

PERFECT 7

WEEKLY

CURRENT AFFAIRS

January : 2020 / Issue- 2

WILDFIRES IN AUSTRALIA

A Global Concern

- Mission Gaganyaan : India's First Manned Mission
- National Infrastructure Pipeline : A Measure to Boost Economy
- Reforms in Energy Governance : Need of the Hour
- US-Iran Conflict : Rising Global Turbulence
- India State of Forest Report 2019 : An Overview
- Chief of Defence Staff : Responsibilities and Challenges



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DHYEYA IAS : AN INTRODUCTION



The guiding philosophy of the institute, throughout, has been creation of knowledge base. Dhyeya IAS inculcates human values and professional ethics in the students, which help them make decisions and create path that are good not only for them, but also for the society, for the nation, and for the world as whole. To fulfill its mission in new and powerful ways, each student is motivated to strive towards achieving excellence in every endeavor. It is done by making continuous improvements in curricula and pedagogical tools.

The rigorous syllabi not only instills in them, a passion for knowledge but also attempts to teach them how to apply that knowledge in real-life situations. The programmes lay emphasis on well-rounded personality development of the students and also in inculcating the values of honesty and integrity in them.

Vinay Kumar Singh
CEO and Founder
Dhyeya IAS



Dhyeya IAS is an institution that aims at the complete development of the student. Our faculty are hand-picked and highly qualified to ensure that the students are given every possible support in all their academic endeavors. It is a multi-disciplinary institution which ensures that the students have ready access to a wide range of academic material.

Our brand of education has broad horizons as we believe in exposure. Our students are encouraged to widen their knowledge base and study beyond the confinements of the syllabus. We aim to lend a gentle guiding hand to make our students recognize their inner potential and grow on their own accord into stalwarts of tomorrow's society.

Q H Khan
Managing Director
Dhyeya IAS

PERFECT 7 : AN INTRODUCTION



With immense pleasure and gratitude I want to inform you that the new version of 'Perfect-7', from the Dhyeya IAS, is coming with more information in a very attractive manner. Heartily congratulations to the editorial team. The 'Perfect-7' invites a wider readership in the Institute. The name and fame of an institute depends on the caliber and achievements of the students and teachers. The role of the teacher is to nurture the skills and talents of the students as a facilitator. This magazine is going to showcase the strength of our Institute. Let this be a forum to exhibit the potential of faculties, eminent writers, authors and students with their literary skills and innovative ideas.

Qurban Ali

Chief Editor

Dhyeya IAS

(Ex Editor- Rajya Sabha TV)



We have not only given the name 'Perfect 7' to our magazine, but also left no stone unturned to keep it 'near to perfect'. We all know that beginning of a task is most challenging as well as most important thing. So we met the same fate.

Publishing 'Perfect 7' provided us various challenges because from the beginning itself we kept our bar too high to ensure the quality. Right from the very first issue we had a daunting task to save aspirants from the 'overdose of information'. Focusing on civil services exams 'Perfect 7' embodies in itself rightful friend and guide in your preparation. This weapon is built to be precise yet comprehensive. It is not about bombardment of mindless facts rather an analysis of various facets of the issues, selected in a systematic manner. We adopted the 'Multi Filter' and 'Six Sigma' approach, in which a subject or an issue is selected after diligent discussion on various levels so that the questions in the examination could be covered with high probability.

Being a weekly magazine there is a constant challenge to provide qualitative study material in a time bound approach. It is our humble achievement that we feel proud to make delivered our promise of quality consistently without missing any issue since its inception.

The new 'avatar' of 'Perfect 7' is a result of your love and affection. We feel inspired to continue our efforts to deliver effective and valuable content in interesting manner. Our promise of quality has reached you in previous issues and more are yet to come.

Ashutosh Singh

Managing Editor

Dhyeya IAS

Send us your suggestions, comments, views and feedback for guiding us towards continuous improvement & enhancement of 'Perfect 7' on

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PREFACE

Dhyeya family feels honoured to present you 'Perfect 7' - a panacea for Current Affairs. 'Perfect7' is an outstanding compilation of current affairs topics as per the new pattern of Civil Service examination (CSE). It presents weekly analysis of information and issues (national and international) in the form of articles, news analysis, brain boosters, PIB highlights and graphical information, which helps to understand and retain the information comprehensively. Hence, 'Perfect 7' will build in-depth understanding of various issues in different facets.

'Perfect7' is our genuine effort to provide correct, concise and concrete information, which helps students to crack the civil service examination. This magazine is the result of the efforts of the eminent scholars and the experts from different fields.

'Perfect 7' is surely a force multiplier in your effort and plugs the loopholes in the preparation.

We believe in environment of continuous improvement and learning. Your constructive suggestions and comments are always welcome, which could guide us in further revision of this magazine.

Omveer Singh Chaudhary
Editor
Dhyeya IAS

Perfect 7

The Weekly Issue

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Our other initiative



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Current Affairs Programmes hosted

by Mr. Qurban Ali

(Ex. Editor Rajya Sabha, TV) & by Team Dhyeya IAS
(Broadcasted on YouTube & Dhyeya-TV)

SEVEN IMPORTANT ISSUES

1. WILDFIRES IN AUSTRALIA : A GLOBAL CONCERN

Why in News?

Record-breaking temperatures and months of severe drought have fuelled a series of massive bushfires across Australia. The fires intensified over the past week, with a number of towns evacuated. At least 24 people have so far been killed - including three volunteer firefighters - and more than 6.3 million hectares (63,000 sq km or 15.6 million acres) of bush, forest and parks have been burned.

Introduction

The writer David Horne once described Australia as “the lucky country”, with its abundance of natural resources, good weather, and its relative geographical isolation from the turbulence of the world. Today, with wildfires burning more than 12 million hectares of land, destroying native flora, killing thousands of wild animals, including endangered species, and displacing residents and tourists. Australia is confronted with a dystopian vision, where “apocalypse becomes the new normal”. The Australia wildfires are a countrywide catastrophe, mainly caused by drought and extreme heat. At least 24 people have lost their lives, nearly 500 million animals have perished. The bushfires began as lightning strikes within Flinders Chase National Park.

Clearly, as a consequence of the bushfires, the debate on global warming, climate change and fossil fuels is going to intensify in the weeks ahead, even while scientists grapple with the

new evidence. Australia’s celebrated novelist Richard Flanagan concluded in a powerful, if controversial, essay: “Australia today is ground zero for the climate catastrophe.” As evidence, he pointed out that the Great Barrier Reef “is dying”, the “world-heritage rain forests are burning”, giant kelp forests have disappeared, “numerous towns have run out of water or are about to, and now the vast continent is burning on a scale never before seen.”

Major Reasons Responsible

Bushfires are actually a part of Australia’s ecosystem. Many plants depend on them to cycle nutrients and clear vegetation. In fact, eucalyptus trees in Australia depend on fire to release their seeds. But all this usually happens during a few weeks in late January-February, when the country is at its driest. The prolonged blaze this year has coincided with Australia’s harshest summer. Parts of the country

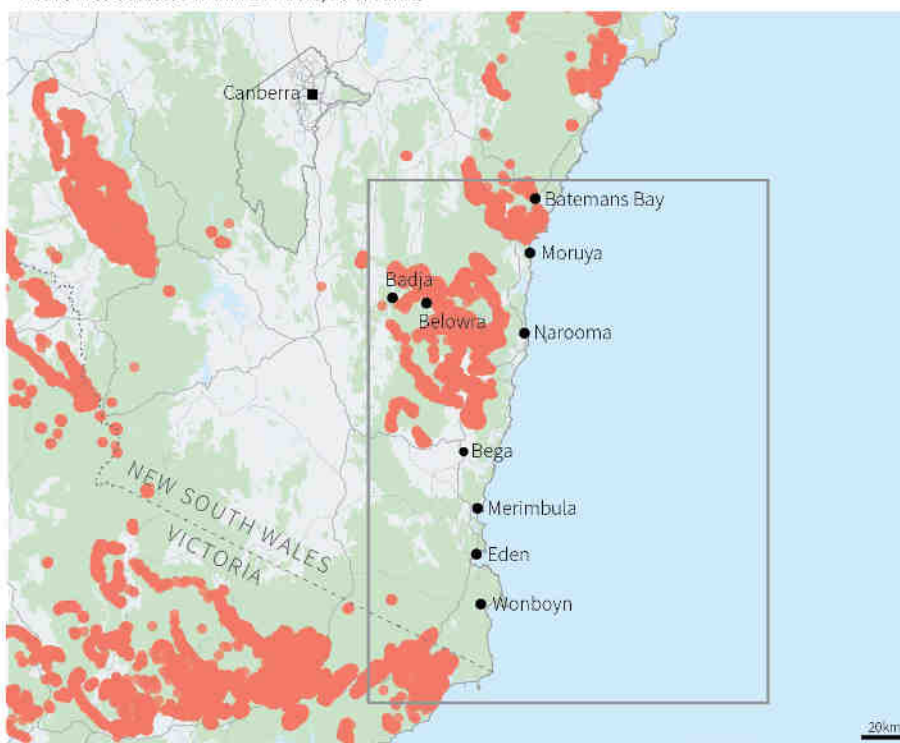
New South Wales "Tourist leave zone"

The state’s rural fire service instructed tourists to leave the area between Batemans Bay and the Victoria state border before Saturday, Jan. 4 due to forecasts of widespread extreme fire danger – the second-highest level of fire danger.



TOURIST LEAVE ZONE

● Active fires detected within 24 hours, as of Jan. 2



Source: New South Wales Rural Fire Service

recorded their highest recorded temperature in December. Then, longer-term factors have been at play. Much of Australia is facing a drought that is a result of three consecutive summers with very little precipitation. This, according to climate scientists, is unprecedented. Moreover, as the Australian Bureau of Meteorology's 2018 State of the Climate report notes, "Australia's climate has warmed by just over 1 degree Celsius since 1910, leading to an increase in the frequency of extreme heat events." This has led to more rainfall in northern Australia, but created drought-like conditions in the more densely populated southeast.

This Human-caused climate change has resulted in more dangerous weather conditions for bushfires in recent decades for many regions of Australia and these fires are so extreme that they are triggering their own thunderstorms. It's an explosive storm called pyrocumulonimbus and it can inject particles as high as 10 miles into the air. Scientists, both those who study fire and those who study climate, say there's no doubt man-made global warming has been a big part, but not the only part, of the fires. Last year Australia was the hottest and driest on record, with the average annual temperature 1.5 degrees Celsius above the 1960 to 1990 average, according to Australia's Bureau of Meteorology. Temperatures in Australia last month hit 49.9°C.

The drier the fuel - trees and plants - the easier it is for fires to start and the hotter and nastier they get. It means more fuel is available to burn, which means higher intensity fires, which makes it more difficult or impossible to put out. The heat makes the fuel drier, so they combine for something called fire weather. And that determines "fuel moisture," which is crucial for fire spread. Eucalyptus trees are especially flammable, "like gasoline on a tree, Chemicals in them makes them catch

fire easier, spread to the tops of trees and get more intense. Raging bushfires in Australia, so extreme that ash, smoke and carbon monoxide from the burning have reached distant New Zealand, could rage for months, climate experts in both countries are warning. In a 2019/2020 outlook for the southern hemisphere's summer, published in late November, the Australia's Bureau of Meteorology (BoM) forecasted that the "key culprit" behind the hot, dry weather was a slower than usual weakening of the "Indian Ocean Dipole (IOD)."

Another alarm bell was the Southern Annular Mode. This describes the movement of the circular belt of wind around Antarctica as it shifts north or south. It's in its negative phase right now, bringing dry conditions to Australia.

The Southern Annular Mode (SAM), also known as the Antarctic Oscillation (AAO), describes the north-south movement of the westerly wind belt that circles Antarctica, dominating the middle to higher latitudes of the southern hemisphere.

The changing position of the westerly wind belt influences the

strength and position of cold fronts and mid-latitude storm systems, and is an important driver of rainfall variability in southern Australia.

In a positive SAM event, the belt of strong westerly winds contracts towards Antarctica. This results in weaker than normal westerly winds and higher pressures over southern Australia, restricting the penetration of cold fronts inland.

Conversely, a negative SAM event reflects an expansion of the belt of strong westerly winds towards the equator. This shift in the westerly winds results in more (or stronger) storms and low pressure systems over southern Australia.

During autumn and winter, a positive SAM value can mean cold fronts and storms are farther south, and hence southern Australia generally misses out on rainfall. However, in spring and summer, a strong positive SAM can mean that southern Australia is influenced by the northern half of high pressure systems, and hence there are more easterly winds bringing moist air from the Tasman Sea. This

The Size of the Australian Wildfires in Comparison

Acres burned in recent major wildfire events



increased moisture can turn to rain as the winds hit the coast and the Great Dividing Range.

In recent years, a high positive SAM has dominated during autumn–winter, and has been a significant contributor to the 'big dry' observed in southern Australia from 1997 to 2010.

Impact of Bushfires

The fires, among the worst in the country's history, have been raging since September and show no signs of abating. Some of the major impact includes:

- ◆ Damage to fresh produce will put upward pressure on consumer prices, given that most fresh fruit and vegetables consumed at home are sourced locally.
- ◆ The broader effects included air pollution, which has affected 30% of the population, and would cause "reduced worker productivity, increased health spending, and lower crop yields", as well as road closures and the cost to insurers.
- ◆ The economic impact has been particularly severe on Kangaroo Island, off the coast of South Australia, where tourists have been evacuated, farms devastated and timber plantations burned.
- ◆ The economic damage from the bushfires devastating Australia's eastern seaboard is likely to exceed the record \$4.4 bn set by 2009's Black Saturday blazes, Moody's Analytics.

The cost to the Australian economy of this summer's devastating bushfire season has already likely topped \$2 billion – and is still climbing.

- ◆ Roughly 480 million mammals, birds and reptiles have been affected since bushfires started.
- ◆ Ecologists within the park put estimates of the number of koalas that have perished in the fire at

25,000 which is half the island's population of the popular animals.

- ◆ Mental health is also a significant concern as people face the stress posed by living through prolonged heatwave and bushfire events, the loss of friends and family, loss of livelihoods, property, pets and livestock, and for some, extended periods of displacement.

Indian Ocean Dipole

The Indian Ocean Dipole (IOD), also known as the Indian Niño, is an irregular oscillation of sea-surface temperatures in which the western Indian Ocean becomes alternately warmer (positive phase) and then colder (negative phase) than the eastern part of the ocean.

A positive phase sees greater-than-average sea-surface temperatures and greater precipitation in the western Indian Ocean region, with a corresponding cooling of waters in the eastern Indian Ocean—which tends to cause droughts in adjacent land areas of Indonesia and Australia. The negative phase of the IOD brings about the opposite conditions, with warmer water and greater precipitation in the eastern Indian Ocean, and cooler and drier conditions in the west.

A positive IOD is associated with droughts in Southeast Asia and Australia. The study also shows that the IOD has a much more significant effect on the rainfall patterns in south-east Australia than the El Niño–Southern Oscillation (ENSO) in the Pacific Ocean. Extreme positive-IOD events are expected to triple due to climate change.

Conclusion

Australia is one of only 17 "megadiverse" countries. Much of our species richness is concentrated in areas torched by the current bushfires. The catastrophic bushfires raging across much of Australia have not only taken a huge human and economic toll, but also delivered heavy blows to biodiversity and ecosystem function. The ancient catastrophe provides strong evidence, written in stone, that firestorms can contribute to extensive extinctions, even among large vertebrates with large distributions and high mobility.

It also shows certain types of organisms will bear the brunt of the impact. Entire guilds of similar species could vanish, severely impacting ecosystem function. It took millions of years of regeneration and evolution for our planet's biosphere to recover from the nuclear winter and wildfires of the asteroid impact.

The recent rampant bushfires are regional rather than global (e.g. Australia, the Amazon, Canada, California, Siberia), and are burning less land cover than the worst-case dinosaur firestorm scenario. Yet their long-term extinction effects could also be severe, because our planet has already lost half its forest cover due to humans. These fires are hitting shrunken biodiversity refuges that are simultaneously threatened by an anthropogenic cocktail of pollution, invasive feral species, and climate change.

Australia is home to nearly 250 animal species, some of them like the koalas and kangaroos are not found elsewhere. But the region also has the highest rate of native animals going extinct over the past 200 years. The fires will aggravate this situation. Experts, for example, reckon that more than a quarter of the koala habitat has been consumed by the blaze. The fires have also caused a drop in the bird, rodent and insect populations. These creatures are the building blocks of the ecosystem and the fall in their population is bound to have long-term impacts. In Australia's bushfires lie a warning about the complex ways in which climate variables interact.

General Studies Paper- III

Topic: Conservation, environmental pollution and degradation, environmental impact assessment



2. MISSION GAGANYAAN : INDIA'S FIRST MANNED MISSION

Why in News?

Indian Space Research Organisation (ISRO) has shortlisted 4 astronauts for the 'Gaganyaan' Mission after a series of tests conducted both in India and Russia. All four of them have been confirmed to be Indian Air Force pilots. The astronauts will be trained in Russia during which they'll be sharing their expertise on human space flights. The training is set to begin by the third week of January.

Introduction

The Indian Space Research Organisation (ISRO) is expanding its wings to one more vertical - indigenous Human Spaceflight Programme. ISRO is working on an Indian crewed orbital mission - Gaganyaan- that would take Indian astronauts to space by 2022. Gaganyaan will be the first Indian crewed orbital spacecraft under the Human Space Flight programme of ISRO. It is scheduled to be launched with the powerful GSLV Mk III rocket by 2022 to commemorate the 75th year of India's Independence. It was announced by the Prime Minister Narendra Modi on 15th August 2018.

India could potentially become the fourth country to send a man in space, after the erstwhile USSR, the US and China. Denmark also has a manned space flight scheduled for 2022.

The current plan is to have two unmanned and one manned flight under Gaganyaan Programme. The first un-crewed flight is planned in December 2020 and second in July 2021. Following two successful unmanned flights, first crewed mission is scheduled in December 2021.

Spacecraft carrying people may be operated by human crew, or remotely operated from ground stations or may be autonomous. The Gaganyaan is a largely autonomous spacecraft. The

crewed spacecraft is intended to orbit in the low Earth orbit for 5-7 days and then bring back the crew module safely.

Gaganyaan Objectives

The main objective of the Gaganyaan mission is technology demonstration. The programme will source 60-70% components and value-added services from Indian industries. ISRO has already developed and demonstrated many critical technologies like crew module configuration, crew escape system, thermal protection, deceleration and flotation systems and re-entry capability.

Other Objectives Includes:

- ◆ Enhancement of science and technology levels in the country.
- ◆ A national project involving several institutes, academia and industry.
- ◆ Improvement of industrial growth
- ◆ Inspiring youth.
- ◆ Development of technology for social benefits.
- ◆ Improving international collaboration.

Human Space Flight Centre (HSFC)

ISRO created a Human Space Flight Centre (HSFC) in January 2019 at the ISRO Headquarter campus in Bengaluru. The responsibilities of the HSFC include end-to-end mission planning, development of engineering systems for crew survival in space, crew selection and training and also pursuing activities for sustained human space flight missions.

The HSFC will function as a nodal agency with the existing ISRO centres support the implementation and testing of spacecraft.

Launching of Gaganyaan

Gaganyaan consists of a service module and a crew module, collectively known as the orbital capsule.

In the Gaganyaan composite capsule, the crew module is mated to the service module, and together they are called the orbital craft. The craft will

be equipped with emergency mission abort and emergency escape system that can be exercised at the first stage or second stage of the rocket burn. In future crewed flights of ISRO, an upgraded version of the spacecraft with rendezvous and docking capabilities are also envisaged.

The crew module with capacity to carry 2-3 astronauts and a volume of about 8 m³ will have controlled cabin environment. During the mission, crew will carry out a microgravity experiment.

About 16 minutes after lift-off from the Satish Dhawan Space Centre (SDSC), Sriharikota, the rocket will inject the spacecraft into an orbit, 300-400 km above the Earth. The capsule will rotate around the Earth every 90 minutes and astronauts will be able to witness sunrise and sunset. The astronauts will be able to see India from space every 24 hours.

Challenges for Gaganyaan Astronauts

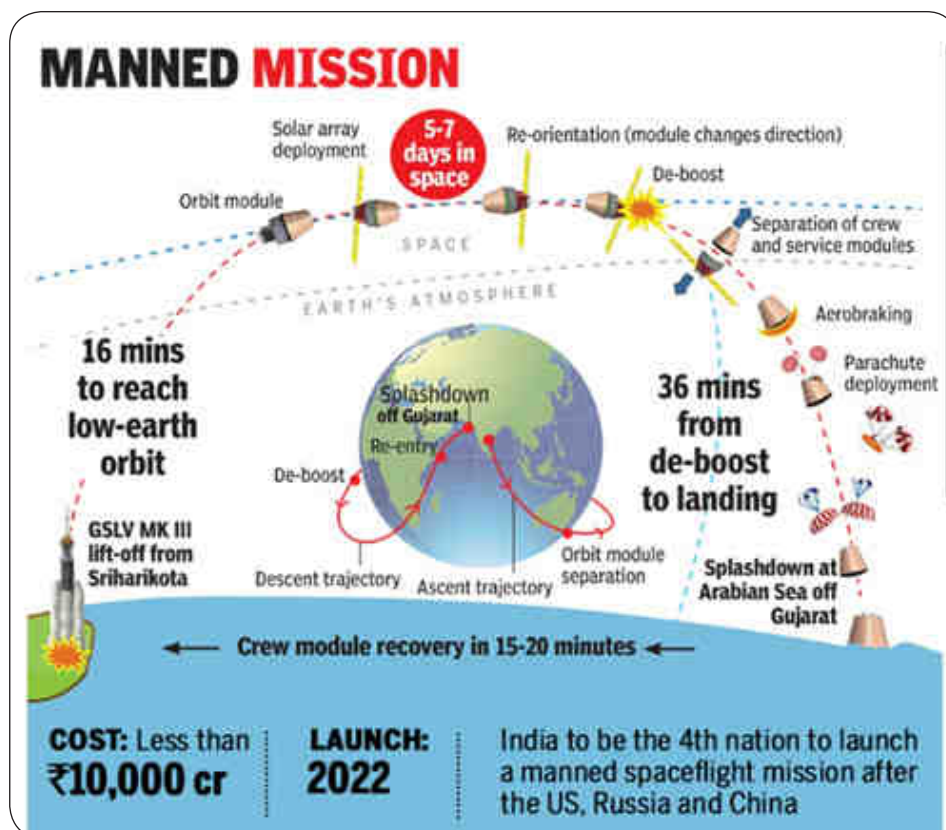
The Gaganyaan mission is so challenging because for the first time humans will be launched into space and must be brought back safely. Making a crew module where the astronauts can live in Earth-like conditions in space and bring the spacecraft back to Earth after the flight are challenging.

In spite of utmost care, there are always formidable risks involved, such as:

- ◆ **Environmental Hazards:** Space environment is hostile. There is lack of gravity and atmosphere and danger of radiation. Astronauts may have medical issues with the hostile space environment.
- ◆ **Microgravity:** Transition from one gravity field to another affects hand-eye and head-eye coordination. In

microgravity astronauts often lose their orientation, vision, muscle strength, aerobic capacity, weight and bone density. The consequent loss of strength could be a serious problem in case of a landing emergency.

- ◆ **Pressure:** The human blood starts boiling if there is no pressure; hence inside the crew acceptable atmospheric pressure has to be maintained.
- ◆ **Radiation Exposure:** Though the radiation exposure is not of much consequence to Gaganyaan, it has relevance to our future human space flight programme. In space stations, astronauts receive over ten-times higher radiation than what people are subjected on the Earth.
- ◆ **Isolation:** Astronauts may encounter depression, cabin fever, fatigue, sleep disorder and other psychiatric disorders.
- ◆ **Sensory Systems:** During spaceflight astronauts are in extreme environment state that may result in the weakening of their senses: hearing, sight, smell, taste, touch, vestibular (motion and equilibrium system) and proprioception system (awareness of the relative position of one's own parts of the body).
- ◆ **Physiological and Metabolic Requirements:** All the things necessary for supporting physiological need of astronauts, like food, water, medicine, and human waste removal have to be addressed. A composite waste management system has to be designed to minimise and store the waste efficiently.
- ◆ **Life Support System:** In human spaceflight, an Environmental Control and Life Support System (ECLSS) supplies the essentials, maintains the acceptable environment and deals with the management of waste products.



Shielding against harmful external influences such as radiation and micro-meteorites is also ensured. The ECLSS maintains a steady cabin pressure and air composition, removes carbon dioxide and other harmful gases, controls temperature and humidity and also manage the other important parameters like fire detection and suppression, food and water management and emergency support.

- ◆ **Artificial Atmosphere:** There are two basic choices for an artificial atmosphere, either an Earth-like mixture of oxygen in an inert gas such as nitrogen or helium or argon, or pure oxygen. A conventional nitrogen-oxygen air is used in the most modern crewed spacecraft (e.g., International Space Station, Soyuz spacecraft).

Aerospace Technology Challenges

Launch Escape System/ Crew Escape System: Space flight requires much higher velocities than air

transportation, which in turn requires high energy density propellants. This results in dissipation of large amounts of energy to pass through the Earth's atmosphere. There are many potential risks during the pre-launch, launch and post-phase, including the explosion of rocket into a fireball. Launch escape system safety features have to be built to minimize the loss. ISRO successfully conducted a Pad Abort Test on 5 July 2018 to determine how well the system could get the crew of a spacecraft to safety in an emergency on the launch pad.

Re-entry and Recovery: Normal satellites launched for communication, remote sensing or scientific applications remain in space, even when their life is over. Any human space flight, however, has to come back safely to Earth. Further, the spacecraft's re-entry into the atmosphere has to be very precise following a pre-planned trajectory in terms of speed and angle. Even the slightest deviation could end into a disaster. For this, a heat shield that can withstand the temperature of thousands of degrees needs to be

developed. After re-entry, the capsule should land at a designated spot in the sea from where Navy or Coast Guard would bring it back to the mainland. Re-entry of the human spaceflight into Earth's atmosphere is a very complex technology. There are few examples of re-entry disasters.

Crew Module Atmospheric Re-entry Experiment (CARE) was an experimental test vehicle for Gaganyaan. It was launched by GSLV Mk III on 18 December 2014 to an altitude of 126 km from the Second Launch Pad of the Satish Dhawan Space Centre, Sriharikota. After about 20 minutes of lift-off, the CARE module re-entered, deployed its parachutes as planned and splashed down into the Bay of Bengal. The crew module was recovered by the Indian Coast Guard from the Bay of Bengal about 600 km from Port Blair in the Andaman Islands and about 1600 km from the Sriharikota launch site.

Space Suit: ISRO had displayed the Gaganyaan crew model and orange space suits at the Bengaluru Space Expo (BSX-2018) in September 2018. The space suits were designed at the Vikram Sarabhai Space Centre, Thiruvananthapuram.

Astronaut Training

The Indian astronauts will be addressed as "Vyomnauts". ISRO's Human Space Flight Centre and Glavcosmos, which is a subsidiary of the Russian state corporation Roscosmos, signed an agreement on 1 July 2019 for cooperation in the selection, support, medical examination and space training of Indian astronauts. An ISRO Technical Liaison Unit (ITLU) is setup in Moscow to facilitate the development of some key technologies and establishment of special facilities which are essential to support life in space.

ISRO has signed an MoU with the Indian Air Force (IAF) for crew management activities. The IAF in consultation with ISRO prepared an extensive road map for the selection and training of the future Vyomnauts

for the Gaganyaan mission.

The Rocket - GSLV MkIII

One of the most important requirements is the development of a launch vehicle that can carry heavy payloads into space. The Gaganyaan composite module is likely to weigh —7.8 tonnes. ISRO's main launch vehicle, the PSLV (Polar Satellite Launch Vehicle), which carried the Chandrayaan and Mangalyaan missions too, can carry payloads that are barely up to 2 tonnes, and that too only to orbits at about 600 km altitude from the Earth's surface. After focused efforts on developing an indigenous cryogenic engine to power the rocket, ISRO successfully tested GSLV MkIII to deliver heavier payloads much deeper into space.

GSLV Mk III, which is also referred as the Launch Vehicle Mark 3, LVM 3 or GSLV III, will be used to launch Gaganyaan. GSLV Mk III is designed to carry 4-ton class of satellites into Geosynchronous Transfer Orbit (GTO) or about 10 tons to Low Earth Orbit (LEO), which is about twice the capability of the GSLV Mk II.

Relevance of a Manned Space Mission for India

Boost to Industries: The Indian industry will find large opportunities through participation in the highly demanding Space missions. Gaganyaan Mission is expected will source nearly 60% of its equipment from the Indian private sector.

Employment: According to the ISRO chief, the Gaganyaan mission would create 15,000 new employment opportunities, 13,000 of them in private industry and the space organisation would need an additional manpower of 900.

Technological Development: Human Space flights are frontier field in the science and technology. The challenges the Human Space Flights provide to India, and the benefits accruing from taking up those missions will be very high and will lead to further thrust for technological developments in India

Spurs Research and Development: It will boost research and technology development. With a large number of

researchers with proper equipment involved, HSF will thrust significant research in areas such as materials processing, astro-biology, resources mining, planetary chemistry, planetary orbital calculus and many other areas

Motivation: Human space flight will provide that inspiration to the youth and also the national public mainstream. It would inspire young generation into notable achievements and enable them to play their legitimate role in challenging future activities

Prestige: India will be the fourth country to launch human space mission. The Gaganyaan will not only bring about prestige to the nation but also establish India's role as a key player in the space industry.

Way Forward

Till now, ISRO has made good progress on Gaganyaan many of the designs are completed and tested. However, many systems need to be tested before flight.

The project holds the utmost importance for the country as it will boost the science and technology capability of the country. Further, the Gaganyaan Mission target of 2022 will mark the culmination of nearly 15 years of background efforts of ISRO. The country eagerly awaits the successful launch of India's first human spaceflight by 2022. The forward leap with which ISRO is moving is surely a matter of pride and inspiration for every Indian.

General Studies Paper- III

Topic: Achievements of Indians in Science & Technology; indigenization of technology and developing new technology.

Topic: Awareness in the fields of IT, Space, Computers, robotics, nano-technology, bio-technology and issues relating to intellectual property rights.



3. NATIONAL INFRASTRUCTURE PIPELINE : A MEASURE TO BOOST ECONOMY

Why in News?

Finance Minister Nirmala Sitharaman has unveiled a Rs. 102 lakh crore National Infrastructure Pipeline (NIP) in accordance with the Prime Minister Narendra Modi government's vision to make India a \$5 trillion economy by 2024-25.

Introduction

As per the Global Infrastructure Outlook 2017 published by Oxford Economics, the estimated global infrastructure investment requirement is \$94 trillion during the period 2016 and 2040. In 2050, we would have seen the human population explode to 9.2 billion and urban population to 6.5 billion. The world economy could more than double in size by 2050, far outstripping population growth. As a result, six of the seven largest economies in the world are projected to be 'emerging economies' in 2050 led by China (No 1), India (2) and Indonesia (4). While these changes shape the direction of the world's growth, infrastructure requirements would be influenced by the following factors.

- ◆ 70% of the global population will be living in urban areas, some in cities of more than 100 million people. So infrastructure will determine their quality of life.
- ◆ The second great challenge relates to energy. As more people demand greater levels of energy to fuel consumption, there are challenges of supply, sufficiency and sustainability. Infrastructure must support this growth, and do so responsibly.
- ◆ Third is the vital challenge of fresh water. Already, 20% of us lack clean drinking water and 40% lack basic sanitation. As this global divide

becomes even more acute, it will drive radical changes in awareness and behaviour around water usage and management, and the energy intensity of our consumption. Infrastructure is vital in addressing this challenge.

- ◆ The fourth great challenge relates to social infrastructure and the question of how we – collectively and as individuals – will finance the cost of more people, living longer, and having fewer children.

Therefore, the emerging economies need to enhance their institutions and their infrastructure significantly if they are to realise their long-term growth potential.

About National Infrastructure Pipeline

It is estimated that India would need to spend \$4.5 trillion on infrastructure by 2030 to sustain its growth rate. The endeavour of the National Infrastructure Pipeline (NIP) is to make this happen in an efficient manner. Finance ministry had set up a task force headed by Economic Affairs Secretary to prepare a road map for the "national infrastructure pipeline" from 2019-20 to 2024-25. On the basis of the information compiled as on date, total project capital expenditure in infrastructure sectors in India during the fiscals 2020 to 2025 is projected at over Rs 102 lakh crore. The detailed sector wise break of the pipeline is as follows:

- ◆ During the fiscals 2020 to 2025, sectors such as Energy (24%), Roads (19%), Urban (16%), and Railways (13%) amount to around 70% of the projected capital expenditure in infrastructure in India.

- ◆ Irrigation and rural infrastructure projects would account for Rs. 7.7 lakh crore each. Rs. 3.07 lakh crore would be spent on industrial infrastructure. Agriculture and social infrastructure would account for the rest.
- ◆ Road projects will account for Rs. 19.63 lakh crore while another Rs. 13.68 lakh crore would be for railway projects.
- ◆ Port projects would see spending of Rs. 1 lakh crore and airports another Rs. 1.43 lakh crore. Rs. 16.29 lakh crore would be spent on urban infrastructure and Rs. 3.2 lakh crore in telecom projects.
- ◆ According to the sector-wise break-up of projects made available by the Finance Ministry, Rs. 24.54 lakh crore investment will flow in the energy sector, and of that Rs. 11.7 lakh crore would be in just the power sector.
- ◆ Rs. 42 lakh crore NIP projects which are in the implementation stage now include expressways, national gas grid and PMAY-G.

Out of the total expected capital expenditure of Rs. 102 lakh crore, projects worth Rs 42.7 lakh crore (42%) are under implementation, projects worth Rs 32.7 lakh crore (32%) are in conceptualization stage and rest are under development. It is expected that projects of certain states, who are yet to communicate their pipelines, would be added to the pipeline in due course.

The Task Force in its detailed report has given recommendations on changes required to several key sectoral policies and other reform initiatives to be initiated by Central and State Governments. A monitoring mechanism has also been suggested to ensure timely implementation.

Key Benefits of the NIP

Economy: Well-planned NIP will enable more infra projects, grow businesses, create jobs, improve ease of living, and provide equitable access to infrastructure for all, making growth more inclusive.

Government: Well - developed infrastructure enhances level of economic activity, creates additional fiscal space by improving revenue base of the government, and ensures quality of expenditure focused in productive areas

Developers: Provides better view of project supply, provides time to be better prepared for project bidding, reduces aggressive bids/ failure in project delivery, ensures enhanced access to sources of finance as result of increased investor confidence

Banks/ Financial Institutions (FIs)/ Investors: Builds investor confidence

as identified projects are likely to be better prepared, exposures less likely to suffer stress given active project monitoring, thereby less likelihood of NPAs.

Can NIP Revive the Economy?

Projects in energy, roads, railways and urban infrastructure under the NIP have been identified by a task force. About 42% of such identified projects are already under implementation, 19% are under development and 31% are at the conceptual stage. The NIP task force appears to have gone project-by-project, assessing each for viability and relevance in consultation with the States. Considering that the NIP will be like a window to the future, a constant review becomes paramount if this is not to degenerate into a mere collation and listing of projects. A periodic review, as promised by the Finance Ministry, is necessary.

Identifying the projects to be put on the pipeline is the easy part. Implementing and commissioning them will be the more difficult one. There are a few hurdles that the NIP task force needs to watch out for. First, the financing plan assumes that the Centre and the States will fund 39% each while the private sector will chip in with 22% of the outlay. Going by the present fiscal situation, it will be no small challenge for the Centre to raise Rs. 39 lakh crore, even if it is over the next five years.

The financial position of States is even more perilous. Second, the Rs. 22 lakh crore expected from private investment also looks steep considering the lack of appetite for fresh investment by the private sector in the last few years. In fact, this factor has been a major drag on economic growth. Given the scale of investment, debt will play an important role and it remains to be seen if banks have gotten over their apprehensions on infrastructure financing as a major part of their bad loans originated there.

Finally, cooperation from States becomes very important in implementing infrastructure projects. The experience on this count has not been very happy till now. While these are genuine obstacles that the task force needs to manage, these should not detract from the need for a concerted effort to invest in infrastructure. The key will be following up and reviewing the pipeline at regular intervals.

Complexities of infrastructure Development

Complexities of infrastructure development need to be understood in order that the support frameworks are sensitive to these needs:

- ◆ Lack of infrastructure is the primary constraint on economic growth.
- ◆ Lead times associated with infrastructure development mean

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NATIONAL INFRASTRUCTURE PIPELINE (NIP)

TO MAKE INDIA A \$5 TRILLION ECONOMY BY 2025

PROJECTS LINED UP UNDER NIP:

- **Energy projects-** ₹ 2,454,249 crore
- **Road-** ₹ 1,963,943 crore
- **Railways-** ₹ 1,368,523 crore
- **Irrigation-** ₹ 772,678 crore
- **Rural infrastructure-** ₹ 772,765 crore
- **Urban infrastructure -** ₹ 1,629,012 crore
- **Industrial Infrastructure-** ₹ 307,462 crore
- **Social Infrastructure-** ₹ 356,701 crore
- **Ports-** ₹ 100,923 crore
- **Airports-** ₹ 143,398 crore
- **Telecommunications-** ₹ 320,498 crore
- **Agriculture and Food Processing Infrastructure-** ₹ 60,553 crore



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that decisions taken now will shape the world of the future.

- ◆ Increasingly, therefore, government looks to the private sector as a partner. Effective models for co-working between the public and private spheres need to be devised.
- ◆ Governments and businesses must make vital strategic decisions now, and promote changes in behaviour, before the speed and severity of climate change are fully known.
- ◆ An increase in natural disasters or unpredictable events will test the resilience of infrastructure, not just in terms of reconstruction, but also in terms of disruption to supply chains.
- ◆ New technologies, like high-speed broadband, are already part of infrastructure thinking. Innovations, such as Internet of Things (IoT) and Artificial Intelligence, will make infrastructure more efficient and sustainable.
- ◆ Financing of infrastructure of the needed scale is the issue for which solutions would have to be found.

Task Force Suggested Reforms on Investment

In order to ramp up infrastructure investments in various sectors throughout the country, it is critical to introduce a set of general reforms and also update existing sectoral policies and reforms. This will help propel investments in the infrastructure sector.

Some of the key policies and reform initiatives to be undertaken are highlighted below.

- ◆ **Improving project preparation processes:** Inadequate attention to project planning may lead to avoidable delays in the implementation of the project or may even lead to scrapping of projects prior to its implementation.

- ◆ **Enhancing execution capacity of private sector participants:** For enabling robust private sector participation in infrastructure sector, it is critical to have a deep pool of experienced developers with required competence and execution capacity. Collaborations and joint-ventures with strong global infrastructure developers must be facilitated to build domestic capacity.

- ◆ **Robust enabling environment:** An effective enabling environment comprises a robust policy framework and a well-developed public institutional capacity. This will help improve private sector participation through well-framed contractual agreements with optimal risk allocation, and honouring of the contracts entered. As a general principle, sanctity of contracts should be upheld.

- ◆ **Institutionalisation and efficiency of dispute resolution:** A critical step in addressing dwindling private sector participation in infrastructure can be institutionalising dispute resolution mechanism to efficiently resolve disputes related to PPP projects.

- ◆ **Improving Capacity development of Project Execution Agencies:** The capacity of public institutions to plan, prepare and deliver infrastructure projects on schedule is key to effective infrastructure development.

- ◆ **Strengthening infrastructure quality:** Good quality infrastructure is important for attaining faster economic growth, ensuring an improved human development index and broad-based participation in development with equitable distribution of benefits.

- ◆ **Promoting competition:** In order to enhance competition in the domestic markets and to generate or promote a culture of competition in the country.

- ◆ **Financial sector reforms:** In order to address key issues and attract foreign and private capital into infrastructure, it is critical to undertake following policies and reforms.

- ◆ Revitalising the bond and credit markets;
- ◆ Strengthening the municipal bond market in India;
- ◆ Revitalising asset monetization;
- ◆ Enabling User charges to finance infrastructure; and
- ◆ Long-term financing landscape.

Way Forward

Overcoming the deficiencies in infrastructure and improving the quality of services provided in both urban and rural areas in India will help in realising full potential of the growing urban economy, thus raising its contribution to India's GDP. Thus, focus on developing infrastructure along with achieving SDG goals and improving the living standards will lead to infrastructure investment in required areas such as redevelopment of slum neighbourhoods, urban roads, water supply coverage and quality, waste-water treatment facilities, urban mobility through public transport, etc. These transformed demographics will require development of a host of infrastructure facilities, thus increasing the demand for increase in coverage and quality of service delivery across the entire infrastructure spectrum.

General Studies Paper- III

Topic: Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment.

Topic: Infrastructure: Energy, Ports, Roads, Airports, Railways etc.



4. REFORMS IN ENERGY GOVERNANCE : NEED OF THE HOUR

Why in News?

According to the government, time is right for the integration of the energy-related ministries as most of them are not working in synergy. The National Energy Policy will be a guide for the integrated energy ministry from the day it is approved by the Cabinet until 2030.

Introduction

NITI Aayog's new National Energy Policy, which is in the final stages of preparation, is said to propose an integration of all energy ministries into one.

In the Draft National Energy Policy (NEP), the NITI Aayog has advocated that a Unified Ministry of Energy be created by merging the Ministries of Petroleum and Natural Gas (MoPNG), Coal (MoC), New and Renewable Energy (MNRE) and Power (MoP). The Department of Atomic Energy (DAE) has been left out since it has implications beyond the scope of energy and involves national security issues. The proposed ministry would have six agencies under it to handle various aspects of the energy sector — Energy Regulatory Agency, Energy Data Agency, Energy Efficiency Agency, Energy Planning and Technical Agency, Energy Schemes Implementation Agency and Energy R&D Agency.

The policy also moots to merge all regulators of the sector like Central Electricity Regulatory Commission (CERC), Petroleum & Natural Gas Regulatory Board (PNGRB) to have a one-stop energy regulator for all the disputes and licensing concerns.

Legislative and Constitutional Background

Electricity is a subject mentioned in the Concurrent List. The Electricity

Act, 2003 (the Electricity Act) is the parent legislation governing the electricity sector in India (other than nuclear energy, which is governed by the Atomic Energy Act, 1962). The Electricity Act consolidated various laws governing the electricity sector in India and introduced key reforms such as:

- ◆ Restructuring of state electricity boards into separate entities governing generation, transmission and distribution activities;
- ◆ De-licensing most generation activities, recognising power trading as a distinct activity and promoting captive generation;
- ◆ Introducing the requirement for providing non-discriminatory open access;
- ◆ Constituting electricity regulatory commissions at state and central levels (i.e., state electricity regulatory commissions (SERCs) and the Central Electricity Regulatory Commission (CERC) respectively), and an appellate tribunal (i.e., the Appellate Tribunal for Electricity (APTEL), among other things) to hear appeals against decisions of the SERCs and CERC;
- ◆ Recognising the Central Electricity Authority (CEA) as the technical advisory body to the government of India and the electricity regulatory commissions; and
- ◆ Promoting renewable energy projects.

In accordance with the provisions of the Electricity Act, the government of India, in consultation with the CEA and state governments, has prepared the National Electricity Policy, 2005 (NEP) and the Tariff Policy, 2016 (Tariff Policy) for the development of the power sector, based on optimal

utilisation of natural resources. NITI Aayog, government of India's think-tank, released a draft National Energy Policy in 2017. The Policy, which is yet to be adopted, recommends a framework to bring about an overarching energy efficiency policy in India by forging coordination between different ministries dealing with electricity. The Policy proposes actions for better access to affordable electricity, improved energy security and independence, greater sustainability and economic growth by 2040.

The Need

Five different ministries along with a multitude of regulators govern India's energy sector. Petroleum and natural gas, coal, renewable energy and nuclear energy have separate ministries or departments. We also have a Ministry of Power, along with State-level bodies that regulate electricity distribution companies, or DISCOMS. Add to this, the presence of different regulators for each type of fuel and energy source which makes it cumbersome for businesses operating in this sector. Further, the petroleum and natural gas sector has two regulators – Directorate General of Hydrocarbons for upstream activities and the Petroleum and Natural Gas Regulatory Board for downstream activities.

Data Constraints

There are also issues with data collection. No single agency collects energy data in a wholesome and integrated manner. Data pertaining to consumption are barely available while supply side data collected by agencies of respective ministries are riddled with gaps. The Ministry of Statistics and Programme Implementation collates data available from various ministries and conducts surveys at sporadic

intervals. On the energy efficiency front, the Bureau of Energy Efficiency is the sole statutory authority with the mandate to regulate energy efficiency on the consumption side. There is no agency or body for the same purpose on the supply side.

Practices followed Elsewhere

This stands in stark contrast to most other nations with their varied energy governance models. Developed and efficient countries such as the United States (US), Germany, France and the United Kingdom (UK) have their vibrant, diverse and prolific energy sectors administered by a single ministry or department. There are also instances where the energy ministry is in conjunction with other portfolios such as environment, climate change, mines and industry. For example, the UK has the “Department for Business, Energy & Industrial Strategy”, France has the “Ministry of the Environment, Energy and Marine Affairs”, Brazil has the “Ministry of Mines and Energy” and Australia has the ‘Ministry of Environment and Energy’. The predominance of unified energy ministries is evident.

Previous Observations

The Kelkar Committee in its report “Roadmap for Reduction in Import Dependency in the Hydrocarbon Sector by 2030” (2013) stated that “Multiple ministries and agencies are currently involved in managing energy-related issues, presenting challenges of coordination and optimal resource utilization, hence undermining efforts to increase energy security”.

Significance of the Move

A single unified ministry of energy would help India to have an integrated outlook on energy that would enable us optimise our limited resources to meet the goals of energy security, sustainability and accessibility. In the fast-changing energy landscape of our country, having a single energy

ministry would be beneficial as it would allow for a quicker policy response. Formulating an integrated and wholesome energy policy in the current governance structure is a complex and challenging task not only due to lack of coordination among ministries but also due to the absence of good quality consumption data and an inadvertent promotion of their own fuels over other choices, which may not always be the best option.

The present government has already taken some steps towards unifying the governance structure of the energy sector such as appointing a single minister for both MNRE and MoP. This move has been lauded across sections of society as both those sectors are heavily interlinked. Having the same person heading both of these ministries will help resolve long-standing issues faced by both conventional and renewable power generators such as power balancing and transmission infrastructure planning.

The then Finance Minister announced 'Deen Dayal Upadhyaya Gram Jyoti Yojana' in Budget 2014-15. The Yojana was aimed at providing 24x7 uninterrupted power supply to all homes has been a great success. Also, government's efforts for providing electricity to all households of the country through the 'Prime Minister Saubhagya Yojana' under which poor households are given free electricity connections have improved the situation of power supply to the poor. The unified, synergized and single energy ministry will only help in easier and faster achievement of targets set in various government schemes.

Also, our nation will be closer to achieving the SDG 7 goal which asks the national governments to ensure access to affordable, reliable, sustainable and modern energy for all if India could manage its different energy ministries and departments in a coordinated fashion.

The hotly debated issue of non-payment of dues by DISCOMS to the generators might also be resolved with such synergy in administration. In the past too, this government has had the same minister for MNRE, MoP and MoC with great results in village electrification, LED bulb distribution (Unnat Jyoti by Affordable LEDs for All, or UJALA), power sector reforms (Ujwal DISCOM Assurance Yojana, or UDAY), coal block e-auctions and alleviation of coal shortages. This demonstrates the intention of the political leadership to reform the energy governance structure.

The case of 'Jal Shakti' Ministry

A pertinent example is the newly created Ministry of Jal Shakti which was formed by merging the Ministry of Water Resources, River Development and Ganga Rejuvenation and the Ministry of Drinking Water and Sanitation. The objective of this action is to unify water management functions, treat the issues of water management holistically and ensure better coordination of efforts. This was a crucial decision at a time when nearly 600 million Indians faced “high to extreme water stress”, while 75% households did not have drinking water on their premises.

Conclusion

The focus of the government is now to bring ease of doing business and push the 'make in India' initiative for the manufacturing sector and hence the NEP has also proposed rationalisation of subsidy, cross-subsidy, and taxation across the energy spectrum. Even though GST proposals are approved by the GST Council, the policy will bat for the same for electricity, petroleum products. The National Energy Policy aims to pave way for government's announcements in the energy sector like increasing manufacturing to 25 percent, reducing oil import dependency by 10 percent by 2022, reduction of emission intensity by 33-35 percent by 2030, 175 GW renewable energy by 2022 amongst others.

Though the actions by the government are a step in the right direction, there is a long road ahead. Accepting and implementing the recommendations of the NEP on reforming energy governance, which is to be placed for the approval of the Cabinet soon, would need to be carefully traversed given their hard-hitting implications on the existing

bureaucratic structure. But nothing is more important than ensuring energy security, sustainability and accessibility. In this age of energy transition, this can only happen with quick and holistic decision-making as well as providing a level playing field for various fuels, all of which can happen if a single ministry handles the entire sector. Such a Unified Ministry of Energy will

not only enable India to keep up with the global energy transition but also to continue to be a leader in adopting cleaner energy sources.

General Studies Paper- III

Topic: Infrastructure: Energy, Ports, Roads, Airports, Railways etc.

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5. US-IRAN CONFLICT : RISING GLOBAL TURBULENCE

Why in News?

President Trump hinted to de-escalate hostilities with Iran, signaling no new United States (US) military strikes following an Iranian missile barrage on Iraqi bases housing American and allied military forces that resulted in no casualties. In a similar kind of statement Iran's United Nations (UN) ambassador held that Tehran has no plans to step up a confrontation with the US after it fired missiles at US military bases in Iraq in "a measured, proportionate response" to the assassination of Gen. Qassem Soleimani.

Introduction

The dramatic escalation between US and Iran occurred days after supporters of Iran-backed militias breached the US embassy in Baghdad, with reports suggesting that Iraqi troops tasked with protecting the diplomatic mission did not do so beyond a point. A week earlier, on December 27, Iran-backed militias had targeted a US base in Kirkuk in northern Iraq, wounding US troops and killing an American contractor.

The death of Soleimani comes at a time of heightened tensions between the US and Iran, with Trump, who has now entered an election year, having worked to isolate Iran both economically and politically by

making major decisions such as exiting from the Iran nuclear deal. Moreover, Trump, as exhibited by comments around the killing of ISIS chief Abu Bakr al-Baghdadi in October in Syria at the hands of the US Army, has shown that he prefers to go after high-profile names, rather than middle-rung or deputies of leaders of terror groups or militias, for a more marketable national security posture, distinguishing himself from his predecessors at the White House.

Who was Qassem Suleimani?

Qassem Suleimani had become well known among Iranians and was sometimes discussed as a future president. Many considered Suleimani to have been the second most powerful person in Iran, behind supreme leader of Iran Ali Khamenei, but arguably ahead of President Hassan Rouhani. He was commander of the Quds Force, the elite, external wing of the Iran's Islamic Revolutionary Guard Corps. From 1998, he led Iran's Quds Force which handles clandestine operations abroad.

Soleimani was critical to Iran's West Asia policy and rode the Iraq, Syria action against the US forces. As commander of elite special forces, he orchestrated covert operations, involving a web of proxy militias, across the region. The Trump administration has alleged that the Quds Force is "Iran's primary mechanism for cultivating and supporting" US-designated terrorist groups across the Middle East - including Lebanon's Hezbollah movement and Palestinian Islamic Jihad - by providing funding, training, weapons and equipment.

However, with the killing of Soleimani, the US has entered an area of unknowns in its dealings with Tehran.

US-Iran Relations: A Brief History

From the CIA-orchestrated overthrow of Iran's prime minister in 1953, to tension and confrontation under President Trump, a look back over more than 65 years of tricky relations between Iran and the US.

- ◆ **Overthrow of Mossadeq (1953):** US and British intelligence agencies orchestrate a coup to oust Iran's democratically elected Prime Minister, Mohammad Mossadeq. The secular leader had sought to nationalise Iran's oil industry.
- ◆ **Iranian Revolution (1979):** The US-backed Shah of Iran, Mohammed Reza Pahlavi, is forced to leave the country on 16 January following months of demonstrations and strikes against his rule by secular and religious opponents. Two weeks later, Islamic religious leader Ayatollah Khomeini returns from exile. Following a referendum, the Islamic Republic of Iran is proclaimed on 1 April.
- ◆ **US Embassy Hostage Crisis (1979-81):** The US embassy in Tehran is seized by protesters in November 1979 and American hostages are

held inside for 444 days. The final 52 hostages are freed in January 1981, the day of US President Ronald Reagan's inauguration.

- ◆ **Iranian Passenger Plane Shot Down (1988):** The American warship USS Vincennes shoots down an Iran Air flight in the Gulf on 3 July, killing all 290 people on board. The US says the Airbus A300 was mistaken for a fighter jet. Most of the victims are Iranian pilgrims on their way to Mecca.

- ◆ **Nuclear Fears and Sanctions (2000s):** In 2002 an Iranian opposition group reveals that Iran is developing nuclear facilities including a uranium enrichment plant. The US accuses Iran of a clandestine nuclear weapons programme, which Iran denies. A decade of diplomatic activity and intermittent Iranian engagement with the UN's nuclear watchdog follows. But several rounds of sanctions are imposed by the UN, the US and the European Union (EU) against ultra-conservative president Mahmoud Ahmadinejad's government. This causes Iran's currency to lose two-thirds of its value in two years.

- ◆ **Closer Ties and a Nuclear Deal (2013-2016):** In 2015, after a flurry of diplomatic activity, Iran agrees a long-term deal on its nuclear programme with a group of world powers known as the P5+1 - the US, UK, France, China, Russia and Germany. Under the accord, Iran agrees to limit its sensitive nuclear activities and allow in international inspectors in return for the lifting of crippling economic sanctions.

- ◆ **Tension in the Gulf (2019):** In May 2018, US President Donald Trump abandons the nuclear deal, before reinstating economic sanctions against Iran and threatening to do the same to countries and firms that continue buying its oil. Iran's economy falls into a deep recession. Relations between the US and Iran worsen in May 2019, when the US tightens the sanctions targeting Iran's oil exports. In response, Iran begins a counter-pressure campaign. In May and June 2019, explosions hit six oil tankers in the Gulf of Oman, and the US accuses Iran. On 20 June, Iranian forces shoot down a US military drone over the Strait of Hormuz. The US says it was over

international waters, but Iran says it is over their territory.

- ◆ **Qasem Soleimani Assassination (2020):** On 3 January 2020, Iran's top military commander, Gen Qasem Soleimani, is killed by a US drone strike in Iraq. Iran retaliated by carrying out missile attack on US military bases in Iraq and pulls back from the 2015 nuclear accord.

US Desperate and Irrational Policy

Till now the US has not been able to extricate itself from its illegal war against Iraq that began in 2003. That war provided a massive advantage to Iran not only in Iraq, but also across the region. This is what terrified two of the US's allies, Israel and Saudi Arabia, both of whom pressured Washington to increase its threats against Iran. Not only did the US create the conditions for the rise of the worst kind of violence in Iraq, and later Syria, but also weakened the strategic position of its allies. No attempt by the US to regain its authority has worked neither the attempt to overthrow the government in Syria nor the sanctions against Iran. US policy against Iran and Iraq appear desperate and irrational.



As the US edges towards the end of two decades in Iraq, its military appears vulnerable. A handful of rockets fired into a military base in Kirkuk in Iraq killed a military contractor, whose death was avenged through US air strikes against a pro-Iranian militia. This, in turn, saw thousands of Iraqis overrun the US embassy in Baghdad. This attack showed the weakness of the US position, which is why President Trump felt the need to retaliate in a dramatic way. Mr. Trump's recklessness has isolated the US further and deepened anxieties amongst its increasingly isolated regional allies, Israel and Saudi Arabia.

Iranian Response

A furious Iran has now vowed a forceful revenge for the killing, raising the risks of a direct war between the US and Iran to an all-time high. Ayatollah Ali Khamenei certainly can't afford to look weak in the face of an unprecedented provocation from Trump. He, however, would certainly not want to lose his head in trying to save his political face. Tehran's responses can be:

- ◆ One, Iran has resumed uranium enrichment as part of its step-by-step withdrawal from the 2015 nuclear agreement with the international community in response to Trump's decision to tear it up.
- ◆ Second, it has got its political allies in Iraq to get the parliament in Baghdad to pass a resolution demanding an end to US military presence in Iraq.

The two moves ramp up pressure on US allies and mobilise anti-Americanism in the Middle East. The Europeans are deeply committed to the nuclear agreement. They are eager to contribute to the de-escalation of the current crisis if only to save the nuclear deal. But Trump does not set much store by America's traditional alliances like NATO. He did not bother to consult

the allies in Europe before taking out Soleimani. The second move feeds into the declared long-term Iranian objective of driving Americans out of the Gulf and brings us to the ultimate irony of the present crisis.

Impact on India

India and the US have differing views on Iran, New Delhi views Tehran as a partner in India's extended neighbourhood to meet its energy needs as well as a gateway to landlocked Middle East and Afghanistan. Washington on the other hand views Iran as the biggest source of instability and terrorism in the region.

Heightened tensions in the Gulf after the assassination of Iranian commander Qassem Soleimani have exposed India's stakes and vulnerabilities in the volatile region. "India will be badly hit" if tensions spiral further. India has goodwill in the area but beyond that we do not have too many cards to play. The fissures, religious and sectarian, run deep and the rise of religious fundamentalism and hyper-nationalism has complicated matters.

India's gross domestic product grew at a mere 4.5% in the September quarter and there are concerns that high fuel prices could adversely impact economic recovery. India does not import oil from Iran because of a new set of sanctions that came into effect in May, any unrest in the volatile region could impact exports from countries such as Saudi Arabia given that most of the oil is transported through the Straits of Hormuz, a narrow waterway carrying a fifth of the world's traded oil, that Iranian officials had in April threatened to block. India had deployed naval assets in the region to protect its supplies in the wake of mine attacks on oil tankers in the region.

A secondary worry is that tensions between Iran and the US could impact India's trade with the region that now stands at \$78 billion (from Gulf

Cooperation Council member countries Saudi Arabia, Kuwait, the UAE, Qatar, Bahrain, and Oman), according to April-November figures from the Indian commerce ministry. The rise in tensions also poses a hurdle to India's plans to develop Iran's Chabahar port. The port was to help India trade with landlocked Afghanistan and Central Asia bypassing Pakistan. A reimposition of US sanctions on Iran last year has deterred Indian companies from investment in the project, despite India obtaining a carve-out from US.

Way Forward

As US President Donald Trump and the "Supreme Leader" of Iran, Ayatollah Ali Khamenei, raise the pitch of their rhetoric, it is quite easy to underestimate the political constraints on both leaders that limit the pressures for an escalation.

Until now, Tehran had some success in running a proxy war against the US but a direct confrontation would be suicidal. Triggering self-destruction can't be a strategy for Tehran. Trump's radical departure from the conventional US thinking on the Middle East and the deepening of many regional contradictions make the current crisis very different from those we have seen in the past. While there is always the danger of miscalculation by one or more of the actors, it would be unwise to assume they are irrational.

General Studies Paper- II

Topic: Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.

Topic: Effect of policies and politics of developed and developing countries on India's interests, Indian diaspora.



6. INDIA STATE OF FOREST REPORT 2019 : AN OVERVIEW

Why in News?

The Ministry for Environment, Forest and Climate Change has released the biennial India State of Forest Report 2019 (ISFR 2019). The report is published by the Forest Survey of India (FSI) which has been mandated to assess the forest and tree resources of the country including wall-to-wall forest cover mapping in a biennial cycle.

Introduction

Forest cover broadly signifies the expanse of forest resources in a country or region. The periodic assessment of forest cover by Forest Survey of India (FSI) started in the year 1987 using remote sensing technique. The current assessment in the biennial cycle of forest cover mapping is 16th in the series providing a continuous monitoring of forest cover and its change across the country in the last 32 years. All tree stands with canopy density over 10% and having an extent of more than one hectare, including tree orchards, bamboo, palms, etc. within recorded forests, on other government lands, private, community or institutional lands are included in the assessment of forest cover.

The report provides information on forest cover, tree cover, mangrove cover, growing stock inside and outside the forest areas, carbon stock in India's forests, forest types and biodiversity, forest fire monitoring and forest cover in different slopes & altitudes. The biennial assessment of forest cover of the country using mid-resolution Satellite data is based on interpretation of LISS-III data from Indian Remote Sensing satellite data (Resourcesat-II) with a spatial resolution of 23.5 meters to monitor forest cover and forest cover changes at District, State

and National level. This information provides inputs for various global level inventories, reports such as Green House Gas (GHG) Inventory, Growing Stock, Carbon Stock, Forest Reference Level (FRL) and international reporting to UNFCCC, targets under CCD, Global Forest Resource Assessment (GFRA) done by FAO for planning and scientific management of forests.

About Forest Survey of India

Forest Survey of India (FSI) is a premier national organization under the Ministry of Environment, Forest and Climate Change. It is responsible for assessment and monitoring of the forest resources of the country on regular basis. Established on 1st June 1981, Forest Survey of India succeeded the "Pre-investment Survey of Forest Resources" (PISFR), a project initiated in 1965 by Government of India with the sponsorship of FAO and UNDP. The main objective of PISFR was to ascertain the availability of raw material for establishment of wood based industries in selected areas of the country. In its report in 1976, the National Commission on Agriculture (NCA) recommended for the creation of a National Forest Survey Organization for a regular, periodic and comprehensive forest resources survey of the country leading to creation of FSI.

Forest Cover and Types of Forest

Forest cover reported in ISFR includes all lands having trees more than one hectare in area with tree canopy density of more than 10%, irrespective of ownership, legal status of the land and species composition of trees. Forest cover classified in terms of canopy density classes

- ◆ **Very Dense Forest:** All lands with tree canopy density of 70 percent and above.
- ◆ **Moderately Dense Forest:** All lands with tree canopy density of 40 percent and more but less than 70 percent.

- ◆ **Open Forest:** All lands with tree canopy density of 10 percent and more but less than 40 percent.
- ◆ **Scrub:** Forest lands with canopy density less than 10 percent.
- ◆ **Non-forest:** Lands not included in any of the above classes.

Key Findings of ISFR 2019

The key findings of the ISFR 2019 are as follows:

- ◆ The total forest cover of the country is 7,12,249 sq km which is 21.67% of the geographical area of the country. The tree cover of the country is estimated as 95,027 sq km which is 2.89% of the geographical area.
- ◆ The total Forest and Tree cover of the country is 8,07,276 sq km which is 24.56% of the geographical area of the country.
- ◆ The current assessment shows an increase of 3,976 sq km (0.56%) of forest cover, 1,212 sq km (1.29%) of tree cover and 5,188 sq km (0.65%) of forest and tree cover put together, at the national level as compared to the previous assessment i.e. ISFR 2017.
- ◆ Mangrove cover in the country has increased by 54 sq km (1.10%) as compared to the previous assessment.
- ◆ The extent of bamboo bearing area of the country has been estimated 16.00 million hectare. There is an increase of 0.32 million hectare in bamboo bearing area as compared to the last assessment of ISFR 2017. The total estimated green weight of bamboo culms is 278 million tonnes, slowly an increase of 88 million tonnes as compared to ISFR 2017.

- Under the current assessment the total carbon stock in country's forest is estimated 7,124.6 million tonnes and there an increase of 42.6 million tonnes in the carbon stock of country as compared to the last assessment of 2017. The annual increase in the carbon stock is 21.3 million tonnes, which is 78.2 million tonnes CO₂ eq.
- Soil Organic Carbon (SOC) represents the largest pool of carbon stock in forests, which has been estimated 4,004 million tonnes. The SOC contributes 56% to the total forest carbon stock of the country.
- There are 62,466 wetlands covering 3.83% of the area within the Recorded Forest Areas (RFA)/ Green Wash (GW) of the country. The total number of wetlands located within the RFA/GW is 8.13%. Amongst the States, Gujarat has largest area of wetlands within RFA in the country followed by West Bengal.
- Dependence of fuelwood on forests is highest in the State of Maharashtra, whereas, for fodder, small timber and bamboo, dependence is highest in Madhya Pradesh. It has been assessed that the annual removal of the small timber by the people living in forest fringe villages is nearly 7% of the average annual yield of forests in the country.
- About 21.40% of forest cover in India is prone to fires according to a 2019 report by the Forest Survey of India (FSI). Forests in the north-eastern region and central India was found to be the most vulnerable.
- The top five States in terms of increase in forest cover are Karnataka (1,025 sq km), Andhra Pradesh (990 sq km), Kerala (823 sq km),



- km), Jammu & Kashmir (371 sq km) and Himachal Pradesh (334 sq km).
- Area-wise Madhya Pradesh has the largest forest cover in the country followed by Arunachal Pradesh, Chhattisgarh and Maharashtra. The top five states which have forest cover as per percentage of total geographical area are Mizoram (85%), Arunachal Pradesh (79%), Meghalaya (76%), Manipur (75.4%) and Nagaland (75.3%).

Relevance of Forests

In India, the rural population is about 68% of the country's total population and a significant part of it is dependent on the forests for meeting the needs of fuelwood, fodder, small timber, bamboo and non-timber forest products (NTFPs). The livestock population in the country is one of the largest in the world. As per the Census 2011, there are about 6,50,000 villages in the country, out of which nearly 1,70,000 villages are located in the proximity of forest areas, they are often termed Forest Fringe Villages (FFVs). Forests play an important role in the socio-economic and cultural lives of the people inhabiting these villages. They have been dependant on the forests for fuel wood, fodder, timber and bamboo since ages but

with the manifold increase in their population in the last 60 to 70 years, pressure on forests has also increased in the likewise manner. All these activities directly or indirectly involve forests. After oceans, forests are the world's largest storehouses of carbon. They provide ecosystem services that are critical to human welfare. These include:

- Absorbing harmful greenhouse gasses that produce climate change. In tropical forests alone, a quarter of a trillion tons of carbon is stored in above and below ground biomass;
- Providing clean water for drinking, bathing, and other household needs;
- Protecting watersheds and reducing or slowing the amount of erosion and chemicals that reach waterways;
- Providing food and medicine;
- Serving as a buffer in natural disasters like flood and rainfalls and
- Providing habitat to more than half of the world's land-based species.

Criticism to ISFR 2019

The present report shows forest cover in India has improved by 3,976 sq km between 2017 and 2019. This should

seem heartening given, today, this stands at 7.12 lakh sq km, up from 6.7 lakh sq km in 2005—that too, in the face of development needs compelling the diversion of forest land. But, while the area under ‘moderately dense forests’ shrunk from 3.3 lakh sq km to 3 lakh sq km, that under open forests has increased from 2.9 lakh sq km to 3.04 lakh sq km. Also, keep in mind that nearly 330 sq km of recorded forest area have been lost between 2017 and 2019—the absolute figure may seem small, but this means significant loss of reserved and protected forests. At the same time, the depletion in the northeastern states’ forest cover is worrying given these are very old forests, and have greater carbon sequestration capacity. The rapid increase in forest cover, especially with a fair share of the gain being concentrated in the dense forests category (canopy density higher than 40%), is likely rooted in two factors.

- ◆ First, the Forest Survey of India has been using better satellite imagery with a 1:50,000 scale, compared

to the 1:250,000 scale earlier. This means any area, even as small as 0.01 sq km, with a canopy density of more than 10% is captured as a forest; the earlier resolution meant land units under 0.25 sq km didn’t get captured as forest. Thus, land that has been denuded of forest cover but did not get recorded as forest earlier because it fell below the 0.25 sq km threshold now figures in the ISFR as a “gain” in forest cover. Denuded forest land and non-forest land can be reforested, but that happens over decades, not years as the ISFR data would seem to suggest.

- ◆ Second, the tree canopy basis of identification doesn’t differentiate between natural forests, plantations, orchards, or even palm groves. This means the loss in diversity doesn’t get captured by the data. Thus, the growth in forest-cover could be attributed to fast-growing plantation trees like eucalyptus that are favoured in compensatory afforestation programmes.

ISFR 2019, for the first time ever, gives data for forest diversity, and ‘plantations/trees outside forests’ already account for nearly 9% of the total area under forests—making plantations the fourth largest group in the plantations. Plantation monoculture just makes the loss of forests worse. Also, given how the 15 of the last 18 years have been drought-years for Andhra Pradesh, and 60% of Karnataka reeled under drought in 9-11 years between 2001 and 2015, it is hard to see how the two states have performed so well in increasing forest cover. The forest data needs to reflect more of the ground reality instead of becoming a tool to lull the country into inaction on forests.

Conclusion

Forest is a dynamic natural resource because of the ecosystem cycles as well as its anthropogenic interfaces. In our country, the dynamism of forests is greatly influenced by forest-people interaction. There is a large scale demand on forests for ecosystem services, meeting needs of people living close to forests for fuel wood, fodder, timber, NTFPs, etc. and for development. Climate change on the other hand is causing increasing stress on the ecosystems. The significance of assessment and monitoring of forests has never been so high as in the present times. India took an early lead in remote sensing based forest cover monitoring as well as in forest inventory; these activities by FSI have completed over 30 and 50 years respectively.

General Studies Paper- III

Topic: Conservation, environmental pollution and degradation, environmental impact assessment



7. CHIEF OF DEFENCE STAFF : RESPONSIBILITIES AND CHALLENGES

Why in News?

In a landmark decision with tremendous reform in higher defence management in the country, the Union Cabinet has approved to create the post of Chief of Defence Staff (CDS). General Bipin Rawat took over as the first CDS on New Year's Day.

Introduction

The appointment of the CDS has been long in coming and it is that much welcome. At the end of the day the country expects a payoff in the form of leaner and meaner forces, who will obtain synergy through planning, training for and executing joint operations. Despite a head start in 2001, India delayed this crucial appointment without which it could not think of joint operations. In the meantime, China began its reform efforts in the late 2000 and then accelerated them in the last five years to structurally transform the way it runs its military.

The need for a unified command was made apparent following the 1962 war against China and the 1965 war with Pakistan. The turning point came with the formation of Kargil Review Committee, which was formed after the Kargil War to review the events leading up to the war and offer recommendations for the future. The report, led by K. Subrahmanyam, highlighted several shortcomings that stemmed from a lack of coordination between services.

Report of Various Committees

The Kargil Review Committee (KRC) report set up in the wake of the intelligence debacle that led to the Kargil conflict, which did not call for the establishment for CDS per se. Instead, it called for the integration of the service headquarters with the Ministry

of Defence (MoD) making it clear that such a reform measure would actually enhance civilian supremacy, not undermine it.

Group of Ministers Report on Reforming the National Security System (GOM) 2001 was the most extensive set of reforms in the country's history. Group of Ministers recommended the establishment of the CDS. The Report of the Group of Ministers on National Security constituted on the basis of the Kargil Review Committee report.

Naresh Chandra Committee Recommendation: In 2012, the Task Force on National Security headed by Naresh Chandra revisited the issue and in view of the resistance towards the CDS, sought to find a way by re-labeling the position as the Permanent Chairman of the Chiefs of Staff Committee (COSC). A Chairman of Chiefs of Staff (COSC) was established in 2012, which was at best a temporary measure and ultimately inadequate.

A Committee of Experts (CoE) was constituted by Ministry of Defence under the chairmanship of Lt Gen (Retd.) D B Shekatkar to recommend measures to enhance combat capability and rebalance defence expenditure of the armed forces. The Shekatkar committee suggests creation of just three joint theatre commands: North, South and West- which will merge the existing 17 commands. Each command will report to a theatre commander. The theatre commanders will report to the Chief of Defence Staff (CDS), the single point military advisor to the government. It is also yet to act on the proposal for a permanent chairman, Chiefs of Staffs Committee (a halfway house to a CDS). The post is presently held in rotation by the seniormost of the three service chiefs. For years, the services could never build a consensus on the roles and responsibilities of the permanent chairman.

CDS: Roles and Responsibilities

General Bipin Rawat will be able to serve as CDS for a period of up to three years after the government amended the rules extending the age of retirement to 65 years. CDS post would be held by a four-star General and he would not be eligible to hold any government office after demitting the office of Chief of Defence Staff. The officer will also not hold any private employment without prior approval for a period of five years after demitting the office of CDS.

The Chief of Defence Staff, apart from being the head of the Department of Military Affairs, will also be the Permanent Chairman of the Chiefs of Staff Committee. He will act as the Principal Military Adviser to Defence Minister on all tri-services matters. The three Chiefs will continue to advise defence minister on matters exclusively concerning their respective services. CDS will not exercise any military command, including over the three service chiefs, so as to be able to provide impartial advice to the political leadership. As the Permanent Chairman of Chiefs of Staff Committee, CDS will perform the following functions:

- ◆ CDS will administer tri-services organisations. Tri-service agencies/organisations/commands related to Cyber and Space will be under the command of the CDS.
- ◆ CDS will be member of Defence Acquisition Council chaired by defence minister and Defence Planning Committee chaired by NSA.
- ◆ Function as the Military Adviser to the Nuclear Command Authority.
- ◆ Bring about jointness in operation, logistics, transport, training, support services, communications, repairs and maintenance, etc. of

the three services, within three years of the first CDS assuming office.

- ◆ Ensure optimal utilisation of infrastructure and rationalise it through jointness among the services.
- ◆ Implement Five-Year Defence Capital Acquisition Plan (DCAP), and Two-Year roll-on Annual Acquisition Plans (AAP), as a follow up of Integrated Capability Development Plan (ICDP).
- ◆ Assign inter-Services prioritisation to capital acquisition proposals based on the anticipated budget.
- ◆ Bring about reforms in the functioning of three services aimed at augmenting combat capabilities of the armed forces by reducing wasteful expenditure.

Department of Military Affairs

The government has created a Department of Military Affairs in the Defence Ministry and it will be headed by newly-appointed CDS General Bipin Rawat. With the latest changes, the Defence Ministry will have five departments under it and these are the Department of Defence, the Department of Military Affairs (DMA), the Department of Defence Production, the Department of Defence Research and Development, and the Department of Ex-Servicemen Welfare. The following areas will be dealt by the Department of Military Affairs headed by CDS:

- ◆ The armed forces of the Union, namely, the Army, the Navy and the Air Force.
- ◆ Integrated Headquarters of the Ministry of Defence comprising Army Headquarters, Naval Headquarters, Air Headquarters and Defence Staff Headquarters.

- ◆ The Territorial Army.
- ◆ Works relating to the Army, the Navy and the Air Force.
- ◆ Procurement exclusive to the Services except capital acquisitions, as per prevalent rules and procedures.

Apart from the above, the mandate of the Department of Military Affairs will include the following areas:

- ◆ Promoting jointness in procurement, training and staffing for the services through joint planning and integration of their requirements.
- ◆ Facilitation of restructuring of military commands for optimal utilisation of resources by bringing about jointness in operations, including through establishment of joint/theatre commands.
- ◆ Promoting use of indigenous equipment by the services.

Global Scenario

Examples of a CDS exist in many other countries: The Chief of the General Staff of the Armed Forces of Russia, the Chief Head of Defence (CHOD) position within NATO countries, and in India's neighbourhood, the CDS in Sri Lanka and the Chairman of the Joint Chiefs of Staff Committee in Pakistan.

Canada experimented with a more unified CDS model in 1967, dissolving its armed services to merge them into the Canadian Armed Forces under the CDS. In 2011, their original names were restored but their unified status was preserved.

The world over, most nations have moved into the theatre command concept. Earlier the reasons being provided for India was that other western powers which have adopted this concept have done so as they do not visualise fighting a war on their soil, but overseas, hence need the combined firepower of all the three services.

With China also having adopted this concept and creating one integrated command against India, this logic has lost its value. India on the other hand has seven different commands facing China, which remains illogical.

In 2016, China integrated its military and other police and paramilitaries into five theatres from the earlier seven area commands, each with its own inclusive headquarters, one of which has responsibility for the Indian border. In contrast, India's border with China is split between the Eastern, Western, and Northern Commands.

Challenges before CDS

- ◆ The task of the CDS will be two fold in nature. One will be as the head of the DMA where he will deal with the administrative functioning of the three wings of the armed forces, their headquarters, the construction related to the military and second tier procurements like petrol oil and lubricants, rations etc.
- ◆ The CDS will go a long way to reform the antiquated military system of the country.
- ◆ The First CDS has a monumental task before him and his ability to do so as the first CDS will set the course for his successors and determine the future shape of our military.
- ◆ The biggest challenges before his tenure will be Army's restructuring, weapon system modernisation and non-contact warfare.

Functional Constraints

First among Equals: At one level, the issue involves his erstwhile colleagues – the chiefs of the Army, Navy and Air Force. At another, they relate to the Indian Administrative Service (IAS), which currently runs the Ministry of Defence.

The CDS, who will also be the Permanent Chairman Chiefs of Staff Committee (PCCSC) does not have a higher rank; he is like the other Service chiefs, a four-star general. But as the government notification details, there are a myriad of little ways in which he is very much primus inter pares or the first among equals, something the existing chiefs have not been used to.

When it comes to their own Service, the chief's word is law, but now the government has clearly ordered the CDS/PCCSC to wade in and change things in the interests of jointness and "reducing wasteful expenditure."

Under Direct Watch of NSA: Besides his fellow chiefs and secretaries, the CDS/PCCSC will also have to contend with the 'shadow CDS' – National Security Adviser Doval. It may be recalled that in early 2018, the government had constituted a Defence Planning Committee (DPC) under the NSA.

The DPC was given widespread powers relating to the country's national security strategy, the defence production base, boosting defence exports, prioritising capability development plans and so on.

Though these are areas of a wider remit, there could be places where the CDS' responsibilities create friction with those of the NSA. There is no protocol problem here though, since the NSA, who has a Cabinet rank, clearly outranks the CDS/PCCSC.

Department of Military Affairs (DMA): The new DMA has also been inserted into the civilian MoD. Just what kind of shape the DMA will assume is difficult to say. But it can be sure it will have a significant component of uniformed personnel and expertise.

Relevance of CDS

- ◆ The CDS' role and inputs in the defence budget is as important as the military counsel the CDS provides to the government.
- ◆ This new department is expected to cut the red tape and bureaucratic bottleneck that often cause delays for decisions on military reforms and critical procurement.
- ◆ The CDS can contribute to rational defence acquisition decisions, preventing redundancy of capacities among the services and making best use of available financial resources.
- ◆ Structural reforms could bring about a much closer and more constructive interaction between the Civil Government and Services."
- ◆ The idea behind having a CDS is to have more synergy in the functioning of the three services - Air Force, Navy and Army.

Way Forward

It is expected that this reform in the Higher Defence Management would

enable the armed forces to implement coordinated defence doctrines and procedures and go a long way in fostering jointmanship among the three services. The country would be benefitted by coordinated action on greater jointmanship in training, logistics and operations as well as for prioritisation of procurements.

The appointment of the CDS will certainly change the civil-military balance, and, if done correctly, will address some of the grievances of the Armed Forces pertaining to their status vis-a-vis the civil services. Yet, it should also cause them to look inwards. However, some teething problems can be expected in the beginning but things are bound to fall in place as norms, processes and rules are worked out between the three services, the CDS and the defence ministry. It will require the navigation of entrenched institutional interests, hierarchical powers and military traditions, to lay the foundations for a strong and functional CDS. India's first CDS, therefore, has a lot of catching up and leapfrogging to do.

General Studies Paper- III

Topic: Various Security forces and agencies and their mandate.

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SEVEN SUBJECTIVE QUESTIONS WITH MODEL ANSWERS

1. Wildfires in Australia : A Global Concern

Q. Discuss the factors responsible for wildfires in Australia.

Hints:

- ◆ Record-breaking temperatures and months of severe drought have fuelled a series of massive bushfires across Australia. At least 24 people have so far been killed - including three volunteer firefighters - and more than 6.3 million hectares (63,000 sq km or 15.6 million acres) of bush, forest and parks have been burned.
- ◆ The prolonged blaze this year has coincided with Australia's harshest summer. Parts of the country recorded their highest recorded temperature in December. Then, longer-term factors have been at play. Much of Australia is facing a drought that is a result of three consecutive summers with very little precipitation. This, according to climate scientists, is unprecedented.
- ◆ In a 2019/2020 outlook for the southern hemisphere's summer, published in late November, the Australia's Bureau of Meteorology (BoM) forecasted that the "key culprit" behind the hot, dry weather was a slower than usual weakening of the "Indian Ocean Dipole (IOD)."
- ◆ The Southern Annular Mode (SAM), also known as the Antarctic Oscillation (AAO), describes the north-south movement of the westerly wind belt that circles Antarctica, dominating the middle to higher latitudes of the southern hemisphere.

2. Mission Gaganyaan : India's First Manned Mission

Q. The Gaganyaan Mission target of 2022 will mark the culmination of nearly 15 years of background efforts of ISRO. Do you agree? Give your views.

Hints:

- ◆ The Indian Space Research Organisation (ISRO) is expanding its wings to one more vertical - indigenous Human Spaceflight Programme. ISRO is working on an

Indian crewed orbital mission - Gaganyaan- that would take Indian astronauts to space by 2022. Gaganyaan will be the first Indian crewed orbital spacecraft under the Human Space Flight programme of ISRO.

- ◆ India could potentially become the fourth country to send a man in space, after the erstwhile USSR, the US and China. Denmark also has a manned space flight scheduled for 2022.
- ◆ The main objective of the Gaganyaan mission is technology demonstration. The programme will source 60-70% components and value-added services from Indian industries. ISRO has already developed and demonstrated many critical technologies like crew module configuration, crew escape system, thermal protection, deceleration and flotation systems and re-entry capability.

3. National Infrastructure Pipeline : A Measure to Boost Economy

Q. National Infrastructure Pipeline could boost the Indian economy. Evaluate.

Hints:

- ◆ Finance Minister Nirmala Sitharaman has unveiled a Rs. 102 lakh crore National Infrastructure Pipeline (NIP) in accordance with the Prime Minister Narendra Modi government's vision to make India a \$5 trillion economy by 2024-25.
- ◆ Identifying the projects to be put on the pipeline is the easy part. Implementing and commissioning them will be the more difficult one. There are a few hurdles that the NIP task force needs to watch out for. First, the financing plan assumes that the Centre and the States will fund 39% each while the private sector will chip in with 22% of the outlay. Going by the present fiscal situation, it will be no small challenge for the Centre to raise Rs. 39 lakh crore, even if it is over the next five years.
- ◆ The financial position of States is even more perilous. Second, the Rs. 22 lakh crore expected from private investment also looks steep considering the lack of appetite for fresh investment by the private sector

in the last few years. In fact, this factor has been a major drag on economic growth. Given the scale of investment, debt will play an important role and it remains to be seen if banks have gotten over their apprehensions on infrastructure financing as a major part of their bad loans originated there.

- ◆ Finally, cooperation from States becomes very important in implementing infrastructure projects. The experience on this count has not been very happy till now. While these are genuine obstacles that the task force needs to manage, these should not detract from the need for a concerted effort to invest in infrastructure. The key will be following up and reviewing the pipeline at regular intervals.

4. Reforms in Energy Governance : Need of the Hour

- Q. The proposed unified Ministry of Energy will not only enable India to keep up with the global energy transition but also to continue to be a leader in adopting cleaner energy sources. Discuss.**

Hints:

- ◆ NITI Aayog's new National Energy Policy, which is in the final stages of preparation, is said to propose an integration of all energy ministries into one. The proposal will seek a merger of power, coal, new & renewable, petroleum & natural gas ministries. Fortunately, most ministries are in agreement for the merger. The policy also moots to merge all regulators of the sector like Central Electricity Regulatory Commission (CERC), Petroleum & Natural Gas Regulatory Board (PNGRB) to have a one-stop energy regulator for all the disputes and licensing concerns.
- ◆ Five different ministries along with a multitude of regulators govern India's energy sector. Petroleum and natural gas, coal, renewable energy and nuclear energy have separate ministries or departments. We also have a Ministry of Power, along with State-level bodies that regulate electricity distribution companies, or DISCOMS.
- ◆ A single unified ministry of energy would help India to have an integrated outlook on energy that would enable us optimise our limited resources to meet the goals of energy security, sustainability and accessibility. In the fast-changing energy landscape of our country, having a single energy ministry would be beneficial as it would allow for a quicker policy response.

- ◆ Formulating an integrated and wholesome energy policy in the current governance structure is a complex and challenging task not only due to lack of coordination among ministries but also due to the absence of good quality consumption data and an inadvertent promotion of their own fuels over other choices, which may not always be the best option.

5. US-Iran Conflict : Rising Global Turbulence

- Q. Evaluate the impact of US-Iran tension on India.**

Hints:

- ◆ President Trump hinted to de-escalate hostilities with Iran, signaling no new United States (US) military strikes following an Iranian missile barrage on Iraqi bases housing American and allied military forces that resulted in no casualties.
- ◆ India and the US have differing views on Iran, New Delhi views Tehran as a partner in India's extended neighbourhood to meet its energy needs as well as a gateway to landlocked Middle East and Afghanistan. Washington on the other hand views Iran as the biggest source of instability and terrorism in the region.
- ◆ India's gross domestic product grew at a mere 4.5% in the September quarter and there are concerns that high fuel prices could adversely impact economic recovery. India does not import oil from Iran because of a new set of sanctions that came into effect in May, any unrest in the volatile region could impact exports from countries such as Saudi Arabia given that most of the oil is transported through the Straits of Hormuz, a narrow waterway carrying a fifth of the world's traded oil, that Iranian officials had in April threatened to block.
- ◆ A secondary worry is that tensions between Iran and the US could impact India's trade with the region that now stands at \$78 billion (from Gulf Cooperation Council member countries Saudi Arabia, Kuwait, the UAE, Qatar, Bahrain, and Oman), according to April-November figures from the Indian commerce ministry. The rise in tensions also poses a hurdle to India's plans to develop Iran's Chabahar port. The port was to help India trade with landlocked Afghanistan and Central Asia bypassing Pakistan. A reimposition of US sanctions on Iran last year has deterred Indian companies from investment in the project, despite India obtaining a carve-out from US.

6. India State of Forest Report 2019 : An Overview

Q. The 2019 state of forest report tells only half picture of India's forest. Do you agree? Give your reasons.

Hints:

- ◆ The present report shows forest cover in India has improved by 3,976 sq km between 2017 and 2019. This should seem heartening given, today, this stands at 7.12 lakh sq km, up from 6.7 lakh sq km in 2005—that too, in the face of development needs compelling the diversion of forest land. But, while the area under 'moderately dense forests' shrunk from 3.3 lakh sq km to 3 lakh sq km, that under open forests has increased from 2.9 lakh sq km to 3.04 lakh sq km.
- ◆ The Forest Survey of India has been using better satellite imagery with a 1:50,000 scale, compared to the 1:250,000 scale earlier. This means any area, even as small as 0.01 sq km, with a canopy density of more than 10% is captured as a forest; the earlier resolution meant land units under 0.25 sq km didn't get captured as forest. Thus, land that has been denuded of forest cover but did not get recorded as forest earlier because it fell below the 0.25 sq km threshold now figures in the ISFR as a "gain" in forest cover. Denuded forest land and non-forest land can be reforested, but that happens over decades, not years as the ISFR data would seem to suggest.
- ◆ The tree canopy basis of identification doesn't differentiate between natural forests, plantations, orchards, or even palm groves. This means the loss in diversity doesn't get captured by the data. Thus, the growth in forest-cover could be attributed to fast-growing plantation trees like eucalyptus that are favoured in compensatory afforestation programmes.
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and 60% of Karnataka reeled under drought in 9-11 years between 2001 and 2015, it is hard to see how the two states have performed so well in increasing forest cover. The forest data needs to reflect more of the ground reality instead of becoming a tool to lull the country into inaction on forests.

7. Chief of Defence Staff : Responsibilities and Challenges

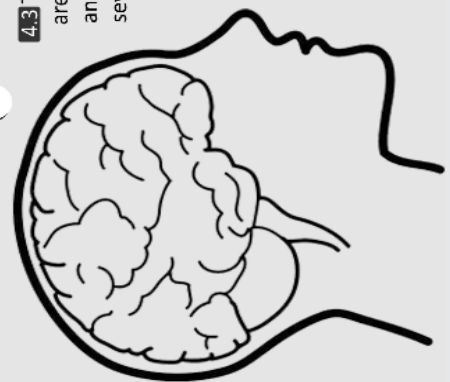
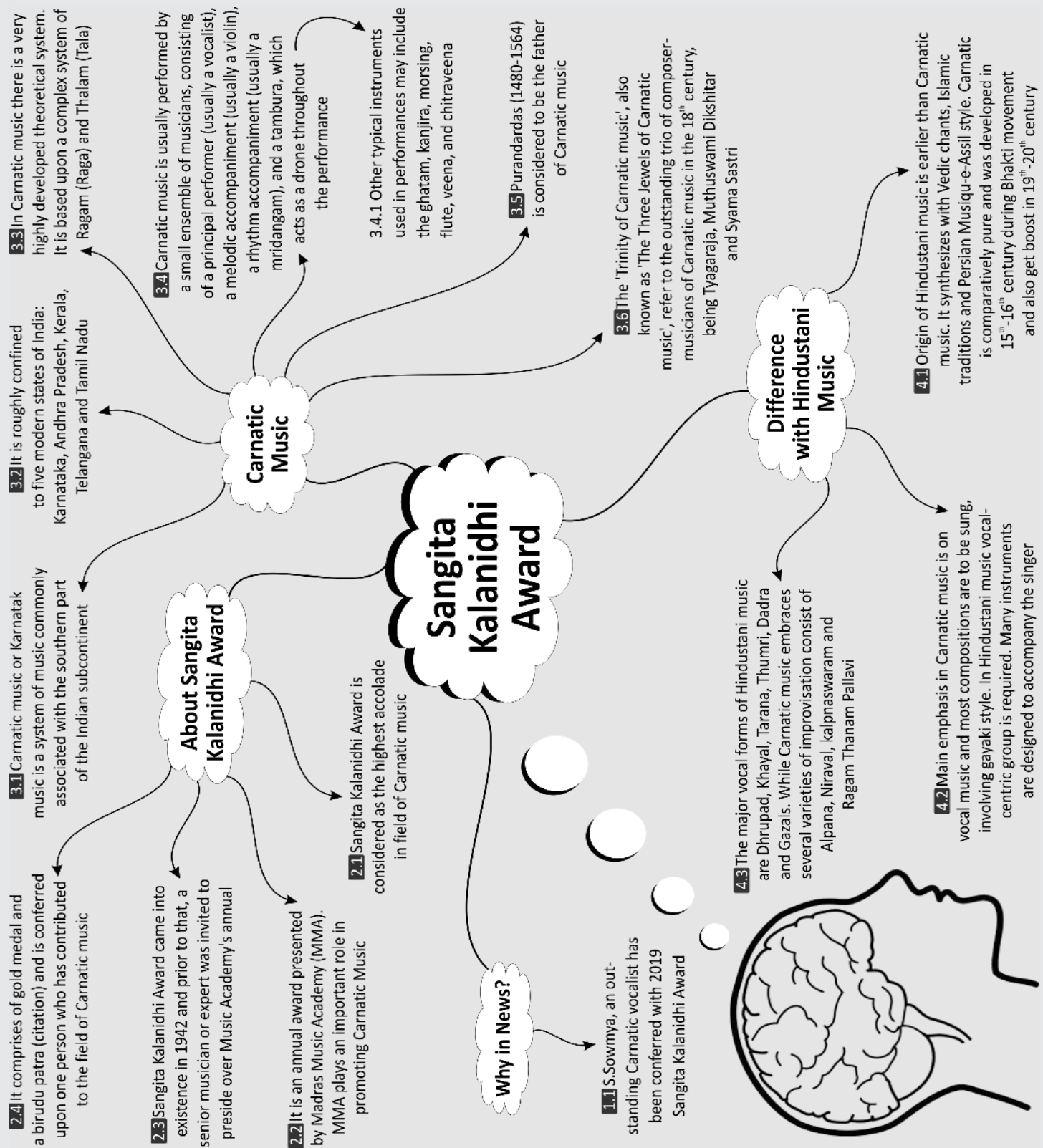
Q. India got its first CDS. Discuss its roles and responsibilities.

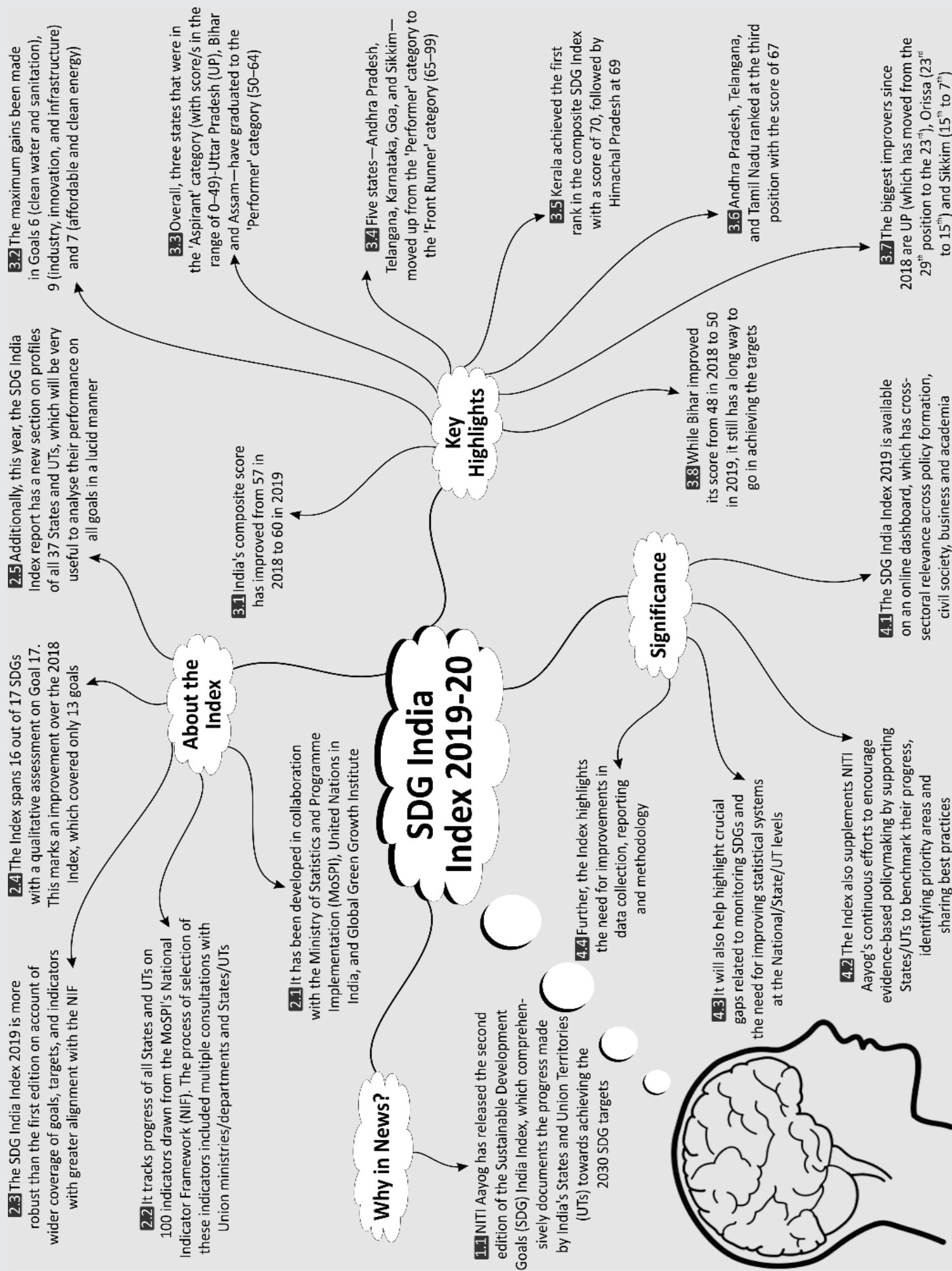
Hints:

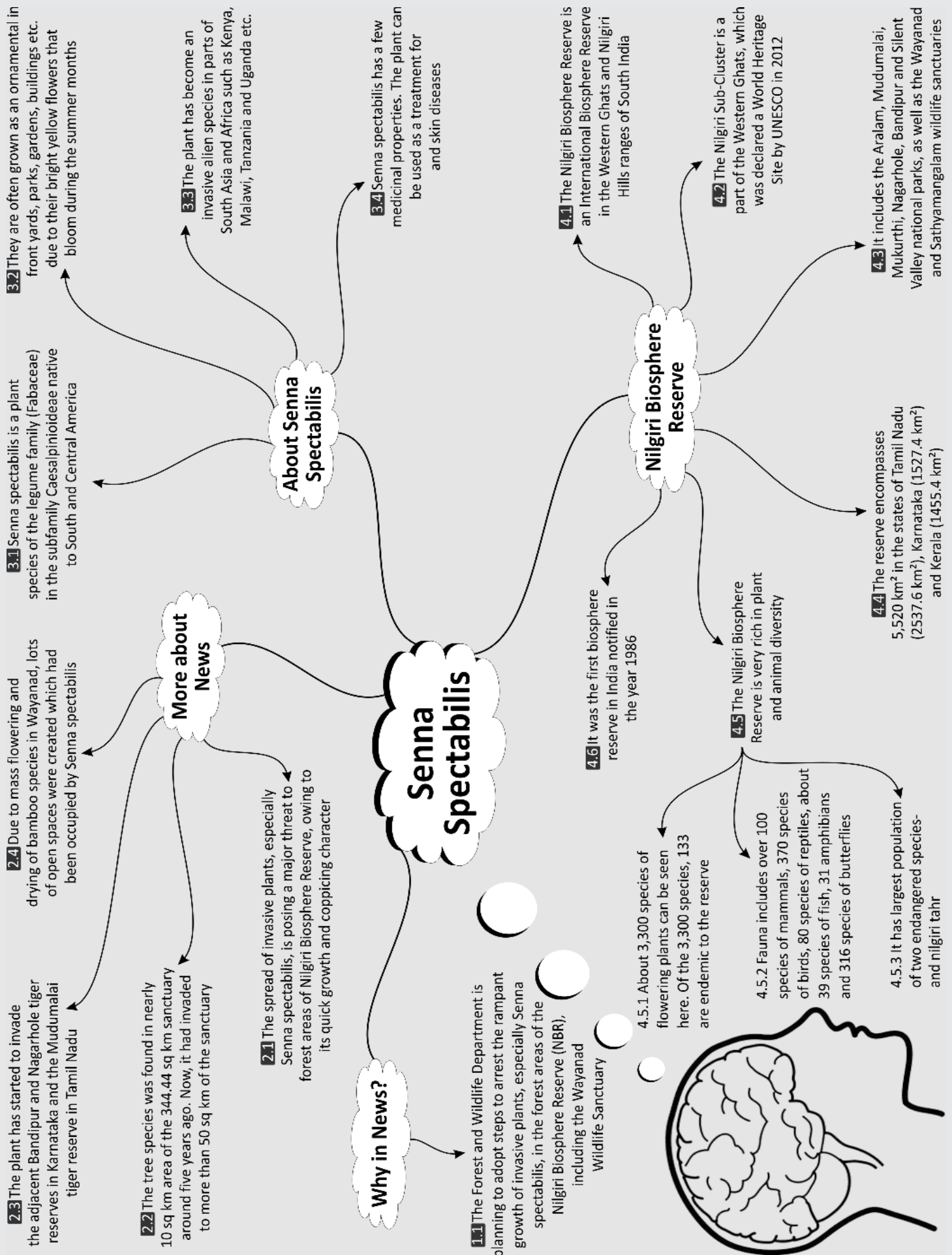
- ◆ In a landmark decision with tremendous reform in higher defence management in the country, the Union Cabinet has approved to create the post of Chief of Defence Staff (CDS). General Bipin Rawat took over as the first CDS on New Year's Day.
- ◆ The Chief of Defence Staff, apart from being the head of the Department of Military Affairs, will also be the Permanent Chairman of the Chiefs of Staff Committee. He will act as the Principal Military Adviser to Defence Minister on all tri-services matters. The three Chiefs will continue to advise defence minister on matters exclusively concerning their respective services. CDS will not exercise any military command, including over the three service chiefs, so as to be able to provide impartial advice to the political leadership.
- ◆ CDS will administer tri-services organisations. Tri-service agencies/organisations/commands related to Cyber and Space will be under the command of the CDS.
- ◆ The appointment of the CDS will certainly change the civil-military balance, and, if done correctly, will address some of the grievances of the Armed Forces pertaining to their status vis-a-vis the civil services. Yet, it should also cause them to look inwards. However, some teething problems can be expected in the beginning but things are bound to fall in place as norms, processes and rules are worked out between the three services, the CDS and the defence ministry.

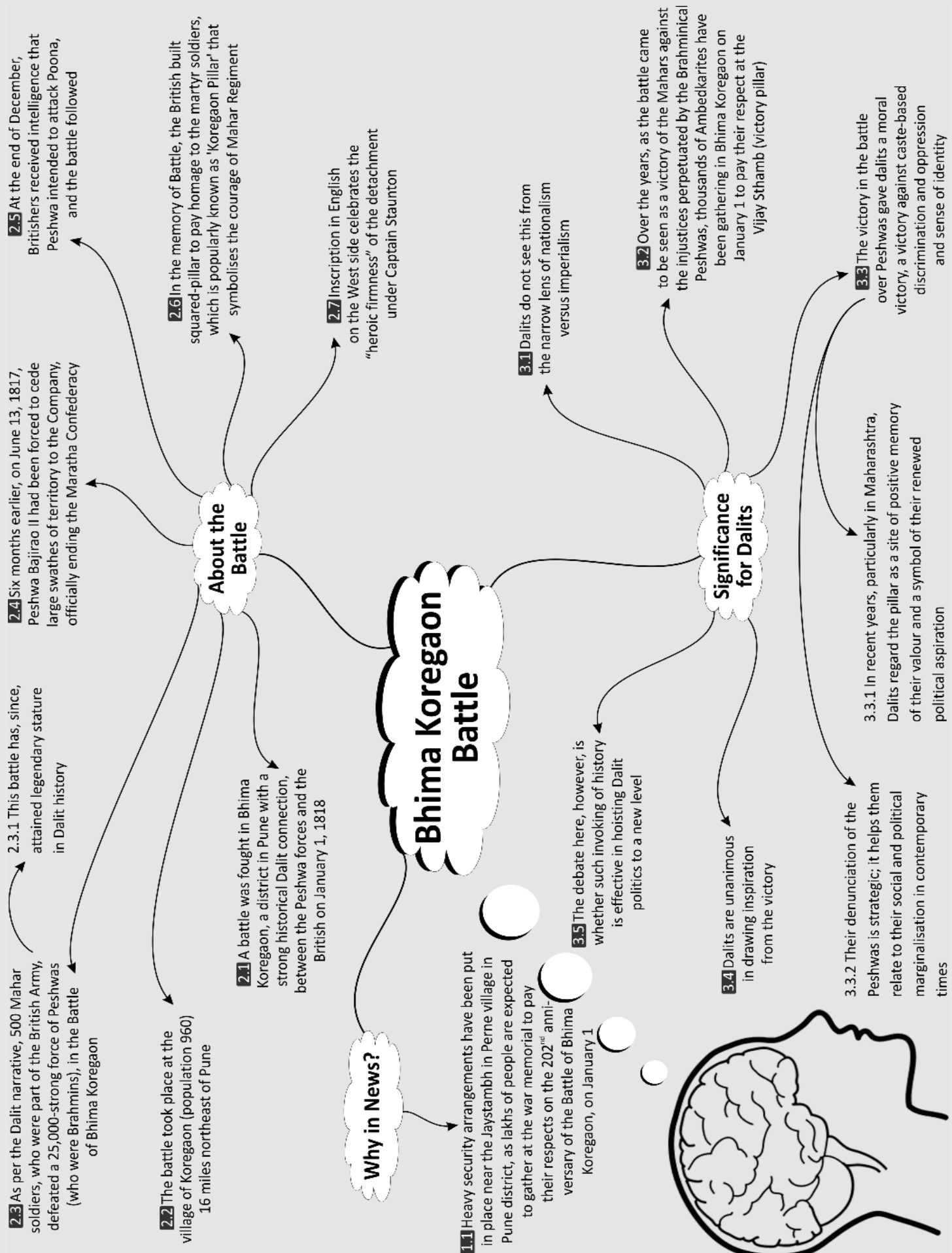


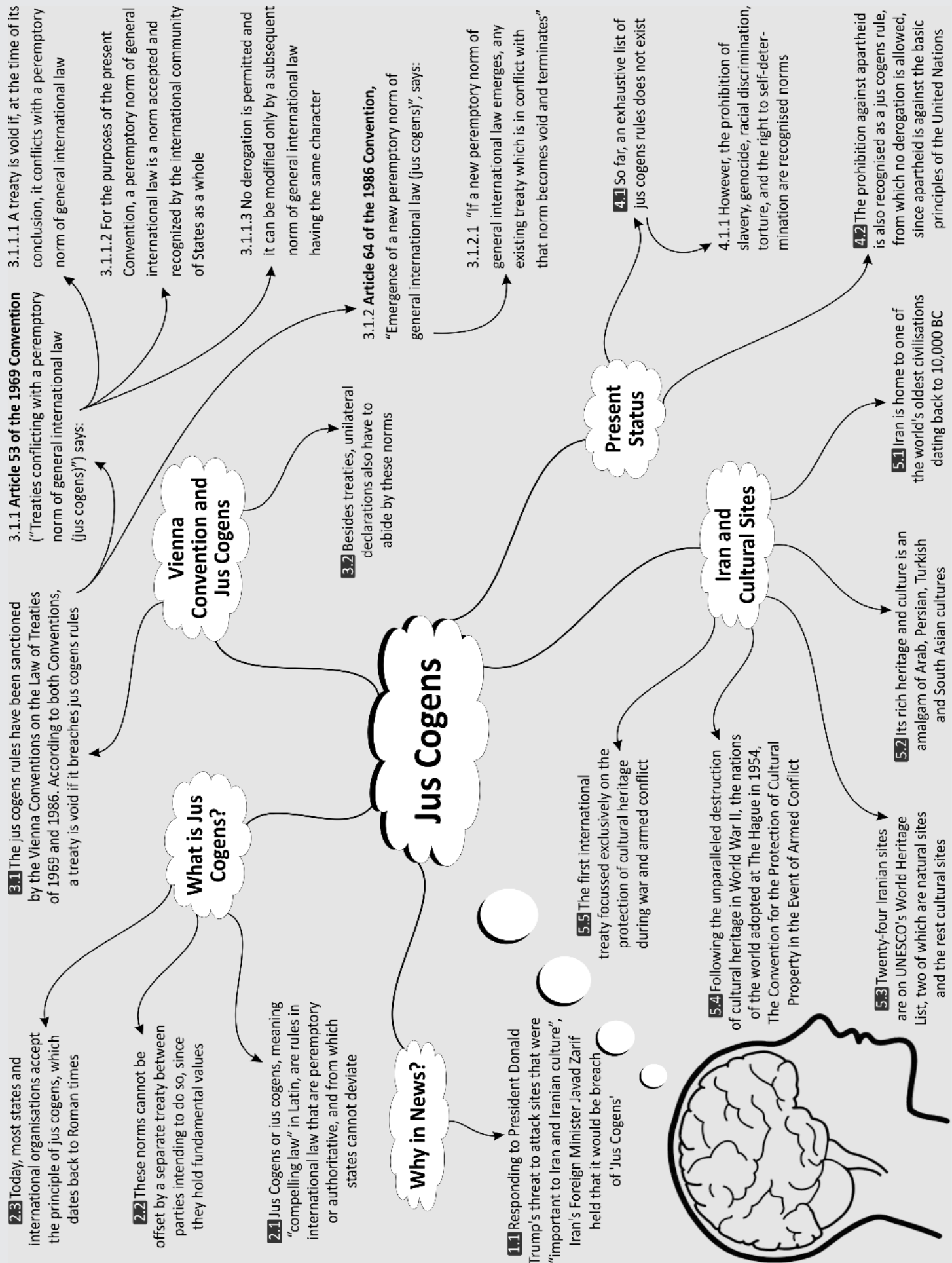
SEVEN BRAIN BOOSTERS

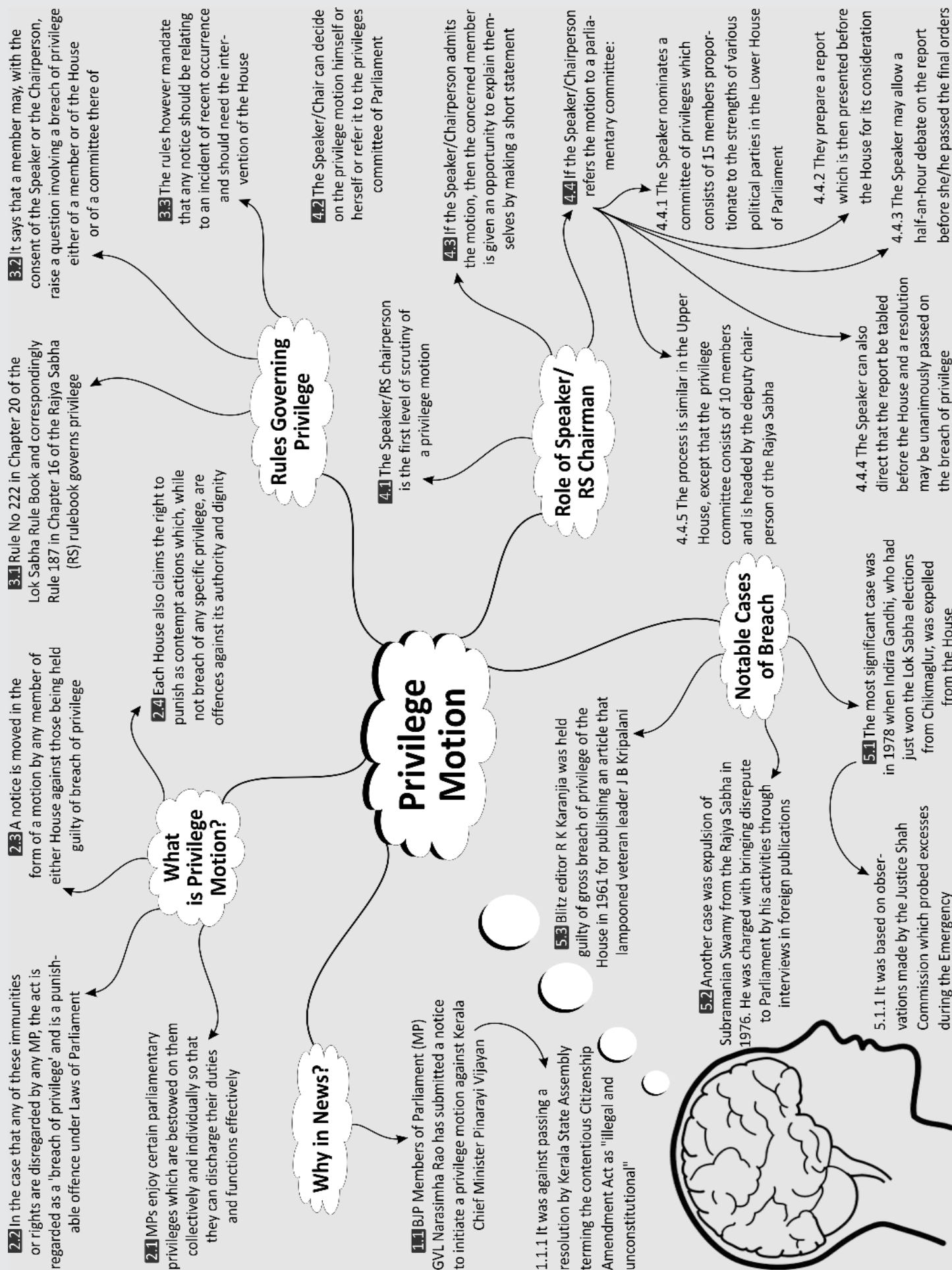


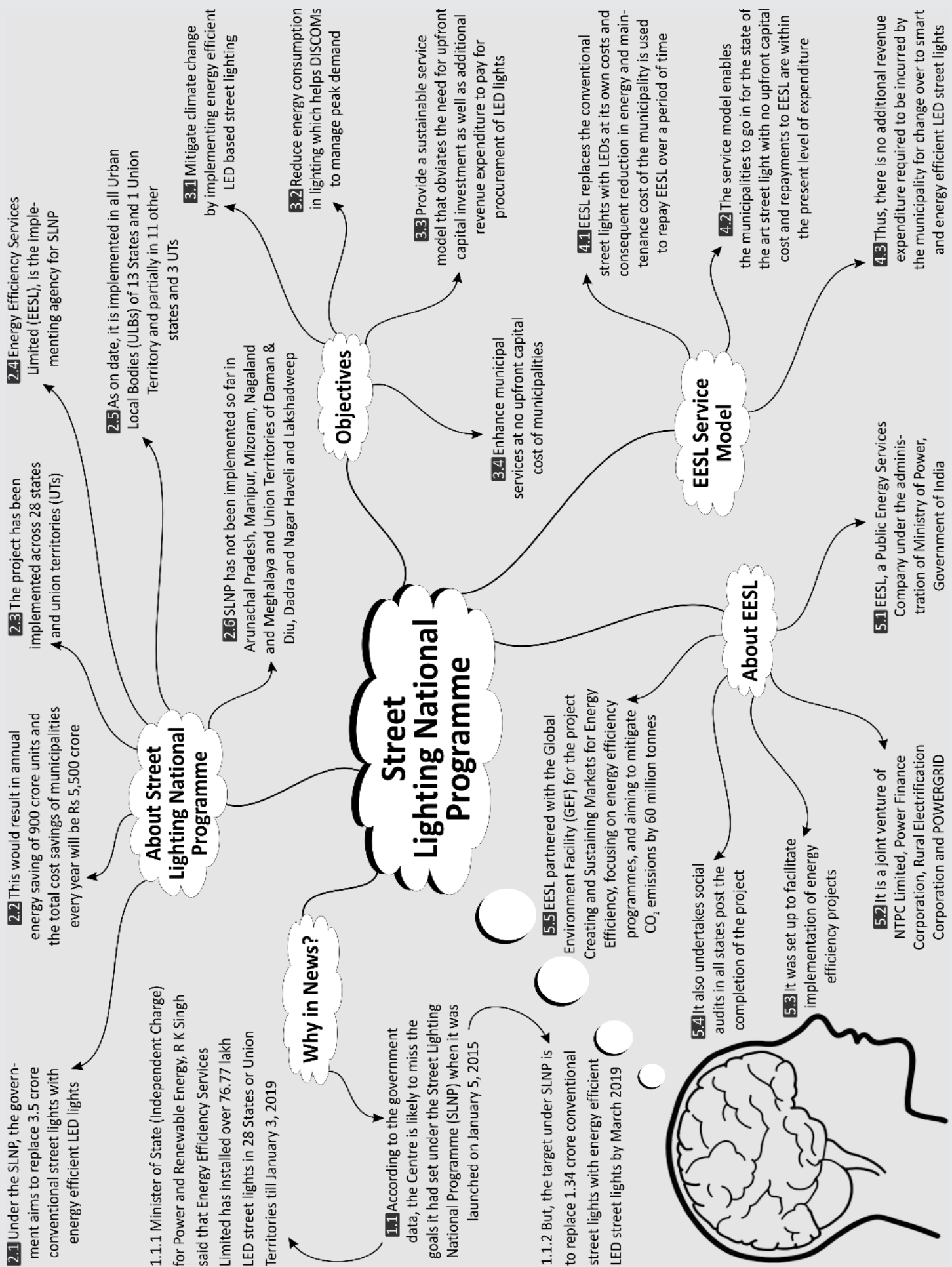












SEVEN MCQ's WITH EXPLANATORY ANSWERS

(Based on Brain Boosters)

1. Sangita Kalanidhi Award

Q. Consider the following statements with respect of 'Sangita Kalanidhi Award':

1. S.Sowmya, an outstanding Carnatic vocalist has been conferred with 2019 Sangita Kalanidhi Award.
2. It is considered as the highest accolade in field of Carnatic music by the government of India.

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: (a)

Explanation: Statement 1 is correct. Noted vocalist S. Sowmya has been conferred with 2019 SangitaKalanidhi Award.

Statement 2 is incorrect. Sangita Kalanidhi Award is considered as the highest accolade in field of Carnatic music. It is an annual award presented by Madras Music Academy (MMA). MMA plays an important role in promoting Carnatic Music.

2. SDG India Index 2019-20

Q. With reference to the SDG India Index, consider the following statements:

1. It is developed by United Nations only.
2. Kerala achieved the first rank in the Index.
3. The biggest improvers are UP, Orissa & Sikkim.

Which of the statements given above is/are correct?

- a) 1 and 2 only b) 3 only
c) 2 and 3 only d) 1, 2 & 3

Answer: (c)

Explanation: Statement 1 is incorrect. SDG India Index has been developed in collaboration with the Ministry of Statistics and Programme Implementation (MoSPI), United Nations in India, and Global Green Growth Institute.

Statements 2 and 3 are correct. Kerala achieved the first rank in the composite SDG Index with a score of 70, followed by Himachal Pradesh at 69. While UP, Orissa and Sikkim are the biggest improvers.

3. Senna Spectabilis

Q. Consider the following statements with respect of 'Senna Spectabilis':

1. It belongs to legume family.
2. Sennaspectabilis is native to South and Central America.
3. It is posing a major threat to forest areas of Nilgiri Biosphere Reserve.

Which of the statements given above is/are correct?

- a) 1 and 2 only b) 1 and 3 only
c) 2 and 3 only d) 1, 2 and 3

Answer: (d)

Explanation: All statements are correct. Sennaspectabilis is a plant species of the legume family (Fabaceae) in the subfamily Caesalpinioideae native to South and Central America. The spread of invasive plants, especially Sennaspectabilis, is posing a major threat to forest areas of Nilgiri Biosphere Reserve, owing to its quick growth and coppicing character including the Wayanad Wildlife Sanctuary.

4. Bhima Koregaon Battle

Q. With reference to 'Koregaon Pillar', consider the following statements:

1. It symbolises the courage of Mahar Regiment in Bhima Koregaon battle.
2. It stands for victory against caste-based discrimination.

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: (c)

Explanation: Both the statements are correct. A battle was fought in Bhima Koregaon, a district in Pune with a strong historical Dalit connection, between the Peshwa forces and the British on January 1, 1818. As per the Dalit narrative, 500 Mahar soldiers, who were part of the British Army, defeated a 25,000-strong force of Peshwas (who were Brahmins), in the Battle of BhimaKoregaon.

In the memory of Battle, the British built squared-pillar to pay homage to the martyr soldiers, which is popularly known as 'Koregaon Pillar' that symbolises the courage of Mahar Regiment.

Over the years, as the battle came to be seen as a victory of the Mahars against the injustices perpetuated by the Brahminical Peshwas.

5. Jus Cogens

Q. The term 'Jus Cogens' is recently seen in news, consider the following statements with this regard:

1. It is a Latin term meaning 'compelling Law'.
2. It is sanctioned by the Vienna Conventions on the Law of Treaties.
3. Recently, US breached the law of 'Jus Cogens' in dealing with Iran.

Which of the statements given above is/are correct?

- a) 1 only
- b) 3 only
- c) 1 and 2 only
- d) 1, 2 and 3

Answer: (c)

Explanation: Statements 1 and 2 are correct. Jus Cogens or ius cogens, meaning "compelling law" in Latin, are rules in international law that are peremptory or authoritative, and from which states cannot deviate.

The jus cogens rules have been sanctioned by the Vienna Conventions on the Law of Treaties of 1969 and 1986. According to both Conventions, a treaty is void if it breaches jus cogens rules.

Statement 3 is incorrect. President Donald Trump has made threat to attack sites that were "important to Iran and Iranian culture" but no such attack has been carried out hence the law of 'jus cogens' is not breached.

6. Privilege Motion

Q. Consider the following statements with respect of privilege motion:

1. It is governed as per the Lok Sabha rulebook only.
2. Only a committee of Parliament decides on matters of Privilege.
3. Rajya Sabha can punish for its contempt actions which are breach of specific privilege.

Which of the statements given above is/are correct?

- a) 3 only
- b) 1 and 2 only
- c) 2 and 3 only
- d) None of the Above

Answer: (d)

Explanation: Statement 1 is incorrect. Rule No 222 in Chapter 20 of the Lok Sabha Rule Book and correspondingly Rule 187 in Chapter 16 of the Rajya Sabha (RS) rulebook govern privilege.

Statement 2 is incorrect because the Speaker/RS chairperson is the first level of scrutiny of a privilege motion. The Speaker/Chair can decide on the privilege motion himself or herself or refer it to the privileges committee of Parliament.

Statement 3 is also incorrect as each house claims the right to punish as contempt actions which, while not breach of any specific privilege, are offences against its authority and dignity.

7. Street Lighting National Programme

Q. With reference to the 'Street Lighting National Programme (SLNP)', consider the following statements:

1. Energy Efficiency Services Limited (EESL) is the implementing agency for SLNP.
2. It aims to replace 3.5 crore conventional street lights with energy efficient LED lights.
3. It has achieved its target in January 2019.

Which of the statements given above is/are correct?

- a) 1 only
- b) 2 only
- c) 1 and 2 only
- d) 1, 2 and 3

Answer: (c)

Explanation: Statements 1 and 2 are correct. SLNP was launched on January 5, 2015. Energy Efficiency Services Limited (EESL) is the implementing agency for SLNP.

Under the SLNP, the Government aims to replace 3.5 crore conventional street lights with energy efficient LED lights.

Statement 3 is incorrect. The Centre is likely to miss the goals it had set under the SLNP when it was launched on January 5, 2015. As per government, EESL has installed over 76.77 lakh LED street lights in 28 States or Union Territories till January 3, 2019.

SEVEN IMPORTANT FACTS FOR PRELIMS

1. Which city has hosted the third international symposium on Marine Ecosystems – Challenges and Opportunities (MECOS-3)?

–Kochi, India

2. Which aircraft has been developed as first indigenous light transport aircraft by National Aerospace Laboratory (NAL)?

–Saras Mk2

3. Which city hosted 9th Women Science Congress (WSC)?

–Bangalore

4. Which organisation has inaugurated the first “Patola Saree” production unit in Gujarat?

–Khadi and Village Industries Commission (KVIC)

5. Which country has participated with India in naval exercise ‘Naseem al Bahr’?

–Oman

6. Which city has been selected for establishment of the Human Space Infrastructure Centre by ISRO?

–Bangalore, Karnataka

7. Where the National Disaster Response Force (NDRF) Academy will be established?

–Nagpur

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SEVEN PRACTICE QUESTIONS FOR MAINS EXAM

1. Australia is witnessing the worst wildfires seen in decades. What are the factors that lead to the large scale forest fires? Also, discuss its environmental and economic impact.
2. Evaluate the participation and support of cinema stars and other persons of influence in students and other popular protests.
3. Brain Computer Interface (BCI) at different phases of research in different countries. Highlight the utilities and threats associated with BCI.
4. Recently some states have finalised action plan for agriculture export policy. Explain the main objectives and limitations of the Agriculture Export Policy, 2018.
5. Vertical Farming is emerging as a silent revolution. Substantiate.
6. Friendly neighbour and secured borders not only ensure national security of a country but they also help the nation in its all round development. Elucidate.
7. Discuss the role and powers of the recently created office of the Chief of the Defence Staff (CDS).

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SEVEN IMPORTANT NEWS

1. NEFT 24x7

To promote digital transactions, Reserve Bank of India (RBI) has directed banks not to charge savings account holders for National Electronic Funds Transfer (NEFT). RBI also announced that NEFT money transfer has now become 24x7 facility, which means you can transfer money round-the-clock. Now, this facility is also available during bank holidays. This will be extremely beneficial for large-value transactions which cannot be done through UPI or Immediate Payment Service (IMPS). The eventual waiver of charges will benefit small traders as well. NEFT money transfer timings were fixed

from 8 am to 6.30 pm on working days, however NEFT money transfer facility was not available during holidays.

With this, India has joined an elite club of a handful of countries having payment systems that ensure round the clock funds transfer and settlement on real time basis.

What is NEFT?

NEFT is an electronic funds transfer system maintained by the RBI, to transfer funds from one bank account to another. NEFT is a nation-wide payment system facilitating one-to-one funds transfer. Under this scheme,



individuals, firms and corporates can electronically transfer funds from any bank branch to any individual, firm or corporate having an account with any other bank branch in the country participating in the scheme.

2. Udasi Mutt

The Udasi mutt in Nirmal town is among those built around 1822 in the Deccan by Dewan Chandulal, who was the Prime Minister for Nizam, Asaf Jah III, a follower of the Udasi sect of ascetics which was based on the teachings of Guru Nanak's elder son Sri Chand. Followers of Sri Chand established mutts at all the places visited by Guru Nana. The mutt in Nirmal Town was built during Guru Nanak's second Udasi between 1511 CE and 1513 CE.

About Udasis

Udasis were the missionary travels of Guru Nanak, the second one covering Sri Lanka and the Deccan, including Vijayawada and Guntur in Andhra Pradesh, and Hyderabad and Nirmal in Telangana. This sojourn of the first Sikh Guru also saw establishment of the famous Nanak Jhira gurudwara in Bidar, now in Karnataka.

Other Udasis

First Udasi (1500-1506 AD) covered the Sultanpur, Tulamba (modern Makhdumpur, zila Multan), Panipat, Delhi, Banaras (Varanasi), Nanakmata (zila Nainital, U.P.), Tanda Vanjara (zila Rampur), Kamrup (Assam), Asa Desh (Assam), Saidpur (modern Eminabad, Pakistan), Pasrur (Pakistan), Sialkot (Pakistan). Guru Nanak was of the age of 31-37.

Second Udasi (1506-1513 AD) covered the Dhanasri Valley, Sangladip (Ceylon). Guru Nanak was of the age of 37-44.

Third Udasi (1514-1518 AD) covered Kashmir, Sumer Parbat, Nepal, Tashkand, Sikkim, Tibet. Guru Nanak was of the age of 45-49

Fourth Udasi (1519-1521 AD) covered the Mecca and the Arab

countries. Guru Nanak was of the age of 50-52

Fifth Udasi (1523-1524 AD) covered the places within the Punjab. Guru Nanak was of the age of 54-56.

After which he settled to Kartarpur before leaving his physical form (1525-1539 AD). Guru Nanak was of the age of 56-70. He spent 24 years on the 5 udasis.

About Nirmal Fort

Nirmal is a prominent town in Adilabad district. The region was ruled by Kakatiyas, Chalukyas, the Qutubshahis and Nizams who have contributed immensely to the growth of cultural heritage. Nirmal Fort, also called as the Shamgarh fort, was built by the French.

3. Bandhavgarh Tiger Reserve

In November 2018, elephants in herds, 38 of them, wandered into the forests of Bandhavgarh looking for food and water, like each year. A year on, they have stayed back in Madhya Pradesh for the first time over seasons and even bred two new calves. Elephant is a Schedule-1 species as listed under the Wildlife Protection Act, 1972. While India is home to 50% of the Asian Elephant population, and according to 2017 elephant census,



there are 27,312 elephants in the country, marking a decrease of nearly 3,000 elephants from the 2012 census.

About Bandhavgarh Tiger Reserve

Bandhavgarh National Park is located in the Umaria district of Madhya Pradesh. It was declared a national park in 1968 and then became Tiger Reserve (BTR) in 1993. The whole park is filled with more than 20 streams out of which some of the most important streams are Johilla, Janadh, Charanganga, Damnar, Banbei, Ambanala and Andhiyari Jhiria. These streams then merge into the Son river (an important southern tributary to the river Ganga). BTR with its dense forest, bamboo vegetation, vast

grasslands along with some perennial streams offers an excellent habitat for the solitary predator.

Bandhavgarh National Park consists of mixed vegetations ranging from tall grasslands to thick Sal forest and so is the perfect habitat of variety of animals and birds. Due to varied topography, the Bandhavgarh national park provides ample opportunity to spot the majestic Indian tiger and some rarely seen animals like leopard, sloth bear, Asiatic Jackal, Bengal Fox, Sloth Bear, Striped Hyena, Leopard and Tiger, Wild Pigs, Nilgai, Chinkara and Gaur (a herbivore and the only coarse feeder).

4. Atal Rohtang Tunnel

The government of India has renamed Rohtang Pass as 'Atal Tunnel' on the birth anniversary of former Prime Minister Atal Bihari Vajpayee (December 25). The tunnel is expected to be ready for an official inauguration by September 2020.

Key Highlights

Upon completion, the 8.8 km-long tunnel will be the world's longest highway tunnel at an altitude of above 10,000 feet (3,000 metres).

It is a 10.5 m-wide single tube, a bi-lane tunnel with a fireproof emergency tunnel built into the main tunnel itself. The 10.5-m width includes a 1-metre footpath on both sides.

Vehicles will travel at a maximum speed of 80 km per hour inside the tunnel. Up to 3,000 cars and 1,500 trucks are expected to use the tunnel every day.

Cutting through the mighty Pir Panjal range, the tunnel will reduce the distance between Manali and Leh

by 46 kilometres, and save crores of rupees in transport costs.

It will also provide all-weather connectivity to remote border areas of Himachal Pradesh and Ladakh, which otherwise remained cut off from the rest of the country for about six months.

The project has significant strategic implications for the military. Once the tunnel is operational, the forces will have access beyond the Rohtang Pass even in peak winter.

5. Maharashtra-Karnataka Belgaum Tension

On December 29, bus services between Kolhapur and Belgaum were suspended after the decades-old border dispute between Maharashtra and Karnataka flared up again. The dispute between Maharashtra and Karnataka over Belgaum and other border areas is a longstanding issue between the two states, and has been

pending before the Supreme Court for many years.

Background

The erstwhile Bombay Presidency, a multilingual province, included the present-day Karnataka districts of Bijapur, Belgaum, Dharwar and Uttara-Kannada (previously North Kanara).

In 1948, the Belgaum municipality requested that the district, having a predominantly Marathi-speaking population, be incorporated into the proposed Maharashtra state. However, the States Reorganisation Act of 1956, which divided states on linguistic and administrative lines, made Belgaum a part of the then Mysore State (which

was renamed Karnataka in 1973). The Maharashtra government contested the inclusion and lodged a protest with the Centre in September 1957. This led to the formation of the Mahajan Commission under former Chief Justice Mehr Chand Mahajan in October 1966. The Commission, which submitted its report in August 1967, recommended that 264 villages be transferred to

Maharashtra and that Belgaum and 247 villages remain with Karnataka. Maharashtra rejected the report and demanded another review.

Current status

Maharashtra continues to claim over 865 villages along the border, as well as Belgaum city, which are currently part of Karnataka. Successive

governments in Maharashtra have demanded their inclusion within the state. Karnataka has contested these claims. On December 8, present government of Maharashtra appointed Ministers Chhagan Bhujbal and Eknath Shinde as coordinators to oversee his government's efforts to expedite the case related to the dispute. ■

6. Central Equipment Identity Register

The Department of Telecommunications has launched a web portal for residents of Delhi, Noida, Ghaziabad and Gurgaon to enable them to block and trace stolen or lost mobile phones with smartphone's International Mobile Equipment Identity (IMEI) number. The portal, 'www.ceir.gov.in' was started on a pilot basis in Maharashtra last year and will soon be implemented across the country.

What is IMEI?

International Mobile Equipment Identity (IMEI) is a unique identification code for each mobile device. The IMEI is a 15 digit number that is used to identify the device. The IMEI also reveals

the manufacturer, make & model. The Equipment Identity Register (EIR) is a database present in the mobile network that contains a list of IMEIs of mobile terminals which are active in a mobile network. EIR maintains a white, grey and black list. The white list is composed of IMEIs of mobiles that are permitted for use. The gray list consists of devices that do not conform to the standards but could be permitted to connect under supervision or triggering an alert. The black list contains IMEIs of devices which have been reported stolen or lost and not to be provided service. Such IMEIs are denied access to the network.

Significance

The implementation of the CEIR would resolve the issues namely, curtail the counterfeit mobile phones while permitting the use of such existing mobile phones; blocking of lost/theft mobiles across mobile networks thus discouraging theft of mobile phones; maintaining the registry of all equipment identity facilitating data base of all valid equipments; protecting the interests of the consumers by making them aware of the information related to fake and cloned mobile equipments; mechanism to report loss/theft of mobile equipment and facilitate IMEI based lawful interception. ■

7. 'MANI' App to Help Visually Challenged Identify Currency Notes

The Reserve Bank of India (RBI) has launched a mobile app, MANI (Mobile Aided Note Identifier), to help visually-impaired people to identify the denomination of currency notes.

Indian banknotes contain several features which enable the visually impaired (colour blind, partially sighted and blind people) to identify them, viz., intaglio printing and tactile mark, variable banknote size, large numerals, variable colour, monochromatic hues and patterns. Technological progress has opened up new opportunities for making Indian banknotes more accessible for the visually impaired, thereby facilitating their day to day transactions.

Key Features

Capable of identifying the denominations of Mahatma Gandhi Series and Mahatma Gandhi (New) series banknote by checking front or reverse side/part of the note including half folded notes at various holding angles and broad range of light conditions (normal light/day light/low light/ etc.).

Ability to identify the denomination through audio notification in Hindi/English and non-sonic mode such as vibration (suitable for those with vision and hearing impairment). After installation, the mobile application

does not require internet and works in offline mode.

Ability to navigate the mobile application via voice controls for accessing the application features wherever the underlying device & operating system combination supports voice enabled controls.

The application is free and can be downloaded from the Android Play Store and iOS App Store without any charges/payment. This mobile application does not authenticate a note as being either genuine or counterfeit. ■

SEVEN IMPORTANT SCIENTIFIC HIGHLIGHTS OF LAST YEAR

1. Biological Sciences

New Sensory Organ Discovered

Researchers from Karolinska Institute in Sweden have discovered a new sensation organ in skin which is sensitive to the risky environmental irritation and capable of detecting painful mechanical damage. The newly found organ comprises glia cells which have multiple long protrusions and collectively make a mesh-like organ within the skin. The study was published in 'Science'.

Great White Shark's Genome Decoded

Researchers from Nova Southeastern University's (NSU) Save our Seas

Foundation, Shark Research Centre and Guy Harvey Research Institute (GHRI), Cornell University College of Veterinary Medicine, and Monterey Bay Aquarium, decoded the white shark genome and compared it with genomes of other vertebrates, including the giant whale shark and humans. Decoding the white shark's genome showed not only its huge size i.e., 1.5 times the size of the human genome, but also a plethora of genetic changes which led to the evolutionary success of these sharks. This research has potential applications in the field of health and disease prevention. The findings are reported in the journal 'Proceedings

of the National Academy of Sciences' (PNAS).

New Type of Skin-cell Coordinates Tail Regeneration

A team of scientists from Cambridge University found a specialised population of new type of skin-cells responsible for tail regeneration in tadpoles. These Regeneration Organizing Cells (ROC) provide an opportunity to understand how this ability can be achieved in mammalian tissues also. Using single-cell genomics, the scientists of Cambridge University tried to unveil how this regeneration of tail happens in different tadpole cells. The study was published in Science.

2. Nature & Environment

Gel-like Fluid to Prevent Wildfires

Stanford University researchers have developed a cellulose-based gel-like fluid which can be coated over vegetation by spraying through standard agricultural equipment or an aircraft to prevent wildfires. The technology could combat fire-outbreaks in the future. It contains non-toxic substances widely used in

food, drugs and agricultural products. The study has been reported in 'PNAS'.

Unique Oil-Eating Bacteria at the Bottom of the Ocean

Scientists from the University of East Anglia in Norwich, along with researchers from China and Russia have discovered unique bacteria in the deepest part of the Earth's oceans —

the Mariana Trench eats oil. During the study of the collected microbial population samples, researchers found a hydrocarbon-degrading bacteria which was abundant at the bottom of the Mariana Trench. Such microbes could eat compounds similar to those in oil and then could be used for fuel. The study was published in 'Microbiome'.

3. Technology

Artificial Leaf — Producing Synthetic Gas

Researchers from Cambridge University created an artificial leaf powered by sunlight, water and carbon

dioxide that produces synthetic gas. The artificial leaf comprises two light absorbers similar to the molecules of plant that collect sunlight and combine with the cobalt catalyst. When in water using the catalyst, one light absorber

produces oxygen and the other carries the chemical reaction that reduces carbon dioxide and water into carbon monoxide and hydrogen making it a syngas mixture. The key feature of the artificial leaf is that it can operate even

in cloudy and rainy days. The study has been published in 'Nature Materials'. The technology can eventually be helpful to have a sustainable liquid-fuel alternative to gasoline.

Nanoseaweed — Thinnest Gold in the World

Scientists at the University of Leeds, UK, have developed a new form of gold "Nanoseaweed", just two atoms (0.47 nanometres) thick. It is a million times thinner than the human fingernail, and the thinnest unsupported gold ever developed. The colour of the thinnest gold in water appears green therefore researchers named it nanoseaweed. The newly formed gold has been

reported in the journal 'Advanced Science'.

Installation of the World's Highest Weather Stations

Climate researchers and the multi-disciplinary group led by scientists from National Geographic Society (NGS) and Tribhuvan University, Nepal and in partnership with Rolex, in a single scientific expedition to the Mount Everest have made history by installing the world's highest operating weather station at Mount Everest's Death Zone along with other automated stations on other parts of the mountain. The stations were installed to monitor and understand the climate change at

higher altitudes and also for predicting weather patterns around the globe.

World's First Armed Amphibious Drone Boat

"Marine Lizard", the world's first armed amphibious drone developed by Wuchang Shipbuilding Industry Group under China Shipbuilding Industry Corporation (CSIC) was successfully tested. The drone which is remotely controlled by satellites can reach a maximum speed of 50 knots. The 12-metre long drone is capable of forming a combat triad with aerial drones and other drone ships and could be used in land assault operations.

4. Space Exploration

Marsquake Detected

NASA's InSight lander on 6 April 2019 for the first time ever detected a seismological tremor on Mars which was recorded as "Marsquake" (The Martian Sol 128) — a natural trembling from the Mars interior. It is the first seismic activity ever recorded on a planetary body outside of the Earth or the Moon.

NASA's Kepler Confirms First Exoplanet

Ten years ago, despite being the very first exoplanet revealed by NASA's Kepler Space Telescope, Kepler-1658b

was marked as a false positive as it was not really pointing to a planet. But in March 2019, new software was used to refine the data and reexamine it, which changed it from a data anomaly to a possible planet. The newly-confirmed Kepler-1658b is a massive hot Jupiter that whips around its star every 3.85 days.

"Forbidden Planet" — Neptune Size Exoplanet

Using the state-of-the-art Next-Generation Transit Survey (NGTS) observing facility, an international collaboration of astronomers led by the University of Warwick, UK,

discovered a rare sub- Neptune-sized transiting exoplanet. The newly discovered planet formally named as NGTS-4b is 20% smaller than Neptune and about three times the size of the Earth orbiting its host star in the harsh conditions of the Neptunian Desert. Due to its rare existence astronomers have nicknamed it as the "Forbidden Planet".

NGTS-4b is 920 light-years away from the Earth revolving around the host star in only 1.3 days equivalent to the Earth's orbit around the Sun in one year. The planet is 1000 degrees Celsius and hotter than Mercury.

5. Indian S&T 2019 - I

Mission Shakti — India's ASAT Missile Programme

With the test launch of the first Anti-satellite (ASAT) missile programme, India became the fourth nation in the world to successfully test an anti-satellite missile by destroying a Low Earth Orbit (LEO) satellite Microsat-R

built by DRDO (Defence Research and Development Organisation). Mission Shakti holds the potential to safeguard the nation's space assets.

India Unveils 28 New Milky Way Stars

Scientists at ARIES (Aryabhata Research Institute of Observational

Sciences), Nainital, discovered twenty-eight new variable stars in the outer part of the Milky Way Galaxy by using a powerful 3.6-metre optical telescope, the Devasthal Optical Telescope. The stars were found in the Globular cluster NGC 4147 in the constellation of Coma Berenices.

GraspMan — A Multimodal Robotic System

Researchers at IIT (Indian Institute of Technology) Madras have developed and fabricated a multimodal robotic

system called "GraspMan" for field and industrial application as it possesses very good grasping, locomotion and manipulating capabilities. The system consists of a pair of graspers which can hold things securely and is also

capable of manipulating it much like the hand of a human being. The recent development has been published in ASME's (The American Society of Mechanical Engineers) peer- reviewed 'Journal of Mechanisms and Robotics'.

6. Indian S&T 2019 – II

TIFR Scientists Develop New Wonder Material — Black Gold

Researchers at the Tata Institute of Fundamental Research (TIFR), Mumbai, have created a new material called "Black Gold" with unique qualities like the capacity to absorb light and carbon dioxide. It has been developed by rearranging the gaps and the size of gold nanoparticles. As the name implies, it is black in colour and has various applications ranging from harvesting solar energy to desalinating seawater. The research has been detailed in the journal 'Chemical Science'.

Smallest Orchids Discovered

Lecanorchis taiwaniana, a Japanese orchid variant, has been accidentally discovered in Assam by a Forest Officer. It is one of the smallest orchids in terms of size and bloom duration. The orchid is a parasitic plant. The discovery has been reported in the 'Journal of Botany' as a "new record for the flora in India".

AJIT — India's First Indigenously Developed Microprocessor

Engineers at IIT Bombay have indigenously developed and fabricated a microprocessor called AJIT, the first homegrown microprocessor.

The technology not only can reduce the nation's imports but also make India self-reliant in electronics. The project was funded by the Ministry of Electronics and Information Technology (MeitY) and IIT Bombay.

India's First Humanoid RoboCop

India's first humanoid police robot KP-BOT was inaugurated in Kerala and has been given the rank of Sub- inspector (SI) at the Police Headquarter, Thiruvananthapuram, Kerala. Embracing a progressively automated future of the nation, Kerala has become the first-ever police department in the nation to deploy a robot for police task.

7. Council of Scientific & Industrial Research (CSIR)

Whole Genome Sequencing of 1000 Indians

The Council of Scientific and Industrial Research (CSIR) has sequenced the genome of 1000 Indians from different populations. This was achieved as part of the IndiGen initiative undertaken by CSIR in April 2019, and implemented by the CSIR-Institute of Genomics and Integrative Biology (CSIR-IGIB), New Delhi and CSIR-Centre for Cellular and Molecular Biology (CSIR-CCMB), Hyderabad.

The genome sequencing and computational analysis of 1008 Indians was accomplished in six months demonstrating scalability at an industrial scale in a defined timeline. The development could signal a major step towards enabling predictive and preventive medicine.

CSIR Develops Solutions for Parali Burning

To provide a solution to the burning of agro-waste parali in Delhi and neighbouring States (Haryana, Punjab and Uttar Pradesh), scientists from CSIR-AMPRI, Bhopal, have developed techniques to convert agro-waste residues, especially paddy, wheat and maize straw into commercially viable materials equivalent or better than that of commercially available synthetic wood such as particleboard, plywood, etc.

Meanwhile, scientists from the CSIR- National Physical Laboratory (NPL), New Delhi, have suggested the conversion of paddy biomass into green 'bio coal' which be used in thermal power plants. According to a study published in Current Science, the conversion of paddy stubble into green product bio coal can be done through torrefaction. This process will also help farmers to earn money using the agriculture residue.



Composite Materials Developed from Wheat Straw by CSIR-AMPRI Bhopal

The residue of other crops like wheat, sugarcane, oilseed, maize and cotton can also be used as bio coal in thermal plants after the torrefaction has been carried out.

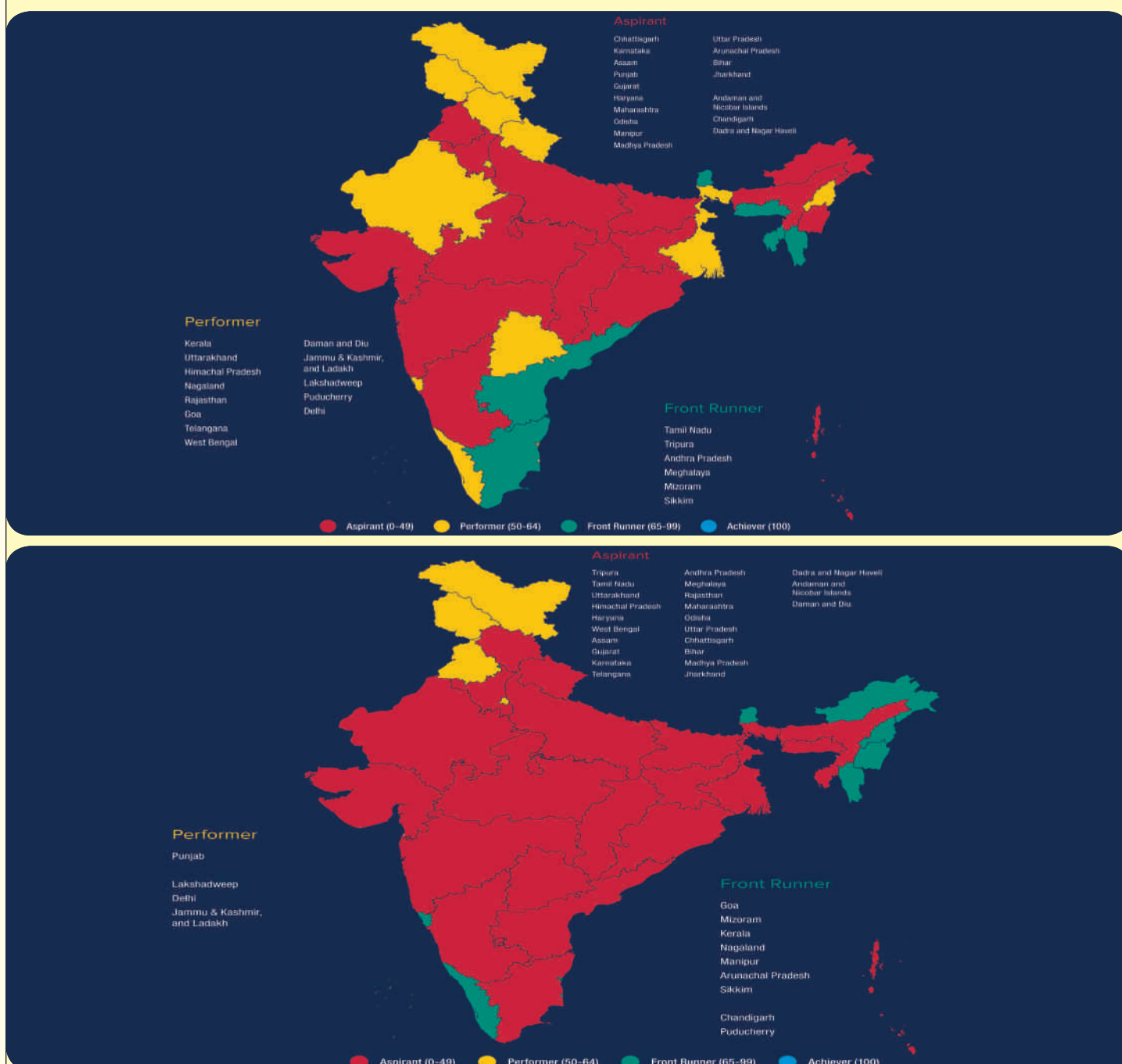
Green Technologies for Quality Drinking Water

CSIR-CMERI (Central Mechanical Engineering Research Institute), Durgapur has developed three technologies for supply of quality drinking water from groundwater sources. The recently developed technologies are based on the principles of oxidation, precipitation and filtration and do not require electric power and so are completely green. (Source: Science Reporter-January 2020)

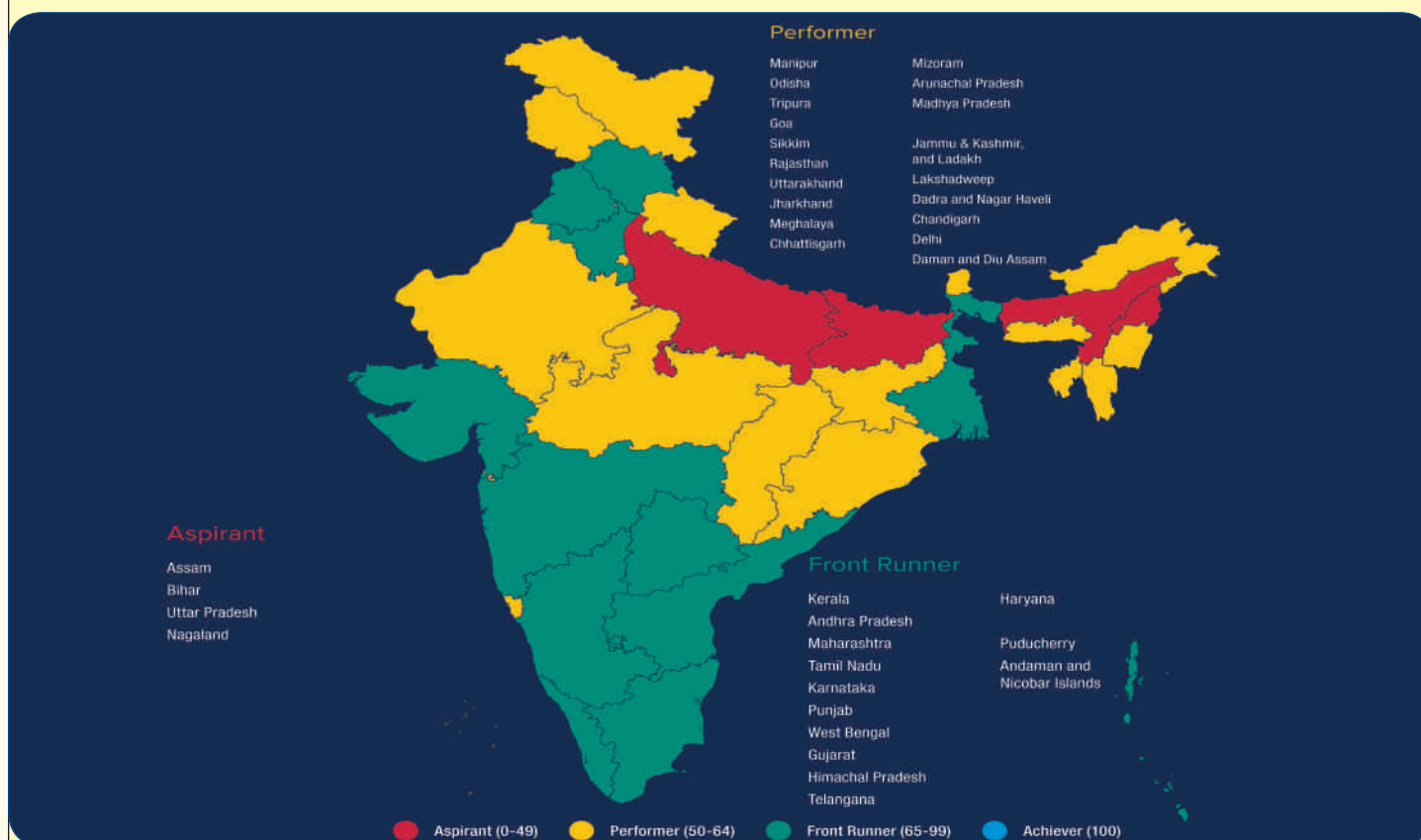
SEVEN IMPORTANT CONCEPTS THROUGH GRAPHICS

SDG India Index 2019-20

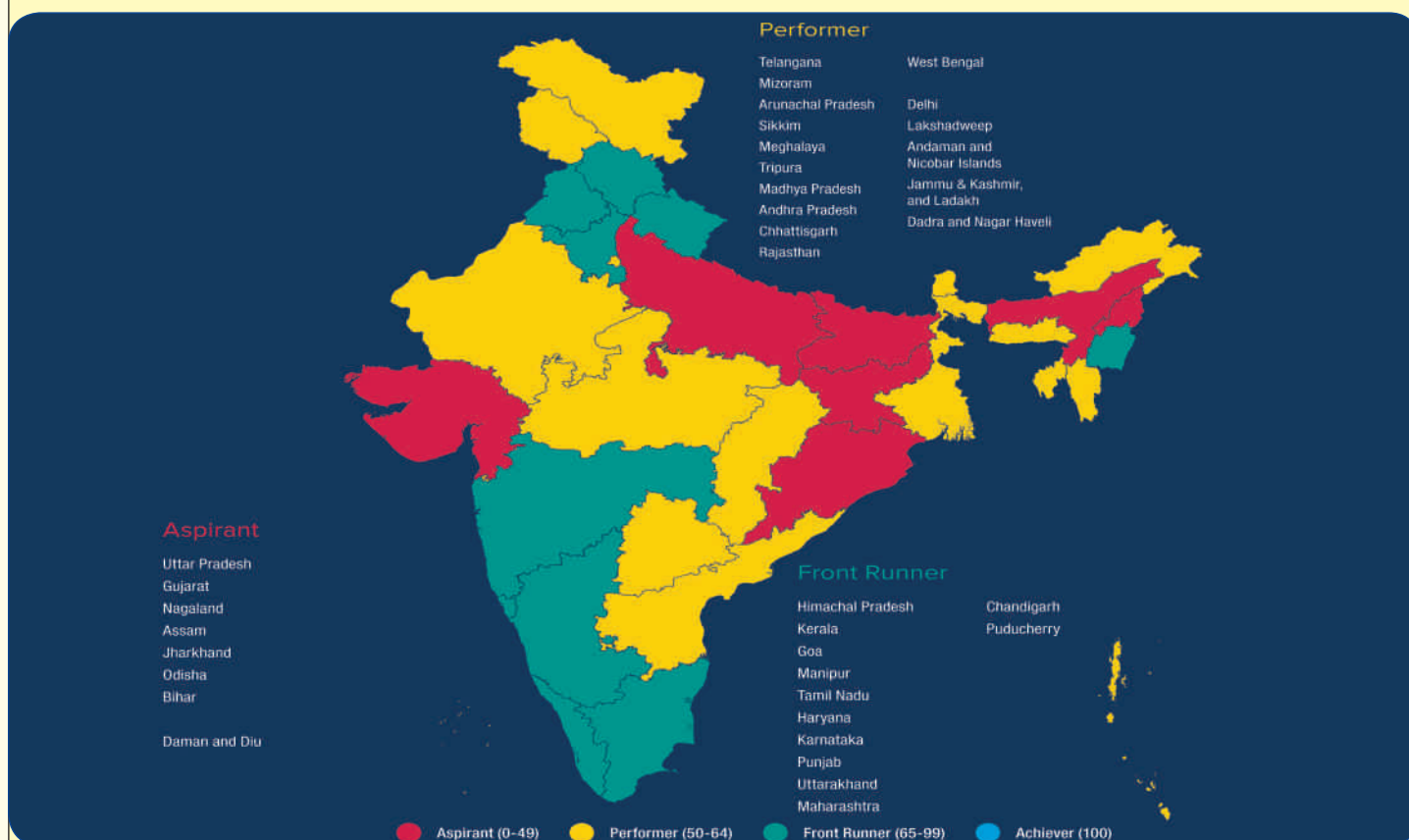
1. Performance of States/ UTs on SDG 1 (No Poverty) and SDG 2 (Zero Hunger)



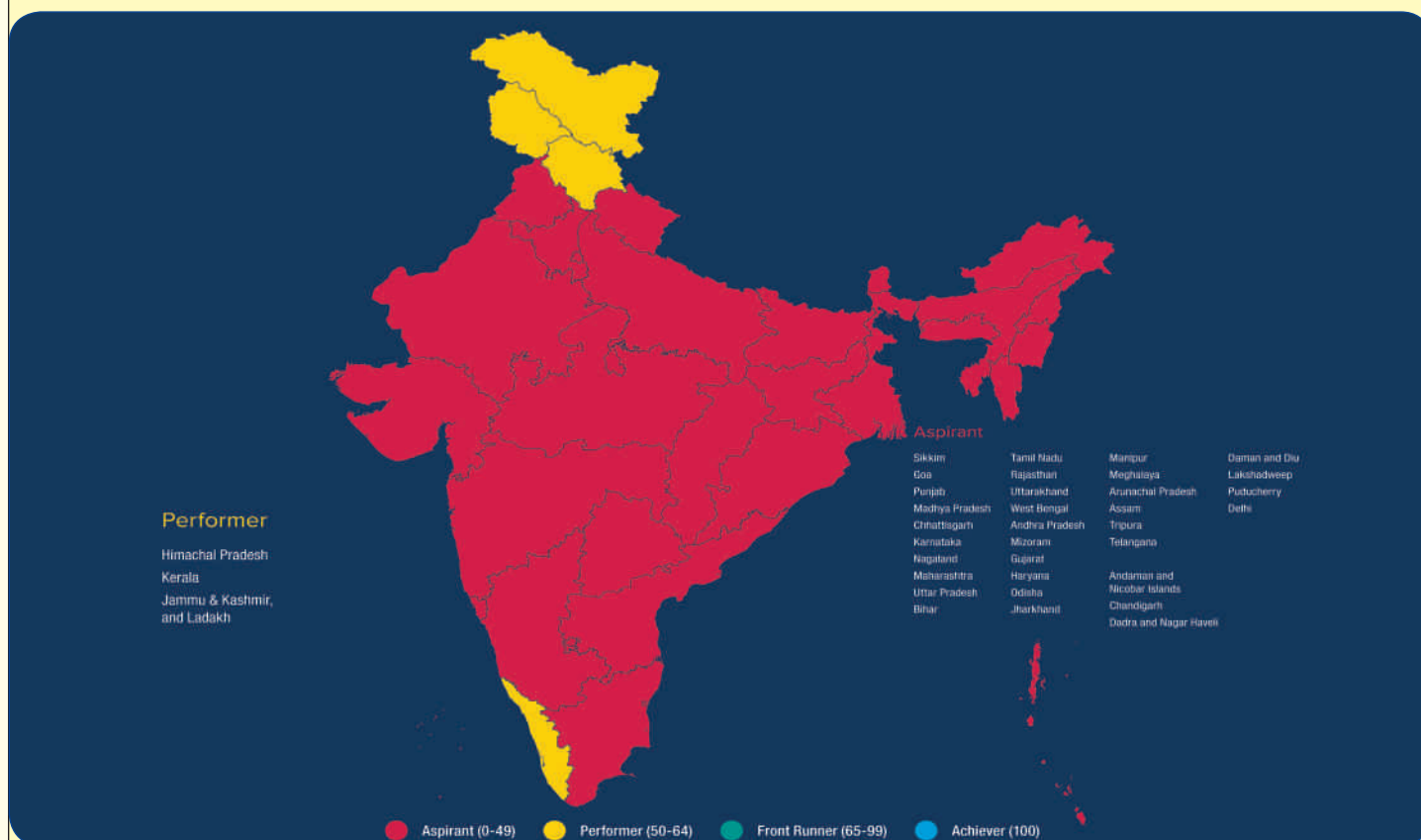
2. Performance of States/ UTs on SDG 3 (Good Health and Well-being)



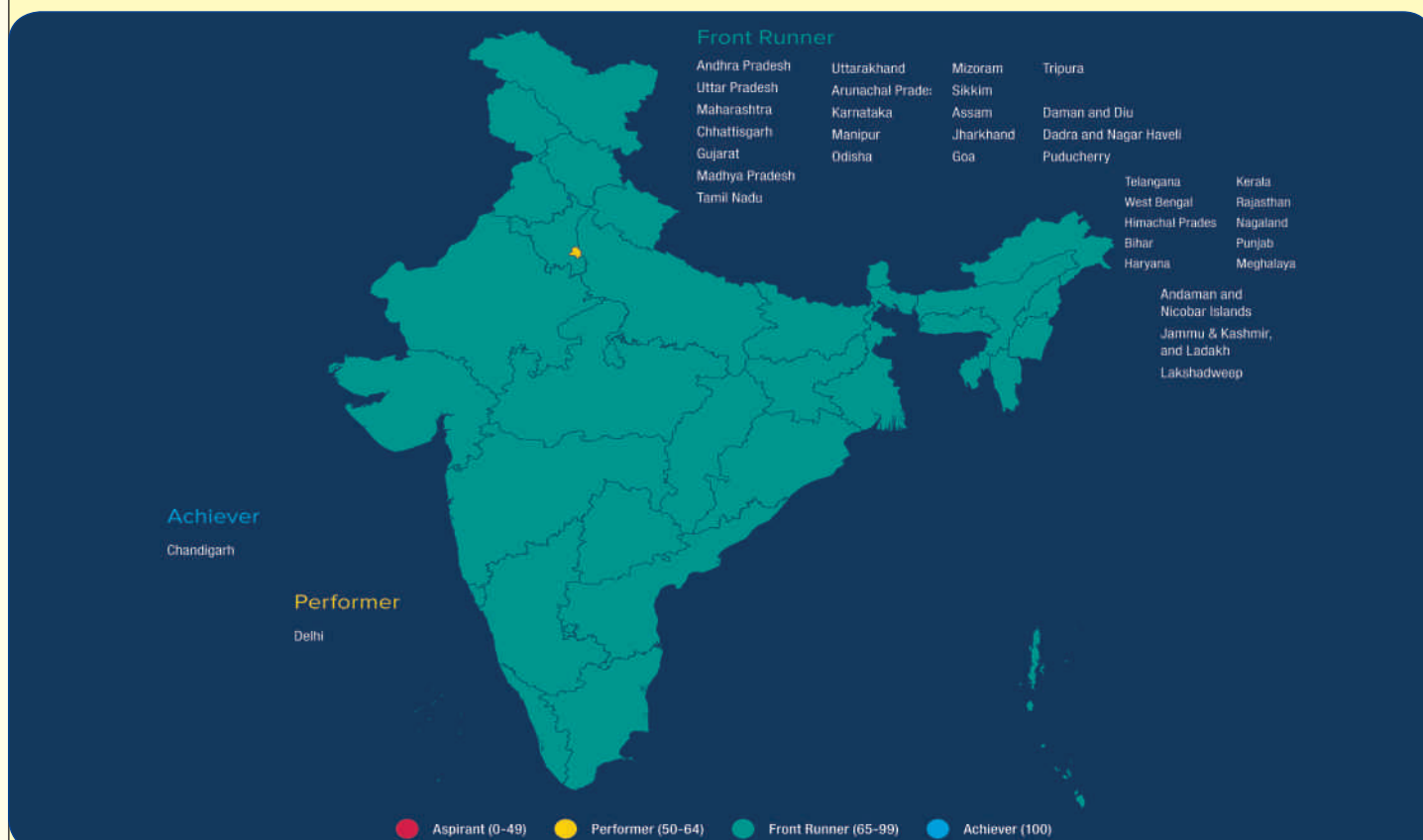
3. Performance of States/ UTs on SDG 4 (Quality Education)



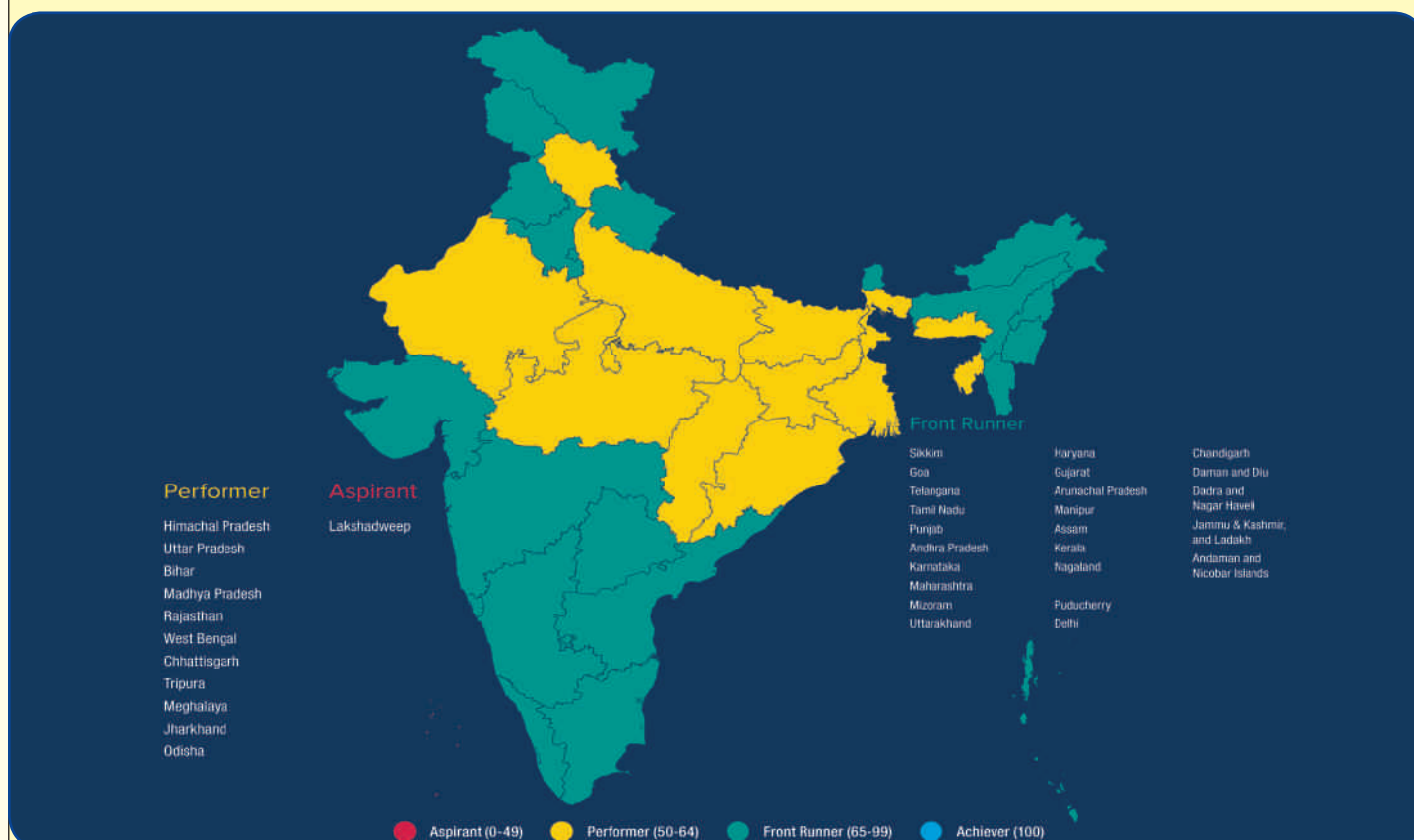
4. Performance of States/ UTs on SDG 5 (Gender Equality)



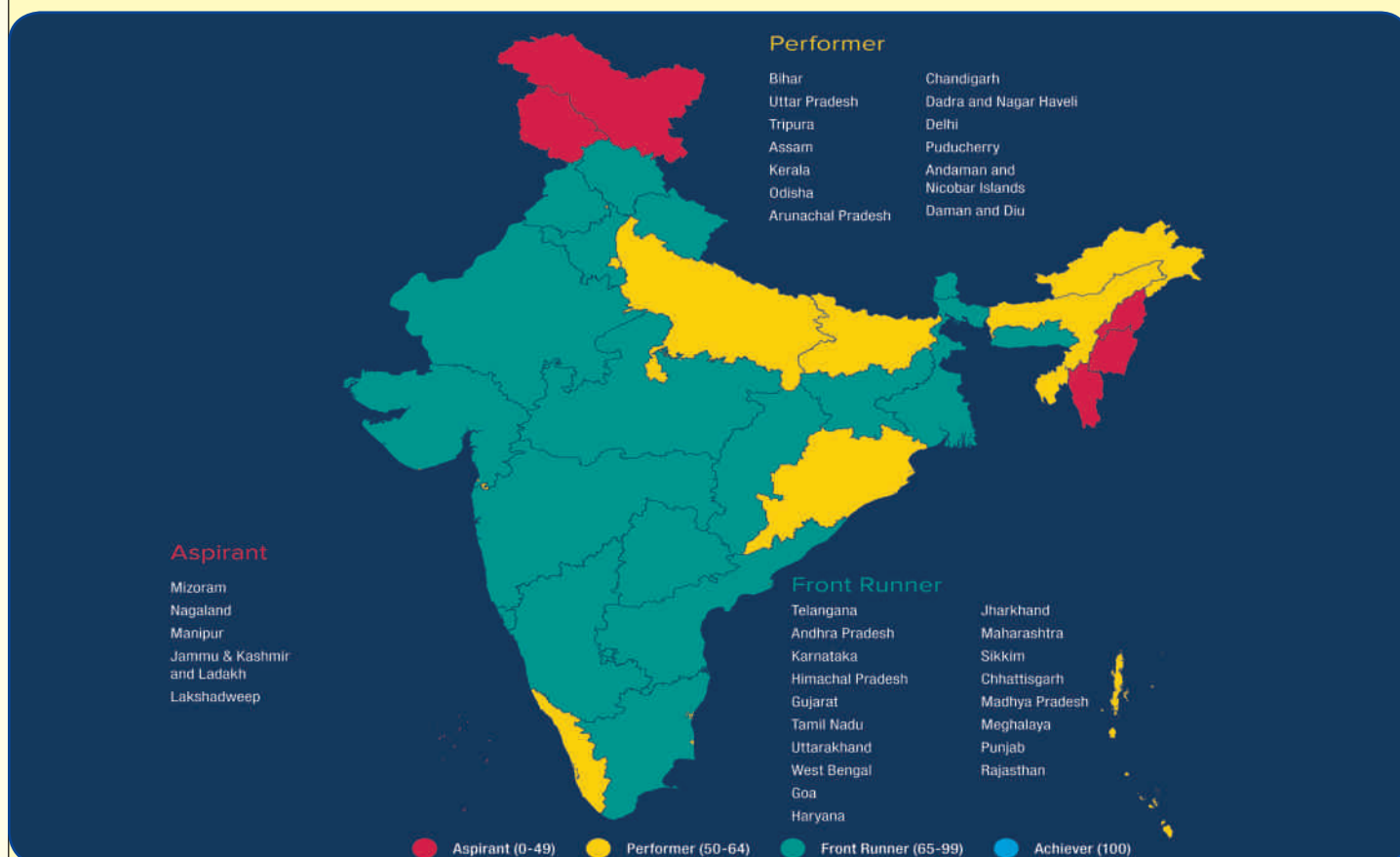
5. Performance of States/ UTs on SDG 6 (Clean Water and Sanitation)



6. Performance of States/ UTs on SDG 7 (Affordable and Clean Energy)



7. Performance of States/ UTs on SDG 8 (Decent Work and Economic Growth)



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Dhyeya IAS, a decade old institution, was founded by Mr. Vinay Singh and Mr. Q.H. Khan. Ever since its emergence it has unparalleled track record of success. Today, it stands tall among the reputed institutes providing coaching for Civil Services Examination (CSE). The institute has been very successful in making potential realize their dreams which is evidents from success stories of the previous years.

Quite a large number of students desirous of building a career for themselves are absolutely less equipped for the fairly tough competitive tests they have to appear in. Several others, who have a brilliant academic career, do not know that competitive exams are vartly different from academic examination and call for a systematic and scientifically planned guidance by a team of experts. Here one single move my invariably put one ahead of many others who lag behind. Dhyeya IAS is manned with qualified & experierenced faculties besides especially designed study material that helps the students in achieving the desired goal.

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