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**JULY**

**19.07.2021**

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**GS 2 : Polity, Governance, International Relations**

**1. Midday meals leave a long-lasting impact: study**

**Context:**

A study on the **inter-generational benefits of the midday meal scheme** published in Nature Communications.

**Mid day meals scheme**

- The scheme **guarantees one meal to all children in government and aided schools and madrasas supported under Samagra Shiksha.**
- It was **launched in the year 1995** as the National Programme of Nutritional Support to Primary Education (NP - NSPE). In **2004, the scheme was relaunched** as the Mid Day Meal Scheme.
- It is a **centrally sponsored scheme**, hence cost is shared between the centre and the states.

**Issue:**

- In India, **more than one in three Indian children are stunted**, or too short for their age, reflecting **chronic undernutrition**.
  - Stunting i.e, **low height for age, is caused by long-term insufficient nutrient intake and frequent infections.**
  - Stunting generally **occurs before age two, and effects are largely irreversible.**
- While nutritionists argue that **maternal health and well-being is the key to reducing stunting in their offspring, the focus has been on boosting nutrition for young children.**

**Key Findings:**

- By 2016, the prevalence of stunting was significantly lower in areas where the scheme was implemented in 2005.
- The scheme was associated with **13-32% of the improvement in the height-for-age z-scores in India between 2006 and 2016.**
- Girls who had access to free lunches provided at government schools had **children with a higher height-to-age ratio than those who did not.**

- The study noted that interventions to improve maternal height and education must be implemented years before those girls and young women become mothers.
- The linkages between midday meals and lower stunting in the next generation were **stronger in the lower socio-economic strata** and likely work through women's education, fertility, and the use of health services.

## 2. Sensitive and precise

### Context:

- **The Trafficking in Persons (Prevention, Care and Rehabilitation) Bill, 2021**, is likely to be tabled in the ongoing monsoon session of Parliament.
  - The Bill aims at **preventing and countering trafficking in persons** and has provisions for care, protection and rehabilitation to the victims. It envisages the creation of a supportive legal, economic and social environment for the victims of human trafficking.

### Human trafficking:

- Human Trafficking is the **illegal trade in human beings** for the purposes of commercial sexual exploitation, prostitution or forced labour.

### Constitutional provision:

- **Article 23 of the Indian Constitution** deals with the aspect of **prohibition of traffic in human beings and forced labour**.
  - Article 23 of the Indian Constitution deals with the **Right against Exploitation**.
- As per clause (1) of Article 23, traffic in human beings and begar and other similar forms of forced labour are prohibited and any contravention of this provision shall be an offence punishable in accordance with the law.

### Measures taken so far:

- As per the provisions enshrined in the Constitution, the government had passed **the Immoral Traffic (Prevention) Act** in 1956, which continues to be the main legislation for the prevention of trafficking for commercial sexual exploitation.
- **India has also ratified the United Nations Convention on Transnational Organised Crime (UNTOC)** which has as one of its Protocols, Prevention,

Suppression and Punishment of Trafficking in Persons, particularly Women and Children. Various actions have been taken to implement the convention and as per Protocol, Criminal Law Amendment Act, 2013 has been enacted wherein human trafficking has specifically been defined.

### Notable aspects of the bill:

- The Bill has expanded the area under coverage to **include offences taking place, not only within India but also outside it.**
- The draft legislation envisages **the setting up of anti-trafficking committees at the State and national levels** to implement the proposed provisions.

### Concerns associated with the proposed legislation:

#### **Powers envisaged for the NIA:**

- The proposal to hand the **responsibility of investigation in trafficking crimes to the NIA** has been criticized for the following two reasons:
  - This could further **burden the already stretched NIA.**
  - This also amounts to an **attack on federalism**, given that this will only decrease the power of local enforcement agencies with respect to the implementation of the proposed provisions.

#### **Very broad definition of human trafficking:**

- Another key criticism of the Bill has been its broad definitions of victims and **failure to distinguish consensual sexual activity for commerce from human trafficking.** This would end up criminalising sex work and victimisation of the already exploited.

#### **Overzealous provisions:**

- Various civil society activists and legal experts have criticised some overzealous provisions adopted by the draft legislation to counter human trafficking.
  - **Reporting of offences has been made mandatory** with penalties for non-reporting.
  - The **proposal of the death penalty** for various forms of aggravated trafficking offences.
- Though societies and governments must have zero tolerance for human trafficking, the use of overzealous provisions as those proposed risks **the adoption of a purely legal and punitive approach to solve what is essentially a socio-economic problem.**

### Failure to acknowledge root causes:

- In its current form, the draft Trafficking in Persons (Prevention, Care and Rehabilitation) Bill, 2021 seems to be inadequate to stamp out human trafficking given its failure to acknowledge the contributing factors to human trafficking, including **vicious poverty, debt, lack of opportunity, and ineffectiveness/inefficiency of the development schemes.**

For more related information on the proposed legislation, refer to the following article:

### Conclusion:

- **Tackling human trafficking needs a wholesome approach** that is cognizant of the causative factors.

### 3. Lokpal yet to get director of inquiry

#### What's in News?

The Centre is yet to appoint a **director of inquiry** as prescribed by the **Lokpal and Lokayuktas Act, 2013.**

- According to the **Lokpal and Lokayuktas Act, 2013**, there shall be a director of inquiry.
- He/she shall **not be below the rank of Joint Secretary** to the Government of India.
- The director of inquiry shall be **appointed by the Central government** for conducting **preliminary inquiries referred to the Central Vigilance Commission (CVC) by the Lokpal.**

### 4. SC mulls limit to role as policy watchdog

#### What's in News?

A Division Bench of the Supreme Court has voiced its **resolve to examine the extent to which the judiciary can question the government's COVID-19 policies.**

#### Issue:

- The recent remark is contrary to SC's three-judge Bench judgment which held that **courts cannot be "silent spectators when constitutional rights of citizens are infringed by executive policies"**.

- The division bench remarked that the **judiciary should not undermine the executive at a time when a collective effort was required to overcome the public health crisis.**
- Earlier, Justice Chandrachud had said “Our Constitution does not envisage courts to be silent spectators when constitutional rights of citizens are infringed by executive policies. Judicial review and soliciting constitutional justification for policies formulated by the executive is an essential function, which the courts are entrusted to perform,”
  - The judgment highlighted that **courts across the globe have responded to constitutional challenges to executive policies which violate the rights and liberties of citizens.**

## **GS 3 : Economy, Science and Technology, Environment**

### **5. China denies politics behind UNESCO move on Barrier Reef**

#### Context:

The Great Barrier Reef has been **put on a list of World Heritage sites** that could be put on the **in-danger list** after losing half of its corals since 1995.

#### Details:

- Australia has criticised the move, **blaming global warming for the loss.**
- It also suspected that **China had a role to play** in recommending the Barrier Reef to be listed as endangered.
- However, UNESCO experts argued that **pollution run-off has contributed to the loss.**
- A top Chinese official has said that political tensions between Beijing and Australia were not behind the UNESCO recommendation.

#### Note:

- The List of World Heritage in Danger is **compiled by UNESCO.**
- The list is intended to **increase international awareness of the threats and to encourage counteractive measures.**
- Two UNESCO world heritage sites in India that were earlier included in the World Heritage in Danger list but now have been delisted include:
  - **Group of Monuments at Hampi**

- Manas Wildlife sanctuary, Assam

## 6. Pegasus spyware used to 'snoop' on journalists

### Context:

It has been reported that some **40 Indian journalists** are a part of the leaked list of **potential targets for surveillance** by an unidentified agency using **Pegasus software**.

### Issue:

- **Indian Ministers, government officials and Opposition leaders** also figure in the list of people whose phones may have been compromised by the spyware.
- The **spyware Pegasus** is sold to governments around the world by **NSO Group, an Israeli company**.
- It can be used to **track, extract messages and information from the phones** that run on Android and iOS systems.

## 7. Time to build a valuable economy

### Context:

- In the context of the **30th anniversary of the economic reforms launched by India in 1991**, the article carries out an assessment of the economic policy changes of 1991.

### Background:

#### **Economic reforms of 1991:**

- **Liberalization, Privatization and Globalization** were the major features of the reforms.
- It involved lessening of government control over the economy, allowing higher participation of the private sector in the Indian economy and opening up of the economy to international trade and capital flows.

### Assessment of the economic reforms:

#### **Positives:**

*Impact on the balance of payment:*

- As against the low foreign exchange reserves that India had in mid-1991, **the post-reform era has witnessed India's foreign exchange reserves growing to record levels.**
- As against the frequent balance of payment crisis that India had witnessed in the pre-reform era, **the three decades since 1991 has seen India witness no such balance of payments crisis.**

*Impetus to the rate of economic growth:*

- The economic reforms have aided in the **high rate of growth of the Indian economy.**
- Though there has been a lag between the economic reforms and the subsequent acceleration in the economic growth rate, the rate of growth of the Indian economy has been high after 2001.

**Shortcomings:**

*Foreign exchange reserve growth based on capital flow:*

- Despite impressive improvement in the foreign exchange reserves of India, a close analysis of it reveals that **this increase is mainly attributable to financial inflows rather than export surpluses**, as was expected from the reforms introduced.
- The balance of payments has been **shored up by portfolio capital**. Such capital can flow out just as easily, leaving reserves to deplete rapidly.

*Failure to increase competitiveness of Indian industries:*

- The economic reforms which were based on the premise of reducing government control over the private sector have failed to increase the competitiveness of the Indian industries adequately.
- Indian goods continue to remain highly uncompetitive in the international market and this has resulted in a scenario where the **attainment of the envisaged trade surplus status has remained a distant dream.**

*Trend of economic growth:*

- The Indian economy of late has been exhibiting a slowdown, dropping to less than pre-reform levels even before we were struck by the pandemic.
- Even considering the long-term growth trend, the economic acceleration after the reforms of 1991 was not the first time it happened and also, there have



been higher degrees of economic acceleration in the early 1950s and the late 1970s.

*Absence of certain crucial services:*

- COVID-19 has brought to light the absence from the economy of certain crucial services and the underlying assets that enable their production.
- The **acute inadequacy of the Indian health system, sanitation, transportation, urban governance and the producer services, from power supply to waste management**, needed to undertake economic activity, are all inadequately available.
- The economic reforms of 1991 failed to provide for these crucial services.

**Recommendations:**

- **Publicly provided infrastructure, private R&D and facilitating government machinery** are crucial for a country's export competitiveness. Appropriate measures are required in this direction.
- India should acknowledge the importance of **ensuring adequate infrastructure to meet the needs of the general public** and allocate sufficient funds towards it. This should be followed up by the effective management of the infrastructure to supply the stream of services expected by the citizens.

## THE INDIAN EXPRESS

### GS 2 : Polity, Governance, International Relations

#### 1. Addressing the issues of undertrials

##### Context

After the death of Stan Swamy, questions about the conditions of jails and treatment of the incarcerated have been raised anew.

##### Issue of deaths of prisoners

- The National Crime Records Bureau data reports the death of over 1,800 prisoners in the year 2018.
- An estimated 70 per cent of prison inmates are undertrials, so it can be safely assumed that a large percentage of those dying in prison are not convicted of any offence.
- Despite the promise of Article 21, **that no person shall be denied life or liberty except by the due process of law**, the NCRB data reveals that the number of those dying in prison as they await their trials is only going up.

##### How prisoners are subjected to additional torture

- **Overcrowding**, delayed medical attention, **unhygienic conditions and malnutrition** exist in all Indian prisons.
- Given that incarcerated people are unable to access medical facilities and healthy food, it is the responsibility of the State and the judiciary **to ensure that they are only deprived of their liberty and are not exposed to any additional torture** in the form of medical deprivation, unhygienic conditions, bad or inadequate food etc.
- Yet, thousands are dying every year and the **prison authorities are not made accountable**.

##### Way forward

- Acts of extreme neglect that could result in the death of inmates should be acknowledged as **extrajudicial torture and made an offence**.
- The Constitutional Bench judgment in **Sunil Batra (I) v. Delhi Administration (1978)**, held that “the humane thread of jail jurisprudence

that runs right through is that **no prison authority enjoys amnesty for unconstitutionality**".

- This judgment has been followed by several similar judgments by various high courts for the improvement of prison conditions.
- The collective interest of the community is not best served by subjecting undertrials to torturous and medieval prison conditions.
- The collective interest of the community also demands an introspection by the judicial institution on whether it is really in the public interest to make jail the rule and bail the exception.

## Conclusion

The government needs to take urgent measures to address the issue of additional torture in various forms and the death of prisoners.

## 2. New Commission for Air Quality Management

### Why in News

The **Ministry of Environment, Forests and Climate Change (MoEFCC)** is set to table the **Commission for Air Quality Management in the National Capital Region and Adjoining Areas Bill, 2021** in Parliament during the **Monsoon Session**.

### Key Points

- **Background and New Changes:**
  - Initially, the **Commission for Air Quality Management ordinance** was promulgated by the **President** in October, 2020 but the bill to replace the ordinance was not passed in the **budget session of Parliament**, as a result of which the commission ceased to operate in March, 2020.
  - Subsequently, the **MoEFCC brought a second ordinance in April 2021**, with modifications due to the **farmers' protest**.
    - Farmers had raised concerns of **stiff penalties and possible jail terms for stubble burning** (as stated in the first ordinance).
    - The **government has decriminalised the act of stubble burning** and withdrawn the clause for possible jail time.
    - However, **environmental compensation fees** are levied on those who are found to be engaged in stubble burning, including farmers.
- **About the Bill:**

- It provides for the constitution of a Commission for better coordination, research, identification, and resolution of problems related to air quality in the **National Capital Region (NCR) and adjoining areas**.
  - Adjoining areas have been defined as areas in the **states of Haryana, Punjab, Rajasthan, and Uttar Pradesh adjoining the NCR** where any source of pollution may cause **adverse impact on air quality in the NCR**.
- It also dissolves the **Environment Pollution Prevention and Control Authority** established in the NCR in 1998.
- **Composition:**
  - The Commission will be headed by a **full-time chairperson** who has been a **Secretary to the Government of India, or a Chief Secretary to a State government**.
    - The chairperson will hold the **post for three years or until s/he attains the age of 70 years**.
  - It will have members from several Ministries as well as representatives from the stakeholder States.
  - It will have experts from the **Central Pollution Control Board (CPCB), Indian Space Research Organisation (ISRO) and Civil Society**.
- **Functions:**
  - **Coordinating actions** taken by concerned state governments (Delhi, Haryana, Punjab, Rajasthan, and Uttar Pradesh).
  - **Planning and executing plans** to prevent and control air pollution in the NCR.
  - **Providing a framework** for identification of air pollutants.
  - **Conducting research and development** through networking with technical institutions.
  - **Training and creating a special workforce** to deal with issues related to air pollution.
  - **Preparing various action plans** such as increasing plantation and addressing stubble burning.
- **Powers:**
  - The new body will have the **power to issue directions and entertain complaints** as it deems necessary for the **purpose of protecting and improving the quality of the air** in the NCR and adjoining areas.
  - It will also **lay down parameters for control of air pollution (such as permissible levels of emissions and discharge of pollutants)**.
  - It will also be in **charge of identifying violators, monitoring factories and industries** and any other polluting unit in the region, and will have the **powers to shut down such units**.
  - It will also have the **powers to overrule directives issued by the state governments in the region**, that may be in violation of pollution norms.

## Way Forward

- **Legal and regulatory changes** to tackle public issues like air pollution, need a **democratic conceptualisation**.
- There is a need for the **massive augmentation of intra-city public transport**, and to move industries, power plants and other users away from polluting fuels like coal to natural gas, electricity and renewable energy to ensure clean combustion.
- The government should undertake a **thorough review of the various laws and institutions** in order to look at their **efficacy and utility**; it must have detailed consultation with all relevant stakeholders, especially those outside Delhi, which includes farmers' groups and small scale industries and the public at large.

## GS 3 : Economy, Science and Technology, Environment

### 3. What the new Ministry of Cooperation needs to achieve

#### Context

Two weeks ago, the government created a new Ministry for Cooperation. India is, perhaps, the first country to have such a ministry. The Ministry can play an important role in the transformation of cooperatives in the country.

#### How 1991 economic reforms benefited agriculture

- On July 24, 1991, India decided to unshackle the spirit of private sector entrepreneurship through the move to de-license industry and reduce tariffs on a host of commodities.
- Trade policy changes **improved the terms of trade for agriculture** and benefitted millions of farmers.
- Agri-exports increased, but this led to higher domestic prices.

#### The success story of dairy sector in India

- In 1991, Manmohan Singh, then finance minister wanted to delicense the dairy sector as well, but there was stiff opposition from Verghese Kurien.
- It was after 10 years in 2002 that the **dairy sector was fully de-licensed**.

- The competition between **cooperatives and corporate dairy players** has benefitted millions of farmers around the country.
- With the entry of the private sector, the growth of the dairy sector accelerated at double the speed.
- Today, both procure roughly the same quantities and growth in the organised private sector is faster than in cooperatives.

### Performance of cooperative movement in India

- India's experience with the cooperative movement has produced mixed results – **few successes and many failures**.
- There are cooperatives in the financial sector, be it rural or urban.
- But the performance of these agencies when measured in terms of their share in overall credit, achievements in **technology upgradation**, keeping **NPAs** low or curbing fraudulent deals has been poor to average.
- Sugar cooperatives of Maharashtra initially touted as exemplars of the movement, are in the doldrums now.
- Many are being sold to the private sector.

### Performance of cooperatives in dairy sector

#### 1) Amul

- The performance of the cooperative champion, **Gujarat Cooperative Milk Marketing Federation (GCMMF)** – with its poster brand, Amul – has been most successful.
- During Operation Flood, it received a lot of capital at highly concessional terms.
- But its success is also the result of professionalism, business and, therefore, keeping **politics away**.
- But despite the grand success of Gujarat's milk cooperatives in Gujarat, **the model did not spread to other states as successfully**.

#### 2) Karnataka Milk Federation

- In its eagerness to please milk farmers, the Karnataka Milk Federation (KMF), which sells its products under the brand name of Nandini, **gives them Rs 5 to Rs 6 extra per litre**.
- This subsidy, given by the state government, cost the exchequer Rs 1,260 crore till 2019-20.
- KMF procures a lot of milk and then dumps it at lower prices in the market for consumers.
- This **depresses prices in adjoining states** like Maharashtra, affecting the fortunes of Maharashtra milk farmers.

- If Maharashtra and Karnataka were two different countries, Maharashtra would be challenging Karnataka at the WTO.

### Way forward

- The new Ministry of Cooperation can work towards ironing out distortions in state price policies due to subsidization such as in Maharashtra and Karnataka milk prices.
- Cooperatives desperately need **technological upgradation**.
- The Ministry of Cooperation can give them soft loans for innovation and technology upgradation.
- But such loans should also be extended to the private sector to ensure a level playing field.
- The Ministry of Cooperation needs to ensure the **least political interference** in the operation of cooperatives.

### Conclusion

The new Ministry of Cooperation can work towards bringing in professionalism in cooperatives and make them more competitive.

## 4. The Challenge of Skilling India

The PM has yet again underscored the importance of a skilled workforce for achieving the goal of becoming Atma-nirbhar Bharat. India still continues to be a country that faces one of the highest shortages of skilled workforce.

- On one hand, companies in India face an acute shortage of skilled manpower and, on the other, India has millions of educated unemployed.
- The massive unemployment in India worsens with educational attainment.
- The data for this chart is for the January to April 2021 period, when the overall unemployment rate in the country was 6.83%.
- In comparison, those with graduation (or even higher degrees) face almost three times the unemployment level.
- At over 19% unemployment rate, one in every five Indians who graduate (or even better) is unemployed.
- It is almost as if the economy penalizes you for getting educated.

### What explains this contradiction?

- The lack of skill is definitely the only answer.
- Before understanding the size of the skilling challenge that India faces, it is important to understand what do we mean by “skilling”.

### What is Skilling?

- A good resource in this regard is the 2018 report by the National Council of Applied Economic Research – aptly titled “No time to lose”.
- This report explains that there are three types of skills.
  1. **Cognitive skills:** which are the basic skills of literacy and numeracy, applied knowledge and problem-solving aptitudes and higher cognitive skills such as experimentation, reasoning and creativity.
  2. **Technical and vocational skills:** which refer to the physical and mental ability to perform specific tasks using tools and methods in any occupation.
  3. **Social and behavioural skills:** which include working, communicating, and listening to others.
- Different levels of these three types of skills can be combined to further classify skills into foundational, employability, and entrepreneurial skills.

### What is the scale of the skilling challenge facing India?

According to the 2018 report by NCAER, India had about 468 million people in its workforce.

- **Informal sector:** Around 92% of them were in the informal sector.
- **Illiteracy:** Around 31% were illiterate, only 13% had primary education, and only 6% were college graduates.
- **No vocational training:** Further, only about 2% of the workforce had formal vocational training, and only 9% had non-formal vocational training.
- Another noteworthy observation in that report was that out of the more than 5 lakh final year bachelors students aged 18–29 who were surveyed, around 54% were found to be “unemployable”.

### Opportunities for India

- India’s working-age population (light green area) is growing faster than its population of young and old dependents.



- There is a great opportunity for India to improve both its social and economic outcomes if a higher number of workers are productively employed.
- At precisely the year 2020, the proportion of those Indians who belong to the working-age (15 to 64 years of age) and those who are dependent will be 50-50.
- Between 2020 and 2040, this proportion will turn even more favourable.
- There is a great opportunity for India to improve both its social and economic outcomes if a higher number of workers are productively employed.

### **What is at stake?**

- If the skilling issue is not resolved, India risks forfeiting its so-called “demographic dividend”.
- But whether this will turn into a demographic dividend or not will depend entirely on how many of those in the working-age bracket are working and becoming prosperous.
- If they are not in well-paying jobs, the economy would not have the resources to take care of itself since with each passing year, the proportion of dependents will continue to rise after 2040.
- To put it simply, to attain its rightful place and realise its aspirations, India must become rich before it gets old.

### **The skilling paradox**

- Indians have excelled in technical expertise at the global level – be it medicine or engineering. Then what explains India’s domestic skilling paradox?
- A big part of the trouble is the starting condition. Over 90% of India’s workforce is in the informal sector.

### **India is trapped in a vicious cycle:**

1. Greater workforce informality leads to lower incentives to acquire new skills. Faced with inadequately skilled workers, businesses often choose to replace labour with machinery.
  2. That’s because “skilled labour and technology are complementary, but unskilled labour and technology are substitutes”.
  3. This, in turn, leads to still fewer formal jobs.
- Millions of Indians who work in agriculture continue to subsist because they do not have the skills to take up industrial or services sector jobs.
  - Even these sectors themselves have failed to create adequate job opportunities.

## What can be done to break this cycle?

- A distinct disadvantage with India's approach towards skilling has been to ignore the demands of the market.
- For the most part, skills have been provided in a top-down fashion.
- Thus, most skilling efforts focus almost solely on providing certain skills but fail to "match" them with the needs of the market.
- For skilling schemes to yield lasting results, even matching is not enough.
- Given the way market demands fluctuate – for instance, look at how the Covid pandemic has upended supply chains – skilling efforts must try to anticipate the needs of the market.

## 5. Hubble Space Telescope

### Why in News

NASA has returned the science instruments on the Hubble Space Telescope (HST) to operational status, almost a month after suspending their work due to trouble with its payload computer.

### Key Points

- **About:**
  - It is **named after the astronomer Edwin Hubble**.
  - The observatory is the **first major optical telescope** to be placed in space and has made groundbreaking discoveries in the field of astronomy since its launch (into **Low Earth orbit** in 1990).
    - It is said to be the "most significant advance in astronomy since **Galileo's telescope**."
  - It is a part of **NASA's Great Observatories Program** - a family of four space-based observatories, each observing the Universe in a different kind of light.
    - The other missions in the program include the visible-light **Spitzer Space Telescope**, **Compton Gamma-Ray Observatory (CGRO)**, and the **Chandra X-Ray Observatory (CXO)**.
- **Large and Versatile:**
  - It is larger than a school bus in size (13.3 meters), and has a 7.9 feet mirror.

- It captures images of deep space playing a major role in helping astronomers understand the universe by observing the most distant stars, galaxies and planets.
- **Data Open to People:**
  - NASA also allows **anyone from the public to search the Hubble database for which new galaxy it captured**, what unusual did it notice about our stars, solar system and planets and what patterns of ionised gases it observed, on any specific day.
- **Important Contribution of HST:**
  - **Expansion of the Universe was accelerating (1990s)**, this in turn led to a conclusion that most of the cosmos was made up of mystery "stuff" called **dark energy**.
  - **Snapshot of Southern Ring Nebula (1995)**, it showed two stars, a bright white star and a fainter dull star at the centre of the nebula where the dull star was indeed creating the whole **nebula**.
  - **Collusion of two dwarf galaxies (1998)** one of which is I Zwicky 18. This led to the **formation of a new Star**.
  - **Colourful patterns of gases in a black hole powered galaxy known as the 'Circinus Galaxy'(1999)**.
  - **Collision between two galaxies UGC 06471 and UGC 06472 (2000)**.
  - **Snapshot of Neptune (2011):** The image of the most distant planet revealed the formation of high-altitude clouds composed of methane ice crystals.
  - The **disc surrounding a star 'Beta Pictoris'**, which was discovered in 1984, was found to be constituted by two planets, light-scattering dust and debris in 2012.
  - It captured the **'Galaxy Cluster Abell 2744'** in 2013. It is 3.5 billion light-years away and has several clusters of small galaxies in it.
    - It also poses a strong gravitational field which acts as a lens to reflect the light of almost 3,000 background galaxies.
  - Captured **an encounter of a comet named C/2013 A1 with Mars in 2014**.
    - The **'Comet Siding Spring'** passed with a distance of just 87,000 miles to that of Mars.
  - The **'Gum 29', a vibrant stellar being ground**, which is 20,000 light-years away, consisting of a giant cluster of 3,000 stars was captured in 2014.
    - This behemoth cluster of stars is called **'Westerlund 2'**.
  - Captured the **disintegration of an ancient comet 332P/Ikeya-Murakami** in 2016.
  - The **Triangulum Galaxy was snapped** depicting the specific areas of star birth with a bright blue light spreading across the galaxy in beautiful nebulas of hot gas in 2017.

- Picture of 'Galaxy ESO 243-49, which had a **medium-sized black hole** in 2012.
  - The 20,000 suns sized black hole was positioned on a glacial plane of the galaxy.
- **Successor of HST:**
  - A successor to Hubble, the **James Webb Space Telescope (JWST)**, is scheduled to launch later this year.
  - But many astronomers hope that the two will be able to operate alongside each other - at least for some period of time.

## James Webb Space Telescope

- The James Webb Space Telescope (also called JWST or Webb) will be a large infrared telescope with a 6.5-meter primary mirror.
- The telescope will be launched on an Ariane 5 rocket from French Guiana in 2021.
- It will study every phase in the history of our Universe, ranging from the first luminous glows after the Big Bang, to the formation of solar systems capable of supporting life on planets like Earth, to the evolution of our own Solar System.
- Webb is an **international collaboration between NASA, the European Space Agency (ESA), and the Canadian Space Agency (CSA).**

## 6. Moon's Wobble Effect

### Why in News

Recently, the **National Aeronautics and Space Administration (NASA)** has highlighted **Moon's Wobble** as a **potential problem in the near future.**

### Key Points

- **Moon's Wobble:**
  - When the Moon makes its **elliptical orbit**, its **velocity varies and alters causing our perspective of the "light side"** to appear at **slightly different angles.** This is what it calls the Moon's wobble or that is how it appears to our eyes.
  - It is a **cyclical shift in the moon's orbit**, it is a **regular swaying (Oscillation) in the moon's orbit.**
  - It was first documented **way back in 1728.** This wobble takes over an **18.6-year period** to complete. It acts as a background of **sea level rise.**
- **Impact of Wobble on Earth:**

- The moon wobble impacts the gravitational pull of the moon, and therefore, indirectly influences **the ebb and flow of tides** on the Earth.
- Each wobble cycle has the **power to amplify and suppress the tides on Earth.**
  - During **half of the Moon's orbit of 18.6 years, the Earth's regular tides are suppressed** i.e. high tides are lower than normal and low tides higher than normal (Current situation).
  - In the **other half, the effect is reversed, which is called the tide-amplifying phase** of the Moon.
- **Related Concerns:**
  - The **lunar cycle is expected to shift again by mid-2030**, and in the coming phase, the **tides will amplify once again.**
  - The upcoming changes in the lunar cycle will pose a serious threat, as the amplified **high tides coupled with the rising sea levels** will make the risk of flooding far greater across **all coastal regions of the globe.**
    - It raises **the baseline**, and the more the baseline is raised, the smaller the weather event to cause flooding.
  - The **high tide-associated floods** – also known as nuisance floods or sunny day floods – **may occur in clusters that could last for months** or even for longer periods.
  - This surge will be closely associated with the **position of the Moon, Earth and the Sun.**

## Tides

### ▪ About:



- Tides can be defined as the **alternate rise and fall of the ocean water.**

### □ Occurrence:

- It is caused by the combined effects of the **gravitational force** exerted on Earth **by the Sun**, the gravitational force exerted on Earth **by the Moon and rotation of the Earth.**

### □ Types:

- **Spring Tide:** It occurs during the **full moon and new moon days** when the sun, the moon and the earth are in the same line twice each lunar month all year long, without regard to the season.

- **Neap Tide:** It occurs when the moon is in its **first and last quarter**, the ocean waters get drawn **in diagonally opposite directions** by the gravitational pull of sun and earth resulting in low tides.

□ **Stages of Tidal Changes:**



- **High tide** is the stage when the tidal crest arrives at a particular location on shore, raising the local sea level.
- **Low tide** is the stage when the trough arrives, lowering the local sea level.
- **Flood tide** is a rising or incoming tide between low tide and high tide.
- **Ebb tide** is a falling or outgoing tide between high tide and low tide.
  - The vertical distance between high tide and low tide is the tidal range.

□ **Impact:**

- Tides affect other aspects of **oceanic life, including the reproductive activities** of fish and ocean plants.
- High tides **help in navigation**. They raise the water level close to the shores which helps the **ships to arrive at the harbour more easily**.
- Tides stir the ocean water that **makes habitable climatic conditions** and balance the temperatures on the planets.
- The fast movement of water **during the inflow and outflow** will provide a source of renewable energy to communities living along the coast.

### Prelims Practice Questions

**1. Which one of the following is not the most likely measure the Government/RBI takes to stop the slide of Indian rupee?**

- a. Curbing imports of non-essential goods and promoting exports
- b. Encouraging Indian borrowers to issue rupee denominated Masala bonds
- c. Easing conditions relating to external commercial borrowing
- d. Following an expansionary monetary policy

**Answer: d**

**Explanation:**

An expansionary monetary policy results in increased money supply in the economy resulting in stronger dollar. Such a policy might lead to a fall in the value of Indian Rupee.

**2. Which of the following dam/s is/are built/being built in Afghanistan in partnership with India?**

- 1. Salma Dam
- 2. Sokhtuk Dam
- 3. Shahtoot Dam
- 4. Band-e Sardeh Dam

**Options:**

- a. 1 only
- b. 1 and 3 only
- c. 2 and 4 only
- d. 1 and 2 only

**Answer: b**

**Explanation:**

- The Salma Dam (Afghan-India Friendship Dam) inaugurated in 2016 was built in partnership with India.
- Shahtoot dam is another major dam being built by India in Afghanistan.

3. Consider the following statements regarding Superfluidity of Helium:

1. Superfluidity is the frictionless flow of electrons observed in liquid helium at room temperature.
2. A Single Electron Bubble (SEB) is created when an electron is injected into the superfluid form of Helium.

Which of the statements given above is/are correct?

- A 1 only
- B 2 only
- C Both 1 and 2
- D Neither 1 nor 2

Answer : B

Explanation

- **Superfluidity** is the **frictionless flow** and other exotic behaviour of electrons observed in liquid helium **at temperatures near absolute zero** ( $-273.15\text{ }^{\circ}\text{C}$ ), and similar frictionless behaviour of electrons in a superconducting solid. **Hence, statement 1 is not correct.**
- **An electron injected into a superfluid form of helium creates a Single Electron Bubble (SEB)** – a cavity that is free of helium atoms and contains only the electron. **Hence, statement 2 is correct.**
  - An electron bubble is the empty space created around a free electron in a cryogenic gas or liquid, such as neon or helium. They are typically very small, about 2 nm in diameter at atmospheric pressure.

4. Which of the following is the first country in our immediate neighbourhood to accept mobile based payments through the *BHIM App*?

- a. Nepal
- b. Bhutan
- c. Maldives
- d. Sri Lanka



Answer : b

- *Union Minister of Finance & Corporate Affairs Smt. Nirmala Sitharaman, along with her counterpart, the Hon'ble Finance Minister of Bhutan, Mr Lyonpo Namgay Tshering, jointly launched BHIM–UPI in Bhutan recently.*
- This launch fulfils the commitment made by the two countries during the Hon'ble Prime Minister of India's State visit to Bhutan in 2019.
- Following that visit, India and Bhutan have already enabled inter-operability in acceptance of Rupay cards in each other's countries in two phases.
- With today's launch of BHIM-UPI in Bhutan, the payment infrastructures of the two countries are seamlessly connected and will benefit a large number of tourists and businessmen from India who travel to Bhutan each year.
- This will enhance the ease of living and ease of travelling through cashless transactions at the touch of a button.
- ***Bhutan*** is the first country to adopt UPI standards for its QR deployment, and the ***first country in our immediate neighbourhood to accept mobile based payments through the BHIM App.***

**5. Consider the following statements:**

1. The Department of Fertilizers has mandated all the domestic producers to produce 100% urea as Neem Coated Urea (NCU).
2. All non-urea based fertilisers are regulated under Nutrient Based Subsidy Scheme.

Which of the statements given above is/are not correct?

- A 1 only
- B 2 only
- C Both 1 and 2
- D Neither 1 nor 2

Answer : D

Explanation

- India's fertiliser consumption in FY20 was about 61 million tonnes – of which 55% was urea – and is estimated to have increased by 5 million tonnes in FY21.
- Since non-urea (MoP, DAP, complex) varieties cost higher, many farmers prefer to use more urea than actually needed.

- The government has introduced neem-coated urea to reduce illegal diversion of urea for non-agricultural uses.
  - The Department of Fertilizers (DoF) has made it **mandatory for all the domestic producers to produce 100% urea as Neem Coated Urea (NCU). Hence, statement 1 is correct.**
- Non-urea fertilisers include Di-Ammonium Phosphate (DAP), Muriate of Potash (MOP).
  - The MRPs of non-urea fertilisers are decontrolled or fixed by the companies. The Centre, however, pays a flat per-tonne subsidy on these nutrients to ensure they are priced at “reasonable levels”.
  - All **Non-Urea based fertilisers** are regulated under **Nutrient Based Subsidy Scheme. Hence, statement 2 is correct.**

**6. With reference to Convention on Biological Diversity, consider the following statements:**

1. It is a legally binding treaty to conserve biodiversity.
2. The CBD Secretariat is based in Geneva, Switzerland.
3. The Aichi Targets are a set of goals proposed under CBD to conserve biodiversity.

Which of the statements given above is/are correct?

- A 1 only
- B 2 only
- C 1 and 3 only
- D 1, 2 and 3

Answer : C

Explanation

- The **Convention on Biological Diversity (CBD)**, a legally binding treaty to conserve biodiversity has been in force since 1993. **Hence, statement 1 is correct.**
- It has 3 main objectives:
  - The conservation of biological diversity.
  - The sustainable use of the components of biological diversity.
  - The fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

- The CBD Secretariat is based in **Montreal, Canada** and it operates under the United Nations Environment Programme. **Hence, statement 2 is correct.**
- The CBD at COP-10 also adopted a ten-year framework for action by all countries to save biodiversity.
  - Officially known as **“Strategic Plan for Biodiversity 2011-2020”**, it provided a set of 20 ambitious yet achievable targets collectively known as the **Aichi Targets** for biodiversity. **Hence, statement 3 is correct.**

### **Mains Practice Questions**

#### **1. The frequent promulgation of ordinances is an assault on the democratic structure of the Constitution. Critically analyse. (250 words)**

##### **Approach**

- Introduce the concept of ordinances with constitutional articles (for both President and Governors) for the same.
- Briefly explain the need for the promulgation of ordinances.
- Discuss the issues with the frequent promulgation of the ordinances.
- Also give some examples to show the frequent promulgation and re-promulgation of the ordinances in the country.
- Conclude suitably on a positive note.

#### **2. The Minimum Support Price (MSP) scheme protects farmers from the price fluctuations and market imperfections. In the light of the given statement, critically analyse the efficacy of the MSP. (250 words)**

##### **Approach**

- Introduce by defining Minimum Support price (MSP).
- Discuss the advantages of MSP scheme.
- Analyse the constraints or issues with the MSP system.
- Conclude with a way forward.