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A. GS1 Related

Category: GEOGRAPHY

1. Why is northeast India drying up rapidly?

Analysis:

- It is important to note that Northeast India, which is one of the wettest places on the Earth, has been experiencing rapid drying, especially in the last 30 years.
- As a matter of fact, some places which used to get as high as 3,000 mm of rain during the monsoon season have seen a drop of about 25-30%.

Recent Research work conducted:

- A team of researchers from the Indian Institute of Tropical Meteorology, Pune, and Assam University set out to understand **whether this decline is caused by anthropogenic activity or is it part of natural changes.**
- The results published recently in JGR-Atmospheres show that the decreasing monsoon rainfall is associated with natural changes in the subtropical Pacific Ocean.

Pattern of fluctuations

- The team of researchers found that changes in the Pacific decadal oscillation (PDO) — a pattern of fluctuations in the ocean, particularly over the north Pacific basin — are mainly associated with this declined rainfall.
- Just like El Nino/La Nina in the tropical Pacific, PDO has a signature for a longer time (on the decadal scale) in the sea surface temperatures and its interaction with the atmosphere, which in turn affects the northeast Indian summer monsoon.

Natural and manmade:

- The team used observed rainfall and sea surface temperature data for the period 1901-2014 for the study.
- The results show out that the reduction in rainfall during a major part of the last 114 years may be associated with global man-made factors, while the trend during the last 36 years is associated with natural phenomena.
- It is important to note that only about 7% of the rainfall in this region is associated with local moisture recycling, which means that anthropogenic activities can affect only this small percentage. **The researchers note that this study can be used to predict the monsoon rainfall over the northeast region on a decadal time scale using Pacific Ocean region data.**
- Previous studies have found that a dry spell may be preceded by a wet spell, so the researchers warn that “change in land cover and deforestation could potentially result in more natural disasters, for example, flash flood, landslides from torrential rains, and damage to crops and biodiversity”.
- Lastly, policymakers should take these long-term predictions into account while planning construction of dams, power plants, etc. to prevent loss of property.

B. GS2 Related

Category: POLITY AND GOVERNANCE

1. More women voted in nine States: EC data

What's in the news?

- Women voters have outnumbered men in several States and Union Territories, according to phase-wise data released by the Election Commission.

Analysis:

- If the overall voter turnout in the four phases of the Lok Sabha elections has been higher than in 2014, there is one more reason to cheer. **Women voters have outnumbered men in several States and Union Territories, according to phase-wise data released by the Election Commission.**

A Look at the numbers:

- More than 20.31 crore women voted as against a little above 21.5 crore men. The poll percentages in the four phases were 69.5, 69.44, 68.40 and 65.51.
- The first phase was conducted in 91 constituencies across 18 States and two Union Territories on April 11.
- In nine States, there was a higher women turnout. The highest of 52.13% was recorded in Meghalaya where there was a jump of almost 2.5% in the overall participation (71.32%) compared with the 2014 election.
- Arunachal Pradesh stood second with 52.05% of the polling with a slight improvement in the overall electoral participation (77.38%) in comparison with the previous elections.
- **Higher women turnout was also noted in Manipur, Chhattisgarh, Mizoram, Odisha, Lakshadweep, Andhra Pradesh and Uttarakhand.**
- More than 53% of the people who voted in Manipur and Puducherry during the second phase on April 18 were women, while the figure was 50.66% in Tamil Nadu.
- The turnout in Manipur improved by about 6% but there was a decline of 0.77% in Puducherry and 1.65% in Tamil Nadu.
- The third phase on April 23, 2019 also saw a significant jump, the highest — 52.42% of polling — reported from Daman & Diu, followed by 52.24% in Kerala.
- In Bihar, Goa and West Bengal also, the turnout was higher than that of men. While there was an increase in the overall voting, 1.12% in Bihar and 3.65% in Kerala, it came down by about 6% in Daman & Diu, 1.88% in Goa and 0.59% in West Bengal.
- On April 29, 2019 in the fourth round covering 71 parliamentary constituencies across nine States and a part of the Anantnag seat in Jammu & Kashmir, a higher women turnout was reported only in Bihar, which saw 1.73% jump in the overall voting compared to the 2014 polls.

2. 'No' to animals in poll rallies

What's in the news?

- Animal rights activists have approached the Election Commission of India with an appeal to stop the use of elephants in campaigning by political parties.
- These activists are very concerned at this news.
- It is important to note that the reported use of elephants for political campaigning is totally unlawful and in violation of the Election Commission's code of conduct.

Category: INTERNATIONAL RELATIONS

1. 200 rockets fired from Gaza

What's in the news?

- Gaza militants on 4th May, 2019 fired some 200 rockets at Israel, which responded with strikes that killed a baby, her pregnant mother and another Palestinian, officials said.

A Closer Look:

- The latest flare-up came with Hamas seeking further concessions from Israel under the ceasefire.
- Israel said around 200 rockets were fired from the Palestinian enclave and its air defences intercepted dozens of them.
- One woman was seriously injured in a rocket strike on the Israeli city of Kiryat Gat, some 20 km from the Gaza border, police said.

Israeli Response:

- The Israeli Army said its tanks and planes hit some 120 militant targets in its response.
- They included an Islamic Jihad attack tunnel that stretched from southern Gaza into Israeli territory.
- The Gaza Health Ministry reported a 22-year-old man as well as a 14-month-old baby and her pregnant mother killed, with 17 others wounded.
- An Israeli Army spokeswoman said the military did not have any information on the incident involving the baby.
- The Army said earlier it was targeting only military sites.
- As the exchange of fire continued, Israeli Prime Minister Benjamin Netanyahu held consultations with security chiefs.

Statement from Hamas ally Islamic Jihad:

- A statement from Hamas ally Islamic Jihad claimed responsibility for at least some of the rocket fire and said it was prepared for more if necessary.
- Its armed wing distributed a video showing militants handling rockets and threatening key Israeli sites, including Ben-Gurion International Airport near Tel Aviv.

Voices appealing for calm:

- A source in the Islamic Jihad group said Egypt was engaged in discussions to calm the situation, as it has done repeatedly in the past.
- The European Union has called for an immediate halt to rocket fire from Gaza.

What has Israel said?

- Israel said that it was closing its people and goods crossings with Gaza, as well as the zone it allows for fishermen off the enclave, until further notice due to the rocket fire.
- It is important to note that the escalation follows the most violent clashes along the Gaza border in weeks on the 3rd of May, 2019.
- Four Palestinians, including two Hamas militants, were killed after two Israeli soldiers were wounded in a shooting during weekly protests on the border.
- Israel blamed Islamic Jihad for what it called a sniper attack, but stressed it held Hamas responsible for all violence from Gaza.

Efforts at de-escalation:

- A ceasefire between Israel and Hamas brokered by Egypt and the UN had led to relative calm around Israel's April 9, 2019 general election.
- The ceasefire has seen Israel allow Qatar to provide millions of dollars in aid to Gaza to pay salaries and to finance fuel purchases to ease a severe electricity shortage.

- Several factors may lead Israel to seek to calm the situation quickly.
- Mr. Netanyahu is engaged in tough negotiations to form a new government following last month's election, while Israel is due to host the Eurovision song contest in Tel Aviv from May 14 to 18, 2019.
- The country also celebrates its Independence Day on the 9th of May, 2019.
- On the Gazan side, the Muslim holy month of Ramzan begins later in May, 2019.

2. Indian students completing master's in U.S. stand better chance to get H-1B visas

What's in the news?

- Under the new visa regime in the U.S., which kicked off in April, 2019, foreign students who complete their master's or any higher degree from American universities will have a better chance of obtaining H-1B visas, say immigration experts based in the U.S.

Editorial Analysis:

- The master's cap of 20,000 visas is available only to applicants with a master's or a higher degree from nationally-accredited public or not-for-profit educational institution in the U.S.
- As per the changed policy, a lottery for 65,000 visas will be held first with both bachelor's and advanced degree holders eligible for selection.
- Once the regular cap is filled, the master's cap, restricted only to those with advanced degrees, will be held.
- Earlier, 20,000 applicants with advanced degrees would have moved out of the system by the time the regular lottery was conducted, giving other applicants a better shot at selection.
- **Now, there would be more such applicants in the regular draw, which obviously results in a disadvantage for those applying with just a bachelor's degree.**
- Experts opine that **given the challenges facing the H-1B programme at present, any proposal to prioritise students who study in the United States would represent a very positive development for Indians, who account for around 20% of all international students in the country.**

Eligibility unchanged:

- It is important to note that the eligibility requirements for students remain unchanged.
- Yet, with a bigger pool of master's and advanced degree holders participating in the draw, those planning to apply for an H-1B after a bachelor's degree will be at a disadvantage.

Perspective on the Indian IT Sector:

- Facing significantly higher rejections and Requests for Evidence (RFEs), Indian IT companies have already begun ramping up hiring in the U.S., but are hampered by the small size of the talent pool in that country.
- As a matter of fact, experts opine that this change shrinks the pool of visas available to Bachelor's degree holders and will make it tougher for Indian IT workers to work in the U.S.
- Further, the policy change, which aims at prioritising master's degree holders for the H-1B visa, seems to be a step towards a reality where inexperienced Indian students may be granted H-1B visas and not skilled Indian tech workers.
- Also, since Indian IT workers rarely opt for advanced U.S. degrees, this move aims to rank a U.S. degree above skills or valuable work experience gained in a foreign country like India or Vietnam.
- Increasing restrictions on the H-1B, for example, on a spouse's right to work and on the threshold salary, could still impact Indians who meet the U.S. study requirements.

- As a result of this uncertainty, one is witnessing an increasing number of people seeking alternative immigration solutions. This includes L1 visas, an E-2 visa coupled with citizenship of Grenada, and the EB-5 investor visa, which is the fastest route to a Green Card.

The H-1B puzzle:

- The USCIS had recently reversed the order in which it conducted the H-1B lottery, which is held if the number of H-1B petitions exceeds the annual cap of 85,000 visas.
- This cap consists of two categories — 20,000 visas open only to applicants with a Master's or higher degree and 65,000 visas open to all eligible applicants including those with advanced degrees.
- Until now, the lottery for the master's cap was held first.

C. GS3 Related

Category: DISASTER MANAGEMENT

1. Centre reviews rescue operation in Odisha, Bengal, A.P.

What's in the news?

- The Union Health Ministry decided to postpone the NEET examination in Odisha, which was scheduled for May 5th, 2019, following a request from the State government in view of the ongoing rescue and relief operations in the aftermath of Cyclone Fani.

Context:

- This decision was conveyed to the National Crisis Management Committee that reviewed the ongoing operations in the cyclone-hit areas of Odisha, West Bengal and Andhra Pradesh.
- Cabinet Secretary P. K. Sinha held the meeting with the officials concerned through video-conferencing. Among the participants were also senior officials from the Prime Minister's Office, the Ministries of Home Affairs, Defence, Shipping, Civil Aviation, Railway, Petroleum and Natural Gas, Power, Telecommunications, Steel, Drinking Water and Sanitation, Food Processing, Health, Fisheries and other departments.

Extensive damage caused by the cyclone:

- Odisha officials said there was extensive damage to the telecommunications and power infrastructure in Puri, Bhubaneswar and other areas due to the cyclone.
- However, due to advance precautionary measures taken and large-scale evacuation, the loss of human lives was minimal.
- West Bengal reported mild impact of the cyclone, while Andhra Pradesh recorded heavy rainfall and some damage to crops and roads in Srikakulam district.

Restoring Power Supply:

- The Cabinet Secretary directed the Ministry of Power and Department of Telecommunications to immediately assist the Odisha government in **providing electrical poles, gang workmen and diesel generator sets for quick restoration of power supply.**
- The transmission line supplying power to Bhubaneswar is expected to be restored soon.
- The Department of Telecommunications also indicated that mobile services would be restored partially.
- The Railway, which suffered major damages to its infrastructure, has cleared the mainline for starting partial operations using diesel-operated locomotives.

- A government official said, “No damages to ports and refinery installations were reported. NDRF (National Disaster Response Force) has moved 16 additional teams for rescue and relief work in Odisha and has removed fallen trees and other obstacles on most of the roads,”.
- Lastly, flight operations also resumed at the Kolkata and Bhubaneswar airports on Saturday (4th of May, 2019) said the Ministry of Civil Aviation.

2. UN agency praises India's timely response

What's in the news?

- The UN agency for disaster reduction has commended the Indian Meteorological Department's “almost pinpoint accuracy” of early warnings of Cyclone Fani that helped authorities conduct a well-targeted evacuation plan and minimise the loss of life.

A Closer Look:

- India's zero casualty approach to managing extreme weather events is a major contribution to the implementation of the Sendai Framework
- The Sendai Framework is a voluntary and non-binding agreement which recognises that the State has the primary role to reduce disaster risk but that responsibility should be shared with other stakeholders, including the local government.
- The almost pinpoint accuracy of the early warnings from the Indian Meteorological Department had enabled the authorities to conduct a well-targeted evacuation plan, which had involved moving more than one million people into storm shelters.
- UNISDR also tweeted about the advisory distributed by India's National Disaster Management Authority and local authorities days before Fani made landfall in an effort to minimise loss of life and injury.

Category: INDIAN ECONOMY

1. State-owned NewSpace creates a flutter among space startups

What's in the news?

- On March 6, 2019 the Department of Space (DoS) quietly registered its second commercial entity, NewSpace India Ltd. (NSIL), in Bengaluru.

A Closer Look:

- In early March 2019, the small set of new age ventures and startups foraying into the space industry sat up in disbelief to see a state-run company taking birth under the name, “NewSpace”, although it did not fit the standard definition of their league.
- On March 6, the Department of Space (DoS) quietly registered its second commercial entity, NewSpace India Ltd. (NSIL), in Bengaluru.
- At the time, these small, new age ventures and startups foraying into the space industry were still coming to terms with the news of February 19 that the Union Cabinet had cleared a new business arm for DoS.
- This was surprising because the **DoS already has a commercial venture, Antrix Corporation Limited, which was set up in September 1992 to market the products and services of the Indian Space Research Organisation (ISRO).**

What has the government said?

- While the government hasn't said much about NSIL plans since the first announcement, **officials in the DoS and ISRO have been trying to figure out how exactly Antrix and NSIL would operate their respective businesses in the common, niche area.**
- What we do know is that NSIL has an authorised capital of ₹10 crore and a paid up capital of ₹1 crore. And that two senior officials of Antrix — Executive Director D.R. Suma and Director (launch services) D. Radhakrishnan — were moved to NewSpace in March 2019 to help the new venture get off the ground.

Constituting a Board soon:

- Currently, experts opine that it is still early to talk about the new company.
- Further, currently the department [DoS] is completing statutory formalities such as the formation of a board of 8-10 directors. A selection committee will find the Chairman and Managing Director.
- Both the companies are there now. Their roles and responsibilities will be divided. The new company will basically focus on industry participation. Clarity will emerge as we go forward.
- It is important to note that a lot of new business activities are cropping up, such as customer satellites, spinoff technologies, industry participation, production partners, ground stations, and satellite data sales.
- Some serving and former DoS associates apprehend that NSIL may one day cannibalise Antrix and reduce it to an idle shell.
- **They contend that the government may have created NSIL just to erase an eight-year-old blot and resultant liabilities associated with Antrix's cancelled Devas contract.**
- However, an ISRO official, ruled out any such eventuality, **asserting that Antrix's expertise, accumulated over decades, could not be recreated or transferred overnight.**

2. 'Rafale team's concern addressed'

Note to students:

- In this coverage of the news analysis, we have also taken into account another article titled, "PMO's Monitoring is not interference: Government of India", which was published by the Hindu on the 5th of May, 2019.

What's in the news?

- The Union government recently told the Supreme Court that concern raised by three senior Defence Ministry officials over Prime Minister Narendra Modi government's new deal for 36 flyaway Rafale aircraft was dealt with in a **"collegiate manner"**.

A Closer Look:

- The official had stated that the deal was not on "better terms" than the offer made by Dassault Aviation during the procurement process for 126 aircraft under the United Progressive Alliance government.

A Look at the Officials:

- The three officials — M.P. Singh, Adviser (Cost), a Joint Secretary-level officer from the Indian Cost Accounts Service; A.R. Sule, Financial Manager (Air); and Rajeev Verma, Joint Secretary & Acquisitions Manager (Air) — were the domain experts on the seven-member Indian Negotiating Team (INT).
- They had expressed strong reservations in a dissent note on June 1, 2016 submitted to the Deputy Chief of the Air Staff (DCAS) in his capacity as chairman of the negotiating team.

- **They had concluded that the delivery schedule of even the first 18 of the 36 flyaway Rafale aircraft in the new deal was slower than the one offered for the 18 flyaway aircraft in the original procurement process.**
- The three officials had also registered serious concern over the Indian government's acceptance of a 'Letter of Comfort' in lieu of a sovereign or government guarantee or bank guarantees; legal issues relating to the inter-governmental agreement; offset issues; and Dassault Aviation's restrictive trade practices.

'Selective highlighting'

- The government said review petitioners had "selectively" highlighted the "concerns" raised by the three officials and that they had failed to reveal to the court that the issue was addressed by the competent authority.
- After the concerns were raised on June 1, 2016, two more INT meetings were held between the members on June 9 and 10, 2016 and July 18, 2016.
- Certain concerns raised by the three members were also referred to the **Defence Acquisition Council**.
- The INT report also indicated the better terms and conditions arrived at as a result of the negotiations, compared with the 126 multi-role combat aircraft case.
- The then JS&AM (Air), who was one of the three signatories to the note, subsequently signed the note for Cabinet Committee on Security approval, the government said.
- It added that the three officials had raised an "unfounded conjecture" that Dassault could not deliver the 36 jets before 10 years.
- "The project is currently as per schedule with the first plane to be delivered in September 2019 as per the contracted schedule of delivery," the government said.
- **The government further pointed out how the Comptroller and Auditor-General found the benchmark price fixed by the INT as "unrealistic".**
- The three officials had observed in their note that the final price offered by the French Government (which is escalation based) was 55.6% above the benchmark.

PMO's Monitoring is not interference: Government of India

- The government attacked the court's April 10, 2019 judgment agreeing to hear the review petitions on the basis of the Rafale purchase documents published in the media.

Government's Cautionary Note:

- **The government said that the judgment would now be taken to imply that any secret document can be obtained through any means and put in the public domain without attracting penal action.**
- "This could lead to the revelation of all closely guarded State Secrets relating to space, nuclear installations, strategic defence capabilities, operational deployment of forces, intelligence resources in the country and outside, counter-terrorism and counter insurgency measures etc. This could have implications in the financial sector also if say budget proposals are published before they are presented in Parliament. **Such disclosures of secret government information will have grave repercussions on the very existence of the Indian State,**" it cautioned.
- The government countered the petitioners' argument that the Defence Procurement Procedure (DPP) was turned on its head when Prime Minister Narendra Modi and the French President announced the purchase in a statement on April 10, 2015 — that is, well over a year before the Cabinet Committee on Security (CCS) approved the purchase on August 24, 2016.
- **It is important to note that the Defence Procurement Procedure (DPP) mandates that any defence deal worth over ₹1000 crore first requires CCS approval.**

- The government claimed “DPP does not mandate approvals prior to conveying an intent or making an announcement.” It said a waiver of sovereign guarantee in Inter Governmental Agreements (IGA) was “not unusual”.
- In contracts signed with Rosoboronexport, the requirement of bank guarantees was waived off in view of assurances provided through a ‘Letter of Comfort’ from the government of the Russian Federation, the government said, adding, “Similarly, in Foreign Military Sales (FMS) with the U.S. government, no sovereign/bank guarantee is signed.”

Offset partner

- It reiterated that it had no role in selection of the Indian Offset Partner, which is a commercial decision of Dassault Aviation.
- **The government dismissed allegations such as the “Reliance Group paid €1.48 million to former French President Francois Hollande’s partner’s venture.”**
- It said these charges were “matters of individual perceptions” of the petitioners.
- It said that the DPP-2013 was followed and approval of the Defence Acquisition Council was taken for the procurement of the Rafale aircraft.
- **The Indian Negotiating Team conducted comprehensive negotiations with the French side for about a year, holding 48 internal and 26 external meetings with the French side. The approval of the CCS was taken before signing the IGA.**
- The Rafale procurement was on schedule with the deliveries of the aircraft commencing September, 2019 and training for the Air Force team had begun in France, the government said.

3. ‘Advanced economies’ idle savings can be diverted to Asia’

Analysis:

- India recently suggested that funds from the idle savings pools of advanced economies could be funnelled to developing countries in Asia, where consumption is rising.
- **Such funds lie in pensions and insurance pools and in sovereign wealth funds and the Asian Development Bank (ADB) could play a role in channelising the money to emerging markets.**
- Further, it is important to note that **advanced economies are seeing stagnant consumption and they have much larger savings pools than their investment requirement. If we can, with ADB assisting, ensure flow of funds from advanced economies to the emerging market and developing economies, we would succeed in not only keeping global growth sustained high but also make significant dent on poverty and infrastructure services debt.**
- Further, private investment in infrastructure and human capital improvement will not flow unless projects are de-risked with guarantees and structured support.
- Multilateral development banks should be fully engaged and enhance their direct support.
- **The ADB can help develop private sector initiatives by investing more through equity and infrastructure trusts.**
- As a matter of fact, experts have also called upon the ADB to expand its social sector engagements in countries like India.
- It is important to note that for the last 52 years, the ADB has helped developing market countries in building infrastructure and reducing extreme poverty. It’s high time it helped developing market countries strengthen their human capital and develop social safety nets.
- However, experts also caution that the bank should ensure that its policy prescriptions “are rooted in ground realities and do not deter the developmental aspirations of the borrowing countries.”

Category: SCIENCE AND TECHNOLOGY

1. Violent birth

What's in the news?

- A new study finds that a violent collision of two neutron stars, which took place 4.6 billion years ago, may have been the source of several heavy elements on Earth such as gold, platinum and uranium.
- According to the study, published in Nature, nearly 0.3% of such elements were created in this collision.
- The study adds to existing knowledge on the origin of our solar system.

2. Living on poison

- Arsenic is known to be poisonous, but recently, researchers have identified micro-organisms in the Pacific ocean that breathe arsenic.
- In the study, the team analysed DNA from the seawater, noting two pathways to gain energy from arsenic-based molecules.
- Biologists think this is remnant from Earth's early history.
- The study was published in PNAS.

3. IIT Delhi 3D prints human skin

What's in the news?

- Researchers at the Indian Institute of Technology (IIT) Delhi have successfully 3D bioprinted human skin models that have certain anatomically relevant structural, mechanical and biochemical features similar to native human skin.

Analysis:

- The bioprinted skin produced in the lab by the team is already being used by ITC Ltd for experiments.
- The bioprinted skin model will have wide applications in testing cosmetics. It can also reduce and probably even replace testing on animals.
- It can also be used for testing dermatology drugs on human skin and at a future date even help in testing drugs for personalised medicine.

Testing on animals

- It is important to note that the European Commission has prohibited testing finished cosmetic products and cosmetic ingredients on animals.
- It even prohibits marketing of finished cosmetic products and ingredients in the European Union.

Some specifics:

- The skin is composed of two important layers — the inner dermis (made of fibroblasts) and the outer epidermis (keratinocytes, melanocytes).
- The junction between the two layers is not flat but is undulatory or wavy.
- The undulatory morphology is important as it provides biochemical cues and mechanical support to the epidermis layer, provides structural stability to the skin by making the two layers adhere to each other, and not allow cells to cross the junction.
- Unlike the currently available tissue-engineered skin equivalents, the team was successful in creating this wavy junction in the bioprinted skin model.
- The results were published in the journal Bioprinting.
- The study was funded by ITC Ltd.

- The undulatory junction was designed using 3D CAD and 10 layers of dermis were constructed through bioprinting followed by eight layers of epidermis.

No shrinkage:

- The bioprinted skin also retained the original dimension without any shrinkage for up to three weeks.
- Traditionally, collagen used for developing skin constructs start shrinking within a few weeks thus affecting the morphology. Testing on such skin constructs therefore cannot be carried out beyond one week.

4. IIT Kanpur identifies novel molecule to control hyper inflammation

What's in the news?

- Researchers at the Indian Institute of Technology (IIT) Kanpur have identified and characterised a novel small protein molecule that can effectively control inflammation leading to better treatment outcomes.
- In contrast, inflammation control by molecules that are undergoing clinical trials may not be optimal due to inherent drawbacks.
- The work was done in collaboration with the University of Queensland.

Hyper inflammation:

- While some amount of inflammation at the site of infection is required for effective clearance of pathogens, too much inflammation compromises pathogen-clearing ability.
- Hyper inflammation also destroys the tissues surrounding the inflamed area leading to inflammation disorders such as sepsis, inflammatory bowel syndrome, rheumatoid arthritis and psoriasis.

A Note on the protein (C5a):

- A small protein (C5a) that is a part of the innate immunity (immediate defence against pathogens that have never been encountered before) gets activated when a pathogen enters the body.
- The C5a protein then binds to a particular receptor (C5aR1) found on the surface of certain cells such as macrophages and neutrophils to begin the process of inflammation and pathogen clearance.
- Neutrophils are already present in the body and circulate in the blood.
- Once the small protein binds to the C5aR1 receptor found on neutrophils, there is increased migration towards the site of infection leading to hyper inflammation.
- At the same time, binding of the small protein to the receptor on macrophages reduces the amount of a pro-inflammatory cytokine called interleukin-6 (IL-6) that is released, which is desirable to overcome inflammatory symptoms.
- Therapeutic agents now undergoing clinical testing prevent the C5a protein from binding to the receptor found on neutrophils leading to reduced migration of neutrophils to the site of infection. Hyper inflammation is thus prevented.
- However, it has the opposite effect on interleukin-6 release. Unlike the C5a protein, the drug candidate molecules do not reduce the amount of IL-6 being released thereby causing more inflammation.

The Role of IL-6

- There is more inflammation when the amount of IL-6 at the site of infection is more. So it is desirable to reduce the amount of IL-6 being released to overcome the inflammatory symptoms.
- The small protein molecule identified by IIT Kanpur researchers addresses the shortcomings seen with the drug molecules now undergoing clinical testing.

- The drug molecule that IIT Kanpur team used for this study is already known to bind to the C5aR1 receptor. But its effects were not characterised in term of IL-6 release and neutrophil migration.
- The peptide molecule devised by the team of researchers binds to the C5aR1 receptor found on neutrophils and reduces their migration to the site of infection. And unlike the molecules now being tested, this peptide molecule also reduces the amount of IL-6 being released.
- Experts opine that under in vitro conditions, the combined effect may lead to reduced inflammation.
- The molecule only reduces and not blocks neutrophil migration. There should be sufficient inflammation at the infection site to clear the pathogens.
- The peptide molecule identified by the team is smaller than the C5a protein, so the binding to the receptor is weak.
- The team plans to carry out animal studies in future to measure the therapeutic potential of the molecule.

D. GS4 Related

Nothing here for today!!!

E. Editorials

Category: INDIAN ECONOMY

1. Chips at stake in the PepsiCo-farmers fight

What's in the news?

- Recently, in Gujarat, food and beverages giant PepsiCo dragging potato farmers to court for allegedly growing its registered potato variety used to make 'Lays' chips.
- Four small farmers from Sabarkantha district were sued ₹1.05 crore each, although they cite a law allowing them to grow and sell even registered plant varieties.
- Faced with growing social media outrage, boycott calls from farmers groups and condemnation from major political parties, the company finally agreed to withdraw cases after talks with the Gujarat government.

Editorial Analysis:

When was the variety introduced?

- PepsiCo introduced, in 2009, **the FC5 variety of potato** that it uses to make its popular 'Lays' potato chips to India.
- The potato variety is grown by approximately 12,000 farmers who are a part of the company's collaborative farming programme, wherein the company sells seeds to farmers and has an exclusive contract to buy back their produce.
- In 2016, the company registered the variety under the Protection of Plant Varieties and Farmers' Rights Act, 2001 (PPV&FRA).
- Finding that farmers who were not part of its collaborative farming programme were also growing and selling potatoes of this variety in Gujarat, PepsiCo filed rights infringement cases under the Act against some farmers in Sabarkantha, Banaskantha and Aravalli districts in 2018 and 2019.
- Farmers allege that the company hired a private detective agency to pose as potential buyers, take secret video footage and collect samples from farmers' fields without disclosing its real intent.

What is the farmers' stand?

- The ₹4.2 crore lawsuit against four small farmers in Sabarkantha district was heard by an Ahmedabad commercial court on April 9, 2019 and an ex-parte injunction ordered against the farmers.
- However, farmers' rights groups across the country began a campaign against PepsiCo, requesting the Protection of Plant Varieties and Farmers' Rights Authority to intervene in the case and bear the farmers' legal costs using the National Gene Fund.
- At the April 26th, 2019 hearing, the company offered an out-of-court settlement to the farmers on the condition that they give an undertaking not to grow the registered variety and surrender existing stocks or to join its collaborative farming programme.
- Demanding an unconditional withdrawal of cases, farmers unions affiliated to the ruling Bharatiya Janata Party (BJP) as well as the Left parties joined in boycott calls against PepsiCo products and stoked outrage on social media as well.
- In the midst of an election season in which agricultural issues are in the spotlight, senior political leaders from the Congress and BJP added their criticism.
- On April 27, 2019, the Gujarat government announced that it would back the farmers and join the legal case on their behalf, although it later indicated it was working toward an out-of-court settlement.
- Finally, on May 2, 2019, PepsiCo agreed to withdraw all nine cases after discussions with the government.

What is the legal basis for the suit?

- Both PepsiCo and the farmers cite the same Act to support their opposing positions.
- The PPV&FRA was enacted in 2001 to comply with the World Trade Organisation's Agreement on Trade-Related Aspects of Intellectual Property Rights.
- PepsiCo based its suits on Section 64 of the Act dealing with infringements of the registered breeder's rights and subsequent penalties.
- The farmers' legal case depended on Section 39 of the Act, which allows the cultivator to "save, use, sow, resow, exchange, share or sell his farm produce including seed of a variety protected under this Act" with the sole exception of branded seed. As this section begins with the words "Notwithstanding anything contained in this Act...", farmers claim their rights have precedence.
- Over the last decade, more than 3,600 plant varieties have been registered under the Act, with more than half of the registration certificates going to farmers themselves. This was the first case of infringement of rights under the Act, according to the central agency set up to implement the Act.

Who are the stakeholders and what are the stakes?

- The farmers claim that they bought potato seeds locally, and are within their rights to grow and sell any variety.
- Even PepsiCo supporters admit that they lost the perception battle by dragging small farmers to court for large sums in election season.
- PepsiCo says its collaborative farming programme and registered variety rights are under threat.
- While 'Lays' claims to be a leader in the country's ₹5,500 crore potato chips market, regional players are eating into the market share.
- Farmers rights groups such as the Alliance for Sustainable and Holistic Agriculture saw the issue as a test case on farmers rights in India under the WTO regime, and warned that **a bad precedent could hurt farmers of other crops and endanger the country's food sovereignty.**

What happens next?

- While farmers have claimed victory, they also demanded an apology from PepsiCo and plan to sue for compensation for "harassment" by the company.

- They are also wary of any future government-facilitated negotiations on seed protection and the rights of breeders.
- Pepsico's decision to withdraw the cases was "backed by an assurance from the government for a long term amicable settlement", according to sources familiar with the development, who added that **both the Gujarat government and the Centre were involved in that assurance for further talks.**

2. Points of conflict

What's in the news?

- On April 26, 2019, the Supreme Court directed the Reserve Bank of India (RBI) to disclose to the public the names of wilful defaulters on loans and also other information gathered by the central bank during its annual inspection of commercial banks.
- The RBI and the Supreme Court have been at loggerheads over this issue for a while now, with the central bank repeatedly refusing to obey the orders of the Supreme Court.

Editorial Analysis:

What did the RBI do?

- In January 2016, the RBI refused to comply with demands made by activists under the Right to Information Act (RTI) to disclose copies of the annual inspection reports on banks such as the State Bank of India, Axis Bank, and ICICI Bank despite orders from the Supreme Court.
- The RBI also refused to provide information regarding the derivative losses suffered by banks and the fines imposed on banks by the RBI for violating various norms.
- The Supreme Court has this time around given the RBI a "last opportunity" to abide by its orders or face serious penal action.
- The disclosure of information about banks, however, is not the only point of conflict between two of the nation's powerful institutions.
- In early April, 2019, the Supreme Court quashed the RBI's circular issued on February 12, 2018 which directed banks to resolve their troubled loans within a period of 180 days.
- It is important to note that if banks failed to resolve their bad loans within the given deadline, the bad loan cases would be sent to bankruptcy courts.

Why does it matter?

- The outcome of the battle between the RBI and the Supreme Court will determine the amount of information related to banks that will be made available to the public.
- Supporters of the Supreme Court's position believe that greater transparency will allow the general public and investors in public and private sector banks to make better decisions with their money.
- In particular, they point to the problem of wilful defaults that has been plaguing banks.
- According to data gathered by TransUnion CIBIL, the amount of wilful defaults has risen by four times in the last five years from ₹39,504 crore at the end of March 2014 to ₹1,61,213 crore at the end of December 2018.
- At the same time, the number of wilful defaulters has doubled over the same period.
- State Bank of India, the largest public sector bank, has suffered the largest amount of wilful defaults among all banks.
- The disclosure of the names of wilful defaulters to the public, many believe, will help bring about better credit discipline in the country by exposing problems brewing within banks sooner rather than later.

- In fact, they find it surprising that the RBI which has been spearheading the fight against bad loans is unwilling to release vital information on wilful defaulters to the public.
- The RBI, on its part, has argued that the disclosure of auditing information related to banks can lead to the exposure of sensitive information that may not be in the commercial interest of banks or even in the interest of the wider economy.
- The RBI also seems to believe that releasing information about defaulters can unfairly shame borrowers who may genuinely not be able to pay back their loans due to various financial difficulties.
- Such shaming could have the unintended consequence of impeding genuine business activity in the economy.
- The central bank has also put forward the argument that it has the fiduciary duty to protect certain information about banks.

Concluding Remarks:

- It is hard to predict what will happen next in this battle.
- The Supreme Court may begin contempt proceedings against the RBI if it chooses to disobey its latest order, but the impact this will have on the RBI's freedom remains to be seen.
- The RBI has chosen not to obey orders coming from the Supreme Court in the past, including previous proceedings of contempt against it.
- If the RBI is forced to abide by the Supreme Court order, it will certainly increase publicly available information on banks.
- Greater transparency will also help make the RBI more accountable.
- If there are legitimate reasons for banks and the RBI to withhold certain information from the public domain, however, the forced disclosure of information following the Supreme Court's order may lead to various unintended consequences both within the financial sector and the broader economy.
- The RBI, for instance, may choose to not include in its annual inspection reports certain sensitive information about banks that it feels shouldn't be in the public domain.

Category: ENVIRONMENT AND ECOLOGY

1. Steering away from diesel

What's in the news?

- On April 25, 2019, Maruti Suzuki, India's top carmaker, announced that it would phase out production of diesel models from April 1, 2020, when stricter Bharat Stage VI emission standards come into force.

Editorial Analysis:

Reasons behind Maruti taking this decision:

- Explaining its rationale, Maruti said that the enhanced emission standards would make diesel engines costlier by up to ₹1.5 lakh, and the acquisition cost of diesel vehicles for consumers would be markedly higher than petrol equivalents.
- Further, given the market dynamics, it would not make business sense for the company to invest in developing new diesel engines to meet the BS VI norms.
- Compressed Natural Gas could be a replacement for both fuels, according to Maruti.
- It is important to note that diesel cars account for about 23% of Maruti's domestic sales and it sold a total of 4.63 lakh diesel-powered vehicles during 2018-19.

Diesel: Losing its attractiveness?

- On the consumer side, diesel vehicles are not particularly attractive today.

- The traditional advantage of lower operating costs due to a wide gap between expensive petrol and lower cost diesel has narrowed significantly.
- Recently, the price of diesel in a city like Chennai was ₹70.48 per litre compared to ₹75.92 per litre for petrol.
- Environmentally, diesel is a heavy polluter and is losing ground in leading passenger vehicle markets such as the European Union.
- Further, the rigging of emissions data by Volkswagen to show lower levels of nitrogen oxides accelerated the move away from diesel.
- Even in Germany, which is a leading maker of diesel cars, cities want to ban them.

Why is the move significant?

- India has a growing vehicle-to-population ratio, although it is still lower than several other big countries.
- While Maruti's is a business decision, policy decisions on emission norms will steer the industry, and are therefore critical to improving air quality.
- Ambient air quality has deteriorated so badly that 15 Indian cities led by Gurugram are among the 20 most polluted cities globally as per the IQAir AirVisual 'World Air Quality Report' for 2018, based on fine particulate matter (PM2.5) that penetrates the lungs and bloodstream. Transport emissions, particularly from diesel, are a major contributor.
- As of 2017, India's installed capacity for vehicle production stood at 7 million four-wheelers and 27.56 million two and three-wheelers.
- Commercial three-wheelers, such as large autorickshaws, sold in the past include heavily polluting diesel models that continue to operate even in densely populated cities.
- During 2017-18 the auto industry produced over four million passenger vehicles and just under 900,000 commercial vehicles, according to the Society of Indian Automobile Manufacturers.
- After the decontrol of diesel pricing about five years ago, the share of diesel models in car sales has dropped from nearly 43% in 2012-13 to 23% at the end of 2018.

What is diesel's pollution profile?

- It is important to note that the **Auto Fuel Vision and Policy 2025** published by the erstwhile Planning Commission, which laid out the road map for a transition to less polluting fuels, pointed out that sulphur in diesel is a contributor to particulate matter both in the vehicular exhaust and in the atmosphere.
- Sulphur is found in petrol too, but for comparison, it was 2,000 parts per million (ppm) in petrol before introduction of standards in 2000, but in diesel it was 10,000 parts per million (ppm) in 1996.
- Sulphur content was reduced with each phase of upgradation of emission standards to touch 50 ppm under BS IV. In BS VI, which is already dispensed in Delhi, it is 10 ppm.
- Sulphur plays a key role since higher concentrations have an impact on technologies for control of other pollutants in the emissions, such as carbon monoxide, particulates, oxides of nitrogen and hydrocarbons.

A Look at More Specifics:

- The importance of cleaner diesel was studied in Karnataka, and data show that the adoption of Bharat IV diesel in 2015 had an impact on the sulphur dioxide (SO₂) concentrations.
- The sulphur content of diesel changed from 350 ppm to 50 ppm.
- There was a 25% drop in nitrogen dioxide (NO₂) concentrations too, which could also be linked to change in the fuel quality.

- However, such gains were neutralised by traffic growth.
- The rise in larger PM10 concentrations by 50%, was linked to growing numbers of vehicles and dust resuspension, besides construction activity.
- Even with cleaner fuel, increase in vehicle numbers, especially those running on diesel cut into the gains.
- It was witnessed in Delhi, where, in spite of a shift of buses and autorickshaws to CNG during 1998-2002, the air quality gains were soon lost to explosive motorisation.

Case in Point: Bengaluru

- Bengaluru also had a similar experience, as a study by the Air Pollution Knowledge Assessment City Program by Urbanemissions.info showed.
- The city has steadily motorised, and number of vehicles registered per 1,000 population increased from 150 in 1990 to 300 in 2001 and 600 in 2016.
- Within the transport sector, more than 70% of PM2.5 emissions were found to originate from a small fraction of diesel-powered vehicles. Also an estimated 200 million litres of diesel are used by diesel generator sets in the city annually.
- Data for Delhi from 2011 led researchers to conclude that on-road commuters are exposed to 1.5 times the average ambient concentrations.
- Automotive emissions add to the pollution burden imposed by manufacturing and construction activity, power plants, biomass burning for cooking and heating, and incineration of farm residues and garbage.

How can eliminating diesel improve health?

- Air pollution is a leading contributor to non-communicable diseases and accounts for a large number of premature deaths.
- The World Health Organisation describes diesel exhaust as an occupational cancer-causing agent.

In India, the **Global Burden of Disease Study 2017 attributed 8% of the disease burden, and 11% of premature deaths in people below 70 years of age to air pollution.**

- An assessment by researchers published by The Lancet Planetary Health in December 2018 said most Indian States, particularly those in north India, and 77% of the country's population were exposed to an annual population-weighted mean [fine particulate matter], PM2.5, greater than the 40 microgrammes per cubic metre of air limit recommended by the National Ambient Air Quality Standards.
- Even with a reduction in the sulphur content in BS VI fuels, the health effects of lower emissions would be lost due to a growing number of vehicles.
- The best scenario to reduce PM2.5 exposure in India is, therefore, not just shifting to BS VI fuels but bringing about a reduction in use of private vehicles through augmented public transport and promoting alternative fuels including the use of electric vehicles.

Perspective by Gary Fuller (An Air Pollution Scientist)

- In his book, '**The Invisible Killer**', air pollution scientist Gary Fuller says diesel cars were promoted by a variety of actors, such as oil companies, governments, and vehicle manufacturers in the 1990s in order to create a market for the middle fractions of crude oil.
- Real-world emissions in new cars have not always aligned with expected type-approval tests.
- While test cycle nitrogen oxide emissions decreased by 80% since 1992, the real driving emissions from diesel cars increased about 20%, says Prof. Fuller in a recent paper.

Concluding Remarks:

- In Europe, trucks and buses were already running on diesel, and industries and governments promoted its use in cars, giving petrol a lesser profile.
- Car makers produced newer diesel engines and promoted them citing lower carbon dioxide (CO₂) emissions compared to petrol equivalents.
- India has slowly moved towards stricter regulation through mass emission norms for vehicles.
- The first standards came into force in 1991 for petrol vehicles, and a year later, for diesel vehicles. Based on Supreme Court orders of 1999, the Central government notified the Bharat Stage II norms for the National Capital Region and Bharat Stage I for the rest of India, from 2000.
- After transitioning over the years to BS III and BS IV, BS VI (the equivalent of Euro VI) standard will cover vehicles manufactured on or after April 1, 2020. (BS V has been skipped altogether.) Its 10 ppm sulphur standard will be less polluting since the current level is 50 ppm.

Tidbits

Nothing here for today!!!

Prelims Facts

Nothing here for today!!!

UPSC Prelims Practice Questions

Q1. I. Consider the following statements, with reference to 'Bioprinted skin', which was in the news recently.

1. 3D bioprinted human skin models have certain anatomically relevant structural, mechanical and biochemical features similar to native human skin.
2. Bioprinted skin models will have wide applications in testing cosmetics. It can also reduce and probably even replace testing on animals.

Which among the above statements is/are correct?

- a) 1 Only
- b) 2 Only
- c) Both 1 and 2
- d) Neither 1 nor 2

Answer

(c) Both 1 and 2

- 3D bioprinted human skin models that have certain anatomically relevant structural, mechanical and biochemical features similar to native human skin.
- The bioprinted skin produced in the lab by the team is already being used by ITC Ltd for experiments.
- The bioprinted skin model will have wide applications in testing cosmetics. It can also reduce and probably even replace testing on animals.
- It can also be used for testing dermatology drugs on human skin and at a future date even help in testing drugs for personalised medicine.

Q2. Consider the following statements with reference to the 'El Niño':

1. The term El Niño translates from Spanish as 'the boy-child'
2. Peruvian fishermen originally used the term to describe the appearance, around Christmas, of a warm

ocean current off the South American coast.

3. It is now the commonly accepted term to describe the warming of the central and eastern tropical Pacific Ocean.

Which among the above statements is/are *incorrect*?

- a) 1 and 2 Only
- b) 2 and 3 Only
- c) All 1, 2 and 3
- d) Neither 1 nor 2 nor 3

Answer

(d) Neither 1 nor 2 nor 3

- The term El Niño translates from Spanish as ‘the boy-child’.
- Peruvian fishermen originally used the term to describe the appearance, around Christmas, of a warm ocean current off the South American coast.
- It is now the commonly accepted term to describe the warming of the central and eastern tropical Pacific Ocean.

Q3. Consider the following statements:

1. Israel is bordered by Syria, Lebanon, Golan Heights, the West Bank, Jordan, the Gaza Strip, and Egypt.
2. The Gulf of Aqaba is a large gulf at the northern tip of the Red Sea, east of the Sinai Peninsula and west of the Arabian mainland.

Which among the above statements is/are correct?

- a) 1 Only
- b) 2 Only
- c) Both 1 and 2
- d) Neither 1 nor 2

Answer

(c) Both 1 and 2

- Israel is bordered by Syria, Lebanon, Golan Heights, the West Bank, Jordan, the Gaza Strip, and Egypt. The Gulf of Aqaba is a large gulf at the northern tip of the Red Sea, east of the Sinai Peninsula and west of the Arabian mainland.

Q4. Consider the following statements:

1. Oceanic trenches are topographic depressions of the sea floor, relatively narrow in width, but very long.
2. These oceanographic features are the deepest parts of the ocean floor.
3. The greatest ocean depth measured is in the Challenger Deep of the Mariana Trench, at a depth of 11,034 metres.

- a) 1 and 2 Only
- b) 2 and 3 Only
- c) All, 1, 2 and 3
- d) Neither 1 nor 2 nor 3

Answer

(c) All, 1, 2 and 3

- Oceanic trenches are topographic depressions of the sea floor, relatively narrow in width, but very long.
- These oceanographic features are the deepest parts of the ocean floor.
- The greatest ocean depth measured is in the Challenger Deep of the Mariana Trench, at a depth of 11,034 metres.

UPSC Mains Practice Questions

1. India's timely response in handling the evacuation efforts before Cyclone Fani made landfall in Odisha has come under praise, most notably from the United Nations. Examine the need for timely response towards natural disasters and the efforts that the government has taken in this regard. (10 Marks, 250 Words)

2. The space sector has emerged as the next frontier for India. Discuss the challenges and opportunities that this sector presents and examine the role of ISRO in capitalizing on the vibrant space market. (10 Marks, 250 Words)