrous Oxide:**

- Nitrous oxide is a greenhouse gas and is 300 times more potent than carbon dioxide. It remains in the atmosphere for a longer time and poses a grave risk to the climate.

**Global Carbon Project:**

- Established in the year 2001, GCP or Global Carbon Project is an international organisation that is tasked to quantify greenhouse gas emissions and their sources.
- GCP quantifies three greenhouse gases - carbon, methane, and nitrous oxide.
- The main objective of GCP is to understand the carbon life cycle.
- GCP bings together scientists, experts and economists together to tackle the problem of climate altering greenhouse gas emissions.
- World Climate Programme, International Geosphere-Biosphere Programme, International Human Dimensions Programme, and Diversitas partnered to found GCP under the Earth System Science Partnership.
- GCP releases Global Carbon Budget, an annual publication of carbon sources, sinks and carbon cycle at the global level.
- Global Carbon Budget 2019 showed that CO2 emissions have increased every decade from 11.4 Gt in 1960 to 34.7 per year during the 2009-18 period.

**The share of CO2 emissions in 2018 were**

1. Coal - 40%
2. Oil - 34%
3. Gas - 20%
4. Cement - 4%
5. Flaring - 1%
6. The top four countries/groupings with highest share of CO2 emissions in 2018 were
7. China - 28%
8. USA - 15%
9. EU - 9%
10. India - 7%

**International Nitrogen Initiative:**

- **INI or International Nitrogen Initiative** was **founded in the year 2003** by the **Scientific Committee on Problems of the Environment (SCOPE) and from the International Geosphere-Biosphere Program (IGBP).**
- The objective of INI is to optimise nitrogen use for sustainable food production and minimise its harmful effects on health and environment.



**17. Cyber Security Deal between India and Japan:**

- With cyber threat becoming a major concern globally, India and Japan agreed on an agreement for robust and resilient digital and cybersecurity systems.
- The agreement was signed at the 13th India-Japan Foreign Ministers' strategic dialogue.
- The two countries noted the similarities in their Indo-Pacific Vision and stressed on following rule of law, respect for sovereignty, and territorial integrity in the region.
- India considers the agreement with Japan as a key element where Covid-19 made countries, companies and institutions dependent on digital technology.
- India claims that to ensure the security of the digital ecosystem in all sectors from banking to defence there is an immediate need to have robust agreements with similar countries.
- Japan has been repeatedly hit by cyberattacks from the beginning of 2020.
- A cyberattack on Mitsubishi Electric resulted in sterling of information on high-speed gliding missile under development.
- The National Centre of Incident Readiness and Strategy for Cyber Security is being upgraded in Tokyo to expand Japan's cyber-defence capabilities. Also, Japan is expanding its Cyber Defence Unit.
- The key decision was made as cyberattacks are increasing worldwide by both state and non-state actors and are threatening Japan's military cybersecurity capacity.
- The cybersecurity agreement is beneficial for India as it will promote cooperation between the two countries in areas such as Critical Information Infrastructure, research and development, Internet of Things (IoT), 5G, Artificial intelligence (AI).
- Also, the agreement will promote capacity building, security and resilience in the areas.
- Japan's top three telecom firms NTT Docomo, SoftBank Corp and KDDI removed Huawei, the Chinese telecom giant, from their 5G services.
- Japan's SoftBank Corp excluded Huawei and ZTE in the 5G network but in the 4G services, Chinese firms are present.
- India is yet to roll out 5G network services of the Chinese telecom firms Huawei and ZTE.
- At the ministerial level meet, both countries discussed about **Indo-Pacific Ocean's Initiative (IPOI) and Japan agreed to be IPOI's connectivity pillar**
- **The IPOI was launched in November at the East Asia Summit in Bangkok, 2019.**
- IPOI is an Indian-backed framework, proposed by Prime Minister Narendra Modi at the East Asia Summit of Bangko.
- It is to create a safe and secure maritime domain in the Indo-Pacific region in the backdrop of China's aggressive and assertive approach in the region.
- Also at the meet, both the foreign ministers discussed in trade and investment, connectivity, infrastructure, manufacturing, and UN reforms.

**Agreement at the Right Time:**

- Unlike many other countries, India did not bar Chinese telecom firms Huawei and ZTE to participate in its 5G telecommunication projects. But, India did not yet approve the Chinese

companies to go ahead with the work. Amidst this, the agreement with Japan on cybersecurity and 5G gains significance.

**18. Nobel Prize in Chemistry for CRISPR Creators:**

- The Nobel Prize in Chemistry was jointly awarded to two women for development of genome editing.
- Emmanuelle Charpentier of France and Jennifer Doudna of America were awarded the Noble Prize for discovering one of the sharpest tools on gene technology.
- The sharpest tool is named as CRISPR or Cas9 genetic scissors.
- The CRISPR is named as Clustered Regularly Interspaced Short Palindromic Repeats technology.
- Using this technology, scientists can add, remove or alter specific DNA sequences.

**CRISPR Technology:**

- Editing or modifying gene sequences is in practice in the field of agriculture.
- Several crops have been genetically modified to provide particular characteristics.
- The CRISP technology makes gene editing very easy, simple and very efficient.
- It locates a specific area in the genetic sequence which is the cause of the problem.
- After the diagnosing the problem, cuts it out and replaces it with a new and correct sequence.
- The correct sequence will no longer cause any problem.
- The CRISP technology replicates a natural defence mechanism of bacteria that protect itself from virus attacks.
- To locate the problematic sequence on the DNA strand an RNA molecule is programmed.
- To break and remove the problematic sequence a special protein called Cas9 commonly called as genetic scissors are used.
- A DNA strand has a natural tendency to repair itself but this can lead to the re-growth of the problematic sequence.
- During the auto-repair process, the desired sequence of genetic codes will be supplied which replaces the original sequence.
- It has remarkable efficiency as the entire process is programmable.
- This technology can be used included in some forms of cancer which are caused by a genetic mutation, altering the genetic sequence of disease causing organisms and editing the plants genes.

**Ethical Concerns:**

- A geneticist from China He Jiankui claimed that he altered the genes of twin girl babies in 2018.
- This is the first case of designer babies produced using the new gene-editing tools CRISPR.
- The genes were edited to ensure that babies do not get infected with HIV.
- Scientists raised the concerns of producing babies with particular genetic traits and without any regulatory permissions.
- Scientists claim that there is a possibility that some other genes could also get altered.
- For the use of CRISPR technology, Doudna is campaigning for the development of international rules and guidelines.

**19. Ratification of Seven Persistent Organic Pollutants:**

- The Union Cabinet ratified **seven persistent organic pollutants that are listed under the Stockholm Convention.**

- The Cabinet delegated its power to ratify chemicals of **Persistent Organic Pollutants (POP)** which are regulated under the domestic regulations for streamlining the procedure.
- The ratification of POPs is to meet its international obligations about the protection of the environment and human health.
- The ratification process enables India to update its **National Implementation Plan (NIP) by accessing the Global Environment Facility.**
- On January 13, 2006, India ratified the **Stockholm Convention** as per Article 25(4).
- To provide a safe environment and minimize the human health risks, the Ministry of Environment, Forest and Climate Change (MoEFCC) under the provision of Environment Act, 1986 notified on March 5, 2018, the 'Regulation of Persistent Organic Pollutants Rules'.
- The regulations prohibited trade, manufacturing, use, import and export of seven chemical which were already listed as POPs under Stockholm Convention.

**The seven POPs include:**

- Chlordecone
- Hexabromodiphenyl ether and Hexabromodiphenyllether commonly called as Commercial octa-BDE
- Hexabromobiphenyl
- Tetrabromodiphenyl ether and Pentabromodiphenyl ether commonly known as Commerical penta-BDE
- Pentachlorobenzene
- Hexabromocyclododecane
- Hexachlorobutadiene

**Stockholm Convention:**

- Stockholm convention ensures to protect human health and environment from Persistent Organic Pollutants (POP). It is a global treaty.
- The convention was opened in 2001 in Stockholm, Sweden and was effective from 2004.
- Persistent Organic Pollutants (POPs) are chemical substances that persist in the environment and bio-accumulate in the living organisms.
- They have adverser effects on human health.
- They cause damage to the environment due to their long-range environmental transport (LRET) property.
- Exposing to POPs leads to cancer, damage of the central and peripheral nervous system, reproductive disorders, immune system disorders, interference with normal infant and child development.
- Stockholm convention lists the POPs under various Annexes after through research, deliberations and negotiations among member countries.
- The Stockholm convention calls to ban key POPs, to minimize the use of DDT to control malaria and to lessen the production of dioxins and furans.
- In three categories, the Stockholm convention listed 12 chemicals.
- Two Industrial Chemicals - hexa chlorobenzene and poly chlorinated biphenyls
- Eight pesticides - DDT, endrin, Aldrin, chlordane, dieldrin, heptachlor, mixer and toxaphene
- Two unintended byproducts of industrial processes- poly chlorinated dibenzo-p-dioxins and dibenzofurans.

**20. Nobel Peace Prize to the WFP:**

- The Norwegian Committee announced the 2020 Noble Peace Prize.

- **Nobel Peace Prize 2020** was awarded to the UN agency **World Food Programme (WFP).**
- WFP was awarded the prize for its outstanding efforts in combating huger, creating conditions for peace in conflict areas and preventing the use of hunger as a weapon.
- Since its inception from 1901, WFP is the 28th organization which was awarded the Nobel Peace Prize.



**World Food Programme:**

- World Food Programme was established in 1961 and is headquartered in Rome, Italy.
- The WFP has 36 members and is governed by an Executive Board.
- The Board is headed by an Executive Director, who is appointed jointly by the UN Secretary-General and the Director General of the Food and Agriculture Organization (FAO) of the United Nations.
- The term of the executive director of the WFP is five years.
- The idea of providing food aid through the UN system was advised by the then US President Dwight Eisenhower.
- The first humanitarian program done by the WFP was during an earthquake in Boein Zahra in Northern Iran.
- During this calamity, 12,000 people died and WFP sent tonnes of wheat, sugar and tea.
- After that WFP provided food aid in Algeria and Thailand.
- The first development programme of WFP was launched for Nubians in Sudan in 1963.
- The first school meals project of WFP was in Togo.
- Within two years, WFP became a full-fledged UN programme.

**The Scale of WFP's Work:**

- The volume of work WFP does to prevent hunger makes it the largest agency agency fighting against hunger in the world.
- The WFP said that in 2019 it assisted 97 million people in 88 countries and this is the largest since 2012.
- In 2019, the WFP delivered 4.4 million tonnes of food, purchased food from 91 countries worth $1.7 billion and goods and services from 156 countries worth of $762 million.
- The WFP has 5,600 trucks, 30 ships and 100 planes on the move every day to feed those in needy.
- Every year WFP distributes 15 billion rations.
- The estimated average cost per ration is of US $0.61.

**The Need for Food Programme:**

- The UN's Sustainable Development Goal 2 is to eradicate hunger by 2030.
- WFP being the primary agency of UN, it works towards achieving this goal.
- WFP claims that around the world there are 690 million people who are hungry and about 60% of them are living in conflict affected areas.
- Due to COVID-19 pandemic, this number is going to increase further.
- The WFP suggests that nearly half of the global poor will be living in conflict and fragile areas by 2030.
- The people living in long running crisis areas are 2.5 times more than undernourished people.

**WFP Role in India:**

- After two years of its establishment, WFP started working in India since1963.
- WFP focuses on reforms in the Targeted Public Distribution System of the country.

- Apart from that it also provides policy inputs, advocacy and technical assistance for the improvement of accessing the food.
- The unique initiatives proposed by WFP are Automatic Grain Dispensing Machine - Annapurti and for implementing TPDS installations of Mobile Storage Units.
- Annaputi is named as 'ATMs of rice. The machines will be set up across five states which include Karnataka, Uttarakhand, Uttar Pradesh, Maharashtra and Haryana.
- Annapurti allows to withdraw food grain quota at any time of the beneficiary choice.
- The Machine can dispense two products at a speed of 25kg per 1.3 minutes and has a storage capacity of 200 kg to 500kg.
- India has completed a pilot on rice fortification and the rice was used in the government's midday meal programme in Varanasi.
- The fortified rice was produced and fed to 300,000 children since 2018. It used 4145 tonnes of rice.
- During the pandemic, WFP India signed a MoU with the Uttar Pradesh State Rural Livelihood Mission.
- Under this MoU, WFP will provide technical assistance for establishing supplementary nutrition production.
- The units will be established in 18 districts for the supply of quality food to about 33 lakh beneficiaries of the Anganwadi Scheme which is an integrated child development services.
- WFP also helped in preparing guidelines for reopening of the schools.

**21. RudraM - An Anti-Radiation Missile Test Fired:**

- The Defence Research And Development Organisation (DRDO) had test launched an anti-radiation missile from Sukhoi fighter aircraft. The test was part of a series of missile tests that the premier defence organisation had carried out.
- **RudraM-I or New Generation Anti Radiation Missile (NGRAM) is a first generation anti-radiation missile developed by DRDO.**
- The missile is designed to locate, target and destroy radiation emitting sources such as communication stations, enemy radars, and any other radio-frequency emitting devices.
- Radar stations play a key role in providing air defence. By eliminating these stations fighter aircrafts can carry out offence action against the enemy targets.
- Launched on a radiation target present on the Odisha's Wheeler Island, the RudraM-I is said to have achieved all the parameters set by the DRDO scientists.
- The missile was test fired from a Su-30 fighter jet and is said to have hit the target with pin point accuracy.

**Missile Features:**

- RudraM-I has a target range of 200kms. It can be launched from altitudes ranging between 500m and 15km.
- The missile has a top speed of Mach 2 and generally varies between 0.6 to 2 mach.
- According to a statement from the DRDO, depending on the launch conditions, the Su-30 fitted missile is capable of hitting targets in various ranges.
- It is fitted with Inertial Navigation System (INS)-Global Positioning System (GPS) navigation with Passive Homing Head (PHH) for the final attack.
- The missile will be a potent weapon for the Indian Air Force to destroy enemy air defence.
- The PHH on the RudraM-I is said to be capable of seeking and engaging targets over a wide range of frequencies.

- The Defence Research Development Laboratory (DRDL), Hyderabad, is the nodal agency for the development of NGRAM.
- The DRDO stated that the development of NGRAM involved several DRDO labs, IAF, HAL and some private sector enterprises.
- Over the last 35 days, DRDO tested over 10 missiles, which is not a coincidence. Since the Ladakh standoff, India was planning to show intent and the missile tests must be seen in that light. Instructions have been given to the DRDO to ramp up missile testing.
- The test of RudraM-I is a big achievement for the Indian defence scientists. Only a few countries in the world possess such a weapon. The missile will boost the Indian Air Force's capability to fight a two-front war, which has become highly likely. But, it is also a known fact that China and Pakistan have better anti-radiation missiles than India. Nevertheless, the test of RudraM-I is a boost to Indian defence industry.

**22. Indian Biodiversity Is Rich By 544 Species:**

- The Z**oological Survey of India (ZSI) and Botanical Survey of India (BSI) released *Animal Discoveries 2019* and *Plant Discoveries 2019,*** which have added **544 new species** to the Indian biodiversity.
- In-Detail
- Among the new discoveries in 2019 are a rock-dwelling gecko from western Ghats - **Cnemaspis anandani**; a burrowing frog from Jharkhand- **Sphaerotheca magadha**; a dung beetle from Arunachal Pradesh - **Enoplotrupes tawangensis**; a ginger variety from Nagaland - **Amomum nagamiense**; and a wild fern - **Pteris subiriana.**
- A total of 544 new species have been added to the India biodiversity.

**Animal Discoveries:**

- As per the ***Animal Discoveries 2019***, 368 are faunal species are new to science and 116 are first records from India.
- First records or new records of a plant or animal species refers to the species already been discovered in some other place in the world and is being discovered for the first time in the country.
- Details of 360 new species, four sub-species, four fossil species and 116 species that were recorded for the first time in India have been published in Animal Discoveries 2019.
- Of the total, 294 species are invertebrates and 74 are vertebrates.
- Insects dominated the list, where as in vertebrates fish species discoveries are the highest with 38 new species and five records of fish.
- According to the ZSI, Indian faunal diversity now stands at 1,02,161 species, which is 6.52% of the global faunal diversity.
- To identify new species, ZSI has used modern identification methodologies like DNA barcoding, complete genome sequencing and X-Rays.

**Plant Discoveries:**

- The ***Plant Discoveries 2019*** of BSI listed 180 new plant species and 73 are new records discovered first time in the country.
- Among the plant discoveries, 134 are seed plants, five are fern and fern ally species, six are bryophytes, 18 are lichen, 51 are fungi, 23 are algae and 16 are microbes.
- Among the discoveries there were many pants which are edible and have horticultural value.
- These include aroids, syzygium (wild jamun), impatiens, mushrooms and zingibers.

- According to ZSI, there are 50,012 plant species in India accounting for 12% of all floral species of the world.

**23. Plant-Virus Interactions - An Arms Race:**

- In a new study, researchers have discovered that plants and viruses undertake an arms race.
- The study was conducted by the researchers from the **National Centre of Biological Sciences (NCBS-TIFR), Bengaluru.**
- The study showed arms race between the **viruses** called **Synedrella Yellow Vein Clearing Virus** and the plants it attacks.
- The researchers isolated the virus from a plant called ***Synedrella nodiflora.***
- In their study, they found that the virus was able to infect tomato and tobacco plants.
- The new study also provided new tools to identify and generate plants which can resist viruses.

**Synedrella Yellow Vein Clearing Virus:**

- The Yellow Vein virus belongs to **Begomovirus family of viruses.**
- Begomoviruses family have 400 members and considered as largest virus family.
- They are the **major reason for crop loss** as they mainly infect the economically important plants.
- When the Synedrella Yellow Vein Clearing virus attacks the plant it produces vein clearing symptoms and tries to escape the plant attack. This makes the plant look beautiful.
- But it makes difficult for the plant to produce fruits and flowers.
- The virus cannot infect the plant completely as it cannot move through the veins of the plant.
- To destroy the virus the plant develops a defence mechanism.
- The plant targets the protein called **BetaC1** made by the virus, without which the virus will not be able to defeat the host attacks.
- Plants **degrade BetaC1** with a smaller protein called **ubiquitin.**

**Viral Response:**

- The virus uses the plant's machinery to create a modification in the BetaC1 protein.
- In a process called **SUMOylation, the virus adds a tiny protein called SUMO to the betaC1 protein.**
- **BetaC1 overtakes the SUMO pathway machinery of the plants. The virus makes itself a substrate for SUMOylation.**

**Tiny Virus:**

- Researchers used tobacco and tomato plants for their study.
- This type of begomovirus attacks 60% of horticulture crops.
- The size of the virus can range from 5 nanometress to 300 nanometres.
- The virus in this study falls under geminivirus and is smaller with a size of about 20 nanometres.
- With this small size, they make proteins that are comparable in size than that of the plant.
- The rich plant will make about 35,000 proteins and humans make about 20,000 proteins.

**24. SAMITVA - Property Card Scheme Launched:**

- Prime Minister Narendra Modi launched the Property Card Scheme to help the rural households.
- The **Property Card provides clarity of property rights in villages.**
- This is a significant measure as two thirds of the population in the country lives in villages.
- The card enables the farmers to use their property as collateral for loans from banks and financial institutions.

- **The property card was distributed under SAMITVA Scheme, an ownership scheme.**
- **To map land parcels in rural areas** and cover some 6,20,000 villages for the next 4 years, the government is going **to use drone technology.**
- Initially, **digitized property cards will be distributed to** 100,000 people from 750 villages across six states.
- The **property card will have a unique identity card** which is similar to the Aadhaar card.
- Experts suggest that property ownership rights play a big role in a country's development.

**SAMVITHA Scheme:**

- **SAMVITHA is Survey of Villages and Mapping with improvised Technology in Village Areas Scheme.**
- SAMVITHA scheme was **launched on 24th April 2020** which was the **National Panchayati Raj Day.**
- The implementation of the scheme is planned in a phased manner for four years from 2020-2024.
- For the survey, the **implementation agencies are the Ministry of Panchayati Raj at the national level, revenue department or land records department at the state level and the technology partner is Survey of India.**
- To measure the inhabited lands in villages and rural areas, the government is using the latest technology such as drones.
- Drones will draw the digital map of every property and later property cards will be distributed.
- The scheme creates records of land ownership in villages.
- These records will help in facilitating tax collection, building plan approvals and issuance of permits.
- With the help of this scheme, the government can effectively plan for the village infrastructure programs.
- This scheme will also help in reducing property disputes.

**Significance of the Scheme:**

- Land is a scarce resource. In our country, unclear land titles are the major cause for litigation. Also, without proper titles, people, especially from the rural areas are unable to avail formal credit. Small and medium farmers face this problem a lot.
- Legacy issues likes the zamindaari system, poor land records administration, and shortcomings in legal framework are the reasons for unclear titles.
- Now, with the new scheme, where digital property cards are distributed with accurate land map and digitised record will go a long way in reducing litigation and helps boost agriculture credit.

**25. Blue Flag Tag for Indian Beaches:**

- India's eight beaches have got Blue Flag certification.
- **Blue Flag certification is an international eco-level tag.**
- **This certification is the world's most recognized awards for clean, safe and environmentally** friendly beaches. It also includes marinas and sustainable boating tourism operators.
- **The eight Indian beaches are:**

1. Shivrajpur in Dwarka, Gujarat,
2. Ghoghla in Diu,
3. Kasarkod and Padubidri in Karnataka,
4. Kappad in Kerala,
5. Rushikonda in Andhra Pradesh,

6. Golden Beach in Puri Odisha and
7. Radhanagar in Andaman and Nicobar islands.

- Till now, no blue flag nation has ever been awarded eight beaches in a single attempt.
- This is a global recognition of the country's conservation and sustainable development.
- India is the first country in the Asia-Pacific region that achieved this award within two years.
- India started working on getting the tag in 2018 and planned to expand the certification for 100 beaches in the next five years.
- Under the **Integrated Coastal Zone Management (ICZM) project,** India has launched its own **eco-label 'Beach Environment and Aesthetics Management Services '(BEAMS).**

**Blue Flag Tag:**

- The **Blue Flag Tag is an international eco-level tag, accorded by the Foundation for Environmental Education (FEE) and headquartered in Copenhagen, Denmark.**
- **The eminent jury members are from the UN Environment Programme, World Tourism Organisation, FEE and IUCN**
- The beaches under this tag are considered as the cleanest beaches of the world.
- To qualify for a blue tag, the beaches must meet 33 stringent criteria relating to environmental, quality water for bathing, education, safety, services and accessibility standards.
- So far, 4600 beaches, marinas and boats from 50 countries have got the Blue Flag Tag.
- The highest number of Blue Tagged sites in the world are in Spain.

**About BEAMS:**

- BEAMS is a highly acclaimed programme of **Society of Integrated Coastal Management (SICOM)** which is aimed at sustainable development of coastal regions.
- As clean beaches indicate the quality of coastal region and its management, the BEAMS initiative was launched to rid out beaches of litter and maintain cleanliness.
- **BEAMS is unique as it promotes beach tourism in complete harmony with the nature.**

**BEAMS Objective:**

- To rid the beaches and coastal waters of pollution.
- Sustainable development of beach areas.
- To protect and conserves the coastal ecosystems and natural resources.
- To encourage maintenance of cleanliness, safety and security for the beachgoers at the beaches by the local authorities and other stakeholders.

**26. Climate Change is Pushing Species out Of Their Habitat:**

- The rising temperatures in the Himalayan region is forcing butterfly and moth species to habitats at higher altitudes.
- The study was carried by the Zoological Survey of India (ZSI) and was funded by the Ministry of Environment, Forest and Climate Change (MoEFCC).
- The researchers identified 49 species of moths and 17 species of butterfly which showed considerable upward altitude records.
- The difference between the new and previous recorded mean habitat altitudes is about 1000 metres.
- The research findings will be used as a baseline indicator to track the impact of climate change on animal species.
- The Himalayas are home to more than 35% of Lepidoptera.

- Lepidoptera is the order of the insects which includes butterflies and moths species found in India.
- **Butterflies are sensitive species that are susceptible to changes in climate.**
- **Butterflies are good indicators of long-term change in climatic conditions.**
- Researchers tracked 1274 species of moth and 484 species of butterfly in Jammu and Kashmir, Sikkim, North Bengal, Himachal Pradesh, Uttarakhand and Arunachal Pradesh.
- In addition to it, the researchers identified 80 new species of butterfly and moth.
- The **major reasons for the altitudinal shift is the receding ice caps, glaciers leading to a scarcity of water in the Himalayas.**
- The **shift in vegetation in the Himalayas is due to the increase in average temperatures.** Increasing human habitation is also one of the reason.
- Shimla and Darjeeling are two big hot spots of rich butterfly diversity.
- Expansion of towns have shrunken the space for the butterfly.
- The research identified two species richness hotspots - Darjeeling and Kumaon.
- In West Bengal's Darjeeling hills 400 species were recorded and in Kumaon, Uttarakhand 600 species were recorded.
- The two high diversity areas in Himachal Pradesh are Dharamshala and Shimla.
- The research revealed an increase in the Lepidoptera biodiversity from the Western to the Eastern Himalayas.
- In the west, 211 species of butterfly were recorded and in east 354 were found.
- The ZSI predicts a decline of as much as 91% by 2050.
- The red Apollo butterflies are highly prized by collectors and sell for up to 100 pounds in the international market.

**Moth Species:**

- The researchers identified seven species that started to inhabit altitudes more than 2000 metres.
- The seven species are Trachea auriplena (Noctuidae), Diphtherocome fasciata (Noctuidae) and Actias windbrechlini (Saturniidae) of the moth species.
- The mean altitudinal difference of the species is 2800m, 2684m and 2280 m.
- During the survey, the Common Map and Tailless Bushblue butterflies were found at 3577m at the Ascott Wildlife Sanctuary in Uttarakhand which was previously recorded at 2500m.
- In Ladakh region, the Indian Red Admiral butterfly was found at 3900m and now found at 4853m.
- The altitudinal difference increased to 950m.
- Researchers found that 8 moth species including the mulberry silkworm moth and tiger moth are found at 3500m or higher altitudes which were 2000m previously.

**27. Sri Lanka Negotiating Loan with China:**

- Sri Lanka is negotiating a $500 million loan with Beijing.
- Sri Lanka is preparing to repay the outstanding debt amount of $4.5 billion next year.
- This concessional loan is in addition to Beijing's $90 million grant to Sri Lanka that have been given to the island nation after a high-level visit from China.
- If the concessional loan is granted, Sri Lanka's total borrowings from China will be over $1 billion.
- To help Sri Lanka cope up with the economic impact of the pandemic, China extended an urgent financial assistance in March.
- To repay its mounting foreign loans, Sri Lanka is exploring all possible options.

- This includes an agreement with India of $1 billion currency swap with investments in the securities market and bonds and $700 million syndicated loans with China.
- The US credit rating agency Moody's downgraded Sri Lanka's sovereign credit rating to the very high credit risk category.
- To tackle the debt repayment schedule, Sri Lank in February sought a debt moratorium from India.
- For the promotion of Buddhist Culture exchanges, India sanctioned a $15 million grant.
- Sri Lanka is gearing up for yet another high level visit, where the US Secretary of State is likely to visit.
- This is pointing towards the **heightened geopolitical interest on Sri Lanka.**
- Previously the visit of the secretary cancelled citing scheduling conflicts.
- But there was a considerable resistance towards the proposed 'Visiting Force Agreement '(VFA) with the US.
- Also, the Sri Lanka government opposed the Millennium Challenge Corporation Agreement for a $480 million grant which was negotiated by the former government.
- The visit of the Secretary will be after the Australia-India-Japan-US Quadrilateral (Quad) meeting in Tokyo.
- The Quad members will be observing the engagements of Sri Lanka very closely.
- This is because last month Sri Lanka terminated $1.5 billion Japanese funded light rail project.
- Sri Lanka rejected the project on the ground that it is not a cost effective solution and will lead to environmental concerns.
- The East Container Terminal in Colombo which was jointly agreed to develop by India and Japan has run into trouble as the workers opposed the involvement of foreign players in the nation assets.
- At the same time, Sri Lanka is protecting Chinese interests, which is making the Quad skeptical of Sri Lanka's intentions.

**28. Nobel Economic Prize:**

- **Two US economists won the Nobel Economics Prize for work on commercial commerce.**
- The work also includes goods and services which is difficult to sell in traditional ways like radio frequencies.
- The **Nobel Economics Prize is technically known as the Sveriges Riksbank Prize in Economic Sciences. This is given in memory of Alfred Nobel and established in 1969.**
- The two US economists **Paul Milgrom and Robert Wilson** were awarded for the improvements in the auction theory and inventions of new auction formats.
- In a statement given by the Royal Swedish Academy of Sciences, the discoveries made by the two economists have benefited sellers, buyers and taxpayers around the world.
- Mr. Wilson is a professor at Stanford University in the US.
- He developed a theory for auctions with a common value. Common values is a value which is uncertain beforehand but in the end, is the same for everyone.
- He showed why rational bidders tend to bid under their estimate of worth.
- This is due to the worries over winning the auction but at the end paying too much.
- Mr. Milgrom is a professor from Stanford came up with a general theory of auctions.
- He analyzed bidding strategies in different auction forms.
- The economists will share the prize sum of 10 million Swedish kronor.
- The two economists invented new formats for auction for many interrelated objects.

**29. Global TB Report - India's Low Case Notifications Worrying:**

- **The World Health Organisation (WHO) released the Global TB Report.**
- WHO collected data from 200 countries which showed a significant reduction in the notification of TB case.
- According to the report, the disruptions in services is caused due to Covid-19 pandemic.
- **There has been a 25-30% drop in high burden countries like India, Indonesia and the Philippines between January and June 2020.**
- The WHO said the reductions in notification could lead to increase in tuberculosis deaths.
- The analysis shows that there is a 50% drop in the detection of TB cases over three months.
- This may lead to 4,00,000 more deaths due to TB.
- WHO said that the Covid-19 reversed the reduction in TB cases globally.

**India Scenario:**

- **In India, the TB case notifications fell by more than 50% at the end of March and late April.**
- In India, notifications of new patients diagnosed with TB and relapse patients increased from 1.2 million in 2013 to 2.2 million in 2019.
- This increase is due to the rolling out of a nationwide web- and case-based reporting system called **Nikshay.**
- **Nikshay facilitates reporting of detected cases by care providers in the public and private sectors.**
- From January till June 2019, 12.50 lakh TB cases were notified to the **National TB Elimination Programme.**
- This year in the same period a total of 9.15 lakh TB cases were notified.
- In 2019, globally, 1.4 million (approximately) people died due to TB.
- It is estimated that 10 million people developed TB in 2019 and 3 million were not diagnosed with the disease or not officially reported to national authorities.
- Before Covid-19 pandemic, many countries were making progress in tackling TB cases.
- Between 2015 and 2019 there was a 9% reduction in the incidence and a 14% drop in deaths.
- Now, countries have to tap in to some innovations like public education through Whatsapp, usage of masks among people with respiratory conditions, contact tracing apps, use of screening apps, telehealth consults, sample collection closer to homes of patients, e-pharmacies, rapid molecular testing to check both TB and Covid-19 and digital adherence technologies for the completion of the treatment.

**National TB Elimination Programme:**

- India is a high burden country with respect to tuberculosis (TB).
- An estimated 4,80,000 people die every year due to the disease. This means 1400 proper per day die of TB in the country.
- The National TB Elimination Programme is the renamed version of RNTCP (Revised National TB Control Programme).
- RNTCP was launched in 1997 and is a flagship programme under the National Health Mission.
- The National TB Elimination Programme is formed with an aim to eliminate TB in the country by 2030, which is also the aim of National Strategic Plan for Tuberculosis Elimination 2017-25.
- The programme will provide technical and managerial support to anti-TB activities in the country.
- Under the programme, free diagnosis and treatment will be provided at designated public health care systems.
- A key element in eliminating TB in the country is by identifying and notifying the disease.

- As soon as a patient with TB is notified, treatment begins immediately.
- TB is curable if the treatment is continued without any halt. If not, the bacteria becomes resistant to medicines.
- The WHO's assessment of low notifications in India should worry the authorities.
- As undiagnosed patients increase, the threat of the diseases spreading further increases.
- India cannot afford the lapse and rectify the issue as soon as possible. If not, the 2030 TB elimination target will become a distant dream.

**30. School Education Reform Project:**

- This project is partially funded by the World Bank and is **named as STARS.**
- The **agenda** of the project is to **govern the school education, improve data and assessment systems at the national level. Improve teaching and learning outcomes in 6 states, early childhood and vocational education.**
- The project includes an emergency response component.
- This helps the government respond to disaster situations which leads to loss of education and closure of schools.

**STARS Project:**

- The **STARS project is known as the Strengthening Teaching-Learning and Results for Stars.**
- The **total project cost is of Rs 5,718 crore, partially supported by World Bank amounting to about Rs 3,700 crore ($500 million).**
- **STARS will be a Centrally Sponsored Scheme and the Department of School Education and Literacy will be the implementing agency.**
- The establishment of **PARAKH as a National Assessment Centre is the major component of the project.**
- **PARAKH includes Performance, Assessment, Review and Analysis of Knowledge for Holistic Development.**
- **PARAKH is an autonomous institution under the Union Education Ministry which is included in the National Education Policy 2020.**
- This institution will set norms for student assessment and evaluation for all school boards.
- At the State level, the project seeks to improve education outcomes and school-to-work strategies.
- **The project will cover Himachal Pradesh, Rajasthan, Kerala, Madhya Pradesh, Maharashtra and Odisha.**
- The **Asian Development Bank will cover Tamil Nadu, Gujarat, Uttarakhand, Assam and Jharkhand.**
- The vision of the project is to monitor and measure activities in the Indian School Education System.
- The STARS project includes a **Contingency Emergency Response Component (CERC) alerting disasters**. This will help in the re-categorization of financing and the utilization of streamlined financing request procedures.

**Two Major Components:**

- The STARS project has two major components- national level and state level.

**At National Level:**

- At the national level, the project will support all states and UTs.
- To strengthen MOEs national data systems which include capturing robust and authentic data on transition, retention and completion rates of the students.

- To support MOEs in improving the PGI scores.
- To strengthen the learning assessment systems.

**At the State Level:**

- To strengthen Early Childhood Education.
- Strengthening classroom instructions and improving learning assessment systems.
- To improve service delivery, management of Governance and Decentralization.
- Strengthening Vocational Education.
- The project focuses on initiatives under the Atmanirbhar Bharat Abhiyan like the PM e-Vidya, Foundational Literacy and Numeracy Mission and National Curricular and Pedagogical Framework.



**Outcomes of the Project:**

- To increase minimum proficiency in grade 3 language in selected states.
- Improvement in secondary school completion rate.
- Improvement in governance index scores.
- To strengthen learning assessment systems.
- Partnership between states to facilitate cross-learning.
- Improvement in state level service delivery.
- Training of BRCs and CRCs for decentralized management.
- Strengthening management by training Head Teachers and Principals for improved education delivery.

**31. Risk Factors for Deaths in India:**

- The Lancet Report estimates the top five risk factors for deaths in India.
- The top five factors that caused deaths in India in 2019 were

1. **air pollution -** number of deaths due to this is estimated to be 1.67 million,
2. **high blood pressure -** number of deaths is estimated as 1.47 million deaths
3. **use of tobacco -** 1.23 million deaths
4. **poor diet -** estimated to be 1.18 million deaths and
5. **high blood sugar -** 1.12 million deaths.

- The risk factor analysis is a part of the **Global Burden of Disease (GBD) study.**
- The researchers have analyzed data from 204 countries on 286 causes of deaths, 369 diseases and injuries and 87 risk factors.
- The latest estimation indicates the vulnerability of the countries to the Covid-19.
- The researchers said that the interaction of Covid-19 with the current global crisis of chronic illness and the related risk factors has put populations vulnerable to health emergencies.
- The risk factors include obesity, high blood pressure, tobacco use, and outdoor air pollution which have risen over the past 30 years.
- The non-communicable cause of deaths in India in 2019 was led by the **ischemic heart disease** with an estimation of **1.52 million deaths**.
- This is followed by the **chronic obstructive pulmonary disease** with 8,98,000 deaths, **strokes** 6,99,000 deaths, **diabetics** 2, 73,000 deaths, **cirrhosis** and other **chronic liver diseases** with an estimation of 2,70,000 deaths.
- In 2019, the leading risk factor for health loss was child and maternal malnutrition and the second leading risk factor was air pollution.
- The Lancet report said that **58% of the total disease burden in India is due to non-communicable diseases (NCD). This has increased from 29% in 1990.**
- The premature deaths due to non-communicable diseases have doubled from 22 to 50 percent.
- India's life expectancy has increased to 70.8 years in 2019 from 59.6 years in 1990.

- In states, Kerala has the highest life expectancy at 77.3 years an UP the lowest at 66.9 years.
- But the increase in healthy life expectancy which is 60.5 years in India do not match the increase in the growth of life expectancy. This means most of the people are living with illness and disability.
- In India, child and maternal malnutrition is still the top risk factor for illness and death.
- Several states in northern India such as Bihar and Uttar Pradesh contributes 20% of the total disease burden due to child and maternal malnutrition.
- Since 1990, the proportion of total health loss (DALYs) caused by the rise of NCDs is more than 150% in countries like Bhutan, Nepal and Bangladesh.
- These regions are dominated by infectious, maternal, neonatal and nutritional diseases for 30 years.

**Silver Lining:**

- One silver lining the authors of the study noted was reduction in infectious diseases across the world, including India.
- The achievement, the authors observed, was due to immunisation and better medical care in many countries.
- But, the authors also noted that some countries are still struggling to manage the infectious disease epidemics.

**Prescribed Solution:**

- The researchers for the study noted that there is a correlation between social and economic development to overall health of a human being.
- Thus, they call for doubling down on polices which hamper economic development.
- They also recommended making expanding access to schools and improving the status of women a collective priority for better health.

**32. Global Hunger Index 2020:**

- According to the Global Hunger Index 2020, **India has the highest prevalence of wasted children under five years in the world.**
- This indicates **acute undernutrition of children under the age of five.**
- In comparison to 2010-14 where it was 15.1%, **the prevalence of child wasting has increased to 17.3% in the 2015-19 period.**
- **Out of 107 countries in the Global Hunger Index 2020, India ranks 94 which is lower than the neighbouring countries.**
- The ranks of the neighbouring countries are Bangladesh-75, Pakistan-88, Sri Lanka-64, Nepal-73.
- **The report is released annually by Concern Worldwide and Welthungerhilfe.**
- India is classified as worst in **child wasting which is low weight for height**, reflecting acute undernutrition and **child stunting which is low height for age**, reflecting chronic undernutrition.
- The two indicators together make up a third of the total score.
- India is still in the poorest category though it improved from 54% in 2000 to less than 35% now.
- On the other hand, child wasting has not improved in decades.
- India has improved in both child mortality rate and undernourishment with 3.7% and 14% respectively.
- In the region of the south, east and southeastern Asia, only two countries were worse than India which are Afghanistan, Timor-Leste and North Korea.
- According to the report, globally 690 million people are undernourished.

- The report says that the world is not on the path to **achieving Sustainable Development Goal 2 which has called for Zero Hunger by 2030.**
- At present, 37 countries will fail to achieve their goal.

**Global Hunger Index:**



- The GHI is used to measure and track hunger at global, regional and national levels.
- The **indicators used for the Global Hunger Index** are

1. **Undernourishment**
2. **Child Wasting**
3. **Child Stunting**
4. **Child Mortality**

- The GHI score of a country is classified based on severity like low, moderate and serious.

**The Indian Puzzle:**

- India is a fast-growing economy and implements one of the largest anti-malnutrition programmes in the world. Yet, the high numbers of malnourished children in the country is puzzling.
- Some experts believe that it is due to the faulty indicators that are used to determine malnourishment. The consideration of height as an indicator by World Health Organisation (WHO) and other international organisations is the bone of contention here. The experts argue that India is a vastly diverse country with some communities having short stature. In such a scenario, how can they be considered malnourished, the experts argue.
- Technicality apart, the reality is, India has a huge malnourishment problem, especially in children. Malnourishment directly impacts a child's cognitive and mental ability growing up. This means they will have tough chances to lift themselves socially and economically. Further, malnourishment perpetuates inequality in society.
- Some key factors that will help improve children's nutrition in the country are

1. Access to clean drinking water and sanitation.
2. Access to a low-cost and effective healthcare system.
3. States' investment in social welfare schemes.
4. Expanding nutrition to adolescent girls.
5. Improving the education status of women in the country.

**33. Bio-Capsules from IISR:**

- Farmers are picking up bio-capsules developed by scientists from the Indian Institute of Spices Research (IISR).

**Bio-Capsules:**

- Scientists from the Indian Institute of Spices Research (IISR) developed bio-capsules, a bio-fertilizer technology.
- Bio-capsule ensures the delivery of biological component and beneficial microbes directly to the plant.
- A combination of microorganisms such as Trichoderma, Pseudomonas and Bacillus are used as bio-fertilisers in the capsule.
- The key advantage of the capsule is that it is easy to store, use and transport.
- The technology to develop bio-capsules has been transferred to two private firms which have started the production.

- The capsule is diluted in 100-200 litres of water as per the requirements.
- According to IISR, 4000 capsules are equivalent to 4000 kg talc-based formulation of microorganisms.
- The weight of the capsule is 1gm and a farmer can easily replace 4 tonnes of formulation with 4kg of capsules.
- These capsules are safe as they do not create any harmful residuals.
- The capsules are also suitable for urban farmers who farm in grow bags.
- The price of each capsule is Rs.100.

**Increased Sales:**

- According to IISR, the sale of bio capsules has increased.
- Since the lockdown, many young entrepreneurs entered into the organic farming sector.
- IISC released a report which says that the number of bio-capsules sold to small scale and large farmers in May 2020 was 4000.
- Farmers from Kerala, Karnataka, Tamil Nadu and Andhra Pradesh purchased 6000 tablets between May and August.
- Framers from states Madhya Pradesh, Telangana, Maharashtra, Gujarat, Uttar Pradesh and Himachal Pradesh have also started using it.
- Before the lockdown, the average sale of the product was just 400 per month.
- Farmers are exploring the new technology for the improvement of organic vegetables and spice cultivation.
- The effects of using synthetic fertilisers on health has led to farmers turning to organic farming. But, effective bio-fertilisers to increase the produce is a shortcoming in this method of farming. Innovation is the need of the hour and the Indian Institute of Spices Research (IISR) delivered exactly that through bio-capsules. Not only for spices, farmers are exploring the use of bio capsules for organic vegetable cultivation.

**34. Tectonic Fault Line in Ladakh is Active:**

- A recent survey done by the Wadia Institute of Himalayan Geology, Dehradun has found that a tectonic fault that runs through Ladakh is not inactive.
- The tectonic fault line passes through Ladakh, along the river Indus and is not inactive but moving towards north.
- The fault line is known as the Indus Suture Zone (ISZ) and is tectonically active.
- The frontal and central parts of the Himalayas such as the Shivaliks, Uttarakhand, Himachal Pradesh, Sikkim, and Jammu and Kashmir are known to be active and moving.
- The current study is about the ISZ in Ladakh region which was locked.
- The survey shows that the fault line runs all along the Indus River from China through India and Pakistan.
- A structure zone is a linear belt of intense deformations.
- They are joined together with distinct terranes or tectonic units with different plate tectonic, metamorphic and paleogeographic histories.
- The survey was conducted from the north region of the Ladakh's capital, Leh to the Tso Moriri lake which is at a distance of 213 km.
- The new study shows that a low-intensity earthquake in 2010 near the village of Upshi in Ladakh can now be attributed to a thrust rupture. This village falls on the fault line.
- The observations in the study show that the sedimentary beds in the area were tilted and the Earth's crust is broken.

- Also, the rivers had uplifted the terraces and the bedrock showed brittle deformation that occurred at shallower depths.
- These geological features are dated at Dehradun with the help of Optically Stimulated Luminescence technology.
- Then the data of seismicity and the rate of denudation or wearing away of the Earth's surface was reviewed.
- The field and lab data show that the Indus Suture Zone has been neo technically active for the past 78,000-58,000 years.
- Scientists said that the new finding would help in major implications for earthquake studies and in understanding the seismic structure of the mountain chains.
- The implication of an active tectonic plate could make the region more vulnerable to erosion and landslides.
- Ladakh experienced a devastating floods in August 2010 that affected 71 towns and villages including Leh and 255 persons were killed.

**35. A Comprehensive List on Skinks of India:**

- The ZSI reveals that there are 62 species of skinks in India and **33 species of all the skinks found to be endemic.**
- The study is a result of 4 years work and studied over 4000 specimens in all 16 regional zones of ZSI and also the **Bombay Natural History Society**, Indian Institute of Science, **Salim Ali Centre for Ornithology** and Natural History and Wild Institute of India.
- All the 62 species are described with their taxonomic identification keys, habits, distribution maps, habitat and breeding biology.
- Out of 62 species, **24 species are found in the Western Ghats of which 18 are endemic to the region, 19 species are found in the Deccan Peninsular region out of which 13 are endemic and 14 species from the northeastern region out of which two are endemic**.
- Around the world, there are 1602 species of skinks making it the largest family of lizards.
- In India, their occurrence is less than 4% when compared with global density.
- There are 16 genera of skinks in India out of which **4 genera are endemic.**
- The limbless skinks found in the hills and coastal areas are ***Sepsophis*** with one species and ***Barkudia*** with two species.
- The ***Barkudia insularisis*** with two species is believed to be found in Odisha in the Barkud Island in Chilika Lake.
- The ***Barkudia melanosticta*** is found n Visakhapatnam and is endemic to the region.
- In the northern parts of the Eastern Ghats, ***sepsophis punctatus*** is found.
- In the Western Ghats, five spices of ***Kaestlea*** which are blue tailed ground skinks are endemic and 4 species of ***Ristella*** which are Cat skinks are endemic to the southern part of Western Ghats.

**Skinks:**

- Skinks have long bodies with small or no legs, no neck or glossy scales.
- They are common reptiles found around homes, gardens and open spaces such as school grounds and lakes.
- They have a prominent role in maintaining an ecosystem.
- The skinks are found in all kinds of habitats in the country i.e, from the Himalayas to the coasts and from dense forests to the deserts.
- These species are highly alert, agile and fast moving.
- The skinks feed on a variety of insects and small invertebrates.

- Their movements resemble to snakes as they have reduced limbs or complete lack of them.

**37. China Closes in on the US:**



- China is becoming the most powerful country in the Asia-Pacific region according to **Asia Power Index.**
- Due to the United State's shabby handling of the Covid-19 pandemic, China is becoming the most powerful country in the Asia-Pacific region.
- According to the **Sydney-based Lowy Institute's Asia Power Index for 2020**, America has been halved in its 10-point lead on China than two years ago.
- **Lowy's Institute has ranked 26 nations and territories.**
- The Institute used **128 indicators to measure the index power** which includes **defence spending, economic relations, internal stability, the flow of the information and resources for future projects.**
- Due to the poor response to the Covid-19 pandemic, multiple trade disputes and the President Donald Trump's move to withdraw from multilateral deals and agencies has led to loss of prestige to the United States in the Asia-Pacific region.
- As per the latest estimate, to recover from the pandemic, the US economy could take until 2024.
- On the other hand, China's economy has bounced back from the impact of the virus and is the only large economy to recover in 2020.
- Despite seeing a fall, China stayed firmly at the second place for the third year in a row in the **Asia Power Index.**
- The contributions to that fall are due to China's diplomatic clout which is facing accusations relating to Covid-19 and its wolf warrior diplomacy.
- The study says that China will eventually level with the United States and may surpass the US at the end of the decade.

**Indian Power in Asia:**

- **India** lost economic growth potential due to the pandemic and is now the **fourth** most powerful nation after Japan in the Asia-Pacific region.
- By 2030, Lowy projects that India will reach 40% of China's economy when compared with 50% estimate in 2019.
- Impact of Pandemic on Asia-Pacific Region
- According to the **United Nations University World Institute for Development Economics Research**, **347.4 million people in the Asia-Pacific region could fall below the $5.5 a day poverty line because of the pandemic.**
- Asia's economy is considered to become larger than the rest of the world in 2020.
- But now, it is facing a storm of public health, economic and strategic challenges.

**Other Powers:**

- **Japan is ranked third** and is reported as a **smart power for using limited resources to wield broad influence in the region.**
- Japan gained most points in terms of its defence diplomacy which includes joint military exercises and procurement of arms.
- The countries which ranked under top 10 are Australia, Malaysia, Russia, Singapore, Thailand, and South Korea.
- According to the report, South Asian nations have been gripped with political turbulence.
- This year Taiwan gained its power, along with Australia and Vietnam.

- Taiwan improved its diplomatic influence score when a handful of allies cut official ties in 2019 as Beijing wanted to isolate the island on the world stage.
- Australia climbed to 6th rank by overtaking South Korea.
- Cultural and diplomatic influence helped Australia score points. Its economic relationship score has also increased after Australia secured its 14th free trade deal with Indonesia.
- Russia and Malaysia positioned as the biggest loses in the index.
- Russia performed best on resilience measures, diplomatic influence and military capability.

**38. October - The Month Delhi Sees A Rise in Air Pollution:**

- Delhi's air quality starts to dip every year in October.
- On October 15, the Air Quality Index touched 'very poor' for the first time this season.
- Air pollution in the whole Indo-Gangetic plains and Delhi is a complex phenomenon.
- The weather during October, the input of pollutants and the local conditions play a part in the rise of air pollution in Delhi in October.
- In **2015, a study conducted by IIT-Kanpur** states that **17-26% of all particulate matter in Delhi air pollution in winter is biogas burning.**
- The **System Air Quality and Weather Forecasting And Research (SAFAR)** developed a system to calculate the contribution of stubble burning.
- The **stubble burning season is around 45 days long and in the beginning of October it has been 2%-4%.**

**Rise of Air Pollution in October:**

- **In northwest India, October marks the withdrawal of monsoons.**
- The direction of the wind is towards the east during monsoons.
- These winds carry moisture which travels from over the Bay of Bengal and brings rain to this region.
- When the monsoon has withdrawn the direction of the wind changes to northwesterly.
- During summer the storms carry dust from Rajasthan, Pakistan and Afghanistan and the direction of the wind is also to north westerly.
- The scientists from the **National Physical Laboratory** conducted a study and reviewed that the winter winds of Delhi, which is of 72% comes from northwest and the remaining 28% from the Indo-Gangetic plains.
- In 2017, a far off storm in in Iraq, Saudi Arabia and Kuwait led to a drastic dip in air quality in Delhi, showing the impact of the northwest winds on the Capital city's air.
- The increased pollution is also due to the dip in the temperatures.
- As the temperature dips, the inversion height is lowered where the concentration of pollutants in the air increases.
- **Inversion height is the layer beyond which the pollutants cannot move into the upper layer of the atmosphere.**
- For dispersing pollutants, high speed winds are very effective but winters bring a dip in wind speed.
- The combination of these meteorological factors make the region prone to pollution and other factors such as farm fires, dust storms add a high base to pollution.

**Role of Farm Fires:**

- The easiest and low cost method to get rid of paddy stubble is the farm fire.
- With the use of combine harvesters, the practice became more common.

- The Farm fire practice gained acceptance from 2009 when the Punjab and Haryana government passed laws delaying the sowing of paddy.
- This law allows conserving groundwater as the new sowing cycle will coincide with monsoons and less water extraction.
- This will make farmers to have little time for sowing for the next time.
- The paddy straw and stalk have high silica content which is not suitable for livestock. So, the best way to get rid of it is to set fire to it.
- The smoke residues from the fires, due to the northwesterly movement of the winds travel to Delhi during the winter leading to an increase in pollution in the city.

**Sources of Air Pollution:**

- In winter, the two biggest causes of dipping air quality in Delhi are dust and vehicular emissions.
- The top contributor for air pollution during the season is dust pollution which contributes 56% of PM 10 and PM 2.5 load at 59t/d. The major source for dust pollution is roads at 38% of PM 2.5 concentration.
- Between October and June, there won't be much rain due to which dust seems prevalent in the entire region.
- The second contributor to air pollution is vehicular pollution - 20% PM 2.5 in winters.
- Government has taken several steps to reduce pollution such as introducing BS VI cleaner fuel, push for electric vehicles, odd-even as an emergency measure and construction of Eastern and Western Peripheral Expressways. Still, Delhi is reeling under severe air pollution every year.

**39. Malabar Naval Exercise - Australia to Join:**

- The Ministry of Defence announced that **Australia will take part in the Malabar Naval Exercise 2020.**
- The countries that are going to participate in the **Malabar Naval Exercise in 2020 are India, Japan, the USA and now Australia.**
- **The Quad group formally bring four countries militaries together and this is the first military exercise between all the four countries.**
- The exercise is scheduled to be held at the end of November.
- The exercise is planned on a non-contact format at sea level.
- The discussion for Australia's inclusion has come up at the Quad meeting in Tokyo.
- **The Malabar exercise was a bilateral exercise between India and the USA in 1992.**
- Later it expanded into the **trilateral format with Japan's inclusion in 2015.**
- The Malabar exercise includes simulated war games and combat manoeuvres.
- In 2019, it was held in September off the coast of Japan.
- It included the complex maritime operations in surface, air domains and sub-surface with the key focus on anti-submarine, anti-air and anti-surface firings, tactical scenario based exercise at the sea and maritime interdiction operations (MIO).

**Malabar, BECA and Strengthening of Quad:**

- Wary of China's rise in the Asia-Pacific region, a grouping of four countries - India, the USA, Japan and Australia was mooted.
- But, the progress towards formalising the Quad was slow until recently.
- With China's aggression in the region and the standoff at Ladakh gave a fresh impetus to the Quad and the things are moving quickly towards formalisation.
- The joining of Australia to the Malabar exercise must be seen in this light.

- China had vehemently opposed the Malabar exercises between the four countries. It perceives the exercises to be directly aimed at it.
- But, the formalisation of Quad is gaining pace and the grouping will be a strong counter top China in the region.
- In this regard, India and the USA are stepping up to conclude the **Basic Exchange and Cooperation Agreement (BECA).**
- The **BECA will allow India to use US geospatial intelligence. It also enhances the accuracy of automated weapons and systems like missiles and armed drones.**
- In September 2018, both the countries have signed the **Communications Compatibility and Security Agreement (COMCASA).**
- This cleared the way for the transfer of communication security equipment from the US to India.
- This will help in interoperability between the two forces and with other militaries which are using the US origin systems for secure data links.
- **In August 2016, the USA and India signed the Logistics Exchange Memorandum of Agreement (LEMOA).**
- This agreement will allow replenishing the military of each country from the other's base.
- The completion of the all the three foundational agreements with the USA will make India take advantage of technological and intelligence of the USA to counter China.

**40. India-US Defence Deals 0n the Cards:**

- On October 26-27, 2020 at New Delhi the External Affairs Minister and Defence Minister of India and US Secretary of State and Defence Secretary are preparing for the **third 2+2 ministerial meeting.**
- The key agenda will be on the **Basic Exchange and Cooperation Agreement (BECA).**
- The **BECA lays the foundation for deeper military cooperation.**
- In the previous two meetings, **COMCASA and LEMOA** were signed.
- All three agreements include the **sharing of telephone intercepts, high-end satellite images and data sharing of Chinese troops and weapons deployment along the Line of Actual Control which is 3488km.**
- The Indian armed forces used five American platforms at the LAC-C-17 Globemaster III from military transport, Boeing's Apache as tank killers, Boeing's Chinkoo CH-47 as heavy-lift helicopters, for overland reconnaissance P-81 Poseidon and Lockheed Martin's C-130J for airlifting troops.
- India made this move because of Chinese belligerence being clear and the threat from them is evident.

**BECA:**

- The **Basic Exchange and Cooperation Agreement (BECA)** refers to the **geospatial intelligence and sharing satellite images and information on maps for defence.**
- Geospatial intelligence can identify anyone who sails on the ship, flies an aircraft, fights wars, locates targets, responds to natural disasters, etc.
- This agreement will allow India to use advanced US geospatial intelligence.
- It also enhances the accuracy of automated weapons and systems like missiles and armed drones.
- BECA gives access to topographical and aeronautical data and products.
- This agreement will aid in navigation and targeting.
- The geospatial intelligence could add the key to the Air Force to Air Force cooperation.

**LEMOA:**

- In August **2016**, India and the US signed the **Logistics Exchange of Memorandum of Agreement (LEMOA).**
- This agreement facilitates the military of each country to replenish from other bases.
- Each country can access supplies, spare parts and services from other country's land facilities, airbases and ports.
- As India and the US are cooperating closely in the Indo-Pacific, this is useful for Navy-to-Navy cooperation.
- Signing the LEMOA needed trust and its application enhances the trust.

**COMCASA:**

- After the first 2+2 ministerial meeting, the **Communications Compatibility and Security Agreement (COMCASA)** was signed in **2018.**
- This agreement provides India with the US encrypted communications equipment and systems.
- This allows India and the US military commanders, aircrafts and ships to communicate through secure networks in peace and in war.
- India's willingness to sign all these agreements signal the level of trust between India and the US and their militaries faced with an aggressive China.

**41. New Organ in Throat Discovered:**

- The **Netherlands Cancer Institute** researchers have discovered a **new organ in the throat.**
- The researchers identified salivary glands in a new location in the throat.
- This will help radiation oncologists to bypass the area in patients with head and neck tumours to avoid any complications during treatment.

**Salivary Gland System:**

- The researchers were studying a new type of scan to investigate the side effects of the radiation on the head and neck when they identified two areas in the **back of the nasopharynx.**
- These areas are similar to salivary glands and have the same characteristics.
- In the human body, the salivary glands have three major paired glands and 1000 minor glands that are spread over the mucosa.
- **The salivary glands produce saliva which is necessary for swallowing, digestion, dental hygiene, tasting and mastication.**
- Researchers studied scans of 100 people and found a bilateral structure at the back of the nasopharynx.
- Researchers named the new gland**" tubarial glands".**
- **This gland would qualify as the fourth major salivary gland and the other glands are named as parotid, sublingual and submandibular.**
- These glands are present at the inaccessible anatomical location under the base of the skull.
- This area can be visualized only by using nasal endoscopy.
- The conventional CT scan, MRI and ultrasound have not allowed the visualizations.
- **A new type of scan called the PSMA PET/CT scan was used which revealed the location of the new organ.**
- Researchers identified that **the major function of the gland is to moisten and lubricate the nasopharynx and the oropharynx.**

**Importance of the Research:**

- Researchers believe that the discovery may help some cancer patients with head and neck tumours.
- The cancer patients are treated with radiation therapy which can damage the salivary glands.
- Now the radiation oncologists can bypass these areas and protect them from the side effects of radiation.
- The side effects of the radiation can lead to complications like trouble in speaking and swallowing.
- Also, the discovery will help doctors determine issues in the nasopharynx and oropharynx which were earlier proven to be difficult.

**42. Solid Waste to Wealth Tech Designed by CSIR:**

- The CSIR-CMERI developed a municipal solid waste processing facility plant.
- The plant helps in achieving the decentralized decimation of solid wastes and also creates value-added end products.
- The new technology disposes of solid waste in a scientific way following the **Solid Waste Management Rules (SWM), 2016, notified by the Ministry of Environment, Forests and Climate Change.**
- The primary focus is on the **advanced segregation techniques.**
- The segregation system segregates solid waste into metallic waste - metal body; metal container inert - glass, stones, etc.; biodegradable waste - food, vegetables, fruits, grass; non-biodegradable - plastics, packaging material, pouches, bottles etc.
- In an anaerobic environment, the **bio-degradable waste is decomposed and is popularly known as bio-gasification.**
- The **biogas is used as a fuel for cooking and in the gas engine for the generation of electricity.**
- The residual slurry is converted to compost known as vermicomposting and utilized in organic farming.

**Need for Waste Management:**

- Due to rapid urbanization and increasing population, India is facing a waste management challenge.
- The estimation of the volume of waste may rise from 62 million tonnes currently to 150 million tonnes by 2030.
- There will be a huge requirement of landfill area for the dumping such huge volumes of garbage.
- So there is an urgent need for scientific solid waste management.

**Plasma Arc Gasification:**

- Solid waste management and disposing of utilizing **plasma arc gasification** is the best option for solid waste management.
- **This process is eco-friendly where a large volume reduction of waste of up to 90% is possible.**
- This **process utilizes electricity** to generate high-temperature plasma - 3000 degrees centigrade - inside the **plasma reactor.**
- **In the plasma reactor, the waste is converted into syngas.**
- The syngas passes through a series of gas purification systems.
- The gas purification system consists of catalyst compressors like convertor, redox reactor, cyclone separator, scrubber and condenser.
- The condenser is ready for use in gas engines for electricity generation.
- The ash obtained can be mixed with cement for the preparation of recycled bricks.

- But this technology is not economically viable as the energy requirement for waste treatment is very high approximately 1.5kWh/kg of waste for small plants for <100 MT capacity and for greater than 100MT is approximately 1.2 kWh/kg.
- The recurring expenses make the process expensive as the rate of electrode consumption is very high approximately 500mg/kg of waste processed.
- In India, the solid waste generated majorly consists of organic wastes (>50%).
- The disposal of organic waste produces greenhouse gases.
- The ineffective processing of Municipal Solid Wastes causes many diseases as the landfills to transform into contamination hubs for pathogens, viruses and bacteria.

**Biomass Waste Disposal:**

- The dry leaves, dead branches, dry grass are biomass waste and these are disposed of by first shredding them into a suitable size, then mixing them with the slurry of the biogas digester.
- This mixture forms the feedstock for briquette which is subsequently used as a fuel for cooking.
- Also, the briquette is utilized for the production of syngas for the generation of electricity.
- The ash produced by burning the briquettes can be used in cement bricks production by mixing an appropriate quantity of ash with cement and water.

**Polymer Waste Disposal:**

- The polymer waste is disposed of through two main processes.
- In the **pyrolysis process,** the waste is heated to a temperature of **400-600°C** in an **anaerobic environment.**
- The volatile matter comes out from the waste and on condensation gives **pyrolysis oil.**
- The non-condensed syngas and pyrolysis oil are reused for heating purposes.
- The char which is a solid material is mixed with the biogas slurry for making briquette.

**Sanitary Waste Disposal:**

- The sanitary napkins, masks and diapers are disposed of by using high-temperature plasma.
- The CSIR MSW facility is equipped with disinfection capabilities.
- The Decentralized Solid Waste Management plant has the potential to scientifically manage the waste including COVID-19 and other viruses.
- This helps to break the COVID-19 chain through UV-C Lights and Hot-Air Convection methods.
- The pilot plant is self-sufficient in terms of energy requirements. By installing roof-topped solar panels on the facility, surplus energy can be provided to a mini-grid to operate the facility.

**43. Measuring the Hydrogen Content of Galaxies:**

- Indian astronomers have figured out why there is a decrease in the rate of star formation in galaxies after it peaked about 8-10 billion years ago.
- Galaxies are made up of gas which slowly converts into stars.
- To understand this conversion, the measurement of the atomic hydrogen gas is required.
- Astronomy scientists from the **National Centre for Radio Astrophysics (NCRA-TIFR), Pune and the Raman Research Institute (RRI), Bangalore carried out the research.**
- They measured the atomic hydrogen content of galaxies to determine the star formation rate.
- To measure the hydrogen gas astronomers used **Giant Metre Wave Radio Telescope (GMRT).**
- The new GMRT allowed astronomers to use 10 times more galaxies in the stacking analysis.
- This gives sufficient sensitivity to detect the weak average 21cm signal.

**Stacking Technology:**

- Using a radio telescope one can detect the presence of **atomic hydrogen at signal 21 cm radio wavelength signal**.
- But the 21 cm signal is very weak and difficult to detect form individual galaxies.
- To overcome this, the astronomers used **stacking technology** to combine the 21 cm signals of nearly 8000 galaxies.
- This technique helps to measure the average gas content of these galaxies.

**Outcome of the Research:**

- According to the astronomers, the start formation was intense in the early galaxies.
- Their atomic gas was consumed by star formation in one-two billion years after the big bang.
- As the galaxies could not acquire new gas, the start formation in the galaxies declined and finally ceased.
- The researchers observed the exhaustion of the atomic hydrogen gas to conclude that star formation activity is declining.

**GMRT:**

- GMRT was built in 1980s and 1990s to detect the 21 cm signal from the most distant galaxies.
- It is located in Narayangoan, Junnar, Pune, Maharashtra.
- GMRT is maintained and operated by NCRA-TIFR.
- In 2017, GMRT was upgraded which led to its increased sensitivity to detect weak 21 cm signals from distant galaxies.
- For the past few years, Indian astronomers are contributing enormously to astronomical research. The current research on the start formation will eventually help in determining what would happen to our universe when all star formation ceases.

**44. Important Molecules from Hydra Discovered:**

- Scientists of Agharkar Research Institute at Pune along with the University of Hyderabad discovered **two important molecules from the hydra.**
- **The two molecules discovered are Gremlin and noggin.**
- **The study is significant as it provides evidence that humans evolved from simpler ancestors as proposed by Charles Darwin in 1859.**
- **This study is useful to understand tissue and organ regeneration.**
- By using conventional and modern techniques, gremlin and noggin play a role in tentacle formation and budding in hydra.
- To interfere with the pattern formation and to figure out the functions of the two protein scientists used specific chemicals.
- Similar molecules are present in humans and perform a different function.
- This research helps to study biological evolution and complex body structures like fish, monkey, and giraffe.
- The study has implications for the understanding of evolution of animal body parts.
- For the first time in the world, **MACS-ARI has designed a non-commercial low cost hydra kit.**
- With the help of this kit, hydra can be grown and maintained for research and teaching.

**Hydra:**

- Hydra are freshwater organisms with a simple body structure and an ability to regenerate.

- If hydra is cut into pieces, each piece of hydra can regenerate into a new organism. Hydra has an oral-aboral axis and radial symmetry like starfish.
- **Noggin** is crucial for the development of dorsal structures and also for tentacles formation.
- Hydra can be used for toxicity testing for drugs and for checking water pollution levels by industrial wastes.
- Hydra is an excellent replacement for banned animal experiments due to ethical considerations.

**45. A Global Treaty to Ban Nuclear Weapons will Come into Effect Soon:**

- The United Nations announced a UN treaty to ban nuclear weapons.
- The United Nations said that 50 countries have ratified the treaty where the **50th ratification was received from Honduras.**
- The ***Treaty on Prohibition of Nuclear Weapons*** **is the first multilateral legally-binding instrument for nuclear disarmament.**
- The treaty was adopted by a vote of 122 in favour to one against - the Netherlands, and one abstention by Singapore in 2017.
- The 50th ratification was on the 75th anniversary of the ratification of the UN Charter and is celebrated as the UN Day.
- The UN named it as the best treaty which can work with the civil society to bring democracy to disarmament.
- The five nuclear powers - Russia, China, US, Britain and France and America NATO allies are in opposition to the treaty and had not participated in the negotiations.
- **India had abstained from voting and given Explanation of Vote (EoV) for its abstention on the resolution in October 2019.**
- India said that the **Geneva Conference on Disarmament (CD) is the single multilateral disarmament forum.**
- India said that it supports the commencement of negotiations in the CD on a **Comprehensive Nuclear Weapons Convention which adds prohibition, elimination and verification.**
- The UN envoys of three nations the US, the UK, and France criticized the treaty for not providing the solution for the grave threat from North Korea.
- The United States of America (USA) said that the **Treaty on the Prohibition of Nuclear Weapons (TPNW)** turns back on verification and disarmament and is dangerous to the **Nuclear Nonproliferation Treaty**.

**TPNW-Treaty on the Prohibition of Nuclear Weapons:**

- A UN Assembly conference to negotiate a ban on nuclear weapons took place in the year 2017. It was hailed as a historic achievement by many countries.
- In July 2017, by a vote of 122 in favour to one against, the Treaty on the Prohibition of Nuclear Weapons (TPNW) was adopted.
- By September 2017, the treaty was open for signature to all States at the UN Headquarters and will enter into force 90 days after its ratification by the fiftieth country.
- TPNW prohibits participation in any nuclear weapon activities such as testing, possessing, developing, producing, stockpiling and threatening to use nuclear weapons.
- A state party to the treaty are obliged to prevent and suppress any nuclear weapon activity undertaken by persons or on territory under its control.
- TPNW was the result of a decades-long struggle by non-nuclear countries and a coalition of non-governmental organisations - the **International Campaign to Abolish Nuclear Weapons (ICAN).**
- **For its efforts, ICAN was given the Nobel Peace Prize in 2017.**

**Nuclear Threat:**

- Amongst the many threats that can wipe out the human race, nuclear war sits at the top of the list.
- Ever since the world has witnessed the devastating impact of the Hiroshima & Nagasaki bombings, and the fallout of radiation due to nuclear accidents has made nuclear war a serious threat to the world.
- The threat still persists as there are an estimated 13000 nuclear warheads with 90% of them shared between the United States and Russia.
- Countries like North Korea openly claim that they will not hesitate to use nuclear weapons when threatened.
- With belligerent leaders raising the rhetoric of winning wars with nuclear weapons, the world seems to be a dangerous place with the existence of nuclear weapons.
- There is a renewed push to augment nuclear weapons and their delivery mechanisms by many countries.
- TPNW is thus a step in the right direction to put an end to the development and deployment of nuclear weapons.
- But, without nuclear weapons states joining the treaty, it will have less impact.
- Nevertheless, the treaty will fill a major legal gap in international nuclear non-proliferation.
- The Non-Proliferation Treaty (NPT) of 1968 does not explicitly ban nuclear weapons but has facilitated an environment for nuclear disarmament.

**46. Jammu and Kashmir Land Laws:**

- Centre notified new land laws for Jammu and Kashmir, ending the abrogated Article 370.
- Now, common people and investors outside J&K can purchase land in the region.
- This ended the exclusive rights of locals over the land granted under Article 370.
- The new J&K Development Act omitted the term 'being a permanent resident of the State 'as a criterion to purchase land.
- Soon the Centre is going to notify land laws separately for the Union Territory of Ladakh.
- According to the amendments of 'The Jammu and Kashmir Land Revenue Act, Samvat, 1996 ' only agriculturists of the region can buy agriculture land and no exchange, sale, gift and mortgage shall be valid by a non-agriculturist.
- The Ministry of Home Affairs (MHA) introduced the UT of J&K Reorganization, Adaption of Central Laws, Third Order, 2020 resulted in the repeal of 26 state laws.
- This included the J&K Big Landed Estates Abolition Act which resulted in the 'Land of tiller rights'.


**Features of the New Law:**

- The new law ended the right of permanent residents over land.
- Common citizens as well as investors outside J&K can now purchase the land.
- Restrictions on conversion of agricultural lands to non-agricultural purposes. But a district collector can clear the conversion.
- For healthcare or higher or senior secondary or for specialized education land can be transferred in favour of a person or an institution.
- For declaring an area as "Strategic Area" for operational and training requirements of the armed force, an army officer should be not below the rank of Crops Commander.

**Need for the New Laws?**

- The changes to the land laws are the logical steps following the nullification of Article 370 and Article 35-A which had ended the special status for Jammu & Kashmir.
- The government argues that the new laws will spur economic activity in J&K. It pointed that because of the restrictions on land purchase that were in place in the erstwhile state, Jammu & Kashmir had little landholdings to attract investors.
- But, there are concerns among the local populace and local political parties are vehemently opposing the laws.
- Some argue that the changes could have been made after consultation with local population.
- For so long, the J&K politics had been dominated by deliberate demographic engineering. Fears are ripe that this will change now.
- The government should also understand that pushing development in J&K without political participation and people's deliberations will result in fraught development.

**47. Substantial Amounts of Water on the Moon Discovered:**

- In two separate studies, scientists have identified huge implications for human sustenance on the moon.
- **The first study identified water on the moon's sunlit surface for the first time.**
- **The other study revealed that the Moon's dark and shadowy regions contain ice.**



**Importance of Water:**

- Water is a precious resource in deep space as it is necessary to sustain life and also for generating rocket fuel.
- **NASA's Artemis programme plans to send first woman and the next man to the Moon in 2024.**
- The Artemis programme by NASA is to establish a "sustainable human presence" by the end of the decade.
- If the astronauts can use the moon's resources, then they can carry less water to the moon.
- Thus, the discovery has a huge implication for setting up a sustainable habitat on the Moon.

**Water on the Moon:**

- The **Indian Space Research Organisation (ISRO)** had provided evidence for the existence of water on the moon by **Chandrayaan-1 Mission.**
- In 2009, the Moon Mineralogy Mapper (M3) instrument of the Chandrayaan-1 had found found water molecules in the polar regions of the Moon.
- In August 2013, M3 data was analysed to detect the magmatic water on the Moon's surface, which is the water originating from the deep interiors of the Moon.
- Based on the observations done by the Chandrayaan-1 mission, NASA's Cassini and Deep Impact Comet mission and NASA's ground based Infrared Telescope Facility were not able to understand whether the detected molecules were water or in the form of hydroxyl (OH).

**New Discovery:**

- The discovery confirmed that the water molecules are present in the Clavius Carter in the Moon's Southern Hemisphere.
- It is for the first time water has been detected on the sunlit side and it is not a shadowy region.
- The unique water molecules were picked up by **SOFIA (Stratospheric Observatory for Infrared Astronomy) of NASA/DLR.**
- SOFIA is a modified Boeing 747SP jetliner which can fly at an altitude up to 45,000 feet and has an infrared camera.
- The mission of SOFIA is to look at dark and distant objects.
- The data collected by SOFIA showed water in concentrations of 100-412 parts per million trapped in 1 cubic metre of soil.

**Formation of Water:**

- Scientists believe that the space rocks carrying small amounts of water may have bombarded the moon.
- Also, the Sun's solar wind may have carried the hydrogen and reacted with the mineral in the lunar soil to create hydroxyl and transformed into water.
- Since the moon does not have a thick atmosphere, scientists are puzzled to understand how the sunlit surface retained the water.
- NASA scientists said that the water may have got trapped into tiny bead-like structures that were created in the soil by the impacts from space rocks.
- Water may be hidden between grains of lunar soil and sheltered from the sunlight.
- It is not yet known that the water found is easily accessible.

- The cold traps in the hidden shadowy pockets on the lunar surface are spread across a combined area of 40,000 sq km.
- To estimate this, NASA uses **Lunar Reconnaissance Orbiter.**
- Now, SOFIA mission will look for water in sunlit locations and NASA's **Volatiles Investigating Polar Exploration Rover (VIPER) mission** will create the first water resource map on the moon.



**48. Electricity Access and Benchmark Utility Report:**

- The **Ministry of Power, NITI Aayog in collaboration with Rockefeller Foundation and Smart Power India launched the report on 'Electricity Access in India and Benchmarking Distribution Utilities'.**
- The survey was conducted across 10 states.
- The survey represented 65% of the total rural population of India with a sample size of more than 25,000 and assessed 25 distribution utilities.
- The sample includes households, commercial enterprises and institutions.
- The survey collected information on both the demand - electricity customers as well as supply side - electricity distribution utilities.
- Government schemes such as **Pradhan Mantri Bijli Har Ghar Yojana and Deen Dayal Upadhyaya Gram Jyothi Yojana** were highlighted in the report for advancing electrification in the country.
- The Rockefeller Foundation will focus on three key areas - tariff simplifications and rationalization, learning DGT schemes in Punjab and best practices from high performing Indian Discoms.

**Purpose of the Report:**

- To evaluate the electricity access across the states and distribution utilities along all the dimensions in India.
- To benchmark utility capacity.
- To provide electricity access and identify the drivers for access.
- To develop recommendations for electricity access.

**Key Findings:**

- The electricity infrastructure within 50 metres of their premises is available to as much as 92% of customers.
- Not all the customers have connections, this is because of the distance of the households from the nearest pole.
- The access to grid-based electricity is available to 87% of the customers.
- The remaining 13% of the customers used non-grid sources or no electricity at all.
- The hours of supply have improved to nearly 17 hours per day.
- The metered electricity connection is available to 85% of customers.
- The access to electricity of household customers is 83%.
- A total of 66% of those surveyed were satisfied and 74% of customers in urban and 60% in rural areas were satisfied.

**Recommendations of the Report:**

- New connections for non-household customers.
- Transfer of subsides or benefits directly into a customer's account.
- Enhancing technology driven customer service.
- Ensuring 100% metre connections of customers.
- Segregation of feeder lines and ongoing programs of the government.

**Pradhan Mantri Sahaj Bijli Har Ghar Yojana:**

- Also known as **Saubhagya Scheme**, the Pradhan Mantri Sahaj Bijli Har Ghar Yojana was launched in 2017 to achieve universal electrification of households in both rural and urban areas of the country by 2019 and provide 24x7 electricity to all.
- The scheme provides for last-mile electric connectivity to all un-electrified households.
- The electricity connection include drawing service lines from the nearest electricity poles, fitting electricity metres, wiring for a single point LED light and a mobile charging point.
- Ministry of Power is the implementing authority for the scheme.

**Deendayal Upadhyaya Gram Jyothi Yojana:**

- The Deendayal Upadhyaya Gram Jyothi Yojana is for creating basic electricity infrastructure in villages, strengthening and augmenting existing power infrastructure and ensuring that quality power is delivered to the end consumer.
- As part of the scheme, subsidies electricity connection is provided to BPL households in villages. The BPL beneficiary is decided based on the list drawn out by each state.

**49. Joint Call for Destruction of Terror 'Safe-Haven":**

- The Central Asian Republics and India joined in demanding the destruction of "safe havens" of terrorism.
- India said that for sustainable peace and stability in Afghanistan it is important that the world community should support the Afgan government.
- The joint meeting expressed support for the peace negotiations in Afghanistan.
- The Ministers condemned terrorism and combating this danger is by destroying terrorist safe-havens, infrastructure, networks and funding channels.
- India described the Central Asian region as India's extended neighbourhood.
- During the meeting, India announced an additional **$1 billion Line of Credit for the Central Asian Countries.**
- The money will be used for **major infrastructural and connectivity projects**.
- During the meet, India received appreciation from the Foreign Ministers of central Asian countries for it Chabahar Port infrastructure modernization efforts in Iran.
- The Chabahar port is an important link in trade and transport communications between the Central and South Asian markets.
- India also announced financing support for high impact community development projects in the Central Asian countries.
- Also at the meet, establishment of a working Group by India Central Asian Business Council with the participation of all countries' key chambers was announced.

**India and Central Asia:**

- India has strategic and economic interests in the Central Asian Region.
- The region is rich in natural resources and India has deep-rooted relations with the countries of the region.
- Both India and countries of the region has common interests such as tackling terrorism, economic and security cooperations, curbing illicit trade and cooperation in multilateral institutions.
- For India, cordial relations with countries of the region is important for two major reasons.
- First, the region is a bridge between India and Europe. Any land-based trade with Europe must pass through the region.

- Second, any terror threat emanating out of Afghanistan to India must be tackled with the help of Central Asian countries.
- No wonder India called the region to be its 'extended neighbourhood' - a showing of intent and seriousness towards maintaining cordial relations with Central Asian countries.



**50. ASER Survey on rural Education and Learning Outcomes:**

- According to the **Annual State of Education Report (ASER) survey**, about 30% of rural children have no textbooks at home.
- The ASER survey was conducted in September, the schools were closed due to COVID-19 across India during that time.
- In Assam, West Bengal and Nagaland, 98% of children had textbooks and in Rajasthan, 60% had textbooks.
- In Andhra Pradesh less than 35% of children had textbooks and in Bihar only 8%.
- More than 80% of children in Himachal Pradesh, Punjab, Kerala and Gujarat received textbooks.
- During the week of the survey, one in three children had no learning activities and two in three had no learning materials or activities given by the school.
- Online classes were accessible only one in ten children.
- The ASER survey revealed that a third of children with smartphones access did not receive any materials.
- The ASER survey pointed out the levels of learning loss in rural India due to the varying levels of technology, school and family resources.
- The survey revealed that 5.3% of rural children of age 6-10 years had not enrolled in schools in comparison to 1.8% than in 2018.
- This indicates that due to the disruptions caused by pandemic, the families are waiting to reopen the schools.
- The enrollment of 15-16 years age children is slightly higher than 2018.
- The enrollment showed a drop in private schools in all age groups due to shifting towards government schools, 69.55% of children of age group 6-14 enrolled in a government school.
- The proportion of boys enrolled in government schools has risen from 62.8% in 2018 to 66.4% in 2020, for girls the enrollment has risen from 70% to 73%.
- The ASER survey found that 36% of households with school children had a smartphone in 2018 and the number spiked to 62% in 2020.
- Many children did learning activities on their own of which 70% did some activities, 11% had access to online classes, 21% had recorded or video classes and the number is higher in private schools.
- Parental levels of education and resources played a key role in children who studied at home and 20% of children got their learning materials whose parents had less than five years of education when compared with 46% parents who studied more than class IX.
- The survey found that 40% of low education households did not get any materials compared to 17% of high education families and 40% of low education families did some learning activities even without any materials.
- ASER recommends that schools find ways to build home support.

**Key Features of the Survey:**

- The survey revealed that 5.3% of rural children of age 6-10 years had not enrolled in schools.
- By September, 20% of children did not have textbooks at home.
- Only &70% of children had done their learning activities had done some learning activities.
- Only < 36% of rural children materials from school.

- Only 75% of schools conducted online classes via Whatsapp.

**ASER:**

- ASER, the Annual State of Education Report is a nationwide survey of rural education and learning outcomes.
- The survey conducted in terms of reading ability, arithmetic skills.
- It has been conducted for the past 15 years by NGO Pratham.
- This year the survey was conducted through phones and reached 52,227 rural households with school going children in 30 states and UT.



**51. Mandatory Packaging in Jute Materials:**

- The Cabinet chaired by the Prime Minister approved that 100% of food grains and 20% of sugar should be mandatorily packed in diversified jute bags.
- The decision of packing sugar in jute bags will increase the diversification of jute industry.
- For packing food grains initially, 10% of jute bags will be placed through a reverse auction on the Gem portal.
- The government expanded the norms for mandatory packaging under the Jute Packaging Material (JPM) Act, 1987.
- In case of any shortage or disruption in the supply of jute packaging material or contingency, the provisions will be further relaxed up to 30% of the production of the food grains over and above provisions.
- In India, nearly 3.7 lakh workers and farm families depend on the jute sector.
- The government is working towards the development of the jute sector by increasing the quality and productivity, by diversification of jute sector, boosting and sustaining demand for jute products.
- The government sector purchases jute bags of value more than Rs. 7,500 crore every year for packaging foodgrains.

**Benefits:**

- The new approval will benefit farmers and workers located in the Eastern and North Eastern regions of India.
- The states which will benefit are Andhra Pradesh, West Bengal, Assam, Odisha, Bihar, Meghalaya and Tripura.
- Under the JPA Act, compulsory use of jute bags in packaging commodities Act, 1987, the government is providing compulsory use of jute packaging material in the supply and distribution of certain commodities.
- This will benefit the interest of production of raw jute and packaging materials and the persons engaged in it.
- The reservation norms will benefit the interest of domestic production of raw jute and jute packaging material in India.
- This makes India self-reliant in consonance with Aatma Nirbhar Bharat.

**Support to Jute Sector:**

- The government has been supporting 2 lakh farmers through Jute ICare.
- The Jute ICare is for designing and also includes agronomic practices such as line sowing using seed drills, using wheel-hoeing for weed management and use of nail-weeders, distribution of quality certified seeds and providing microbial assisted retting.

- These interventions increased the quality and productivity of raw material and increased the income of the farmers by Rs10, 000 per hectare.
- On a commercial basis, the Jute Corporation of India signed an MoU with the National Seeds Corporation for the distribution of 10,000 quintals of certified seeds.
- This will increase the quality and productivity and increase the income of the farmers.
- The National Jute Board collaborated with National Institute of Design for jute bag designs and also a Jute Design Cell is opened at Gandhinagar.
- Promotion of Jute Geo Textiles and Agro-Textiles has been done by the state governments special in the North-Eastern region and also departments such as Ministry of Road Transport and Ministry of Water Resources.
- The government imposed Definitive Anti-Dumping Duty on import of jute bags from Bangladesh and Nepal which was effective from 5th January 2017.
- To promote transparency in the industry, JUTE SMART, an e-government programme was launched in December 2016.
- This provides an integrated platform for the procurement of B-Twill sacking by Government agencies.
- For the procurement of the jute under MSP and commercial operations, the JCI is transferring 100% funds to jute farmers online.

**52. SERB-POWER - A New Scheme for Women Researchers:**

- The Union Ministry for Science and Technology, Earth Sciences and Family Welfare launched a new scheme for women researchers and named as SERB-POWER.
- The SERB-POWER scheme is designed exclusively for women researchers to promote opportunities for them in exploratory research.
- Globally, only 30% researchers are women and in India 18.6% are full time R&D women researchers.
- The Science and Engineering Research Board (SERB) is a statutory body of the Department of Science and Technology.
- The SERB has been planning a scheme to mitigate gender disparity in science and engineering research.
- The scheme will end the disparity in various science and research programs, academic institutions of India and R&D laboratories.
- The key focus of the scheme is to enhance the participation and promotion of the women in the research workforce.
- The Women Fellowship Scheme of DST scheme introduced women empowerment policies and supported 1000s of women scientists.
- For identifying the POWER fellowship a Search-cum-Selection Committee will be present.
- To select the POWER Research Grant, the existing Programme Advisory Committee (PAC) will be used.
- The SERB-POWER scheme has two components namely Fellowship and Research Grant.
- Features of SERB-POWER Fellowship
- The fellowship will be given to the women of age group 35-55 years and up to 25 fellowships will be given and 50 Power Grants.
- For a year only 75 fellowships will be given at any point in time.
- The fellowship members will receive Rs 15,000 per month along with the regular income, a research grant of Rs 10 lakh per annum and overheads of Rs 90,000 per annum.
- The duration will be three years without the possibility of extension.

**Salient Features of SERB-POWER Research Grant:**

- The funding will be provided in two categories.
- **LEVEL 1** is for the applicants from IITs, NITs, IISERs, IISc, Central Universities and National Labs of Central Government Institutions. Funding is up to Rs 60 Lakhs for 3 years.
- **LEVEL 2** is for the applicants from State Universities, Colleges and Private Academic Institutions. Funding is up to Rs 30 Lakhs for 3 years.
- The POWER Grant will be regulated through SERB-CRG (Core Research Grant) guidelines.

**Southern States Top Governance Index:**

- **Kerala is the best governed state** among the big states of the country according to the Public Affairs Index-2020.
- The Index was developed by the non-profit organisation **Public Affairs Centre.**
- The NGO is in Bangalore and is headed by the former ISRO Chairman K. Kasturirangan.
- The report is released annually and ranks states on their **governance performance based on a composite index in the context of sustainable development.**
- The **three parameters** that the report considers in governance are **equity, growth and sustainability.**

**Large States:**

- Four southern states have topped the index under large states category in terms of governance.
- Large states are those with a population of more that 2 crore.
- Kerala topped the list with a score of 1.388 PAI Index point followed by Tamil Nadu with 0.912 score.
- Andhra Pradesh stood at third place with 0.531 score and Karnataka is fourth with 0.468 score.
- Amongst the states that were ranked at the bottom of the index were Uttar Pradesh with a score of -1.461, Odisha with -1.201 score and Bihar with -1.158 score.

**Small States:**

- As per PAI-2020, small states are those with a population of less than two crore.
- Goa topped this segment with a PAI score of 1.745 points.
- The state is followed by Meghalaya - 0.797 and Himachal Pradesh - 0.725.
- The worst performing states in the category are Manipur -0.363, Delhi -0.289, and Uttarakhand -0.277.

**Union Territories:**

- Chandigarh is the top-governed UT with a score of 1.05 PAI points.
- Puducherry is second with 0.52 PAI score and Lakshadweep is third with 0.003 score.
- The worst performing UTs are Dadar and Nagar haveli with -0.69 PAI score, followed by Jammu & Kashmir with -0.50 score and Andaman and Nicobar Islands with -0.30 score.
- One Size Fits All Approach Doesn't Work
- While releasing the report, the Chairman Kasturirangan had said that one size fits all approach to governance doesn't work.
- He further states that the state interventions, including centrally-sponsored Schemes are being implemented mechanically which is running counter to objective pluralism.
- He states that the evidence and insights from the PAI-2020 must compel us to look at the economic and social transition that is underway in India and what it holds for our future development.
- The first PAI Index Report was released in 2016.

**53. Are Human Body Temperatures Falling?:**

- In a 16-year study published in the journal Science Advances, researches have determined the possible reasons for the decline in human body temperatures across populations.
- Ever since German doctor Carl Reinhold August Wunderlich determined in 1868 that the average human body temperature is 98.6°F, doctors have took it as a golden standard.
- But several studies in recent years found that the human body temperature is varying.
- In some, the average temperature is 97.7°, while in others it is 97.9°, yet in many it is 98.2°F.
- A study published in 2019 found that for the past two centuries the human body temperatures of Americans have been decreasing.
- Similar such evidence was found in Europeans. But the new study was to know whether the phenomenon is restricted to high-income countries only or it is normal across populations.

**The New Study:**

- For the new study, researchers have made 18,000 body temperature observations of 5500 Tsimane individuals, an indigenous population in Bolivian Amazon.
- Tsimane are forager-horticulturalists inhabiting the tropical environment which is rife with diverse pathogens.
- While some pathogens are familiar ones like cold or pneumonia, less familiar ones like hookworm, tuberculosis etc., are also found in their environment.
- Exposure to these infections will lead to inflammation of the body, which means higher body temperature.
- As per researchers, from early evidence Tsimane experience higher inflammation due to the infections and the researchers have expected the same and the temperatures would be higher than those seen in the US, UK and German populations.
- But, to their surprise, the researchers have found that the average body temperatures of Tsimane people decline by 0.09°F per year.
- Today, they average at 97.7°F.
- The researchers observed that the decline in temperatures was rapid as in less than two decades the Tsimane tribes' body temperatures have declined, while in the US it took two centuries.

**The Reasons for Decline:**

- After observations, the research team looked at number of hypotheses about factors that brought the decline. The following are some.
- **Better Healthcare:** One possible hypothesis is that better healthcare and hygiene in high-income group populations have led to fewer infections and in turn have lowered the body temperature. In case of Tsimane, though they live a rural lifestyle, they have better access to healthcare than they did two decades ago.
- **Lower Inflammation:** The frequent use of anti-inflammatory medicines such as ibuprofen has been thought to be a reason for the decline in body temperature. Yet, even after accounting for biomarkers of inflammation, body temperature declines remained among Tsimane people.
- **Briefer Illness:** Could reduced infection duration due to better treatment be the reason for decline? This argument was consistent with the findings among the Tsimane. For example, if study participant has respiratory infection in the early stages of the 2002-18 study, they had higher body temperatures in 2002 than in the later years if they had the same infection.
- **Bodies Working Less:** another hypothesis the research team tested is that people are healthier now and their bodies are working less to fight infections. Also, because of air-conditioning and winter heating, our bodies do not need to work hard as before to regulate internal temperature. Though, Tsimane do not use advanced technology, they still have access to blankets and clothes.

**Study Implications:**

- Cumulatively, the findings suggest that there is no one cause that can explain the falling body temperatures. There are a combination of factors.
- The researchers believe that the study will not influence doctors in using body temperature readings as doctors already acknowledge that there is no universal normal body temperature.