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Door No 18, New Plot No 259 /109,
AL Block, 4th Avenue, Shanthi Colony,
Annanagar, Chennai - 600040.



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G.S PAPER I

1. HISTORY

The Self-Employed Women's Association is both an organisation and movement, also an outcome of legacy of Mahatma Gandhi. Explain

KEY POINTS

Legacy of Mahatma Gandhi

- The Self Employed Women's Association. SEWA was born in 1972 as a trade union of self employed women.
- It grew out of the Textile Labour Association, TLA, India's oldest and largest union of textile workers founded in 1920 by a women, Anasuya Sarabhai.
- The inspiration for the union came from Mahatma Gandhi, who led a successful strike of textile workers in 1917.
- He believed in creating positive organised strength by awakening the consciousness in workers. By developing unity as well as personality, a worker should be able to hold his or her own against tyranny from employers or the state.
- To develop this strength he believed that a union should cover all aspects of worker's lives both in the factory and at home.

Organisation

- SEWA main goals are to organise women workers for full employment. Full employment means employment whereby workers obtain work security, income security, food security and social security (at least health care, child care and shelter).
- SEWA organises women to ensure that every family obtains full employment.

Movement

- SEWA is a trade union registered in 1972. It is an organisation of poor, self-employed women workers. These are women who earn a living through their own labour or small businesses.
- They do not obtain regular salaried employment with welfare benefits like workers in the organised sector. They are the unprotected labour force of our country. Constituting 93% of the labour force, these are workers of the unorganised sector.
- Of the female labour force in India, more than 94% are in the unorganised sector. However, their work is not counted and hence remains invisible.

Battle of Buxar was one of the most decisive battles of Indian history for it demonstrated the superiority of English and made Bengal as their power centre. Elaborate.

KEY POINTS

- After the Battle of Plassey 1757, Mir Jafar was placed in throne of Bengal to act as a puppet ruler of East India Company.

- As the treasury of Bengal declined consistently to help the territorial expansion of British, subsequently fell into arrears and Mir Quasim was placed in the throne of Bengal.
- After recognizing the real motive behind British conquests, Mir Quasim started to resist against East India Company.
- He allied with Shah Alam-2, Shujaudaula to fight against British, this resulted in Battle of Buxar, October 22 1764 where British defeated the combined armies Mughal rulers.
- This led to the signing of Treaty of Allahabad 1765 by Robert Clive in which the revenue rights of Bihar, Bengal, Orissa were given to British, Awadh was declared as buffer state.
- Further Dual government was established, Mughal ruler had no responsibility and British had the power to rule Bengal.
- Bengal was chosen as the power centre by British to increase their trade relations with India and for further territorial expansion.

For Mahatma Gandhi, nationalism was based on a practical understanding of what was required for the people to be free from the clutches of British rule. Justify

KEY POINTS

Nationalism, a practical approach

- The policy of Struggle-Truce-Struggle (STS) was a no-win situation for British, at the same time it gave people enough time to regroup and fight back British
- Gandhi's nationalism was inclusive, especially participation of women.
- It did not see the nation as standing above the people, an entity for which the people only made sacrifices; rather, the nation was to improve the living conditions of the people.
- Gandhi was also clear that capitalism as we know it, for which he used the term "the English system", could not serve such a nation. It was incompatible with the people's freedom.
- He wanted a different economic system altogether, where the capitalists could at best be the "trustees" of people's property.
- Gandhi's solution to the problem of unemployment was a restraint on the rate of technological change, which of course was impossible under capitalism in its spontaneity.
- The importance of charakha showed the simplicity and self-reliance to people and enabled people to understand the ideological hegemony of British.
- But Gandhi did not advocate state-imposed restrictions towards this end. He wanted instead a voluntary consumerism that always privileges technologically-sophisticated goods.
- He wanted the development of a "community" among the people so that one's "brother" the weaver can get employment, a "community" where every person sees his or her well-being as dependent upon that of others.

As a statesman, Tipu Sultan was a formidable threat to English East India Company and stood firmly against its policy territorial expansion. Elaborate.

KEY POINTS

Tipu ranks among those patriotic rulers who spent their life time in defence of their country against foreign invasions.

Reforms that alarmed British



- Introduction of new calendar, new system of coinage, new scales of weights and measures.
- Trading monopoly over products like sandals, spice etc and also exported to other countries, thus earning better foreign exchange.
- Showed keen interest on French revolution, planted Tree of Liberty at Sri Rangapatnam, sent ambassadors France, Turkey to have the support of other countries.
- Military was developed with assistance from the French, effort to build a modern navy after 1796.

Against territorial expansion

- Well organised economic and military reforms helped Tipu Sultan to fight against British valiantly.
- Anglo-Mysore wars were fought between Tipu and English East India Company, finally Britain's force was unmatchable and Mysore was finally captured.
- Under the Treaty of Mangalore 1784, even though English East India Company captured half of Tipu's territory and sons were taken as hostages, he refused to surrender.

GS PAPER- II

2. HEALTH

To avoid crisis like Ebola outbreak in future, India must invest in developing vaccines for various types of diseases. Justify

KEY POINTS

- The current outbreak about the resurgence of Ebola, which has now been declared a public health emergency of international concern, has already claimed nearly 2,500 lives.
- The Ebola crisis has also inspired the creation of important multi-partner initiatives, such as the Coalition for Epidemic Preparedness Innovations, a global alliance dedicated to developing vaccines against emerging infectious diseases.

Need for investing in Vaccines

- Especially in a country like India, which has a high burden of infectious diseases that can spread rapidly given the density of population investment in vaccination is the need of the hour.
- By investing in vaccine development, India can create lasting health and economic benefits for its citizens. In fact, vaccines are one of the most cost-effective public health interventions.
- This corresponds to the investment in human capital formation and further improves the quality of life in the country.
- A 2016 study of 94 lower-income countries found that, for every dollar invested in vaccination, more than 16 dollars are expected to be saved in healthcare costs, lost wages and lost productivity due to illness and death.
- Already, there is a significant and exciting progress to develop indigenous vaccines. India is home to mature and successful vaccine production companies, highly respected worldwide.
- Many vaccines in India's Universal Immunisation Programme (UIP) are manufactured by Indian companies.
- Over the last two years, three vaccines produced in India received the WHO's prequalification—two rotavirus vaccines currently used in India's UIP, and the world's first typhoid conjugate vaccine.
- Since its launch in 2014, the government's immunisation scheme, Mission Indradhanush, has vaccinated over

33 million children across the country.

- Additionally, the government and its partners have developed innovations to help reach every child, such as the Electronic Vaccine Intelligence Network (eVIN), which provides real-time information on vaccine stocks in 371 districts.
- Vaccine research and development, introduction and scale-up requires considerable time, government prioritisation, investment and multi-sectoral partnerships. Above all, it requires a sense of urgency.
- Only if we invest the time and effort today, can we ensure healthy lives for generations to come.

Why India must act urgently to curb the problem of counterfeit drugs? Discuss the initiatives taken by Government of India to tackle the problem of counterfeit drugs.

KEY POINTS

Reasons

- The effect of the chaos in India's drug administration is that nobody is quite certain how reliable medicines sold in the market are.
- This is perhaps difficult to believe. In comparable markets such as many African countries, about a third of drugs have been found to be counterfeit. And, indeed, an overwhelming majority of those counterfeit drugs are imported from India.
- Unsurprisingly, independent studies such as those by the World Health Organization have shown much higher numbers.
- Under such circumstances, one of the first and most important steps must be a clearer sense of the actual position in terms of counterfeit and substandard drugs.
- This is another reason why India is a superbug hotspot antibiotics are prescribed too often, and they are sometimes substandard.
- It is also necessary to ask whether the state and central drug controllers are duplicating their capacity and efforts, and whether an overall reorganisation and harmonisation are necessary.
- Too often, problematic individuals shift to the regulator and then back to the line health ministries to protect themselves from accountability.

Initiatives taken by Government of India

- NITI Aayog and Oraclesigned a Statement of Intent (SoI) to pilot a real drug supply-chain using blockchain distributed ledger and Internet of Things (IoT) software.
- Blockchain technology helps to permanently register a drug's record in the manufacturer's drug supply chain (serial number, labelling, scanning), leaving no scope for record tampering.
- Low-cost medicines manufactured in the country should not end up being labeled as being low in quality.
- Special trial courts to speed up the disposal of cases.
- Smoothing the IP regime to invest more in the manufacturing of drugs and at the same time providing proper patent to the inventor inventor will reduce the counterfeit drugs significantly.



In the context of Operation Green, Government of India needs to find a sustainable solution for price stabilisation, rather than taking temporary ad hoc measures. Explain

KEY POINTS

- Tomatoes-onions-potatoes (TOP) are the three basic vegetables that face extreme price volatility and the government often finds itself on the edge in fulfilling its dual objectives of ensuring remunerative prices for farmers and affordable prices for consumers.
- With a coefficient of variation (CV) of 52 per cent, onion is the most volatile, followed by tomato (47 per cent) and potato (31 per cent).
- Potato is the least volatile because of higher processing-to-production share (7 per cent) than onions (3 per cent) and tomatoes (1 per cent), and also because of large storage facilities for potatoes.
- The current spike in tomato prices is due to lower supply from major tomato producing states like Maharashtra and Karnataka owing to heavy rains.
- The government had announced “Operation Green-TOP” with an allocation of Rs 500 crore in its budget of 2018.
- The idea was to build value chains of TOP on the lines of “Operation Flood” (AMUL model) for milk in such a way that will ensure a higher share of consumer’s rupee goes to farmers and stabilises their prices. The scheme is nested with the Ministry of Food Processing.
- But TOP are mostly traded in APMC markets, with layers of mandi fees and commissions, and farmers get less than one-third of the consumer’s rupee.
- For stabilising retail prices of fresh TOP, and ensuring a higher share of the consumer’s rupee to farmers, policy makers need to focus on three things.

Sustainable price stabilisation

- Ample storage for buffer stocks has to be created. While potatoes and onions can be stored, repeated stocking limits on onion traders discourages private investments in modern cold storages.
- For inviting large private investment in storages, the Essential Commodities Act has to be rationalised. If the government feels that traders are colluding to rig the market, then the Competition Commission of India should look into it. The government banning exports or imposing stocking limits is not a solution.
- Increase processing capacities for Tomato, Onion, Potato. Since buffer stocking for tomatoes is not possible, processing remains the only solution. For this, the GST for tomato puree and juice should be reduced from 12 per cent to 5 per cent. Milk and most milk products attract 0 to 5 per cent GST.
- India needs to have time bound targets to process and export at least 10-15 per cent of TOP production. While India exports 10-12 per cent of onion production in fresh and dehydrated form, it exports less than 1 per cent of tomatoes and potatoes production.
- Direct buying by organised retailers from farmer producer organisations (FPOs) through contract farming, bypassing the mandi system, should be encouraged.

What is meant by Common goods for health? How does it attribute to the strengthening of foundation of public health care systems? Also, discuss the significance of the concept in the light of healthcare schemes of Government of India.

KEY POINTS

Common Goods for Health (CGH) are population-based functions or interventions that require collective financing, either from the government or donors based on the following conditions:

1. Contribute to health and economic progress;
2. There is a clear economic rationale for interventions based on market failures, with focus on
 - Public Goods (Non-Rival, Non-Exclusionary) or
 - large social externalities.

Not all public or common goods are CGH and vice versa, but all CGH must generate large societal health benefits that cannot be financed through market forces.

Strengthening the health care

- The best defence against global pandemics lies in the public health infrastructure that deals with communicable disease, including disease monitoring systems, emergency response, and immunisation.
- Doctors, politicians, and victims see value in health care and attach inadequate value to the invisible public health work, through which fewer people get sick in the first place.
- It is in the nature of the governance process to creep away from public health towards health care.
- Improvements in public health will reduce the extent to which people get sick, thus giving reduced health care expenditures, and thus reducing the fiscal burden associated with government programmes which pay for health care.

Significance with respect to schemes of the Government

- Schemes like PM-AYUSH, ASHA, National Nutrition programme, National Health Mission etc are directly or indirectly devoted to robust health care systems.
- But the governance machinery is varying across states in providing better public service delivery. Ex: Tamil Nadu has better Infant Mortality rate when compared to other states like Bihar, Rajasthan due to better service delivery.
- Primary health care at the local level is often neglected due weak Panchayati raj institutions, which further weakens the efficiency of health care systems.
- So Common Goods for Health can be applied effectively by central government at all levels via strong cooperative federalism.

3. JUDICIARY

Being the ultimate protector of the Right to Life, the higher judiciary must take proactive steps to stop lynching, punish perpetrators. Discuss

KEY POINTS

- The constitution bench of the Supreme Court of India in its judgment, Lynching is an outrage to the rule of law and to the high values of the Constitution itself.



- Therefore, the Court, while laying down various guidelines for the central and state governments including preventive, and punitive measures directed the appointment of nodal officers by the police in each district of every state in this regard to prevent perpetrators
- The judgment of the SC binds all civil and judicial authorities in the country by virtue of Article 144 of the Constitution.
- Though the right to life is a Fundamental Right, which the state including the executive and judiciary is bound to protect, the violations in these types of cases go, more often than not, unpunished or under-punished.
- In a large number of cases of this kind, the judges, including those in the higher judiciary, have been extremely lenient towards the perpetrators.
- Judicial apathy sends terribly wrong signals to future perpetrators, who may justifiably believe that they may ultimately be acquitted, and in any case will be bailed out pending trials.
- Far from instilling fear of law, such decisions remove that fear. The time has come for the SC and the high courts to take up such cases of acquittals/grant of bails *suomotu*, and pass appropriate orders after hearing concerned parties.
- This should be the approach of the entire judiciary, which is the ultimate protector of the Right to Life as guaranteed under Article 21 of the Constitution.

4. GOVERNMENT POLICIES

Does the lack of comprehensive approach and unpredictable policy making are eroding India's mining capability? Justify

KEY POINTS

- The mining sector is plagued by lack of a holistic approach, and unpredictable policymaking. The industry contributes 2.5% of India's GDP, and employs more than a million people.
- The biggest challenge the sector faces is the perception that mining damages the environment.
- Under the new policy, mines are to be auctioned instead of being allocated. This brings transparency, but delays due to absence of clear timelines for conducting auctions results in non-availability of raw material to industry.
- The import of material that India is already blessed with is on the rise, hurting trade deficit and forex reserves. Relooking this approach is crucial to ensure both quality and quantity.
- Ensuring quality coal supply near the point of use is the basic principle to avoid logistical burdens. Currently, Coal India doesn't necessarily provide industry with coal from the same mine, creating inefficiency in the mineral's calorific use.
- While it is important to replace imports, ash content in the coking coal available in India is high. Thus, there is need to allocate new coking coal mines in Jharkhand, Odisha and Madhya Pradesh, and also attract technology and investment in washeries to reduce ash content.
- The ash can be used in the cement industry and brick-making. The government is auctioning 21 coal mines for end-use in non-regulated sectors, and six coking coal mines for end-use in iron and steel.
- Delay in amending Section 8A (4) of the Mines and Minerals (Development and Regulation), or MMDR, Act that allows auctioning of mines only on expiry of the lease period will disrupt mineral supply from captive mines.
- This can bring down the steel industry, which is performing well despite the slowdown—any further delay in

auctions will disrupt production of ~60 mt of iron ore affecting nearly 40 mt of steel-making.

- To remove cartelisation in commercial mining, it is important to have a minimum production clause. If production up to the environment clearance limit is not possible, this minimum requirement should be imposed on the miners.
- The concerns of environmental degradation have put restrictions of the quantity being mined in Karnataka and Goa.
- Goa produces low quality of iron ore only for exports—modern techniques can help reduce the associated environmental impact.
- The Centre should set up a committee of the steel, mining and environment ministries, and state governments to resolve this issue. The need is to rationalise the approach. The mining, when completed, will result in good forest cover in these areas.

Apart from improving road safety, the Motor Vehicle Amendment Act 2019 carries various key objectives like eliminating corruption, enabling enforcement and regulating traffic using technology. Discuss

KEY POINTS

Indian roads are among the world's deadliest and apart from a strong regulatory framework, efficient systemic changes are vital to save lives.

India needs to adopt Integrated Traffic Management Systems (ITMSs) or adopt initiatives like computerised testing and remote supervision of driving tests.

Enabling enforcement and eliminating corruption

- The Motor Vehicle Act 1988 lacked a centralised database of driver's licenses, and, hence, a nearly 30-year-old law made it possible for people to own multiple licenses authorised by different states. This allowed habitual violators to carry other driving permits even if one got suspended.
- The 2019 Amendments act aims to fix this. It introduces a nation-wide integrated, digitised licensing system that will involve linking of the driving permits with unique identifications (UIDs), meaning one license per person.
- The section 25A focuses on establishment of the National Register for Driving Licenses which will include entries from all the state-owned registers to create a consolidated database of new authorisations or renewals of driving licenses.
- This section also allows licensing authorities to identify and maintain publicised records of regular defaulters. If they are found to have broken regulations a certain number of times, the authorities have the power to suspend their driving license.
- Section 136A of the current amendment act addresses the huge disparity in the enforcement protocols followed across different states. While some states relied heavily on electronic implementation of the law, others only did it in limited capacity.

Regulating traffic using Technology

- Implementing Integrated Traffic Management System, for instance, will help minimise congestion using intelligent cameras to track traffic movement at the busiest junctions in real-time.
- Use of sensor technology, automation and advanced video analytics will allow instant identification of

irresponsible drivers for generating computerised penalty tickets.

- Kerala, for example, was the third state to equip its police officials with state-of-the-art body-worn cameras. These cameras are capable of live streaming visuals even at night, using infra-red technology and can exchange voice or text messages internally.
- The breathalysers will be GPS-enabled and have inbuilt cameras for sending photographic evidence of the offence along with the fine.
- Planning to increase road safety via technology, new-age ideas for high-end safety equipment in vehicles, automated centres for checking fitness of vehicles, speed governors to track speed limits, digital message signboards to update users about road conditions in real-time and much more are being explored.
- Several modern-day equipments are getting institutionalised between the central and state administrations, many emerging mechanisms will soon see the light of the day.

The Indian textile and garments industry does not suffer from the lack of a market but a weak ability to compete in terms of price and quality. Analyse

KEY POINTS

- The Union government's proposal to make the use of a range of Indian-made "technical textiles" textiles used in industrial applications mandatory for ministries and public agencies offers another example of the paucity of fresh ideas for reviving the economy.
- The intention behind this proposal is praiseworthy to encourage a fast-growing segment of the textile industry under the Make in India rubric and create jobs.
- The experience with the Jute Control Order offers some perspective. It was introduced with the laudable objective of reviving the perennially ailing jute industry.
- But other structural problems — not least absurd procurement prices, inadequate investment, outdated technology, and inflexible labour laws — ensured that jute mills remained as obstacles.
- It would have been more constructive for the ministry to have focused on enforcing as well as expanding the coverage of an imaginative package for labour.
- That would have enabled flexible hire and fire without impinging on benefits, encouraging the kind of economies of scale that the textile industry sorely needs.
- Equally, an urgent programme to streamline the processes of the goods and service tax, one critical reason for weak exports, would have been more helpful than mandating demand.
- Working with the ports and shipping authorities to improve turnaround time in India's ports would have been useful.
- At a more granular level, technical textile exports have been among the faster-growing segments of the business. Useful enabling interventions of this nature would go far longer towards helping manufacturers compete meaningfully on a global scale.
- The fact is that Indian textile exports have long been misaligned with demand being predominantly in cotton when the market preference is shifting towards synthetics.



Despite ambitious policy moves, India hasn't had much success with plastic waste regulation due to various flaws. Analyse.

KEY POINTS

- Plastic Waste Management (PWM) Rules, 2016, with specific obligations for every stakeholder in the plastic supply-chain, including the extended producer responsibility (EPR) for producers, importers, brand owners.
- The Solid Waste Management Rules (SWM Rules), 2016, also have provisions for plastic waste, including EPR.
- But there is a difference in EPR provisions under SWM Rules and PWM Rules. SWM Rules say that manufacturers/brand-owners shall provide financial assistance to local authorities for establishing waste management systems to fulfil their EPR.
- PWM Rules, however, don't mention the financial contribution to local authorities. Instead, these direct manufacturers/brand-owners to collect waste through their distribution channel or the local body concerned.
- The Biomedical Waste Management Rules, 2016, mandated phase-out of chlorinated plastic bags, gloves and blood bags within two years. This has not happened.
- With respect to state regulations banning single-use plastics (SUP), states have a different definition of what constitutes SUP.
- The problem is with regulations, and with consumer awareness and industry's status-quo approach. Consumer apathy is at the core of the problem.
- Big companies outsource their EPRs to plastic recycling organisations (PROs), which are supposed to collect plastic wastes on behalf of the companies and send them for recycling.
- A fundamental mistake we are doing is by separating plastic waste management from the wider municipal waste management.
- Proper plastic waste management will only happen if there is good municipal waste management. EPR provisions will have to be designed for this reality.

Steps needed

- To increase recycling, we must improve segregation of waste at source and improve the collection and transportation of segregated wastes. Currently, the unsegregated waste contains a lot of contaminated plastics.
- Similarly, as MLPs contain several polymers, they can't be recycled. At best, they can be incinerated in cement plants, used as a refuse-derived fuel (RFD), used in road construction or for making down-cycled products.
- It is essential to understand that a plastic product cannot be recycled forever. As plastics are produced from hydrocarbons, at some point they have to be either incinerated in cement or power plants or used to recover oil or dumped in the landfill or used for producing some long-lasting products.
- There are obvious environmental benefits of using plastics in road construction. Studies show that the life of the road is enhanced and the maintenance requirement is reduced. But, ultimately, plastic fibres, either as micro-plastics or in some other form, will eventually move out of the road into the environment.

While it is time for a comprehensive review of whistle-blower policies, India needs a centralised repository for lodging corporate whistle-blower complaints. Discuss

KEY POINTS

- The law and practice around handling complaints from whistle-blowers has evolved organically, and not by a

push from a law.

- Company law and securities regulations simply require the need for a whistle-blowers policy within the corporation.
- Unless a complaint was backed by a real name, vigilance probes would not be initiated.
- The graver the contents of the complaints, the more difficult it is to ignore it on the ground of the complaint being anonymous or pseudonymous.
- With corporate boards, complaints of this nature are even more rampant. One must not forget that light from any source can be illuminating.
- Therefore, when a complaint is anonymous or pseudonymous, the board of directors should consider the personality of the CEO and the work environment in the organisation.
- The “stronger” (read, more autocratic and overbearing) a CEO, the greater the need for a complainant to mask her identity.
- The more inclusive and accommodative a CEO is of the diverse views within the work space, the more circumspect and stringent the board of directors should be towards anonymous and pseudonymous complaints.
- Companies that have nothing to do with the government too need to handle whistle-blowers complaints and in fact enable a framework where complainants can come in without fear of being identified.
- From a phase of not taking a non-transparent complaint seriously, market reality has moved to treating as illegal the very demand to know the identity of the whistle-blower.
- Some indication of an ideal approach to handling whistleblower complaints, and how organisations would be treated by the law in relation to handling of these complaints, would be an important nudge to the development of the law.

5. GOVERNANCE

Despite digitisation bringing a paradigm shift in governance, limitations exist in Indian Governance approach. Analyse

KEY POINTS

Digitisation bringing a paradigm shift

- The Digital India initiative launched in 2015 has helped improve the delivery of government support and public services. The software industry has revolutionised India in more ways than one.
- Digitisation is key to identifying the beneficiaries based on constitutional rights and eligibility for various welfare schemes.
- It was in 2012 that the first challenge for the Direct Benefits Transfer (DBT) with effective financial inclusion was flagged. All types of financial institutions—banks, post office, cooperative banks, National Payments Corporation of India, payment gateways, credit cards—were creating their digital processes independent of each other.
- The digital evolution of DBT payment was the first step towards creating a strong bridge for financial transactions across financial institutions. For post office and cooperative banks, software that enabled credit into beneficiary accounts in 20 days was accepted. In 2012, the system became operational with all financial software and transaction platforms getting in sync.

Limitations in Governance

- Multiple departments offering overlapping and similar schemes, as there is lack of monitoring system there is lack of clarity on derived benefits and leads misleading statistical representations and skewed estimates.
- Multiple subsidies in insurance and it is offered to same person allocated by state government. Moreover, beneficiaries not even aware of their benefits.
- More number of registrations by beneficiaries and non-sharing of data. Building and other construction workers welfare board formed under the aegis of labour department have collected cesses and is used for different schemes.
- Numerous authorities governing similar schemes. In maternity benefits one has to go to health department for some services and labour department for compensation of wages.

6. INTERNATIONAL RELATIONS

Strengthening strong relationship with West Asian Kingdom could shield India's oil and gas assets against threat from Pakistan. Analyse

KEY POINTS

- Saudi Arabia's oil and gas infrastructure have been attacked repeatedly over the past several months. Recently four oil tankers, two of which belonged to Saudi Arabia were damaged by limpet mines, the East West oil pipeline that runs for 1,200 km across the Arabian peninsula was bombed.
- The Abqaiq attack compelled India to contemplate drawing on its strategic reserves and also look for alternative supplies. Fortunately, India did not suffer greatly from this disruption.

Relationship with West Asian Kingdom

- The attack has also compelled reflection on the state of the security of India's oil and gas infrastructure.
- It is in the context India should encourage cross country investments with Saudi Arabia.
- Saudi Arabia has consequently considerable leverage over Pakistan and the latter in turn cannot afford to ignore Saudi economic interests when war gaming an offensive strategy against India.
- The partners are Aramco, Abu Dhabi National Oil Company (ADNOC) and Indian Oil. This project is currently stalled because of land acquisition and environmental clearance. This needs to be resolved soon.
- Reliance and Aramco are in discussion about the acquisition of a 20 per cent stake by Aramco in these businesses. The commercial logic for Aramco is compelling. It would secure a captive outlet for 5,00,000 barrels of crude oil a day and a foothold in India's downstream market.
- India needs to secure stable oil and gas from Iran too by effectively applying the Look west Policy.
- For Iran, Chabahar is an important deep-water shipping alternative beyond the narrow Strait of Hormuz. For India, the port will provide a trade route to Afghanistan and Central Asia that bypasses Pakistan.
- As of June 2019, Chabahar was still exempt from U.S. sanctions because Washington viewed it as an economic lifeline for the beleaguered Afghan government.
- So this will be an opportunity for India to secure its oil supplies with Iran.



India needs to treat Vanilla Islands as a single strategic space to have a strong influence in south western part of Indian Ocean. Discuss

KEY POINTS

- A group of exotic island states in the South Western Indian Ocean – The Comoros, Madagascar, Mauritius, Mayotte, Reunion, Seychelles joined hands a few years ago to promote tourism to their corner in the Indian Ocean. That many of them grow vanilla – which gives us the popular ice cream flavour – was a good enough reason for calling themselves after it.
- Caribbean Community (CARICOM) and the Pacific Islands Forum (PIF) account for more than 40 members. Their large numbers and impact on the voting patterns in the UN and other multilateral forums had always made island states of interest to major powers.
- Immediate vulnerability to rising sea levels has made island states the most active champions of urgent global action to mitigate climate change. Island states have also taken the lead in developing the concept of “blue economy” focused on sustainable use and development of ocean resources.
- India’s activism on countering climate change and promoting blue economy have made the island states special partners for India.
- One of the Vanilla Islands, Seychelles for example, has a land area of approximately 455 sq km spread over 115 islands but its EEZ is close to 1.3 million sq km.
- Comoros, the island nation is a founding member of the International Solar Alliance and is also a member of the Indian Ocean Rim Association. The Comoros is also a member of the Arab League that India always had strong ties with and the Organisation of Islamic Cooperation that India has begun to reach out in recent years.
- As Delhi appreciates the renewed geopolitical significance of the Comoros, along with the other Vanilla Islands, India is expected to lay the foundation for sustained strategic cooperation with the Comoros.
- The Comoros was of special importance as it sits at the northern end of the Mozambique channel and provided a strong base from which to control the channel.
- The construction of the Suez Canal reduced the strategic significance of the Vanilla islands, so strategic cooperation by India with these islands will help in strengthening its influence in Indian Ocean Region.

If managing the relationship with China has become the biggest test for India's foreign policy, the recent informal summit between India and China is a good occasion to reflect on India's diplomacy towards Beijing. Discuss

KEY POINTS

Test for India’s foreign policy

- Project of OBOR is continuously haunting the geopolitical influence of India in Asia due the dilemma in joining in the project.
- The balance of power in Asia is progressively tilting towards China.
- Doklam stand off, south china sea issue, heavy investments in Asia especially in Bangladesh and Pakistan is concern for India.
- This informal summit can help India to engage with China to redraw the balance in a friendly manner.
- The current difficulties between India and China are not due to lack of mutual understanding. The problem is the widening gap in the comprehensive national power of the two Asian giants.

- China's aggregate GDP, now at about \$14 trillion, is nearly five times larger than that of India, hovering at \$2.8 trillion. China's annual defence spending at \$250 billion is four times larger than that of India.

A good occasion

- Mahabalipuram's ancient cultural connect with China, the visit of Hieun Tsang to Kanchipuram help India to engage with China in a cultural aspect.
- Further relations between Tamil Nadu and Fujian Province, exploring the possibility of establishing an academy to study links between Mahabalipuram and Fujian province on the lines of the experience between Ajanta and Dunhuang and conducting research on maritime links between China and India is really a good approach towards China
- Further, Leaders evaluated the direction of bilateral relations in a positive light and discussed how India-China bilateral interaction can be deepened to reflect the growing role of both countries on the global stage.
- If there is one thing that distinguishes India's diplomacy is that the appreciation of power and its centrality in international relations.
- Recognising the power imbalance with Beijing should liberate Delhi from the prolonged illusions about strategic parity with China and false hopes about building a new global order with it.
- That, in turn, should help focus India's effort at Chennai on small and pragmatic steps to narrow differences with China on bilateral issues — especially the boundary dispute, trade deficit and the development of regional infrastructure.

For better international competitiveness in trade deals, India needs to strengthen its domestic house in line with urgent unilateral trade liberalisation that began in 1991. Explain

KEY POINTS

Trade and logistics facilitation reforms are big constraints to rapid growth of exports and foreign direct investment (FDI).

But considerable reforms were undertaken recently in this particular area, which are reflected in sharp improvements in the rankings of World Bank's Ease of Doing Business, Trading Across Borders and Logistics Performance indicators.

Strengthening internal and external policies

- **Tariff rationalisation:** This is the first reform that is required to maintain international competitiveness and make industry fully integrated into the global economy.
- Average tariff level in India for non-agriculture sectors is 13.6 per cent, a bit higher with tariff hike in the recent Budget, compared to 5.3 per cent in Malaysia, 7.3 per cent in Thailand and 8.4 per cent in Vietnam.
- This reduction is a must for not only promoting exports, but to also benefit from RCEP, or any bilateral free-trade agreement (FTA).
- **Realistic exchange rate:** Correcting the overvaluation of exchange rate over the past few years. This is crucial for reviving the export momentum.
- **Trade and logistics facilitation reforms:** To the credit of the Central Board of Indirect Taxes and Customs (CBIC), our cargo dwell time in ports and airports has been considerably reduced through adoption of modern risk management systems and automation.
- So has logistics development under the special wing created in the Ministry of Commerce and Industry.

- **Trade negotiating strategy:** India needs to behave like a major global player and take a proactive stance in trade in services, removal of subsidies and non-tariff barriers by not consistently pushing for temporary relocation of labour (Mode 4 of the General Agreement on Trade in Services) and Special and Differential Treatment (S&D).
- **Connecting with the largest global value chain:** A good way to carry forward unilateral trade liberalisation to next generation trade reforms is to start preparing to join the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) comprising the 11 original members of TPP, excluding the US.
- Membership in CPTPP will require achieving gold standard trade policy in elimination of tariffs and other barriers to trade and investment, a WTO + IPR regime and trade in services, adherence to competition policy, trade facilitation, reform of state-owned enterprises, investment policy, and government procurement.

With a quiet acceptance of India in the global fora and increasing distrust towards Chinese investments, it is an opportune time for India to focus on Arctic region. Analyse

KEY POINTS

Relevance of the Arctic Region

- The Arctic Circle, established in 2013, is a quasi-government body that works with the Icelandic government to create the largest, unique and open Arctic platform.
- Greenland (Denmark), in the assembly expressed deep distrust towards China's investment in its aviation sector and China's leading role in the establishment of new routes in the region notably the Polar-Silk route and the Belt and Road Initiative.

India's Role

- India has had a vibrant Arctic scientific programme since 2008. It has been posturing for scientific leadership since the commencement of the Antarctic programme in 1982.
- India's dedicated competence in scientific research, perhaps, helped the nation gain the Antarctic Treaty Consultative Meeting membership, the Arctic Council observer status renewed in 2019.
- This competence also beckons collaborative international research augmentation and enhanced expertise in global science.
- Notwithstanding India's scientific advancement, posturing for further involvement calls for an active interest from ministerial bodies.
- Although, India has been partnering with Russia for oil and gas in the high Arctic, the Reykjavik Assembly saw no participation from the sector.
- India's various policy bodies and industry federations need to strategize and devise a new and challenging roadmap for interventions in the region.



GS PAPER- III

7. INDIAN ECONOMY

Creating jobs along with infrastructure investment will help government of India to create more quality employment opportunities. Explain

KEY POINTS

- A recent report by IDFC Institute Infrastructure Priorities for Job Creation in India provides the tools to refine investment strategy.
- Focusing on areas that are poised for economic growth will give the greatest benefit when it comes to helping firms scale up via infrastructure investment.
- According to report, firms with varied types of economic activity were ranked based on major infrastructure bottlenecks they face in their operations.
- Unsurprisingly, a number of issues related to roads were the biggest impediments. Starting with Atal Bihari Vajpayee's Golden Quadrilateral to Pradhan Mantri Gram Sadak Yojana projects, successive governments have recognised the economic importance of connectivity.
- However, connectivity by itself is not enough. We identified specific problems with roads. In services districts, 66 per cent of firms reported traffic jams as a major hindrance. Poor quality of roads stood out in industrial districts, with 70 per cent of firms rating it highest.
- Electricity is particularly important as an infrastructure impediment the most important overall after roads.
- In industrial clusters, for instance, a 10 per cent increase in the costs saved by firms due to better roads would lead to a 3.7 per cent increase in employment.

Link with Jobs

- According to periodic labour force survey (PLFS), unemployment in India in 2017-18 was 6% – 7.8% urban and 5.3% rural joblessness.
- India's jobs scenario seems to be on the edge of a crisis, with one million people entering the job market every month and not enough employment opportunities to absorb them.
- At such a time, a directed approach for prioritising infrastructure investments that will induce wide-ranging employment growth.
- Better the infrastructure, more the labour mobility, also the employability improves.
- But the jobs created by Government for unemployed youths must be in formal sector.
- The right infrastructure, after all, can drastically change the way businesses function and labour moves for the better.
- In the coming months and years, the Centre and states would do well to keep this need for strategic infrastructure provisioning in mind.



In Foreign Direct Investment Policy, increasing Indian equity ownership in Multinational Companies would offer diversified benefits and make them more prosperous. Discuss

KEY POINTS

- Foreign Direct Investment (FDI 1.0) has been welcome in India irrespective of whether or not its equity structure includes Indian public shareholding.
- However, the world has undergone a structural change with the emergence of Internet Multinational Companies (MNCs) such as Microsoft, Google, Facebook and Twitter that are based on 'winner-takes-all' platform business models.
- Rather than accepting the 'winner MNC takes it all' as fait accompli, FDI 2.0 should harmonise interests of all stakeholders including Indian consumers, the government and investors.
- FDI 2.0 could deploy 'List or Trade in India' as a strategic policy tool to enable Indian citizens become shareholders in MNCs such as Google, Facebook, Samsung, Huawei and others, thus capturing the 'upside' they create for their platforms and companies. This is equitable to all, since Indian consumers contribute to the market value of MNCs.

India could implement the following set of proposals:

List in India

- Majority (more than 51%) foreign-owned Indian-listed MNCs could be eligible to domestic company tax rate whereas unlisted MNC subsidiaries could be subjected to a higher tax rate. Many countries such as Bangladesh, Vietnam and Thailand have used tax incentives to attract listing by MNCs.
- This by itself, will not achieve the objective of increasing Indian participation in the fair value of Internet MNCs. This is because of complex issues in revenue booking that result in low profits in Indian subsidiaries.
- Hence, there is a need for additional initiative by way of proposal 2 to enable Indian investor participation in the ownership of parent MNCs' shares.
- The Mexican Stock Exchange allows trading of international shares listed in other stock exchanges. India could replicate such models.

Wealth distribution through mutual funds would create a virtuous cycle of innovative ideas, entrepreneurship, employment, consumption, higher taxes, social and physical infrastructure for the benefit of Indian society. MNCs would earn the goodwill of Indian consumers while expanding their investor base. In other words, this is a win-win for all stakeholders.

The fall in India's ranking in Global Competitiveness Index not only highlights the need for reforms but also underscores their urgency to implement them effectively. Explain

KEY POINTS

- In the competitiveness rankings, India slipped 10 notches to 68th position among 141 countries.
- Although India's overall score declined only marginally in absolute terms, improvement by other countries pushed India's ranking down.
- This underscores an extremely important point that an economy like India needs to keep improving its competitiveness to maintain its position.



Need for reforms

- Capital flows are extremely mobile in today's world and tend to move to markets where they are likely to get the best risk-adjusted returns.
- India ranks better in macroeconomic stability and the depth of the financial sector. Stress in government finances and renewed risks in the financial system could affect India's growth prospects and competitiveness in the near to medium term.
- Although India has gained in the adoption of information and communication technology, it still has a fair distance to cover. India ranks poorly in product market efficiency, largely because of a lack of trade openness.
- The government has increased tariffs in recent years, which will affect India's competitiveness. Further, India slipped from 75th to 103rd position in labour market competitiveness.
- The government is in the process of reforming labour laws, but other countries are moving at a much faster pace. It is important to note that in a globalised economy, where countries are competing for markets and capital, changes on the margin may not help.
- Slow and inadequate reforms in the labour market, among other things, will not allow India to attract firms looking to relocate from China. Besides, India is lagging behind in health and skill development.
- India needs to move faster than its peers to improve its attractiveness as an investment destination.
- Although structural reforms may not immediately push economic growth, they will help increase potential growth in the medium term. What can work in India's favour at the moment is that it has a strong and stable government, which is not averse to taking swift decisions.

Though the India Post Payments Bank was launched recently in 2018, it is now struggling to survive with lack of profitability. Analyse

KEY POINTS

- Recently some of the payments bank in India informed that it was winding up its operations. The decision had been taken due to unanticipated developments in the business landscape that have made the economic model unviable.
- The Reserve Bank of India had issued guidelines for payments banks in November 2014 with the objective of improving financial inclusion.

Why are they unviable?

- It is fundamental that banks can sustain only if they are profitable in short as well as long term.
- A bank's profit is mainly from its lending (financial intermediary) operations.
- Profits generated by other activities form a very small percentage. The 'other income' component can only supplement a bank's revenues.
- When these payments banks are restricted from giving loans and advances, one cannot expect them to thrive merely on commission earned on making remittances.
- Apart from CRR with the RBI, they are required to invest minimum 75 per cent of their "demand deposit balances" in government securities/treasury bills (with maturity up to one year). These prescriptions cannot yield much income to the bank.



- As if the CRR, SLR and non-lending provisions are not enough for the safety of deposit, the eligible deposits mobilised by the payments bank is covered under the deposit insurance scheme of the Deposit Insurance and Credit Guarantee Corporation of India (DICGC). This involves payment of guarantee commission by the bank.
- These restrictions do not leave any scope for sufficient earning for the bank or its promoters. Some of these payments banks are toying with the idea of converting themselves into small finance banks.
- It is better to wind up these banks or merge them with other commercial banks to save depositors' money.

8. AGRICULTURE

What are the reasons for continuous rising debt stock of Food Corporation of India? Discuss the reforms for the better functioning of FCI and robust food management system in India.

KEY POINTS

Reasons

- The growing indebtedness of the Food Corporation of India (FCI), which bodes ill for its financial health, is essentially the consequence of recurrent under-budgeting of food subsidy by the Union government.
- Excessive stockholding and flawed grain procurement and distribution policies. Inadequate provisions for food subsidy in successive Union Budgets in the past few years have been compelling the FCI to borrow from the National Small Savings Fund and other sources.
- Open-ended grain procurement at the minimum support prices (MSPs) has, on the other hand, caused excessive accumulation of food stocks, requiring needless expenses on their upkeep.
- Furthermore, the annual increase in the procurement prices without a simultaneous increase in the sale prices has pushed up subsidy on the food grains supplied under the national food security law.

Reforms for better functioning

- Shanta Kumar committee in its report in 2015 suggested that the FCI should hand over all procurement operations for wheat and rice to the states, which have developed adequate infrastructure for this purpose.
- This would allow it to concentrate more on the areas not covered under any price support mechanism, resulting in widespread distress sales.
- The FCI still picks up grains largely from the same set of states where it has been doing so in the past.
- This has distorted the cropping pattern, tilting it in favour of cereals at the cost of other food crops that are in short supply and often face price volatility.
- The Shanta Kumar committee had also called for carrying out labour reforms in the FCI to bring down the grain handling costs.
- This recommendation has been implemented only partially and needs to be taken forward without delay.
- Another critical recommendation pertains to amending the food security law. The committee had favoured a reduction in the population coverage but an increase in the monthly food grain quota of the beneficiaries to make this law truly helpful for the poor.
- Efficient logistics and optimal allocation of food grains under various schemes by the government is essential for better food management system in India.



If the big data is used sensibly, it can be used to save lives and help build better future citizens. Explain with examples.

KEY POINTS

- Big data stands for information that goes beyond what could be squeezed into a large spreadsheet. It includes words, visuals, pictures, videos and more.
- Big data has led to 'datafication' of what till now that was not in the realm of data. Take for example the smart watch you are wearingable to convert a lot of signals from your body that has always existed into data, measure your pulse rate, and even take real time measurement of your blood pressure.
- Researchers collected tweets posted between October 2013 and June 2014 and narrowed down to 3,810 tweets that mentioned asthma attacks.
- They could link this data with incidence of asthma-related emergency department visits. By mining the tweets and linking it to emergency room visits and atmosphere data, the researchers could build a robust model.
- In yet another case the researchers were posed the question of addressing student drop-outs in the undergraduate programme at the University.
- The data is collected from student identity cards (smart cards) which were used for entry into the mess halls, library, dorms, class room buildings etc. This data was being collected live, real time by the university.
- By mapping card transactions that occur very near in time and at the same location, researchers could make inferences about a student's implicit friends group and social networks.
- They could also build a model around the regularity of the students activities, in an anonymous fashion.
- The model that was build was able to predict at the end of the first 12 weeks the potential for a student to drop out to the extent of 85-90 per cent accuracy.
- By providing selective help, the University was able to hit a retention rate of 86.5 per cent, the highest in its history.
- While questions of privacy remain, here is a case where big data was used to help a very vulnerable cohort manage their lives better.

9. RENEWABLE ENERGY

Why the investments in renewable power sector are progressively declining in India? What are the steps that Government of India should take to put the sector on a high growth trajectory? Discuss

KEY POINTS

Reasons

- The capacity addition programme of the renewable power sector has slowed down since last year, prompting Crisil, a rating agency, to predict that the target is set to be missed by a huge 42 per cent.
- Unstable policies and regulatory challenges, free fall in tariffs and renegeing by state governments and power distribution companies on power purchase agreements (PPAs).
- Besides, the cost-push effect of the safeguard duty levied on the imported solar equipment and depreciation of the Indian rupee against the US dollar have also added to the woes of this sector, as a result of which investors' interest in this sector has seen a sharp dip.
- Many of the sanctioned solar projects are also facing glitches in the implementation process, resulting in inordinate delays in their execution.



- The shift from fixed tariffs to competitive bidding and the increase in the capital cost seem to have shoved the wind power sector into the doldrums.
- The trigger for the current slump in capacity addition can be traced to the refusal of some state governments and power distribution companies to honour the commitments made under the PPAs regardless of the court orders.

Measures to be taken

- Promote hybridization of solar and wind energy and build ancillary markets. This will help reduce variability in power generation. Hybrid projects would also have much higher capacity utilization factors, thus practically eliminating the intermittency challenge.
- Invest in digitalization that can optimize grid-level operations besides impacting consumer behaviour.
- Approaching WTO in a diplomatic manner to solve the solar panel issue with USA.
- Turnaround the distribution companies, immediate reforms are needed to revitalize the discoms – privatization and greater autonomy will be the answer. There is a dire need to invest in upgraded infrastructure and to formulate an action plan to enhance revenue collection.

The livestock-keepers' choice of the animals, their breeds are guided more by their utility rather than the government's decree. Analyse

KEY POINTS

- Despite setting up the Gokul Mission for the preservation and promotion of indigenous cattle breeds and curbs on the movement and trade of cows, and vigilantism by self-appointed cow protectors, cattle-keepers continue to prefer cross-bred cows and buffaloes over indigenous cows.
- While the population of exotic and cross-bred cows has surged by nearly 27 per cent since the last livestock census in 2012, that of the indigenous and non-descript cattle has dipped by 6 per cent. The buffalo count has also risen, even if only marginally.
- Stray cattle are not enumerated in the livestock census. But anecdotal evidence suggests a sharp increase in their numbers as a result of the ban on the movement and trade of cows.
- While earlier the old and unproductive cows used to be disposed of in the cattle bazaars, these are now let loose to roam about in the countryside, damaging crop fields and forests and competing with other livestock for fodder and feed resources.
- The livestock census also shows that the population of several useful but low milk- or non-milk-yielding domesticated animals is dwindling rapidly.
- These animals cumulatively constitute only about 0.23 per cent of the country's vast livestock wealth, but these are useful in their own respect, with each one having its own unique qualities.
- This explains why the population of major milch animals is steady or on the rise while that of the draught animals, which are no longer in much demand due to the availability of mechanical alternatives, is plummeting.
- The best way to popularise the pure-bred indigenous cows would be to boost their inherent milk yield through selective breeding without altering their typical genetic makeup, which is adapted to local conditions.
- The policies concerning the movement and marketing of cows also need to be revisited for the benefit of the cattle owners and the overall livestock economy



10.S & T

What is meant by Thermoelectric Generator? Discuss the challenges in scaling up the generator for commercial purpose and list out its advantages over solar energy.

KEY POINTS

- **Thermoelectric power generators** are the devices which used to convert temperature difference between two junctions into electrical energy. A working of thermoelectric generator is based on Seebeck effect.
- According to which, a loop of two dissimilar metal develops an emf when the two junctions are kept at different temperature. That is why it is also referred as **Seebeck Power Generation**.

Challenges in Scaling up the generator

- The materials used must have high electrical conductivity and ideally, low thermal conductivity.
- The high electrical conductivity allows easy current flow, while the latter ensures differences in temperature don't quickly equalise. Most such materials are very expensive and less efficient.
- Requires relatively constant heat source.
- Lack of customer/industry education about thermoelectric generators.
- Low energy conversion efficiency rate.

Advantages over solar energy

- They have no moving parts, which means less maintenance is required.
- Solar energy provides intermittent power while thermoelectric generator provides continuous source of energy.
- The amount energy required by the generator is very minimal.
- They also don't need fuel, or lubricants, and they can convert waste heat into electricity, which could be a big deal with cars and many industrial processes.
- NASA and other space agencies use these extensively. These devices are also more efficient in space, where there is a big temperature difference between something kept in direct sunlight, versus something kept in shade.
- IoT mostly uses low-powered sensors and another advantage is the lack of need for maintenance.

What is meant by Elastocaloric Effect? How does it contribute to the reduction of global warming? Discuss the advantages of elastocaloric refrigeration.

KEY POINTS

When rubbers bands are twisted and untwisted, it produces a cooling effect. This is called the "elastocaloric" effect.

Reduction in global arming

- Researchers from multiple universities have found that the elastocaloric effect, if harnessed, may be able to do away with the need of fluid refrigerants used in fridges and air-conditioners.
- These fluids are susceptible to leakages, and can contribute to global warming. The results of the research were published in the journal Science on Friday.
- To demonstrate this setup, the researchers developed a fridge the size of a ballpoint pen cartridge that was able to bring down the temperature of a small volume of water by 8°C in a few seconds.



- They suggested that their findings may lead to the development of greener, higher-efficiency and low-cost cooling technology.

Advantages of Elastocaloric Refrigeration

- More efficient than vapor-compression refrigeration as the twisted rubbers are used
- No gases or volatile liquids involved since there is no need for refrigerants
- Non-hazardous, reducing GHG emission and environment friendly
- Re-usable and recyclable parts and components.

While China has an advantage in lithium battery production, India could become competitive by having better strategy in its production regime. Elaborate

KEY POINTS

- More recently, Lithium-ion batteries have been busy liberating the transportation industry. While batteries constituted half the total cost of an electric vehicle a few years ago, they now account for only a third.
- A combination of new sources of lithium supply, innovations in mining technology, manufacturing improvements, economies of scale and battery management systems are contributing to the declining costs of these batteries.
- Chinese companies dominate the lithium-ion battery industry, from extraction of the mineral to exports of cells and batteries. While not quite the Saudi Arabia of lithium—Australia and Chile are bigger producers—Chinese firms currently control almost half the global lithium production and 73% of the global cell manufacturing capacity.
- India imports lithium-ion cells from China, Taiwan and South Korea, and battery assembly capacity of 1 gigawatt hour (GWh), or about 0.3% of global capacity.
- Dependence on imports, and on China, has led the concerned Indian government to propose the setting up of giga factories in India.
- CleanTechnicacompany estimates that India will need a minimum of 10GWh of cells by 2022 and 50GWh by 2025. In comparison, China is expected to have over 600GWh of annual battery production capacity by 2023.
- Even if domestic capacity is created in India to meet these levels of domestic demand, it is unlikely to be price competitive vis-à-vis Chinese imports.
- There are three components to lithium-ion batteries: the basic cell, the battery pack and the battery management system. A complete battery includes several cells in a pack controlled by a management system.
- Battery packs are more resistant to changes in cell technology, and battery management systems can leverage India's strengths in software.
- Securing intellectual property in battery management systems and thermal management of batteries is a better strategy for India.
- Given that India lacks lithium reserves, we should consider urban mining—the extraction of minerals from waste—as a possibly strategic alternative, and not just for lithium.
- A recent market research report projects a recycled lithium-ion battery capacity of 23GWh worth a billion dollars by 2030.
- With 2030 demand projected to be over 125GWh and the geopolitical risks of relying on China, lithium is one more reason to strengthen relations with Australia.



It is imperative that India's legal framework needs to be modified rigorously to the changing situational complexities of space exploration. Analyse

KEY POINTS

- A NASA astronaut is suspected of signing into the personal bank account of her estranged spouse from a computer aboard the International Space Station (ISS).
- The law which is applicable to the case is the International Space Station Inter-Governmental Agreement (IGA). The drafters of this agreement had made provisions to meet such a contingency.
- Hence, the laws of the U.S. will be applicable in this situation concerning the first space crime.
- Although there are legal documents that govern space, such as the Outer Space Treaty, the Moon Agreement, the Registration Convention, the Rescue Agreement, and the Liability Convention, none of them comprehends a detailed framework to cater to criminal disputes that might arise on commercial space vessels, which will have personnel and space tourists from different jurisdictions.
- Space ambitions could lead to an increasing number of autonomous space stations established by countries such as India and China.
- Consider India's space exploration ambition – ISRO is expected to become capable of sending Indians to the ISS owing to missions such as Mission Gaganyaan.

Modifying legal framework for India

- India then might have to become party to the IGA or contemplate a perceptive treaty with ISS nations to meet legal contingencies to dock its space vehicle there.
- If so, India will have to include provisions relating to offences in space in the Indian Penal Code, as that could be material in situations involving outer space, Indian citizens, and space equipment.
- India might also need to formulate new international agreements on space, or sign MOUs to that effect.
- The same national pride that emerged out of India's ambitious plan to reach Mars on its first attempt must be blended with the formulation of visionary laws, clear of legal ambiguities, which cater directly to the needs of rapidly evolving space science.
- Only by keeping pace with the explosive growth in space technology can India hope to remain at the forefront of scientific development in this exciting field.

A decentralisation of the agenda of science and access to science and its methods will bring real science closer to schools and colleges and allow the community to participate in its own development. Discuss

KEY POINTS

- The Department of Science and Technology (DST) of the Government of India has engaged in a review of its State Science and Technology Councils (SSTC) Programme.
- The SSTCs were formed to spearhead the use of science and technology (S&T) for regional problems and to foster "scientific temper" within states, and the DST programme was mandated "to provide core support".
- Many of the development problems, for instance, water or public health, are on the State List. Most state departments do not make any provision for research in their budget simply because it may be too disruptive, or that they do not find viable partner institutions.



- The SSTCs are well-placed to enable problem discovery, identify higher education institutions to work on these problems and engage with state agencies.

Hurdles in working of SSTC

- From the DST ,out of Rs 3,000-4,000 crore, barely Rs 100 crore makes it to the SSTCs put together. State funding is scarce. For example, the Maharashtra SSTC has an annual budget of about Rs 60 crore.
- Much of the SSTC budget is disbursed in the same patronising “project proposal and approval” method of the DST, rather than in sectoral engagement and people-driven problem identification.

For effective decentralisation

- The DST should disburse about Rs 2,000-2,500 crore directly to SSTCs with precise guidelines on problem area selection, publicly available reports as research outcomes, identification of regional institutions, strengthening of universities, and working with regional agencies.
- The DST should be a clearing house for data from central agencies such as the National Remote Sensing Agency (NRSA).
- The SSTC should become the nodal center for research in and for state agencies and administrative units such as forests lands, watersheds, districts or cities.
- This will enable sectoral research, funds, logistical support and access to state-level data.
- The SSTC should work with the state higher education department to evolve curricula and research frameworks for the state’s development requirements and provide academic space for SSTC projects, and evolve a network of regional institutions to work with district-level agencies.
- There should be better alignment of research and development with existing programmes at the national and state level.

11. ENVIRONMENT

The effect of global warming on the oceans and the cryosphere, is the latest in the growing line of warnings that underscore the need for urgent climate action. Justify

KEY POINTS

- Given oceans are key carbon-sinks, if governments worldwide, including India choose to walk their current emission paths, the foreseeable future looks quite bleak.
- Over a billion lives in the high mountains, low-lying coastal zones, island-nations, and the Arctic hang in balance.
- Global heating at 10C above pre-industrial levels—by 2100, it is predicted to reach 2.90C with the “ambitious” plans of the Paris deal signatories, 3.30C with the current emission reduction action, and 4.50C without any action—has already had a drastic impact on ocean ecosystems.
- If countries don’t double down on reducing greenhouse gas emissions by radically reimagining consumption, farming and land-use, energy generation, etc, the effect on oceans and the cryosphere will worsen the climate crisis. So far, these have been part of the buffer against much worse impact.

- The IPCC report states that small glaciers could lose more than 80% of the current ice mass by 2100 under high emission scenarios the kind that can be imagined for a world where the largest historical polluter, the US, and a large developing economy, Brazil, are both headed by stubborn climate-deniers.
- With the retreat of mountain glaciers, water availability, and quality downstream is also likely to be severely affected, with large negatives for food security, once agriculture gets impacted.
- While the 20th century saw sea levels rise globally by around 15 cm, it is currently rising by 3.6 mm per year—more than twice as fast.
- A significant rise in the sea level seems unavoidable given how the report predicts it to reach 30-60 cm by 2100, even when emissions are cut drastically to keep warming to <20C.
- In a high emission scenario, the rise may be as high as 110 cm. Any additional warming over current levels, the report estimates, will cause events that occurred once per century in the past to occur every year by 2050.
- By 2100, the report says, oceans will be absorbing 2-4 times more heat than they did between 1970 and now, if global heating is limited to 20C, and 5-7 times more at higher emission levels.
- Given the retarding effect it will have on the mixing of water layers, and, consequently, on oxygen and nutrient availability, marine life will be severely impacted.
- The report also warns of unprecedented rise in ocean acidification—the oceans absorbed 20-30% of anthropogenic CO₂ emissions since the 1980s.
- Given that the Arctic and boreal permafrost's have large amounts of organic carbon trapped in them almost twice that in the atmosphere any thawing is bad news, even if large-scale initiatives are taken to create carbon-sinks to offset the release.

The Indian government needs to set up a Green Investment Trust to fund green infrastructure projects and look for an overseas green bond market for better quality of human life. Comment

KEY POINTS

- Responding to environmental problems used to be an unappealing, no-win proposition for managers, and economic forces at work.
- Financing, which is normally considered a passive activity, can contribute a lot towards reducing the cost of doing business in a greener way. Green Bonds have emerged as an innovative way to fund green projects. These can reduce the cost of capital and, thereby, improve returns.
- The latest success story comes from Russian Railway, whose eight-year green bond raised €500 million, and was priced at 2.2%. The issuance was oversubscribed with an order-book of over €1.8 billion. The capital raised will be used to purchase electric trains as part of a modernisation programme.
- Transport, the second largest contributor to global GHG emissions, is responsible for 23% of all energy-related carbon dioxide emissions globally, and 14% of total GHG emissions.
- Road transportation remains the primary source of emissions in the sector, and is responsible for 73% of the carbon dioxide emissions.

- Hence, leveraging debt capital markets towards sustainable transport infrastructure development and services has enormous potential to help achieve climate goals. 71% of the climate-themed bonds issued relate to low-carbon transport.
- This is largely due to a number of rail issuers, which have a long history of using bonds to raise finance. As per the Climate Bonds Standard and Certification Scheme of “Climate Bonds Initiative”, there are certain areas which are most likely to get acceptance in the green bond market.
- The electric vehicles industry is one of the thrust areas, and the 2019-20 Budget has announced fiscal incentives and measures to ease regulatory hurdles.
- The Railways can play a huge role in combating climate change. Indian Railway Finance Corporation Ltd (IRFC) established a Green Bond Framework for fund raising.
- The proceeds were proposed to be used for financing the Dedicated Freight Corridor project and electrification of the railways.
- Adani Green Energy issued green bonds worth \$500 million through India INX at a coupon of 6.25%, these were subscribed over three times, when most infrastructure companies struggled raising funds in India.
- The Economic Survey 2018-19 points out that India needs to almost double its annual spending on infrastructure at \$200 billion, which will obviously require harnessing private investment.
- India is only putting \$100-110 billion annually into infrastructure development which requires innovative approaches. Issuing green bonds overseas is one such approach in realising the goal of creating a clean environment.

Should the groundwater for the purpose of cultivation of rice needs to be discouraged? If not, how groundwater can be used effectively for cultivation? Explain

KEY POINTS

- There is a wrong perception that rice needs a lot of water, defending a crop that is indicted for groundwater depletion in north-western states like Punjab, where it is grown mainly for consumption in other states.
- The conventional practice of rice production is bundled with the perception that rice needs to be flooded for most of the time.
- Rice can survive in anaerobic conditions because a specific type of cells pass on oxygen to roots.
- If the aquifers are well-connected, and rechargeable, pumping of groundwater is one of the good approaches to capturing water from rain and rivers, which otherwise ends up in the sea.
- According to International Rice Research Institute, usage of groundwater that depends on the type of aquifer, and the recharge capacity, which, in turn, depends on the source of recharge, and the properties of the sink.
- IRRI says the use of groundwater allows rice farmers to make decisions about sustainable water management; they lack such autonomy with, say, canal water systems.
- So, instead of discouraging rice farmers from using groundwater, they should be educated about the benefits of precise water management.
- Efficient irrigation scheduling (like alternate wetting and drying) not only shrinks the use of water but also the carbon footprint by reducing emissions of methane, a greenhouse gas, from banded fields or paddies.



Incentivising farmers with carbon credits can encourage them to use groundwater efficiently, IRRI says. (In Punjab, where electricity is free, there is little incentive to conserve groundwater).

- While zinc and iron are present in rice, the levels need to be increased to have an impact on health. Conventional breeding helps, but genetic engineering ensures a significant increase. It also allows stacking of multiple traits in a single variety.
- The discovery of a submergence tolerance gene by an IRRI breeder, and its incorporation in popular rice varieties has come as a relief to farmers in flood-prone areas, where productivity is low, and unstable.
- While under water, the plant remains dormant. When the floods recede, it uses conserved carbohydrates to regenerate.
- Another interesting gene isolated from the Pokhali rice variety, grown in coastal Kerala, is the Saltol gene, which makes rice salt-tolerant. Rice productivity in salt-affected areas is about 1.5 tonnes per hectare. IRRI says it has developed about 100 salinity tolerant elite lines, which have traits like high-yield, good grain quality, and resistance to pests and diseases.

The central government's proposal, Green wall of India will be a landmark project if implemented successfully. Comment

KEY POINTS

- India is reportedly planning to undertake a vast reforestation exercise along the Aravalli hill range that stretches from the Ridge of Delhi to Banaskantha in Gujarat.
- What the government appears to have in mind is a “green wall of India”, a 1,400km-long and 5km-wide green corridor all the way from Panipat in Haryana to Porbandar in Gujarat.
- It would be modelled on the so-called Great Green Wall of Africa that was envisioned to run from Djibouti in the continent’s east to Senegal in its west.
- The Aravalli range, which separates western India’s Thar desert from the relatively green plains to its east, has lost so much green cover that it is losing its ability to act as a natural barrier against the heat and dust that blows in from the west.
- The greener it remains, say ecologists, the less likely that the desert will expand into the rest of the Indian landmass.
- Without top-level intervention in favour of vegetation, environmentalists warn, the Thar desert’s expansion could even threaten the “granary of India”—the fertile belts of Punjab, Haryana, western Uttar Pradesh and the Malwa region.
- If this is so, then the proposed project could insure the country against a potential crisis of food insufficiency in the decades ahead.
- The country aims to restore 26 million hectares to health by 2030. While the greening of the Aravalli corridor could help us reach that goal, much more needs to be done.
- Green wall will act as barrier for dust from west and check eastward march of Thar desert.
- It will check desertification by restoring the degraded land through massive afforestation.



If we want real action on climate change and to point out the flaws in policies at global and national level, we need a new development index. Comment

KEY POINTS

- The world still looks at human progress in almost exclusively economic terms.
- The United Nations Development Programme tried to produce a more nuanced measure of progress by including life expectancy and education along with income in its Human Development Index (HDI).
- The original HDI is still relatively crude, failing to account for such things as sustainability and inequality.
- After the UN added an inequality-adjusted index (IHDI) to its 2018 Human Development Report. Including inequality as a factor dramatically altered countries' rankings.
- The US, for instance, fell from 13th on the original index to 25th on the adjusted one. By contrast, Finland rose from 15th to fifth place.
- Accounting for climate damage would likely have an even bigger impact. Countries that rank high on the human development index also use more carbon and deplete more natural resources than those below them.
- Metrics favour unsustainable, environmentally damaging growth. (Using more energy also produces a higher ranking, but only up to roughly 100 gigajoules per person; beyond that, countries are wasting energy in inefficient systems, not improving human development.)
- Up to the middle of the list, where around 140 mostly low- and middle-income countries sit, the footprint is relatively small, less than 2 global hectares per capita (a measure of the world's global ecological capacity per person).
- Some need a new development index, one that takes account of various environmental variables such as CO₂ emissions per capita, SO₂ emissions (a measure of air quality), groundwater extraction and share of renewable energy.
- The World Bank has introduced the concept of adjusted net savings to measure changes to wealth (a stock) rather than GDP (a flow), while accounting for additions or depletion of natural capital.
- But, the measure doesn't adequately address the huge stock of accumulating CO₂, SO₂ or methane in the atmosphere, the country-sized swarms of plastic now floating in the oceans or the melting of glaciers—all things that show we may be at an environmental tipping point.
- If we want real action on climate, we now need to include damage to the environment and depletion of natural resources as factors in measuring development.

Making Generic Adaptation Decision Framework (GADF) as a part of Green climate fund will strengthen adaptation and mitigation framework of poorer countries against climate change. Explain

KEY POINTS

Historically, mitigation projects have always been preferred for funding over adaptation projects.

But, the Green Climate Fund (GCF) remained a rare exception, offering funding for both mitigation and adaptation, while being guided by the UNFCCC principles and provisions.

Adaptation funding

- The GCF's emphasis on involving trust and fund management capacities of both recipient country governments and implementing entities have made access to large-scale funding difficult.



- The GCF also insists on genuine adaptation projects, not development proposals dressed up as adaptation, due to which adaptation projects from Bangladesh and Ethiopia have been rejected lately.
- A solution for this may be found in the Generic Adaptation Decision Framework (GADF).
- The GADF has been proposed to help rationalise between choices of *in-situ* adaptation (adaptation in the vulnerable region) and managed retreat (movement to safer regions).

Sundarbans delta

- This has an application in the Sundarbans delta, which has been encountering a relative-mean-sea-level rise of the Bay of Bengal at the rate of 8 mm/year over the last decade, and is subject to regular instances of land-loss and disappearance of islands.
- The proportion of high intensity events (cyclones) appears to be increasing, possibly as a result of rising sea surface temperatures.
- In the face of this ferocity of climate change, a long-term strategy for adaptation and mitigation for the delta is proposed by the WWF India Vision 2050, in the form of a managed retreat of population by 2050.
- Generally speaking, a refined GADF and its application could be part of a GCF grant programme, while implementation could be a mix of loan, equity, guarantee, and results-based payments.
- Since the GCF is required to channelise up to \$100 billion from 2020 annually to the developing countries for both mitigation and adaptation projects, recourse to a refined GADF could serve all the constituencies well.

Though it is good news, NASA has cautioned that recent shrinking ozone hole is not a sign that atmospheric ozone is on a recovery. Analyse this in the light of Montreal Protocol.

KEY POINTS

- The ozone hole over the Antarctic has been the smallest observed since 1982, NASA and US National Oceanic and Atmospheric Administration (NOAA) scientists have reported.
- The annual ozone hole reached its peak extent of 16.4 million sq km and then shrank to less than 10 million sq km. NASA has described it as great news for the Southern Hemisphere.
- Manufactured chemicals deplete the ozone layer. Each spring over Antarctica (it is now spring there), atmospheric ozone is destroyed by chemical processes.
- This creates the ozone hole, which occurs because of special meteorological and chemical conditions that exist in that region.

Why it is small this year?

- There have been abnormal weather patterns in the atmosphere over Antarctica.
- In warmer temperatures like this year, fewer polar stratospheric clouds form and they don't persist as long, limiting the ozone-depletion process.
- While it is good news, NASA has cautioned it is important to recognise that what we are seeing this year is not a sign that atmospheric ozone is suddenly on a fast track to recovery.

Utility of Montreal protocol

- The research findings is an alert to nations to protect the shrinking ozone hole for welfare of the people.
- Since its legally binding agreement developed countries has to help other countries via green investment to reduce the destruction of ozone layer.



- Parties which violate the agreement should be criticized appropriately irrespective their status at global level.
- This also needs to be linked with Kigali agreement 2016 and phasing out of pollutants should be done gradually at national levels.
- Countries must cooperate with each other by utilizing Montreal protocol as a platform to protect the depletion of ozone layer.

The use of aluminium and its nature of properties presents an excellent potential for increasing the sustainable use of energy. Explain

KEY POINTS

Large businesses across industries are constantly on the lookout for greener alternatives that can aid the implementation of sustainable business models.

While aluminium is not as cost-effective as plastic and steel, it is 100% recyclable, durable, and energy-efficient; it also has the smallest total carbon footprint among competing materials.

Aluminium, to achieve lower carbon footprints

Green Buildings

- Aluminium's strength makes it the first choice for structural frameworks, while its reflectivity makes the buildings more energy efficient.
- The recycling rate for aluminium in the construction industry is 95%, making it a key component of LEED-certified buildings.
- It also enhances the solar efficiency and minimises air leakage. It is an excellent alternative to metals like steel in the manufacturing of green buildings.

Electric Vehicles

- By virtue of being light-weight, aluminium reduces the mass weight of a vehicle, thereby making it more fuel-efficient.
- It plays an instrumental role in reducing the CO₂ emissions from electric vehicles and thereby improving the air quality.
- Furthermore, the thermal and anti-corrosion properties of aluminium make it an ideal component for battery frames.

Aluminium Packaging

- Aluminium's ability to be extruded or rolled into any shape, and its insulating properties, make it a versatile choice of metal for packaging.
- With the recent ban on single-use plastic in India, aluminium is increasingly being used for packaging, like foils, packaging, etc.
- It also reduces shipping costs and carbon emissions for beverage makers.

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