

PERFECT 7

WEEKLY

CURRENT AFFAIRS

May: 2019 / Issue-01

WORLD HERITAGE DAY

Preserving the Heritage Sites

- Slums in India : A By-product of Unplanned Urbanisation
- Recognising the Rights of Rare Disease Patients in India
- Fight Against Corruption : A Scorecard of the Government
- Artificial Intelligence : Augmenting or Disrupting Human Workforce
- Solid Waste in India : A Better Management is Needed
- Re-emergence of Islamic State is Posing a Great Challenge



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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.

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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.

I extend best wishes for the success of this endeavor.

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 around 100 issues and more are yet to come.

Ashutosh Singh

Managing Editor

Dhyeya IAS



PREFACE

Dhyeya family feels honoured to present you a pandora box 'Perfect 7'. '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

Perfect 7

An Initiative of Dhyeya IAS (for Civil Services Examination)

May: 2019 | Issue: 01

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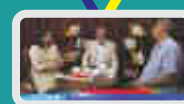
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Our other initiative



Hindi & English
Current Affairs
Monthly
News Paper



DHYEYA TV
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. WORLD HERITAGE DAY: PRESERVING THE HERITAGE SITES

Why in News?

Every year, April 18 is observed as 'World Heritage Day'. The official name for the day is 'International Day for Monuments and Sites'. The day is also aimed at creating awareness about the importance of preserving the various World Heritage Sites around the world. The theme for 2019 is 'Rural Landscapes'. Rural landscapes are areas which are used for the production of food and other resources. This means areas where agriculture, fishing, salt production, hunting and so on are done.

Introduction

The Constitution directs the state and citizens to protect and preserve India's heritage. Cultural heritage is protected by three central laws: the Ancient Monuments and Archaeological Sites and Remains Act, 1958; the Ancient Monuments Preservation Act, 1904; and the Indian Treasure Trove Act, 1878. The natural heritage sites are protected by the Environment (Protection) Act, 1986 and the Biological Diversity Act, 2002. The states have laws to conserve and protect heritage under their purview. Many urban and regional planning and development Acts have provisions for identifying special areas/town planning schemes/local area plans which are used to regulate activities around heritage sites.

In 1977, India ratified the 'UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972', which makes it necessary for India to take measures

to identify, protect and conserve its cultural and natural heritage. Indian laws only define 'ancient monument', 'protected monument' and 'antiquity' while the UNESCO's definition for 'cultural heritage' covers a wider range of items such as industrial heritage, cultural routes, landscapes, etc.

What are World Heritage Sites?

The United Nations Educational, Scientific and Cultural Organisation (UNESCO) selects landmarks or areas around the world which are of cultural, historic or scientific significance. In short, these are landmarks or locations that have 'outstanding universal value'. There are currently 1,092 sites on this list, of which 37 (29 cultural, 7 natural and 1 mixed) are in India. These are places of importance of cultural or natural heritage as described in the UNESCO World Heritage Convention, established in 1972. Tracking down and visiting all these sites could be an experience of a lifetime.

The Criteria for Selection

To be included on the 'World Heritage List', sites must be of outstanding universal value and meet at least one out of ten selection criteria.

Until the end of 2004, 'World Heritage Sites' were selected on the basis of six cultural and four natural criteria. With the adoption of the revised Operational Guidelines for the Implementation of the World Heritage Convention, only one set of ten criteria exists.

1. To represent a masterpiece of human creative genius;
2. To exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design;
3. To bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared;
4. To be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;
5. To be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change;
6. To be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance. (The Committee considers that this criterion should preferably be used in conjunction with other criteria);
7. To contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance;

8. To be outstanding examples representing major stages of Earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features;
9. To be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals;
10. To contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

Conservation in India

Culture plays an important role in the development agenda of any nation. It represents a set of shared attitudes, values, goals and practices. Culture and creativity manifest themselves in almost all economic, social and other activities. A country as diverse as India is symbolized by the plurality of its culture. The mandate of the Ministry of Culture revolves around the functions like preservation and conservation of our cultural heritage and promotion of all forms of art and culture, both tangible and intangible.

The mission of the Ministry is to preserve, promote and disseminate all forms of art and culture. In order to achieve this, the Ministry undertakes the following activities:

- ◆ Maintenance and conservation of heritage, historic sites and ancient monuments.
- ◆ Administration of libraries.
- ◆ Promotion of literary, visual and performing arts.
- ◆ Observation of centenaries and anniversaries of important national

personalities and events.

- ◆ Promotion of institutions and organizations of Buddhist and Tibetan studies.
- ◆ Promotion of institutional and individual non-official initiatives in the fields of art and culture.
- ◆ Entering into cultural agreements with foreign countries.
- ◆ The functional spectrum of the Ministry ranges from creating cultural awareness from the grass root level to the international cultural exchange level.

Further, as per the Ancient Monuments and Archaeological Sites and Remains (Amendment & Validation) Act, 2010 and Rules framed thereunder, persons having buildings or houses in the prohibited area (100 metres from protected monuments) of any Centrally -protected monument may undertake repairs and renovation after obtaining permission from the Competent Authority on the recommendation of the National Monuments Authority. Further, in case of regulated area (200 metres further beyond prohibited area) the persons may undertake construction, reconstruction, repairs and renovation only after obtaining permission from the Competent Authority on the recommendation of National Monuments Authority.

Supreme Court Judgement January 16, 2012

To measure the prohibited (100m) and regulated area (200m) for a centrally protected monument from the base of its boundary wall and not the monument structure.

- Renovation of any building existing in the prohibited area before June 16, 1992 near monuments only meant repair and not razing them and putting up new ones.
- Permission in exceptional cases for undertaking construction in public interest in the vicinity of protected monuments.

Central Government's Recent Initiatives

Heritage City Development and Augmentation Yojana (HRIDAY)

The Ministry of Housing and Urban Affairs has launched the National Heritage City Development and Augmentation Yojana (HRIDAY) scheme on 21st January, 2015, with a focus on holistic development of heritage cities. The scheme aims to preserve and revitalise soul of the heritage city to reflect the city's unique character by encouraging aesthetically appealing, accessible, informative & secured environment. With a duration of 4 years 3 months (up to March, 2019) and a total outlay of INR 500 Crores, the scheme is being implemented in 12 identified Cities namely, Ajmer, Amaravati, Amritsar, Badami, Dwarka, Gaya, Kanchipuram, Mathura, Puri, Varanasi, Velankanni and Warangal.

Adopt a Heritage: Apni Dharohar, Apni Pehchaan

This scheme is an initiative of the Ministry of Tourism, in collaboration with the Ministry of Culture and the Archaeological Survey of India. It was launched in September 2017 on World Tourism Day. Under it, the government invites entities, including public sector companies, private sector firms as well as individuals, to develop selected monuments and heritage and tourist sites across India. Development of these tourist sites calls for providing and maintaining basic amenities, including drinking water, ease of access for the differently-abled and senior citizens, standardised signage, cleanliness, public conveniences and illumination, along with advanced amenities such as surveillance systems, night-viewing facilities and tourism facilitation centres. The sites/monument are selected on the basis of tourist footfall and visibility and can be adopted by private and public

sector companies and individuals — known as Monument Mitras — for an initial period of five years. The Monument Mitras are selected by the 'oversight and vision committee,' co-chaired by the Tourism Secretary and the Culture Secretary, on the basis of the bidder's 'vision' for development of all amenities at the heritage site. There is no financial bid involved. The corporate sector is expected to use corporate social responsibility (CSR) funds for the upkeep of the site. The Monument Mitras, in turn, will get limited visibility on the site premises and on the Incredible India website. The oversight committee also has the power to terminate a memorandum of understanding in case of non-compliance or non-performance.

Vulnerability of Heritage Structures in India

Heritage structures often require remedial interventions due to material deterioration and structural distress caused by natural phenomena, such as, ageing or weathering of materials and natural and man-made disasters. They were built in an era when building codes, as we know them today, were not formalised and with construction materials and techniques that present-day engineers and architects are neither acquainted with, nor formally taught. The durability of these structures may offer an illusion of eternity. Conversely, time is working against the stability of such structures with a mechanism of continuous strength reduction. They exhibit augmented vulnerability to

natural disasters, such as, earthquakes, floods and cyclones. Hence, there is a persistent danger of losing a large stock of heritage structures to natural calamity. This vulnerability holds even under man-made disasters, including vandalism and pollution.

Case Study: Impact of Natural Disaster on Heritage Structure

The Kutch district, continuously inhabited since the Indus Valley civilization, is home to 250 heritage towns and villages with more than 15,000 heritage properties. It was estimated that during this earthquake, about 10,000 heritage structures were either destroyed or extensively damaged. Although earthquakes have repeatedly occurred in the area, e.g., 1819 Allah Bund earthquake and 1956 Anjaar earthquake, seismic safety of historical construction has not been addressed. Some architectural systems (e.g., arches and domes) are used extensively in earthquake-prone areas, which are known to be vulnerable

Challenges

Many activities such as tourism, infrastructure development, new buildings, urban regeneration and changes in land use may have negative impacts on the Outstanding Universal Value (OUV) of the World Heritage properties.

Conservation of heritage structures is an interdisciplinary effort, wherein traditional knowledge on building materials, techniques and specifications are brought to the realm of current practitioners of conservation engineering, with the intent of merging them with modern tools and practices. With one of the largest stocks of

heritage structures in the world, lack of adequate quality and quantity of manpower is a serious bottleneck in India in addressing the task of understanding and protecting heritage structures from natural hazards, ageing and weathering effects.

More importantly, in a country with strong spiritual roots, the approach to conservation of built heritage has to explore the basis of the ancient building system, the centrality of the spirit in the building activity and the philosophy of non-permanence of the material. Such an approach may be in contrast to established, internationally accepted approaches to conservation.

Conclusion

Holistic preservation of Indian heritage would require recourse to pedagogical changes in school and higher education intended to rediscover the ancient Indian wisdom in arts, sciences and philosophies, which hinges on mainstream fundamental research and R&D in the area. Economic viability of heritage will be a by-product of the process due to a revival of traditional arts and crafts, known popularly as intangible heritage and initiation of new disciplines.

General Studies Paper- I

Topic: Indian culture will cover the salient aspects of Art Forms, Literature and Architecture from ancient to modern times.



2. SLUMS IN INDIA: A BY-PRODUCT OF UNPLANNED URBANISATION

Why in News?

A survey report of the Tata Institute of Social Sciences (TISS) has revealed that the life expectancy of Mumbai slum residents barely reaches the age of 40. Further, the report observed that Mumbai's slums occupy 12 per cent

of its total geographic area but 55 per cent of its total population.

Introduction

The 21st century's globalised India now has a brand value in the international arena. However, there are so many challenges and impediments to fulfill

the aspirations of its citizens by the welfare state. The concept of 'Smart City' aims to develop 100 world class, citizen friendly and sustainable cities in India. In this regard, Prime Minister of India Shri Narendra Modi said- "It is our dream that by the time we celebrate the 75th year of independent India, all

the slums are replaced by cemented houses."

The existence of slums is an essential by-product of industrialization and rapid urbanization especially in developing countries. These urban colonies or areas are generally characterized by their closely packed decrepit, unauthorized or encroached small and temporary houses, congested population, unhygienic health conditions, least civic amenities, all types of pollution, criminal activities, foul smell, stray animals and poverty etc. According to the United Nations World Cities Report 2016, the number of slum dwellers in developing countries increased from 689 million in 1990 to 880 million in 2014. Nearly 25% urban population of the world is living in slums. 'Dharavi' of Mumbai is the biggest slum of India the second largest in Asia and third largest in world. It has 2.1 sq km area and one million population. There are so many slums across the globe which are known for their dense population and wide spread area including 'Orangi town', Karachi (Pakistan) with 2.4 million inhabitants, Ciudad Neza, Mexico City (Mexico) with 1.2 million, Kibera, Nairobi (Kenya) with 7 million inhabitants and Khayelitha, Cape Town (South Africa) with 4 million population are some notorious and largest slums of the developing countries.

Slums and India

Slums have risen dramatically since 1947. There were main two reasons for slum development. One is 'partition of India' and the other is Industrial revolution' after independence. Before 1950 slums were predominantly found around the mills, factories etc. They were mostly industrial workers in one room tenements. Recently, Indian towns/cities have witnessed a significant increase in their development activities in the form of renewed urban planning and construction, establishment of

industries and trade, expansion in transport and communication system, availability of their infrastructure facilities in post-independence era. Urban congestion, tremendous migration of labour force both skilled and unskilled, non-availability of housing infrastructure has led to occurrence of slums and reflects the deteriorating quality of life in urban areas.

Definition of Slums

Census slums have been earmarked in all the statutory towns irrespective of their population size based on the same definition as in 2001. Three types of slums have been defined in Census, namely, Notified, Recognized and Identified; (i) All notified areas in a town or city notified as 'Slum' by state, Union Territories Administration or local government under any act including a 'Slum Act' may be considered as 'notified slums'. (ii) All areas recognized as 'Slum' by State, Union territories Administration or Local Government, Housing and Slum Boards, which may have not been formally notified as slum under any act may be considered as 'recognized slums' (iii) A compact area of at least 300 population or about 60-70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities.

UN Habitat define that a slum is an area that combines to various extents the following characteristics; inadequate access to safe water, inadequate access to sanitation and other infrastructure, poor structural quality of housing, overcrowding and insecure residential status.

Slum demography had been presented on the basis of actual count in Census 2011. The slum population was reported from 31 states/union Territories (UTs) in India. Four states/union territories namely, Manipur, Dadra and Nagar Haveli, Daman & Diu and Lakshadweep did not report any slum population in their cities/towns. 2613 towns reported slum population out of 4041 statutory towns. In 2001,

42.6 million populations were lived in slums in India which increased to 65.5 million by 2011. This constituted 17.4% of the urban population of the states/UTs in 2011. The distribution of slum towns across the states and UTs was not uniform in India.

The Census estimates the number of slum blocks in the country to be 110,000. While the number of households in each of these slum blocks varies between 86,000 households in Dharavi, to 1,300 households in Nochikuppam Chennai, the level of public services in these areas remain visibly poor everywhere.

Different scholars have drawn attention to the diversity that exists within each slum residence. Various studies observed that in smaller Indian cities, typical slum dwellers were recent rural migrants, but in Mumbai and Delhi, families have lived in slums for years.

Characteristics of Slums

Lack of Basic Services

Lack of access to improved sanitation facilities and improved water sources is the most important feature, sometimes supplemented by absence of waste collection systems, electricity supply, surfaced roads and footpaths, street lighting, rainwater drainage, open sewers etc.

Illegal and Inadequate Building structures

Slum areas are associated with a high number of substandard housing structures, often built with non-permanent materials unsuitable for housing given local conditions of climate and location.

Overcrowding and High Density

Many slum dwelling units are overcrowded, with five and more persons sharing a one-room unit used for cooking, sleeping and living.

Poverty and Social Exclusion

Slums are areas of social exclusion that are often perceived to have high levels of crime and other measures of social dislocation.

Causes

Rural-Urban Migration

Many people migrate from rural to urban areas in search of employment as employment opportunities is less in rural area as compared to urban areas. Also, many migrants want better facilities and education for their children so that in future their children could support them and their families.

Urbanisation

Urbanisation creates slums because local governments are unable to manage urbanisation and migrant workers without an affordable place to live in. In the situation of large gap between people's low income and the high land price some people have to look for cheap informal settlements, which are known as slums in urban areas.

Poor Housing Planning

The gap between growing demand for affordable urban housing and insufficient supply has encouraged the formation of slums. Whenever the demand surplus is not met by formal sectors, this gap is typically filled by an informal dwelling such as a slum. While a slum is better than nothing, housing that is safe, clean, and secure is obviously preferred. The challenges that both the market supply and demand sides are facing have prevented sufficient affordable housing for the urban poor, stimulating slum formation.

Informal Economy

Slums grow because of growing informal economy which creates demand for workers, and as demand

increases more people migrate from rural area and settle down in slums as the only left option.

Lack of Available Urban Land

In the past 15 years, India's urban population density has increased 45%. With increasingly densified urban population, there exists a huge demand for land. However, excess control over land development creates an artificial urban land shortage, as this could lead to urban sprawl and corruption in land licensing.

Regulatory Constraints

Development projects in urban areas are subject to a long approval process regarding different aspects from both state and central level, which brings about postponement in tasks. In fact, India is ranked 183 out of 189 economies in dealing with construction permits by the World Bank, which shows the challenges real estate developers face in India.

Natural Disasters

Major natural disasters in poor nations often lead to migration of disaster-affected families from areas crippled by the disaster to unaffected areas, the creation of tent city and slums, or expansion of existing slums. These slums tend to become permanent because the residents don't want to leave from there.

The Failure of Governance

Urban Local Bodies (ULBs) are the constitutional bodies which have major role to play in providing basic amenities to urban citizens. But, ULBs in India operate with very low tax bases, where eight of the largest twenty-one cities, are unable to finance even 50% of municipal costs. As a result, informal districts of the city are worst-hit by low service levels. If the slum population is largely informal and tax non-compliant, local governments see little incentive to spend money on increasing their

service levels. This is evident in visible open drainage lines and lack of streetlights, roads, household toilets and garbage collection services. This has led to major public health issues such as open defecation and the presence of unsanitary waste adjacent to houses. Various studies correlating health outcomes to the built environment found that children living in urban slums in India have stunted growth compared to non-slum urban and rural children. The health effects on slum residents have shown to vary by several factors including number of years living in the slum, presence of a separate kitchen, type and permanence of the shelter. The extremely dense housing also causes communicable diseases to spread rapidly.

In cities where the slum population constitutes about 40% of the total population of the city, one would expect the large slum representation to result in greater political demand for basic services. Unfortunately, large electorate numbers have not been able to translate that potential into a political advantage resulting in better service levels. A study of around 800 slums in Delhi, found that the slum population does participate in the electoral process (voter turnout was 58%) but the voter information level remains severely low, leading to voting on the basis of caste lines or cash based voting. The political parties work with slum "Pradhans" who tend to be caste/religious leaders and form the informal power structures. In slums with several ethnic or religious groups, each demographic portion of the slum may be led by its own Pradhan which makes it easier for people to resort to caste/religion based voting. This dissociates politics from past performance and leads to the polarization of votes, often in conflict with the self-interest of the slum community.

Evolution of National Schemes in India Over Time

National Slum Development Programme (NSDP)

NSDP was started in 1996 with the aim to upgrade 47,124 slums throughout India. It identified a target slum in each city which it planned to develop as a 'model' slum.

Basic Services to Urban Poor (BSUP)

BSUP was started as a part of larger scheme called Jawaharlal Nehru National Urban Renewal Mission (JNNURM), a large scale urban renewal program for urban India. BSUP aimed to provide basic services to urban poor in 63 of the largest cities in India by population. While the original intent of this program was to provide security of tenure at affordable prices and improved housing, water supply and sanitation, it ultimately became a housing construction program subsidized and implemented by the government.

Housing for All

In June 2015, the government has approved the 'Housing for All' scheme, with the goal to provide housing to every Indian household by 2022. It plans to include 300 major cities in India in its first two phases by 2019. After 2019, it plans to extend this scheme to remaining cities in India. One of the major components of the program is to utilize in-situ slum rehabilitation, through which the government has devised a strategy to incentivize private developers to use land as a resource. The policy also includes a small slum upgradation component to involve beneficiary-led individual housing construction.

Analysis of Government Measures

The United Nations' Sustainable Development Goals recognize

the sustainable growth of future generations is contingent upon active improvement in quality of life. The Sustainable Development Goals (SDG) aspire to halve the proportion of people living in slums within each country by 2030. India, being a responsible nation, brought a scheme named 'Housing for All' to achieve the target of SDGs.

Given the very nature of informality, surveying the number of households defined as slums is challenging, but in India this implies improving quality of life of at least 6 million households. Yet, India has a more ambitious target in mind; the government announced 'Housing for All' policy. It is estimated that the current shortfall of houses is 19 million, with 95% of this need being in the low-income segment (less than Rs.2,00,000). This cannot be achieved by government interventions alone, hence the government has articulated its policy of incentivizing the private sector to participate in effective redevelopment of the entire slum community. The slum redevelopment component of this scheme proposes an efficient solution: the government aims to use land occupied by squatter settlements as a resource to subsidize housing for urban poor. This effectively solves the problems of land shortage while subsidizing the cost of housing for urban poor to as little as zero in some cases.

By involving the private sector and using real-estate as a financing tool, this component of the policy marks a stark departure from the previous policies which focused on piecemeal upgradation efforts in slums (National Slum Development Program) or used government machinery to create poor quality public housing (Basic Services to Urban Poor).

Conclusion

Government need to understand that urban poor people are not just to take votes at the time of elections, they



are having a great hand in country's economy and our country will only progress when these people are being treated as the part of the society and are given respect and support via different government policies and plans.

Local governments should develop strategies to prevent the formation of new slums. These should include access to affordable land, reasonably priced materials, employment opportunities and basic infrastructure and social services.

Public investments must focus on providing access to basic services and infrastructure. Working with urban poor, cities need to invest in housing, water, sanitation, energy and urban services, such as garbage disposal.

Developing cities requires local solutions. Local authorities need to be empowered with financial and human resources to deliver services and infrastructure to urban poor. Cities should draw up local long-term strategies for improving the lives of slum dwellers.

General Studies Paper- II

Topic: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

Topic: Welfare schemes for vulnerable sections of the population by the Centre and States and the performance of these schemes; mechanisms, laws, institutions and Bodies constituted for the protection and betterment of these vulnerable sections.



3. RECOGNISING THE RIGHTS OF RARE DISEASE PATIENTS IN INDIA

Context

The government has issued a notification recently, saying that the existing policy will be kept in abeyance till it issues a revised policy. The suspension of the National Policy for the Treatment of Rare Diseases was a rude shock, particularly for those patients who were relying on the money allotted through the policy for life-saving treatments.

Introduction

A rare disease is a health condition of a particularly low prevalence that affects a small number of people compared with other prevalent diseases in the general population. It is estimated that globally around 6000 to 8000 rare diseases exist with new rare diseases being reported in the medical literature regularly. However, 80% of all rare disease patients are affected by approximately 350 rare diseases.

Paradoxically, though rare diseases are of low prevalence and individually rare, collectively they affect a considerable proportion of the population in any country, which according to generally accepted international research is – between 6% and 8%. Rare diseases include genetic diseases, rare cancers, infectious tropical diseases and degenerative diseases. 80% of rare diseases are genetic in origin and hence disproportionately impact children.

There is no universally accepted definition of a rare disease. Different countries define rare diseases differently. However, the common considerations in the definitions are primarily, disease prevalence and to varying extent - severity and existence of alternative therapeutic options. World Health Organisation (WHO) defines rare disease as often debilitating lifelong disease or disorder

condition with a prevalence of 1 or less, per 1000 population. In the US, rare diseases are defined as a disease or condition that affects fewer than 200,000 patients in the country (6.4 in 10,000 people) whereas in the case of Japan it is identified as diseases with fewer than 50,000 prevalent cases (0.4%).

Prevalence of Rare Diseases in India

India, like many other developing countries, currently has no standard definition of rare diseases and data on prevalence. Since there is no epidemiological data, there are no figures on burden of rare diseases and morbidity and mortality associated with them. If we apply the international estimate of 6% to 8% of population being affected by rare diseases, to India, we have between 72 to 96 million people affected by rare diseases in the country, which is a significant number. However, this is at best a general estimate and India will need to arrive at its own estimate and definition of rare diseases, derived chiefly from prevalence data, which is currently lacking.

So far only about 450 rare diseases have been recorded in India from tertiary care hospitals. The most common rare diseases include Haemophilia, Thalassemia, Sickle-cell Anaemia and Primary Immuno Deficiency in children, auto-immune diseases, Lysosomal storage disorders such as Pompe disease, Hirschsprung disease, Gaucher's disease, Cystic Fibrosis, Hemangiomas and certain forms of muscular dystrophies.

Rare Diseases as a Public Health Issue

The field of rare diseases is complex and heterogeneous and suffers from

a deficit of medical and scientific knowledge. The landscape of rare diseases is constantly evolving as there are new rare diseases and conditions being identified and reported regularly in medical literature. Apart from a few rare diseases, where significant progress has been made, the field is still at a nascent stage.

Diagnosis of Rare Diseases

Diagnosis of a rare condition may take upto several years, owing to difficulty in diagnostic modalities and lack of awareness among doctors. For many rare diseases, no diagnostic method exists, or diagnostic facilities are unavailable. Traditional genetic testing can only address a few genes at a time. As a result, physicians must often provide their best guess on which genes to investigate. If the test is negative, further testing will be required, which is an expensive and time-consuming process.

There is a lack of awareness about rare diseases in general public as well as in the medical profession. Many doctors lack appropriate training and awareness to be able to correctly and timely diagnose and treat these conditions. There is an immediate need to create awareness among general public, patients and their families and doctors, training of doctors for better diagnosis, standardisation of diagnostic modalities, developing of new diagnostic tools and investment in gene therapy.

Problems of Varying Definitions and Prevalence Thresholds

The use of inconsistent definitions and diverse terminology can result in confusion and inconsistencies and have implications for access to treatment and for research and development.

According to a study, which reviewed and analysed definitions across jurisdictions, most definitions, as discussed above, appear to consider disease prevalence, but other criteria also apply sometimes, such as - disease severity, whether the disease is life-threatening, whether there are alternative treatment options available and whether it is heritable. The study found that relatively few definitions (30%) included qualifiers relating to disease severity and/or a lack of existing treatments.

Disease prevalence alone may also not be an accurate basis for defining rare diseases, as it does not take into account changes in population over time. Hence, some have suggested that a more reliable approach to arriving at a definition could be based on the factors of—

- a) **Location:** A disease which is uncommon in one country may be quite common in other parts of the world;
- b) **Levels of rarity:** Some diseases may be much more rare than other diseases which are also uncommon; and
- c) **Study-ability:** Whether the prevalence of a disease lends itself to clinical trials and studies.

Challenges in Research and Development

A fundamental challenge in research and development for the majority of rare diseases is that there is relatively little known about the pathophysiology or the natural history of these diseases. Rare diseases are difficult to research upon as the patient pool is very small and it often results in inadequate clinical experience. Therefore, the clinical explanation of rare diseases may be skewed or partial. The challenge becomes even greater as rare diseases are chronic in nature, where long term follow up is particularly important. As a result, rare diseases lack published data

on long-term treatment outcomes and are often incompletely characterized.

Challenges in Treatment

Availability and access to medicines are important to reduce morbidity and mortality associated with rare diseases. Despite progress in recent years, effective or safe treatment is not available for most of the rare diseases. Hence, even when a correct diagnosis is made, there may not be an available therapy to treat the rare disease.

As the number of persons suffering from individual rare diseases is small, they do not constitute a significant market for drug manufacturers to develop and bring to market drugs for them. For this reason, rare diseases are also called 'orphan diseases' and drugs to treat them are called 'orphan drugs'. Where, they do make drugs to treat rare diseases, they sell them at extremely high costs, statedly, to recoup the cost of research and development.

Balancing Competing Priorities of Public Health

Rare diseases constitute a major economic burden independent of a country's size and demographics; these costs arise from increased healthcare spending and lost productivity. The exorbitant prices of medicines are important considerations in public health policy development with reference to treatment for rare diseases.

In resource constrained settings, it is pertinent to balance competing interests of public health for achieving optimal outcome for the resources allocated. As resources are limited, there is a macroeconomic allocation dilemma: on one hand, health problems of a much larger number of persons can be addressed by allocating a relatively smaller amount, on the other, for funding treatment of rare diseases, much greater resources will be required for addressing health

problems of a relatively smaller number of persons. This raises questions of fairness and reasonability. However, it also raises issues of ethics and equity of opportunity for patients to benefit, in the interest of patients suffering from rare diseases. Hence any policy on treatment of rare diseases will have to strike a balance between access to treatment with health system sustainability.

National Policy for Rare Disease

High treatment cost of rare disease has compelled families from rare diseases to approach the courts seeking directions that the government must provide the drugs for free, so that the treatment could continue. Consequently, Delhi High court (HC) had directed the Ministry of Health & Family Welfare (MoHFW) to frame a national policy on treatment of rare diseases. Court has categorically stated that low disease incidence cannot be the state's basis for denying someone the right to life enshrined under Article 21 of the Constitution.

On the basis of above background and recognizing the severity, Ministry of Health and Family Welfare has formulated a National Policy for treatment of Rare Diseases in India to progressively build India's capacity to respond comprehensively to rare diseases.

Key Features

- ♦ It recommends that families below the poverty line are given free and supportive services in private or government hospitals.
- ♦ Constituting a Rare Diseases Cell within MoHFW, Indian Council of Medical Research (ICMR) and Department of Pharmaceuticals (DoP) in the Ministry of Chemicals and Fertilizers to be the nodal for the activities related to rare diseases.

- ◆ It provides corpus fund of 100 Crores for part funding treatment of rare diseases. The Central government will contribute 60 percent towards spending on treatment, while state governments will have to bear the remaining 40 percent of the cost.
- ◆ Creating a patient registry for rare diseases housed in ICMR.
- ◆ On the basis of the current knowledge, developing materials for generating awareness in the general public, patients and their families and for training of health care providers.

A Brief Analysis of Policy

Although the policy covered the areas of prevention, awareness generation, training of doctors, funding support for treatment, promotion of research and development for drugs for treatment of rare diseases and diagnostics at affordable prices and measures for making the drugs for rare diseases more affordable, strengthening of laboratory networks, development of Centres of Excellence etc. But there exists certain loopholes in the policy framework.

The policy does not provided the much needed definition of rare disease either, leaving it unresolved. Though the corpus fund of 100 Crores was provided in the affidavit, no such corpus was created under National Health Mission. Similarly there is no clarification as to whether the financial

help for treatment would only be provided for below poverty line (BPL) patients or would also include above poverty line (APL) patients.

Way Forward

Recent developments have not given the rare disease community much to celebrate. Since these diseases are not found commonly, doctors are typically unaware about them and therefore either misdiagnose or do not diagnose them. This further decreases recorded incidence of the disease, which in turn diminishes interest in understanding the disease and finding treatments for it. This cycle of neglect can only be overcome by strong support from the government.

Unfortunately, India's suspended rare disease policy has reinforced the premise that public health is a game of numbers, not lives. There is an implicit calculation as the high 'opportunity cost' of treating someone with a rare disease is considered a sound basis for negligible governmental spending on rare disease. A cold utilitarian calculation is a disturbing basis for public policy because it perpetuates marginalisation and subverts the state's duty to treat its citizens equally.

The government should create a new policy that is based on different fundamentals. The suspended policy's narrow focus on allocating funds to treat a select few rare diseases to the exclusion of untreatable diseases

lacked vision and is costly. When only 5 per cent of all rare diseases are treatable, it is extremely problematic for a government's rare disease policy to state that its least priority is to allocate money to diseases that cannot be treated. In doing so, it effectively excluded 95 per cent of rare diseases from its purview.

A new and inclusive rare disease policy should allocate substantial resources to research for the development of new platform therapies that could commonly treat different rare diseases, with the additional possibility of simultaneously bringing down the costs of current treatments. More research will also facilitate greater interest in rare diseases in the medical community, increasing rates of diagnosis and improving medical care.

The government must not abandon the rare disease community to the market mechanism. To respect the HC's directions, a new policy must be founded on non-discriminatory ideals. Policymakers will have to address fiscal constraints without devaluing lives of entire patient populations.

General Studies Paper- II

Topic: Issues relating to development and management of Social Sector/ Services relating to Health, Education, Human Resources.



4. FIGHT AGAINST CORRUPTION: A SCORECARD OF THE GOVERNMENT

Context

Allegations of several big corruptions on government have surfaced in the last five years, including banking frauds and allegations of irregularities in defence procurement deal. At the same time, there is no evidence of any check on everyday corruption that impacts the delivery of services to people. In this article we will analyse the status,

functionalities and relevance of anti corruption laws and institutions.

Introduction

Everyone censures corruption at a societal stage but that does not mean that anyone has escaped from the flu of corruption. It is not an infection in one country. People worldwide are involved in the act of corruption. India

is no exception to it. Corruption in India has even crossed the alarming stage.

It is a term known to all of us precisely meaning an illegal, immoral or unauthorized act done in due course of employment. But literally it means "Inducement (as of a public official) by improper means (as bribery) to violate duty (as by committing a felony)". Corruption is a termite in every system.

Once it enters the system, it goes on increasing. Today it is rampant and has gradually become routine. Worldwide, bribery alone is estimated to involve over 1 trillion US dollars annually.

This shows how big a problem is corruption. It is indeed the biggest challenge in front of any government because the system itself is handicapped as its own employees are slaves of another. Corruption is the root cause of all other problems that a country faces. Let us look at it with reference to India. Many big problems such as poverty, unemployment, illiteracy, pollution, external threats, etc. are posed in front of the Indian government. But having a glimpse at all these problems faced by India, one might notice that corruption plays an important role in making these problems even bigger. India is still facing poverty and corruption is one of the foremost reason responsible for it.

Corruption Statistics in India

The annual Kroll Global Fraud Report noted that India has among the highest national incidences of corruption (25%). The same study also noted that India reports the highest proportion reporting procurement fraud (77%) as well as corruption and bribery (73%).

Similarly in the latest Corruption Perceptions Index (CPI) released earlier this year by a German based anti corruption watchdog 'Transparency International' ranked India as 78th out of 180 countries surveyed. The index ranked 180 countries and territories by their perceived levels of public sector corruption according to experts and businesspeople. It uses a scale of 0 to 100, where 0 is highly corrupt and 100 is very clean. Although India's ranking increased from 81st in 2017 to 78 in 2018, there was a little significant movement in its CPI score, which moved from 40 in 2017 to 41 in 2018.

In spite of spectacular public mobilisation in 2011, where citizens demanded the government to

take action against corruption and advocated for the passage of the comprehensive Jan Lokpal bill, the efforts ultimately fizzled and fell flat, with little to no movement on the ground to build the specialist anti-corruption infrastructure required.

Various Legislative Provisions for Fighting Corruption

Public servants in India can be penalized for corruption under the Indian Penal Code (IPC), 1860 and the Prevention of Corruption Act, 1988. The Benami Transactions (Prohibition) Act, 1988 prohibits benami transactions. The Prevention of Money Laundering Act, 2002 penalizes public servants for the offense of money laundering.

Indian Penal Code, 1860

The IPC defines "public servant" as a government employee, officers in the military, navy or air force; police, judges, officers of Court of Justice and any local authority established by a central or state Act.

- ◆ Section 169 pertains to a public servant unlawfully buying or bidding for the property. The public servant shall be punished with imprisonment of up to two years or with fine or both. If the property is purchased, it shall be confiscated.
- ◆ Section 409 pertains to criminal breach of trust by a public servant. The public servant shall be punished with life imprisonment or with imprisonment of up to 10 years and a fine.

The Prevention of Corruption Act, 1988

It encompasses broader definition of "public servant" includes office bearers of cooperative societies receiving financial aid from the government, employees of universities, Public Service Commission and banks.

- ◆ If a public servant takes gratification other than his legal remuneration

in respect of an official act or to influence public servants is liable to a minimum punishment of six months and maximum punishment of five years and fine.

- ◆ The Act also penalizes a public servant for taking gratification to influence the public by illegal means and for exercising his personal influence with a public servant.
- ◆ If a public servant accepts a valuable thing without paying for it or paying inadequately from a person with whom he is involved in a business transaction in his official capacity, he shall be penalized with a minimum punishment of six months and maximum punishment of five years and fine.
- ◆ It is necessary to obtain prior sanction from the central or state government in order to prosecute a public servant.

The Benami Transactions (Prohibition) Act, 1988

The Act prohibits any benami transaction (purchase of property in the false name of another person who does not pay for the property) except when a person purchases property in his wife's or unmarried daughter's name.

- ◆ Any person who enters into a benami transaction shall be punishable with imprisonment of up to three years and/or a fine.
- ◆ All properties that are held to be benami can be acquired by a prescribed authority and no money shall be paid for such acquisition.

The Prevention of Money Laundering Act, 2002

The Act states that an offense of money laundering has been committed if a person is a party to any process connected with the proceeds of crime and projects such proceeds as untainted property.

- ◆ The penalty for committing the offense of money laundering is rigorous imprisonment for three to seven years and a fine of up to Rs. 5 lakh. If a person is convicted of an offense under the Narcotics Drugs and Psychotropic Substances Act, 1985 the term of imprisonment can extend up to 10 years.
- ◆ The Adjudicating Authority, appointed by the central government, shall decide whether any of the property attached or seized is involved in money laundering.
- ◆ Every banking company, a financial institution and intermediary shall maintain a record of all transactions of a specified nature and value and verify and maintain records of all its customers and furnish such information to the specified authorities.

Recent Blows to Fighting Graft

The Prevention of Corruption (Amendment) Act, 2018

The recent amendments to the Prevention of Corruption Act narrows down the definition of corruption, increases the burden of proof necessary for punishing the corrupt and makes things more arduous for whistle-blowers.

The most grievous blow is the strengthening of the shield available to officials accused of corruption. Investigating agencies have been barred from even initiating an inquiry or investigation into allegations of corruption without prior approval from the government. Effectively, this empowers political masters to decide whether they wish to allow a corruption inquiry against a government employee or not. The amendments have done away with the offence of abuse of position by a public servant, unless the element of

bribery is established. This frustrates peoples' ability to fight corruption in cases which may not involve the payment of a bribe, as it may be done for other considerations like pleasing political masters for rewards. Also, cases involving gratification are often impossible to trace as they may be deferred in the form of post-retirement benefits or paid through clandestine off-shore accounts.

Undermining Autonomy of CBI

Recent months have witnessed a brazen undermining of the autonomy of the Central Bureau of Investigation (CBI). To insulate the organisation from government influence, the selection and transfer of the CBI Director is vested in a committee comprising the Prime Minister, the Leader of the Opposition in the Lok Sabha and the Chief Justice of India. However, the whole incident of removal the erstwhile CBI Director Alok Verma by the government, without consulting the selection committee and appointment of an Interim Director, M. Nageswara Rao and later the Supreme Court intervention had seriously eroded the credibility of the institution.

Constituting Lokpal

The Lokpal law was enacted to set up an independent and empowered anti-corruption ombudsman, who would work without fear or favour to tackle cases of big-ticket corruption involving high-level government functionaries. The government failed to take the necessary steps to appoint a Lokpal for nearly five years.

Feeling the pressure due to deadline given by the Supreme Court, a selection committee without the Leader of the Opposition selected the chairperson and members of the Lokpal haphazardly. The selection of the Lokpal by a committee having a preponderance of government representatives and consequently

an inherent bias towards candidates favoured by the ruling party, defeated the purpose of the law and undermined public trust in the institution even before it became functional.

Whistle Blowers and Right to Information

Government has failed to promulgate rules and operationalise the Whistle Blowers Protection Act, 2014. Whistle-blowers, who speak truth to power by exposing corruption and wrongdoing, continue to be denied protection. Many Right to Information (RTI) users who have exposed corruption have been killed.

The RTI Act is one of the most effective tools to fight corruption and abuse of power. As per the provisions of this Act, any citizen may place a request for information from a "public authority", where the concerned authority needs to reply within 30 days. Thus, this act has armed citizens to get complete information on public spending. But many a times information is denied by the government officials in the name of Official Secret Act. Not a single commissioner was appointed to the Central Information Commission in the last five years without intervention by courts. In 2018, the government proposed regressive amendment to undermine the independence of information commissions. These were eventually abandoned due to public pressure.

The Case of Electoral Bond

The 'electoral bond' Scheme was introduced to promote transparency in funding and donation received by political parties. The scheme envisages building a transparent system of acquiring bonds with validated Know Your Customer (KYC) and an audit trail. A limited window and a very short maturity period would make misuse improbable. Bonds will prompt donors to take the banking route to donate,

with their identity captured by the issuing authority.

But there are many loopholes like it prevents citizens from finding out who is funding political parties. In one stroke it has ensured that donations worth thousands of crores can be made anonymously. The largest benefactor of the electoral bonds scheme will be the ruling party. Citizens don't know who makes donations and whose interest, therefore, the party will serve.

Case of Everyday or Petty Corruption

Corruption in India is not limited to collusive high-level scams. Petty corruption, which affects the delivery of basic services and rights to people, is rampant. This especially impacts the poor and marginalised, who are most dependent on public provisioning of rations, pensions, health and education. This form of corruption thrives primarily due to lack of effective mechanisms to hold officials accountable. A legislation to fix this problem was introduced in Parliament in the form of a Grievance Redress Bill in 2011. Unfortunately, it lapsed with the dissolution of the Lok Sabha in 2014, no attempts have been made by the government to reintroduce the Grievance Redress Bill, which would have empowered people to fight everyday corruption.

Way Forward

Corruption has been prevalent in human society since time immemorial and is an inevitable evil in public governance. In the words of Kautilya "Just as it is impossible not to taste the honey that find itself in the tip of the tongue, so it is impossible for a government assistant not to eat up, at least a bit of King's revenue." However in the recent past corruption has gained ascendancy to such an extent that, it has adversely affected the nation building programs and processes. Corruption threatens the rule of law, democracy and human rights; undermines good governance, fairness and social justice; distorts competition, hinders economic development and endangers the stability of democratic institutions and moral foundations of society.

Although India has legislated enough laws to deal with corruption but mere enacting anti-corruption laws are not enough. There must be a strong agency to implement those Acts effectively and prevent corruption in public life. The collective effort of the legislature along with a proactive approach taken by the judiciary may be very helpful in bringing some positive results in the context of prevention of

corruption. It is the need of the hour to bring CBI and other central and state investigation agencies out of control of the government so that a fair investigation may be brought out and the culprit may be punished as per the provisions of law.

There should be a comprehensive package to fight against corruption. The government must strengthen existing laws like whistle blower protection act, lokpal act etc. The government should also address the regulatory concerns in Competition Act, the Companies Act, Income Tax etc. Citizen participation and transparency in decision making must be ensured along with focussing on judicial reform and police reform to create deterrence and in turn eradicating the menace of corruption.

General Studies Paper- II

Topic: Important aspects of governance, transparency and accountability, e-governance-applications, models, successes, limitations and potential; citizens charters, transparency & accountability and institutional and other measures.

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5. ARTIFICIAL INTELLIGENCE: AUGMENTING OR DISRUPTING HUMAN WORKFORCE

Why in News?

Private equity/venture capital investments in the Artificial Intelligence (AI) segment in the country grew over fivefold in 2018-19, to \$359 million (nearly Rs 25,000 crore) from \$63 mn (Rs 440 crore) in FY18. India also announced a new national program for the development of AI while presenting the Interim Budget 2019.

Introduction

AI is poised to disrupt our world. With intelligent machines enabling high-level cognitive processes like thinking, perceiving, learning, problem solving and decision making, coupled with advances in data collection and aggregation, analytics and computer processing power, AI presents opportunities to complement and supplement human intelligence and

enrich the way people live and work.

The race to become the global leader in AI has officially begun. In the past fifteen months, Canada, China, Denmark, the EU Commission, Finland, France, India, Italy, Japan, Mexico, the Nordic-Baltic region, Singapore, South Korea, Sweden, Taiwan, the UAE and the UK have all released strategies to promote the use and development of AI. No two strategies are alike, with

each focusing on different aspects of AI policy: scientific research, talent development, skills and education, public and private sector adoption, ethics and inclusion, standards and regulations and data and digital infrastructure.

What is Artificial Intelligence?

AI refers to the ability of machines to perform cognitive tasks like thinking, perceiving, learning, problem solving and decision making. Initially conceived as a technology that could mimic human intelligence, AI has evolved in ways that far exceed its original conception. According to the father of AI, John McCarthy, it is "The science and engineering of making intelligent machines, especially intelligent computer programs".

AI is a way of making a computer, a computer-controlled robot, or a software think intelligently, in the similar manner the intelligent humans think. AI is accomplished by studying how human brain thinks and how humans learn, decide and work while trying to solve a problem and then using the outcomes of this study as a basis of developing intelligent software and systems.

Types of AI

AI can be classified in any number of ways. There are two types of main classification.

Type 1 (Based on Strength)

1. Weak AI or Narrow AI: It is focused on one narrow task, the phenomenon that machines which are not too intelligent to do their own work can be built in such a way that they seem smart. An example would be a poker game where a machine beats human where in which all rules and moves are fed into the machine. Here each and every possible scenario need to be entered beforehand

manually. Each and every weak AI will contribute to the building of strong AI.

- 2. Strong AI:** The machines that can actually think and perform tasks on its own just like a human being. There are no proper existing examples for this but some industry leaders are very keen on getting close to build a strong AI which has resulted in rapid progress.
- 3. Superintelligence:** The term 'superintelligence' is often used to refer to general and strong AI at the point at which it surpasses human intelligence, if it ever does.

Type 2 (Based on Functionalities)

- ◆ **Reactive Machines:** This is one of the basic forms of AI. It doesn't have past memory and cannot use past information for the future actions. Example:- IBM chess program that beat Garry Kasparov in the 1990s.
- ◆ **Limited Memory:** AI systems can use past experiences to inform future decisions. Some of the decision-making functions in self-driving cars have been designed this way. Observations used to inform actions happening in the not so distant future, such as a car that has changed lanes. These observations are not stored permanently and also Apple's Chatbot 'Siri'.
- ◆ **Theory of Mind:** This type of AI should be able to understand people's emotion, belief, thoughts, expectations and be able to interact socially. Even though a lot of improvements are there in this field this kind of AI is not complete yet.
- ◆ **Self-awareness:** An AI that has its own conscious, super intelligent, self-awareness and sentient (in simple words a complete human being). Of course, this kind of bot also doesn't exist and if achieved it will be one of the milestones in the field of AI.

Developments in India

A task force on AI for India's economic transformation was constituted on 24th August 2017. The task force gave its report on 19th January 2018. The task force has inter alia recommended an Inter-Ministerial National Artificial Intelligence Mission to act as a nodal agency for coordinating AI related activities in India. NITI Aayog has prepared and placed on its website on 4th June 2018 a discussion paper on National Strategy on Artificial Intelligence identifying following five sectors to be focused upon: healthcare, agriculture, education, smart cities and infrastructure, smart mobility and transportation.

National Strategy for Artificial Intelligence- '#AIforAll'

India has taken a unique approach to its national AI strategy by focusing on how India can leverage AI not only for economic growth, but also for social inclusion. NITI Aayog called this approach '#AIforAll'.

The strategy, as a result, aims to:

- (1) enhance and empower Indians with the skills to find quality jobs;
- (2) invest in research and sectors that can maximize economic growth and social impact; and
- (3) scale Indian-made AI solutions to the rest of the developing world.

NITI Aayog provides over 30 policy recommendations to invest in scientific research, encourage reskilling and training, accelerate the adoption of AI across the value chain and promote ethics, privacy and security in AI. Its flagship initiative is a two-tiered integrated strategy to boost research in AI.

- ◆ First, new Centres of Research Excellence in AI (COREs) will focus on fundamental research.

- ◆ Second, the COREs will act as technology feeders for the International Centres for Transformational AI (ICTAIs), which will focus on creating AI-based applications in domains of societal importance.

The report also recommends setting up a consortium of 'Ethics Councils' at each CORE and ICTAI, developing sector specific guidelines on privacy, security and ethics, creating a national AI marketplace to increase market discovery and reduce time and cost of collecting data and a number of initiatives to help the overall workforce acquire skills.

Strategically, the government wants to establish India as an 'AI Garage,' meaning that if a company can deploy an AI in India, it will then be applicable to the rest of the developing world.

Global Developments in Artificial Intelligence

Countries around the world are becoming increasingly aware of the potential economic and social benefits of developing and applying AI. For example, China and U.K. estimate that 26% and 10% of their Gross Domestic Product (GDPs) respectively in 2030 will be sourced from AI-related activities and businesses. There have been tremendous activity concerning AI policy positions and the development of an AI ecosystem in different countries over the last 18 to 24 month—France published the AI strategy in January 2017 followed by a detailed policy document in March 2018; Japan released a document in March 2017; China published the AI strategy in July 2017; and the U.K. released its industrial strategy in November 2017.

The USA launched a national strategy on AI in February 2019, when President Trump signed an executive order creating the American AI Initiative. It directs federal agencies to

prioritise AI investments, to increase access to data science resources, boost training in AI skills, to promote an international environment that supports American industries while protecting the US against competitors and adversaries and to establish guidance for AI development and use.

Applications of AI

AI has the potential to provide large incremental value to a wide range of sectors globally and is expected to be the key source of competitive advantage for firms.

- ◆ **Healthcare:** It increased access and affordability of quality healthcare.
- ◆ **Agriculture:** It enhanced farmers' income, increased farm productivity and reduction of wastage.
- ◆ **Education:** It improved access and quality of education.
- ◆ **Smart Cities and Infrastructure:** It will provide efficient and effective connectivity for the burgeoning urban population.
- ◆ **Smart Mobility and Transportation:** It will provide smarter and safer modes of transportation and better traffic and congestion problems.
- ◆ **Retail:** The retail sector has been one of the early adopters of AI solutions, with applications such as improving user experience by providing personalised suggestions, preference-based browsing and image-based product search. Other use cases include customer demand anticipation, improved inventory management and efficient delivery management.
- ◆ **Manufacturing:** Manufacturing industry is expected to be one of the biggest beneficiaries of AI based solutions, thus enabling 'Factory of the Future' through flexible and adaptable technical systems to automate processes and machinery to respond to unfamiliar

or unexpected situations by making smart decisions.

- ◆ **Energy:** Potential use cases in the energy sector include energy system modelling and forecasting to decrease unpredictability and increase efficiency in power balancing and usage.

Key Challenges: Adoption of AI in India

AI tools and technologies have the potential to transform most of the sectors and state of the Indian economy as whole. However, analysing across the various sectors, the challenges are concentrated across common themes of:

- ◆ Lack of enabling data ecosystems.
- ◆ Low intensity of AI research.
 - ◆ Core research in fundamental technologies.
 - ◆ Transforming core research into market applications.
- ◆ Inadequate availability of AI expertise, manpower and skilling opportunities.
- ◆ High resource cost and low awareness for adopting AI in business processes.
- ◆ Unclear privacy, security and ethical regulations.
- ◆ Unattractive Intellectual Property regime to incentivise research and adoption of AI.

These challenges, while by no means exhaustive, if addressed in an expeditious manner through concerted collaborative efforts by relevant stakeholders, with government playing a leading role, could lead to fundamental building blocks that form the core to India's march towards leadership in AI.

Harness the Power of AI

Incentivizing Core and Applied Research in AI: India produced

a whopping 2.6 million Science, technology, engineering and mathematics (STEM) graduates in 2016, second only to China and more than 4 times the graduates produced by USA, thus producing the requisite talent pool to drive innovation in emerging technologies.

Skilling for the AI age: NASCCOM predicts that by 2022, a startling 46% of the Indian workforce will be engaged in entirely new jobs that do not exist today or jobs that have radically changed skill sets. Some other sources estimate that demand for AI and machine learning specialists in India is expected to see a 60% rise by 2018.

Accelerating Adoption: Estimates indicate that only 22% of the firms in India use AI in any business process. However, India's services sector (call centers, BPOs, etc. – roughly 18% of the Indian GDP) have a significant potential opportunity to cater to the coming demand for data cleaning and human-augmented AI training (data labeling, search engine training, content moderation, etc).

Ethics, Privacy, Security and Artificial Intelligence: While the issue of ethics would concern the biases that an AI system can propagate, the privacy concerns are largely on collection and inappropriate use of data for personal discrimination. Issue of security arises from the implications and the consequent accountability of any AI system. While addressing the above issues, one needs to be conscious of the potential vulnerabilities of our extant regulatory and societal structures which are dependent on human judgment and control and thus subject to inherent biases and discrimination.

Emerging Issues Associated with AI

AI is developing with such an incredible speed, sometimes it seems magical.

There is an opinion among researchers and developers that AI could grow so immensely strong that it would be difficult for humans to control. Humans developed AI systems by introducing into them every possible intelligence they could, for which the humans themselves now seem threatened.

- ◆ **Threat to Privacy:** An AI program that recognizes speech and understands natural language is theoretically capable of understanding each conversation on e-mails and telephones.
- ◆ **Threat to Human Dignity:** AI systems have already started replacing the human beings in few industries. It should not replace people in the sectors where they are holding dignified positions which are pertaining to ethics such as nursing, surgeon, judge, police officer, etc.
- ◆ **Threat to Safety:** The self-improving AI systems can become so mighty than humans that could be very difficult to stop from achieving their goals, which may lead to unintended consequences.
- ◆ **Unemployment:** The hierarchy of labour is concerned primarily with automation. With growing automation of jobs, we could create room for people to assume more complex roles, moving from the physical work that dominated the pre-industrial globe to the cognitive labour that characterizes strategic and administrative work in our globalized society.
- ◆ **Inequality:** Our economic system is based on compensation for contribution to the economy, often assessed using an hourly wage. But by using artificial intelligence, a company can drastically cut down on relying on the human workforce and this means that revenues will

go to fewer people and thus leading to widening wealth gap.

- ◆ **Security:** The more powerful a technology becomes, the more can it be used for nefarious reasons as well as good. This applies not only to robots produced to replace human soldiers, or autonomous weapons, but to AI systems that can cause damage if used maliciously.

Way Forward

India's unique challenges and aspirations, combined with the advancement in AI and a desire to assume leadership in this nascent technology means India's approach towards AI strategy has to be balanced for both local needs and greater good. The way forward for India in AI has to factor in our current strengths in AI, or a lack thereof and thus requires large scale transformational interventions, primarily led by the government, with private sector providing able support.

Achieving the goal of '#AIforAll' requires long term and engaged institutional collaboration between all the stakeholders including the citizens. However, while playing the primary role in ensuring that this collaborative strategy succeeds, the government needs to be mindful of not crowding out the private sector. Role of the government thus needs to be one of a facilitator, an active promoter and wherever required, of an owner.

General Studies Paper- III

Topic: Science and Technology-developments and their applications and effects in everyday life.

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



6. SOLID WASTE IN INDIA: A BETTER MANAGEMENT IS NEEDED

Why in News?

Though Centre and Uttar Pradesh government have claimed to have organised a swachh and clean Kumbh Mela 2019, but the National Green Tribunal (NGT) seems to differ. In fact, the NGT has rang alarm bells about host city Allahabad, now Prayagraj, being on the verge of an epidemic. It flagged poor solid waste management during the month-long religious gathering on the Ganga and asked the state chief secretary to appear before it.

Introduction

The 2019 Kumbh Mela was special in many ways—it saw the world's largest temporary city being set up, while the budget for the event was tripled compared to previous years. Concurring with the 150th birth anniversary of Mahatma Gandhi, special arrangements have been made by the Uttar Pradesh (UP) government to ensure cleanliness in and around the Mela.

In order to ensure clean surroundings, hygiene and sanitation, the government has made arrangements for portable toilets, taps for drinking water, sweeping of roads etc. Further, the organisers have put up billboards encouraging people to keep the venue clean. According to the report, 1.2 lakh toilets have been installed, 500 sanitation workers and 1,500 Swachhagrahis (volunteers) have been deployed at the site. The Central Pollution Control Board (CPCB) has been tasked to continuously monitor the water quality.

But some reports are talking about the massive gap between toilet demand and supply on site. According to the NGT, 60,000 metric tonnes (mt) of solid waste had been collected at Baswar Solid Waste Treatment Plant which was lying untreated. Of this, 18,000 mt was

generated in Kumbh, but the plant was not operational since September 2018, while predicting a rise in case of acute diarrhoea, enteric fever, viral hepatitis and cholera. Also, the tribunal pointed out that groundwater too has been polluted. Dirty water from toilets was being collected in kutcha pits. The base of the soak pits had not been lined and the dirty water could percolate underground.

As far as bigger side is concerned, in metro cities in India, an individual produces an average of 0.8 kg waste/person daily. The total municipal solid waste (MSW) generated in urban India has been estimated at 68.8 million tons per year (TPY). The average collection efficiency of MSW ranges from 22% to 60%. MSW typically contains 51% organic waste, 17% recyclables, 11% hazardous and 21% inert waste. However, about 40% of all MSW is not collected at all and hence lies littered in the city/town and finds its way to nearby drains and water bodies, causing choking as well as pollution of surface water.

Unsegregated waste collection and transportation leads to dumping in the open, which generates leachate and gaseous emissions besides causing nuisance in the surrounding environment. Leachate contaminates the groundwater as well as surface water in the vicinity and gaseous emissions contribute to global warming.

Solid Waste Management in Kumbh Mela: An Analysis

The NGT had appointed a committee to see to it that the Ganga river does not suffer any damage during the Kumbh. The committee found that a large number of toilets were constructed in camps on the Arail side, very close to the river. Rajapur Sewage Treatment

What is Solid Waste?

Solid waste is the unwanted or useless solid materials generated from human activities in residential, industrial or commercial areas. It may be categorised in three ways, according to its origin (domestic, industrial, commercial, construction or institutional), contents (organic material, glass, metal, plastic paper etc.) and hazard potential (toxic, non-toxin, flammable, radioactive, infectious etc.).

Types of Solid Waste

It can be classified into different types depending on their source:

Municipal Solid Waste (MSW): It consists of household waste, construction and demolition debris (CnD), sanitation residue and waste from streets, generated mainly from residential and commercial complexes. As per the Ministry of Environment, Forest and Climate Change (MoEFCC) it includes commercial and residential waste generated in municipal or notified areas in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes.

Industrial Solid Waste (ISW): In a majority of cases it is termed as hazardous waste as they may contain toxic substances, are corrosive, highly inflammable, or react when exposed to certain things e.g. gases.

Biomedical Waste or Hospital Waste: It is usually infectious waste that may include waste like sharps, soiled waste, disposables, anatomical waste, cultures, discarded medicines, chemical wastes, etc., usually in the form of disposable syringes, swabs, bandages, body fluids, human excreta, etc. These can be a serious threat to human health if not managed in a scientific and discriminate manner.

Plant (STP) received excess sewage than the installed capacity. Only 50 per cent of Rajapur drain was being treated through geotube (it extracts solid waste from the waste going in the drain so that only water enters it) and the remaining 50 per cent was being permitted to enter Ganga without treatment. Regarding another STP at Salori, the NGT said it too was not working satisfactorily. It had more sewage than it could treat. The geotube was not working satisfactorily and 50

per cent of the sewage from the drain was trapped and the rest was going into the Ganga river.

Geotube Technology - A Failure

The NGT also came down heavily on the administration over the geotube technology. The Mawaiya Nala, where the technology has been adopted, had a bypass because of which untreated water from the drain entered Ganga river. The committee also found that there existed a big dirty water pond at Parmarth Niketan Arailand human excreta were seen floating in it. Mansuthia, another drain, presented a similar picture to the committee. It too had a bypass, due to which untreated waste met treated waste just before it was flowed into the Ganga. The creation of bypass at places where geotube technology had been adopted has let dirty water enter the river.

The committee found several other violations of NGT orders for preserving any river. Thirty six temporary ponds at the bank of the river were constructed with no lining and some of them still contain dirty water. This poses a great challenge for the state government as it will impact the groundwater quality, environment as well as human health.

The NGT order scathingly criticised the Mela administration for being non-cooperative with the supervisory committee in several matters, including uninstalation of public toilets built right on the banks of the Ganga. Pucca constructions were being raised at Yamuna bank and despite notice, the authorities did not disclose as to who had sanctioned the maps/building plan. The order added that the administration was trying to “hoodwink the cleaning of waste from the soak pits and septic tanks and ponds.

This is not the first Kumbh to have come under criticism for poor management. Things were far from perfect during the last Kumbh as well. The Comptroller and Auditor General (CAG) of India's audit report of the event read, “No effective planning

for protection of environment and pollution control was made for the Maha Kumbh Mela.” Last Kumbh too the issue was of solid waste management. More than 25,000 tonnes of solid waste generated during the festival went unmanaged and was found choking the river and city drains.

Present Scenario in India

Solid waste management is one of the most significant problems the Indian government is trying to deal with. In the last two decades, India has witnessed tremendous growth in social and economic sectors. In parallel, the Indian population has grown exponentially too. This growing population has resulted in the massive production of solid waste. Despite a considerable development in social and economic sectors, solid waste management (SWM) systems in India have not kept up with the challenge and remain relatively rudimentary. As a result, around 90 percent of waste is currently dumped rather than adequately landfilled.

Current waste management systems are insufficient and inefficient and solid waste has now started adversely affecting public health and environment in India. Garbage releases methane from anaerobic microbial activities. In open spaces, methane is dangerous due to its combustible nature. When mixed with air, methane becomes explosive. Methane is also one of the greenhouse gases and a primary reason for global warming. Other problems associated with open solid waste are odour formation and leachates escaping into groundwater, one of the most critical sources of drinking water for a vast majority of the Indian population. Odoriferous smells released from waste is another crucial issue in a country like India where the average temperature is mostly above 37 degree Celsius. Dumped tires and other garbage collect water, and this stagnant water becomes a breeding house of mosquitoes, increasing risks

of vector-borne diseases like dengue and malaria.

An about 1.43 lakh tonne per day of MSW is generated across the country. Of this, 1.11 lakh TPD (77.6%) is collected and 35,602 TPD (24.8%) processed. As per the MoEFCC MSW generation will reach 4.5 lakh TPD by 2031 and 11.9 lakh TPD by 2050.

Swachh Bharat Mission and Solid Waste Management

The Swachh Bharat Mission was launched in 2014 with the goal to clean India. The objective of the mission was to construct household, community and public toilets to eliminate open defecation and implement proper solid waste management along with generating information, education, public awareness and capacity building.

In 2014, Rs 7,424 crore was allocated towards SWM, while for the construction of household and community toilets Rs 4,860 crore was allocated. But from 2014 to 2017, only Rs 1,465 crore has been sanctioned for SWM, whereas Rs 2,190 crore was sanctioned for the construction of household and community toilets.

As of June 2016, only 53% of wards are covered with door-to-door collection of waste and on an average only 22% of waste is processed in urban centres — which mean 78% of solid waste remains untreated and contaminates land or makes its way into rivers and lakes. These figures are not as appealing as the 2.89 million household toilets, 13,349 community toilets and 12,582 public toilets constructed — all attractively positioned on the mission website. What gets overshadowed is the fact that urban India generates 151,831 metric tonnes of waste per day. If not collected, treated and disposed safely, this can cause serious environmental and health hazards. Inadequate collection and disposal of waste encourages open dumping on street corners, public spaces, vacant

plots and even drains. These spaces in turn become breeding grounds for disease and also contribute generously to air pollution by generating volatile compounds. People who live close to these sites not only live in an unsafe and unhygienic environment but often end up working as rag pickers, thrusting them further down in the sanitation hierarchy. Many of these dumping sites are the only open spaces available in a neighbourhood and as they get characterised by dirt and stench they end up being used for urination and open defecation.

Possible Solutions

Waste to Energy

Waste-to-energy (WTE) is different from solar (or wind) as it essentially aims to reduce the colossal amount of solid wastes accumulating in cities and towns all over India. In addition to managing wastes, waste-to-energy has the added advantage of producing power which can be used to meet rapidly increasing energy requirements of urban India.

According to the Ministry of New and Renewable Energy (MNRE), there exists a potential of about 1700 MW from urban waste (1500 from MSW and 225 MW from sewage) and about 1300 MW from industrial waste. The ministry is also actively promoting the generation of energy from waste, by providing subsidies and incentives for the projects. Indian Renewable Energy Development Agency (IREDA) estimates indicate that India has so far

realized only about 2% of its waste-to-energy potential. The NITI Aayog, as part of the Swachh Bharat Mission, envisages 800 megawatt from WTE plants by 2018-19, which is 10 times the capacity of all the existing WTE plants put together.

Recycling

Recycling is when waste is converted into something useful. It reduces the amount of waste that needs to be treated, the cost of its handling, its disposal to landfills and environmental impacts. It also reduces the amount of energy required to produce new products and thus helps conserve natural resources. Upcycling and downcycling are two common words used when it comes to recycling. Upcycling implies upgrading of a commodity by different processes of recycling. An example of upcycling is to make roads out of cheap plastic. Downcycling implies downgrading a commodity by different processes of recycling.

An example of downcycling is breaking down of high quality plastics at high temperature into different lower quality plastics.

Installation of Waste-to-Compost and Bio-Methanation Plants

It would reduce the load of landfill sites. The biodegradable component of India's solid waste is currently estimated at a little over 50 per cent. Bio-methanation is a solution for processing biodegradable waste which is also remains underexploited.

The key to efficient waste management is to ensure proper segregation of waste at source and to ensure that the waste goes through different streams of recycling and resource recovery. Then reduced final residue is then deposited scientifically in sanitary landfills.

Way Forward

Around 100 cities are set to be developed as 'smart cities'. Civic bodies have to redraw long term vision in solid waste management and rework their strategies as per changing lifestyles. They should reinvent garbage management in cities so that we can process waste and not landfill it. To do this, households and institutions must segregate their waste at source so that it could be managed as a resource. Along with this, the concept of producing energy from waste seems to be a panacea, the Indian administration needs to invest in research and development to come up with locally designed cost-effective solutions that would work better. Ultimately, to overhaul the waste management sector and induce the necessary behavioural change, citizen participation and engagement is the key.

General Studies Paper- III

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



7. RE-EMERGENCE OF ISLAMIC STATE IS POSING A GREAT CHALLENGE

Why in News?

Two days after the bombings in Sri Lanka, an atrocity that took the lives of more than 250 people, the Islamic State (IS) came out and said it was behind them. It backed up its claim with video evidence that showed the attackers gathering in front of its flag

to pledge allegiance to Abu Bakr al-Baghdadi, the group's current leader. Terrorism has long been a crucial promotional tactic for ISIS. This won't change just because the organization, which tried to build a proto-state on territory it held in Iraq and Syria, was militarily defeated earlier this year.

Background

On 23 March, 2019 the US backed Syrian Democratic Forces (SDF) officially declared the end of the Islamic State's caliphate, after the terror group's last territorial hold, the village of Baghouz and its roughly 3 km long boundary, fell to the anti-ISIS armada led by the

Kurds. SDF released videos, pictures and held a press conference to declare the end of the ISIS's geographic hold that it knew as its 'caliphate'.

The SDF also highlighted the toll it has absorbed in battling the Islamic State, saying that it had lost 11,000 people with over 21,000 wounded. The air campaign against the ISIS has been one of the largest operations since the World War II and lasted three months longer than the duration of the World War I. The loss of Baghouz is a significant moment and the territorial defeat of the ISIS should not be undermined as an achievement. The resistance orchestrated by the ISIS to protect the last patch of sand representing its 'khilafat', once nearly the size of the United Kingdom spanning territory across Syria and Iraq, was intense.

However, the territorial defeat of the Islamic State does not mean the end of the ISIS as a terror group, nor does it mean the end of the civil war in Syria. From here on, the ISIS will continue to live as an insurgency, the first avatar it appeared in during the Arab Spring. Already, sporadic attacks claimed by the ISIS have been reported from various parts of Iraq, Syria, Afghanistan and most recently attack carried on in Sri Lanka.

Is the ISIS Defeated?

The defeat of the Islamic State does not translate into the defeat of the ISIS. Nor does it translate into the defeat of other Islamist groups in the Iraq-Syria theatre. The loss of geography, however, was critical. The geography was perhaps the single biggest driving factor of the mainstreaming of pro-ISIS ideology around the world, which inadvertently saw scores of people travel to Syria between 2013 and 2016 to join this proto-state structure that was well marketed online by the group's sympathisers with slick video productions, magazines, newspapers and so on available freely for consumption. The Islamic State

was not just active in its territory as a military outfit but also playing the role of a governing body. It applied a taxation system, Sharia law, maintained sanitation of the cities and towns under its control, provided aid, policing, Islamic courts and so on. Some of these activities gained it support from populations that were either fed-up of government apathy or in cases such as Mosul in Iraq, where Sunni minorities saw (albeit unwisely, as they later found out) ISIS as upholders of their interests against a predominantly and often brutal Shia Iraq.

In the aftermath of an attack like the one in Sri Lanka last month, we need to ask what purpose it serves for those who claim responsibility. What's in it for them? For ISIS, it's quite clear: the strategic utility of terrorism has never been greater. That's because, to navigate through its loss of land over these past few years, ISIS's propaganda has been claiming that the group gave up on the material reality of its state long ago, having already achieved a "victory." In this telling, its proto-state was a way to build a global platform that would ensure the movement's future by mobilizing tens of thousands of supporters, imbuing them and their kin with its creed and its mission.

To be sure, dissenters in the organization were unconvinced of this claim, arguing that the loss of its lands, prompted by its oppression and extremism, had turned ISIS into a farce. But ISIS's true believers—those who buy into its propaganda hook, line and sinker are the ones who really matter here, because it is they who stand to buoy the movement in the months and years to come.

For them, terror attacks such as the Sri Lanka bombings, an attempted operation in Saudi Arabia and a border assault in the Democratic Republic of Congo are all evidence of ISIS's greater victory. To the faithful, these events show that the group was as successful in expanding its reach and capabilities

as its leaders claim it to have been. However, large-scale attacks are exceedingly difficult to pull off and are therefore unreliable as a way of signaling the group's power. So ISIS has been cultivating another key 'proof' of its continuing relevance: on its own organizational chart, it has been untethering its caliphate brand from Syria and Iraq.

It has been proactively reframing Syria and Iraq as just two of many parts of its overarching global caliphate, something that made it much easier to argue that the group would remain alive and well in the rest of the world, even if its proto-state lost all its land. This is how ISIS is trying to get through its territorial tribulations now, and this is why we have to expect more activity from it, not less. It doesn't really matter whether ISIS's leaders actually believe what they are spouting. What matters is that ISIS's true believers are buying into it. If they continue to do so, the group stands a good chance of surviving through this next, post-territorial phase of its existence.

'Post-Caliphate' Phase Posing a Great Challenge

The 'post-caliphate' phase of the ISIS is not going to be an easy task to tackle by any means. Estimates continue to suggest that thousands of ISIS personnel still persist and have only dispersed for now in order to protect themselves. Many caught international ISIS fighters currently lie in limbo with their countries of origin refusing to take them back, which could mean they may be set free eventually. In Iraq, trial courts are conducting formality hearings and sentencing ISIS fighters to death in proceedings that sometimes last mere few minutes. Questions also remain over legal justifications of ISIS fighters or members who joined the group against their wishes to either safeguard themselves or their families. Answers to these remain elusive, as political turmoil still remains as

prevalent as ever in Syria, and pockets of uncertainty and sectarian strife continues to stand at a tipping point once again in Iraq.

The ISIS brought in unprecedented challenges. Beyond holding a proto-state, it weaponised the internet, used technologies that propagated democratisation of information and communications against people far beyond the caliphate and successfully created presence in places such as the African Sahel, Libya, Philippines and so on in the form of 'wilayats', or guardianships, abroad. It created a significant brand, one that anyone from a terror group to an individual in Europe could brandish and conduct violence in its name, attaining immediate global interest.

ISIS: Implication on South Asia and the Indian Angle

Experts tracking the growth, proliferation and disintegration of the IS said there is enough evidence to believe that the group had launched operations in South Asia. Militants from South Asia who had gone to Syria to join the IS are returning home to pursue their stated aim of setting up Caliphates in their home countries.

As Sri Lanka comes to grips with the loss of more than 250 lives and 500 injuries in the bombings, South Asia can no longer afford to ignore the toehold that the IS terrorist group was gaining in the region. The IS was the only terrorist group which had a marked territory in Syria. They held control, collected taxes, etc. Then eventually, they got cornered and were forced to flee. They can't make a comeback there. So, all these breakaway fighters and groups are now returning to other areas with a Muslim population—Indonesia, India and Sri Lanka—and these regions are their next focus.

The extent of planning and calculation that went into planting the right amount of explosives so as to inflict the kind of damage that was done, plus the level of sophistication in



the use of detonators and fuses, as well as the extent of radicalization, should clear all doubts over whether or not the Islamic State had spread its wings to South Asia.

Experts and Intelligence Agencies warned that India and other neighbouring nations had a lot to worry about, given the reality of the IS in the region. Recruitment for the IS has happened in the past in Sri Lanka, India and the Maldives. What is now a cause for concern is the pattern of lethal, coordinated explosive vector attacks, which can't be traced.

Conclusion

The territorial fight against IS may be over for now, but the fight against the ISIS and the ideologies fueling it is a long-drawn war, one that cannot be beaten by mere enforcement of power and military might. They are using event like Christchurch terror strikes at mosques in New Zealand to rejuvenate and raise morale of the ISIS's supporter base. They are building an analogy on persecution of Muslims from Baghouz to Christchurch, in an attempt to rally what would today be a demoralised ISIS support base.

The deterrence towards ISIS is going to be a combination of on-ground engagement between communities and governance, along with a robust online anti-terror apparatus to keep tabs on pro-ISIS movements on social

media, banking, travel and other arenas. Many cases, for example in India, of authorities alerted towards pro-ISIS activities on Facebook came from foreign intelligence agencies and not domestic ones. While India has showcased a steadfast and robust human intelligence record against deterring terror activities, the Achilles heel remains the online world. A well-operated online intelligence network in India will not only have a domestic benefit, but will give gains to the neighbourhood as well with intelligence sharing, joint online operations and database convergence to keep a check on ISIS's influence on the internet.

The main challenge now is to make sure that no environment is allowed to sustain for an ISIS 2.0 to emerge. The military defeat of the caliphate was expected and easy part, but much of the work on defeating ISIS is yet to begin. The global community can aid this fight the way it aided the SDF. Any lasting solution will eventually have to come from within the states, people, leaders, tribes and ecosystems of the region itself.

General Studies Paper-III

Topic: Security challenges and their management in border areas; -linkages of organized crime with terrorism.



SEVEN SUBJECTIVE QUESTIONS WITH MODEL ANSWERS

World Heritage Day: Preserving the Heritage Sites

Q1. Both culture and heritage play an important role in the development agenda of any nation. They represent a set of shared attitudes, values, goals and practices. Discuss it in the context of conservation of culture and heritage in Indian perspective.

Hints:

- ◆ Both culture and heritage play an important role in the development agenda of any nation. Both represent a set of shared attitudes, values, goals and practices. Culture and creativity manifest themselves in almost all economic, social and other activities. A country as diverse as India is symbolized by the plurality of its culture.
- ◆ There are 37 (29 cultural, 7 natural and 1 mixed) World Heritage Sites in India that are recognised by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as of May 2019. These are places of importance of cultural or natural heritage.
- ◆ More importantly, in a country with strong spiritual roots, the approach to conservation of built heritage has to explore the basis of the ancient building system, the centrality of the spirit in the building activity and the philosophy of non-permanence of the material. Such an approach may be in contrast to established, internationally accepted approaches to conservation.
- ◆ Holistic preservation of Indian heritage would require recourse to pedagogical changes in school and higher education intended to rediscover the ancient Indian wisdom in arts, sciences and philosophies, which hinges on mainstream fundamental research and R&D in the area.

Slums in India: A By-product of Unplanned Urbanisation

Q2. "The existence of slums is an essential by-product of industrialization and rapid urbanization especially in developing countries." Discuss it in the context of India.

Hints:

- ◆ The existence of slums is an essential by-product of industrialization and rapid urbanization especially in developing countries. These urban colonies or areas are generally characterized by their closely packed decrepit, unauthorized or encroached small and temporary houses, congested population, unhygienic health conditions, least civic amenities, all types of pollution, criminal activities, foul smell, stray animals and poverty etc.
- ◆ Lack of access to improved sanitation facilities and improved water sources is the most important feature, sometimes supplemented by absence of waste collection systems, electricity supply, surfaced roads and footpaths, street lighting and rainwater drainage.
- ◆ Urbanisation creates slums because local governments are unable to manage urbanisation, and migrant workers without an affordable place to live in. In the situation of large gap between people's low income and the high land price some people have to look for cheap informal settlements, which are known as slums in urban areas.
- ◆ Government need to understand that urban poor people are not just to take votes at the time of elections, they are having a great hand in country's economy and our country will only progress when these people are being treated as the part of the society and are given respect and support via different government policies and plans.
- ◆ Local governments should develop strategies to prevent the formation of new slums. These should include access to affordable land, reasonably priced materials, employment opportunities and basic infrastructure and social services.

Recognising the Rights of Rare Disease Patients in India

Q3. Apart from a few rare diseases, where significant progress has been made, the field is still at a nascent stage. Critically discuss.

Hints:

- ◆ India, like many other developing countries, currently has no standard definition of rare diseases and data

on prevalence. Different countries define rare diseases differently. However, the common considerations in the definitions are primarily, disease prevalence and to varying extent - severity and existence of alternative therapeutic options.

- ◆ There is a lack of awareness about rare diseases in general public as well as in the medical profession. Many doctors lack appropriate training and awareness to be able to correctly and timely diagnose and treat these conditions.
- ◆ Although National Policy for Rare Disease covered the areas of prevention, awareness generation, training of doctors, funding support for treatment, promotion of research and development for drugs for treatment of rare diseases and diagnostics at affordable prices. But there exists certain loopholes in the policy framework.
- ◆ The policy does not provided the much needed definition of rare disease either, leaving it unresolved. Though the corpus fund of 100 Crores was provided in the affidavit, no such corpus was created under National Health Mission. Similarly there is no clarification as to whether the financial help for treatment would only be provided for Below Poverty Line (BPL) patients or would also include Above poverty line (APL) patients.
- ◆ Recent developments have not given the rare disease community much to celebrate. Since these diseases are not found commonly, doctors are typically unaware about them and therefore either misdiagnose or do not diagnose them. This further decreases recorded incidence of the disease, which in turn diminishes interest in understanding the disease and finding treatments for it.

Fight Against Corruption: A Scorecard of the Government

Q4. "Corruption threatens the rule of law, democracy and human rights; undermines good Governance, fairness and social justice; distorts competition, hinders economic development, and endangers the stability of democratic institutions and moral foundations of society." Discuss.

Hints:

- ◆ Corruption threatens the rule of law, democracy and human rights; undermines good Governance, fairness and social justice; distorts competition, hinders economic development, and endangers the stability of democratic institutions and moral foundations of society.

- ◆ Although India has legislated enough laws to deal with corruption but mere enacting anti-corruption laws are not enough. There must be a strong agency to implement those Acts effectively and prevent corruption in public life. The collective effort of the legislature along with a proactive approach taken by the judiciary may be very helpful in bringing some positive results in the context of prevention of corruption.
- ◆ It is the need of the hour to bring Central Bureau of Investigation and other central and state investigation agencies out of control of the government so that a fair investigation may be brought out and the culprit may be punished as per the provisions of law.
- ◆ There should be a comprehensive package to fight against corruption. The government must strengthen existing laws like whistle blower protection act, lokpal act etc. The government should also address the regulatory concerns in Competition act, the companies act, income tax etc. Citizen participation and transparency in decision making must be ensured along with focussing on judicial reform and police reform to create deterrence and in turn eradicating the menace of corruption.

Artificial Intelligence: Augmenting or Disrupting Human Workforce

Q5. What do you understand by 'Artificial Intelligence'? Discuss how it will present opportunities to complement and supplement human intelligence and enrich the way people live and work.

Hints:

- ◆ Artificial Intelligence (AI) refers to the ability of machines to perform cognitive tasks like thinking, perceiving, learning, problem solving and decision making. Initially conceived as a technology that could mimic human intelligence, AI has evolved in ways that far exceed its original conception.
- ◆ AI is poised to disrupt our world. With intelligent machines enabling high-level cognitive processes like thinking, perceiving, learning, problem solving and decision making, coupled with advances in data collection and aggregation, analytics and computer processing power, AI presents opportunities to complement and supplement human intelligence and enrich the way people live and work.
- ◆ While the issue of ethics would concern the biases that an AI system can propagate, the privacy concerns are largely on collection and inappropriate use of data for personal discrimination. Issue of security arises from

the implications and the consequent accountability of any AI system.

- ◆ India's unique challenges and aspirations, combined with the advancement in AI, and a desire to assume leadership in this nascent technology means India's approach towards AI strategy has to be balanced for both local needs and greater good. The way forward for India in AI has to factor in our current strengths in AI, or a lack thereof and thus requires large scale transformational interventions, primarily led by the government, with private sector providing able support.

Solid Waste in India: A Better Management is Needed

Q6. "Despite a considerable development in social and economic sectors, solid waste management (SWM) systems in India have not kept up with the challenge and remain relatively rudimentary." Discuss.

Hints:

- ◆ Solid waste management is one of the most significant problems the Indian government is trying to deal with. The Indian population has grown exponentially too. This growing population has resulted in the massive production of solid waste. Despite a considerable development in social and economic sectors, solid waste management (SWM) systems in India have not kept up with the challenge and remain relatively rudimentary. As a result, around 90 percent of waste is currently dumped rather than adequately landfilled.
- ◆ The National Green Tribunal (NGT) has rang alarm bells about host city Allahabad, now Prayagraj, being on the the verge of an epidemic. It flagged poor solid waste management during the months-long religious gathering on the Ganga. As far as other side is concerned, An about 1.43 lakh tonne per day of MSW is generated across the country. Of this, 1.11 lakh TPD (77.6%) is collected and 35,602 TPD (24.8%) processed. As per the Union Ministry of Environment and Forests, MSW generation will reach 4.5 lakh TPD by 2031 and 11.9 lakh TPD by 2050.
- ◆ Current waste management systems are insufficient and inefficient and solid waste has now started adversely affecting public health and environment in India.
- ◆ Indian Renewable Energy Development Agency (IREDA) estimates indicate that India has so far realized only about 2% of its waste-to-energy potential. The NITI Aayog, as part of the Swachh Bharat Mission, envisages

800 megawatt from WTE plants by 2018-19, which is 10 times the capacity of all the existing WTE plants put together.

- ◆ Around 100 cities are set to be developed as 'smart cities'. Civic bodies have to redraw long term vision in solid waste management and rework their strategies as per changing lifestyles. They should reinvent garbage management in cities so that we can process waste and not landfill it. To do this, households and institutions must segregate their waste at source so that it could be managed as a resource.

Re-emergence of Islamic State is Posing a Great Challenge

Q7. "The territorial fight against Islamic State may be over for now, but the fight against the ISIS and the ideologies fueling it is a long-drawn war, one that cannot be beaten by mere enforcement of power and military might." Comment.

Hints:

- ◆ The territorial fight against Islamic State may be over for now, but the fight against the ISIS and the ideologies fueling it is a long-drawn war, one that cannot be beaten by mere enforcement of power and military might.
- ◆ The deterrence towards ISIS is going to be a combination of on-ground engagement between communities and governance, along with a robust online anti-terror apparatus to keep tabs on pro-ISIS movements on social media, banking, travel, and other arenas.
- ◆ While India has showcased a steadfast and robust human intelligence record against deterring terror activities, the Achilles heel remains the online world. A well-operated online intelligence network in India will not only have a domestic benefit, but will give gains to the neighbourhood as well with intelligence sharing, joint online operations and database convergence to keep a check on ISIS's influence on the internet. However, an intra-South Asian combined effort on issues such as cyber-intelligence faces.
- ◆ The main challenge now is to make sure that no environment is allowed to sustain for an ISIS 2.0 to emerge. The military defeat of the caliphate was the expected and easy part, but much of the work on defeating ISIS is yet to begin. The global community can aid this fight the way it aided the SDF. Any lasting solution will eventually have to come from within the states, people, leaders, tribes and ecosystems of the region itself.

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SEVEN IMPORTANT NEWS

1. First 'Marsquake' Detected by NASA

NASA's InSight spacecraft detected a potential earthquake on Mars earlier this month and scientists are rejoicing over the discovery of the "marsquake." The faint seismic signal, detected by the lander's Seismic Experiment for Interior Structure (SEIS) instrument, was recorded on April 6, the lander's 128th Martian day. This is the first recorded trembling that appears to have come from inside the planet, as opposed to being caused by forces above the surface, such as wind. Scientists still are examining the data to determine the exact cause of the signal. The tremor was too small to help NASA obtain any information on the Red Planet's interior, but scientists are hoping the discovery will lead

the seismometer to detect bigger earthquakes.

The Martian surface is extremely quiet, allowing SEIS to pick up faint rumbles. In contrast, Earth's surface is quivering constantly from seismic noise created by oceans and weather. An event of this size in Southern California would be lost among dozens of tiny crackles that occur every day.

InSight's seismometer will enable scientists to gather similar data about Mars. By studying the deep interior of Mars, they hope to learn how other rocky worlds, including Earth and the Moon, formed.

NASA currently is planning to return astronauts to the Moon by 2024, laying

the foundation that will eventually enable human exploration of Mars.

Background

NASA's Apollo astronauts installed five seismometers that measured thousands of quakes while operating on the Moon between 1969 and 1977, revealing seismic activity on the Moon.

Three other seismic signals occurred on March 14, April 10 and April 11. Detected by SEIS' more sensitive Very Broad Band sensors, these signals were even smaller than the present event and more ambiguous in origin. The team will continue to study these events to try to determine their cause. ■

2. The US has Placed India on its 'Priority Watch List'

The US has placed India on its 'Priority Watch List' alleging lack of "sufficient measurable improvements" to its Intellectual Property (IP) framework on long-standing and new challenges that have negatively affected American right holders over the past year.

The US Trade Representatives (USTR) in its report identified 11 countries, including India, in its 'Priority Watch List'. China, Indonesia, Russia, Saudi Arabia and Venezuela are among others. It has also placed 25 countries, including Pakistan and Turkey, on the Watch List.

Why in the List?

Over the past year, India took steps to address intellectual property

challenges and promote IP protection and enforcement. However, many of the actions have not yet translated into concrete benefits for innovators and creators, and long-standing deficiencies persist. India remains one of the world's most challenging major economies with respect to protection and enforcement of IP.

The US businesses in India are facing long-standing IP challenges including difficulties for innovators to receive and maintain patents in that country, particularly for pharmaceuticals, insufficient enforcement actions, copyright policies that do not properly incentivise the creation and commercialisation of content and

an outdated and insufficient trade secrets legal framework. India also further restricted the transparency of information provided on state-issued pharmaceutical manufacturing licenses, and expanded the application of patentability exceptions to reject pharmaceutical patents, it alleged.

India also missed an opportunity to establish an effective system for protecting against the unfair commercial use, as well as the unauthorised disclosure, of undisclosed test or other data generated to obtain marketing approval for certain agricultural chemical products, the report alleged. ■

3. World Intellectual Property Day - 2019

World Intellectual Property Day is celebrated every year on April 26, 2019.

Key Points

This year's theme was "Reach for Gold: IP and Sports." It explored how innovation, creativity and the intellectual property (IP) rights that encourage and protect them support the development and worldwide enjoyment of sports.

This year's World Intellectual Property Day campaign celebrated the positive role that intellectual property plays in encouraging sports, a wonderful range of pursuits in which human beings have always engaged and which enrich our lives in so many different ways.

Intellectual property rights underlie and empower the financial model of all sporting events worldwide. IP rights are at the heart of the global sports ecosystem and all the commercial relationships that make sports happen and that allow us to tune in to sporting action whenever, wherever and however we want.

While technology has always played a role in the sports landscape, recent advancements are fueling sports evolution like never before. For instance, widely used wearable tech - smart sports equipment embedded with sensors - enables athletes to avoid injury and better monitor and improve their performance.

Cutting-edge technologies, from sophisticated sports prostheses to

satellite navigation systems that guide blind athletes, are also enabling athletes living with disabilities to achieve record-breaking performances.

Significance

Strategic use of trademarks can generate significant revenue streams. Trademarks, which underpin sports branding, are an exceptionally important intellectual property right for teams and athletes to differentiate themselves and stand apart in a highly competitive market.

In addition, design contributes to the distinct identity of a product – competitors' sports gear, for example – rendering it more appealing to consumers, adding commercial value. ■

4. National Panchayati Raj Day

The National Panchayati Raj Day is observed every year in India on 24th April. The reason behind the celebration of this day is the passing of Constitution (73rd Amendment) Act, 1992 that came into force from 24 April 1993. In the history of democratic India, the 73rd Amendment Act is defined as an important act as, it permits states to take decisions to organize village panchayats and provide them with necessary powers and authority and facilitate them to function as units of self-government.

Key Highlights

The Panchayati Raj Institutions (PRIs) are the backbone of successful and good

governance system for any country. Under the recommendations of 14th Finance Commission, government has decided to give more than Rs. 2 lac crores to Gram Panchayats for five years period to undertake social and physical infrastructure projects in the villages.

Government has also launched a new scheme named "Rashtriya Gram Swaraj Abhiyaan" (RGSA).

Under Sabki Yojna Sabka Vikas, the government has initiated Gram Panchayat Development Plan (GPDP) to give a chance to the Gram Panchayats to participate in planning for themselves and to provide

sufficient financial resources to them. Further, under the scheme Deendayal Upadhyay Grameen Aajeevika Mission, 5.80 Cr. women are associated with Self Help Groups.

Constitution (73rd Amendment) Act, 1992

It came into force with effect from 24th April, 1993. It has vested constitutional status on Panchayati Raj institutions. It marks a defining moment in the history of decentralization of political power to the grassroots level. The 73rd Amendment 1992 added a new Part IX to the constitution titled The Panchayats covering provisions from Article 243 to 243(O). ■

5. Novel Fire Extinguisher can be used in Space

Scientists have developed a novel fire extinguisher for use in space environments that sucks in the flame as well as combustion product.

Key Highlights

The Vacuum Extinguish Method (VEM), designed by researchers at the Toyohashi University of Technology

in Japan is based on the completely "reverse" operation of widely-used fire extinguisher, namely, spraying extinguisher agents into the firing

point. VEM is sucking the flame as well as combustion product, even fire source, by vacuum into the vacuum chamber to remove the firing matters from the space of interest.

This reverse concept shall be suitable for the special environments that are highly enclosed — such as space vehicles and submarines — to prevent or suppress spreading the harmful combustion products such as fume, particulate matters, toxic gas component across the entire enclosed

cabin. This is especially advantageous for space use, preferable in an extreme vacuum environment.

At present, fire extinguishers used in spacecraft or space stations in the US, Japan, Europe and Russia are mainly CO₂-spraying gas extinguishers, although water mist was partially considered as an alternative.

Significance

The research team expects VEM to be an upcoming technique in future space

missions and that the concept would also be applicable for extinguishing certain unusual fire which is severe and unmanageable with currently-used extinguishers such as metal powder fire.

It is also expected to be applied for the fire in clean rooms (eg operating room), where the spraying fire-fighting agents would cause severe damage to the structure and equipment to have large delay of reactivation. ■

6. Earth's Surface has been Warming Over the Past 15 Years

NASA's satellite-based infrared measurement system called AIRS (Atmospheric Infra-Red Sounder) have verified the ground-based data which shows the Earth's surface has been warming globally over the past 15 years (2003 to 2017).

AIRS data reflects skin temperature at the surface of the ocean, land and snow/ice covered regions. Surface-based data are a blend of two-meter

surface air data anomalies over land, and bulk sea surface temperature anomalies in the ocean.

The researchers compared these with station-based analyses of surface air temperature anomalies. Both data sets demonstrate the Earth's surface has been warming globally over this period and that 2016, 2017 and 2015 have been the warmest years in the instrumental record, in that order. ■

Significance of Finding

The findings should help further refine our climate models in regards to the Arctic, while also boosting the trustworthiness of other climate estimates based on ground data. Furthermore, the paper also offers us the possibility to improve on ground-recorded data. ■

7. Up to 1 Million Species at Risk of Extinction

According to a United Nations report, up to a million species are at risk of extinction because of human activities. The reasons for the mass extinction include shrinking habitat, illegal hunting, climate change and pollution.

Key Highlights

The accelerating loss of clean air, drinkable water, CO₂-absorbing forests, pollinating insects, protein-rich fish and storm-blocking mangroves—to name but a few of the dwindling services rendered by Nature—poses no less of a threat than climate change.

Deforestation and agriculture, including livestock production, account for about a quarter of greenhouse gas

emissions, and have wreaked havoc on natural ecosystems as well.

The pace of loss is already tens to hundreds of times higher than it has been, on average, over the last 10 million years.

Scientists estimate that Earth is today home to some eight million distinct species, a majority of them insects. A quarter of catalogued animal and plant species are already being crowded, eaten or poisoned out of existence.

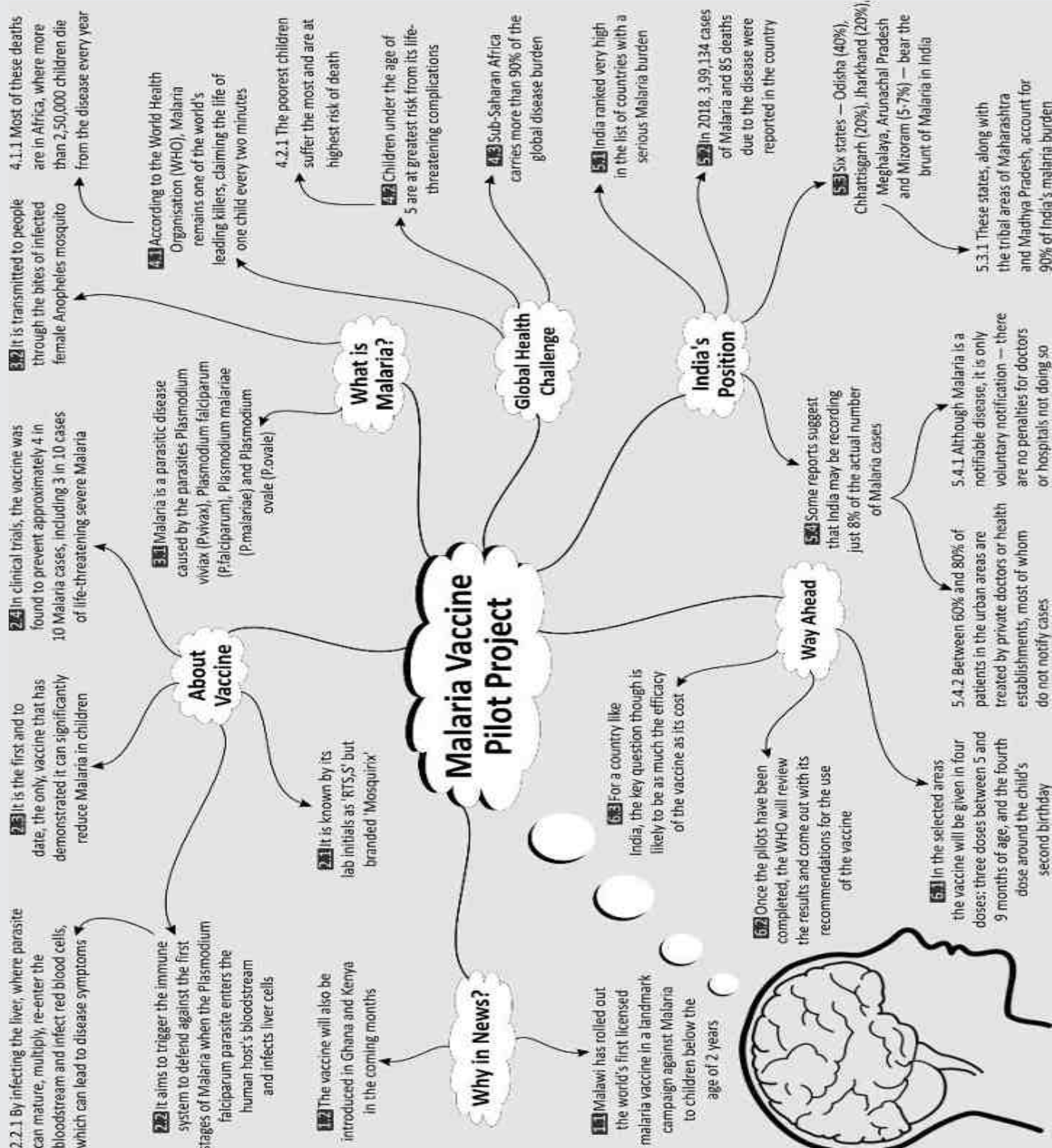
Three-quarters of land surfaces, 40 percent of the marine environment, and 50 percent of inland waterways across the globe have been "severely altered".

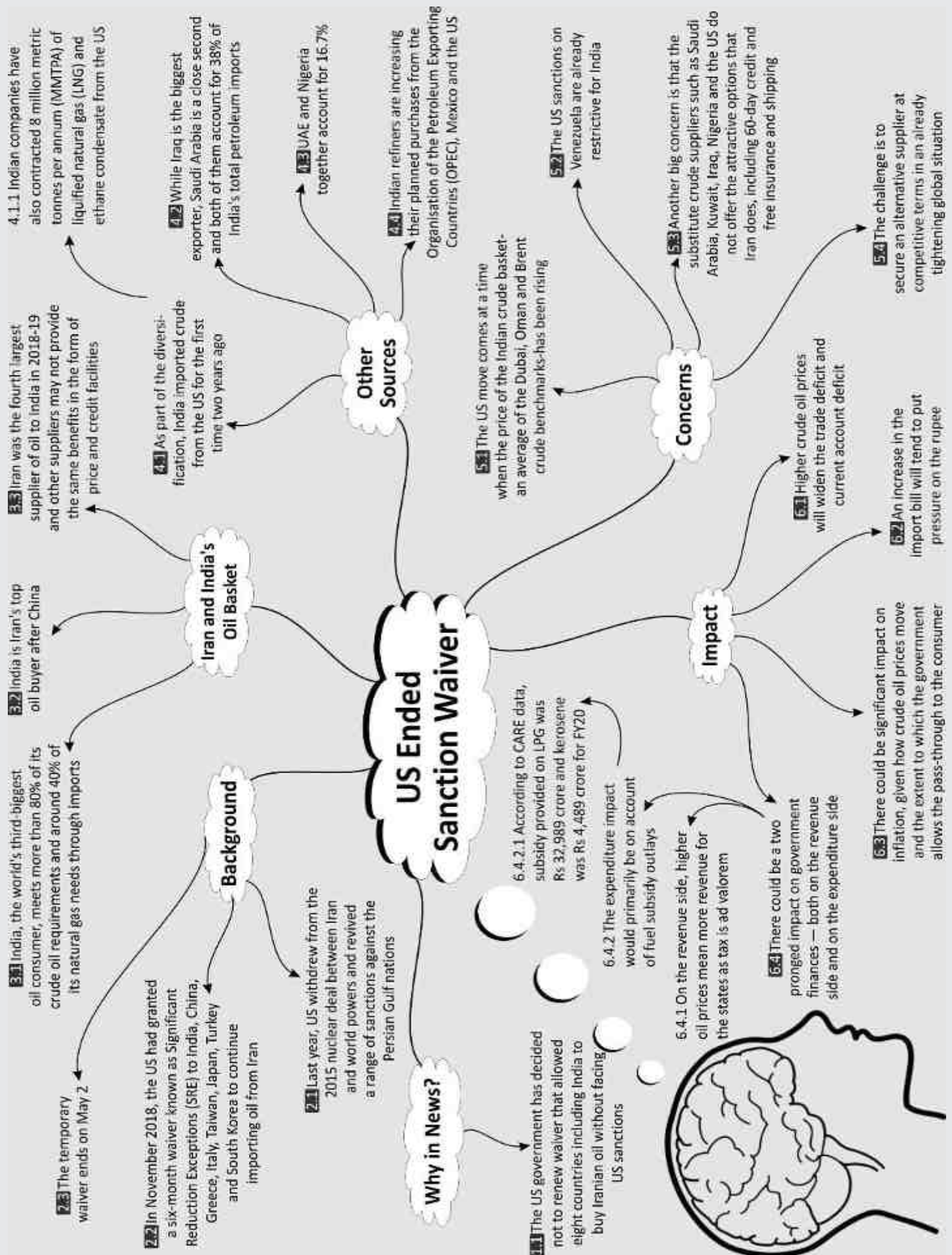
More than two billion people rely on wood fuel for energy, four billion rely on natural medicines, and more than 75 percent of global food crops require animal pollination.

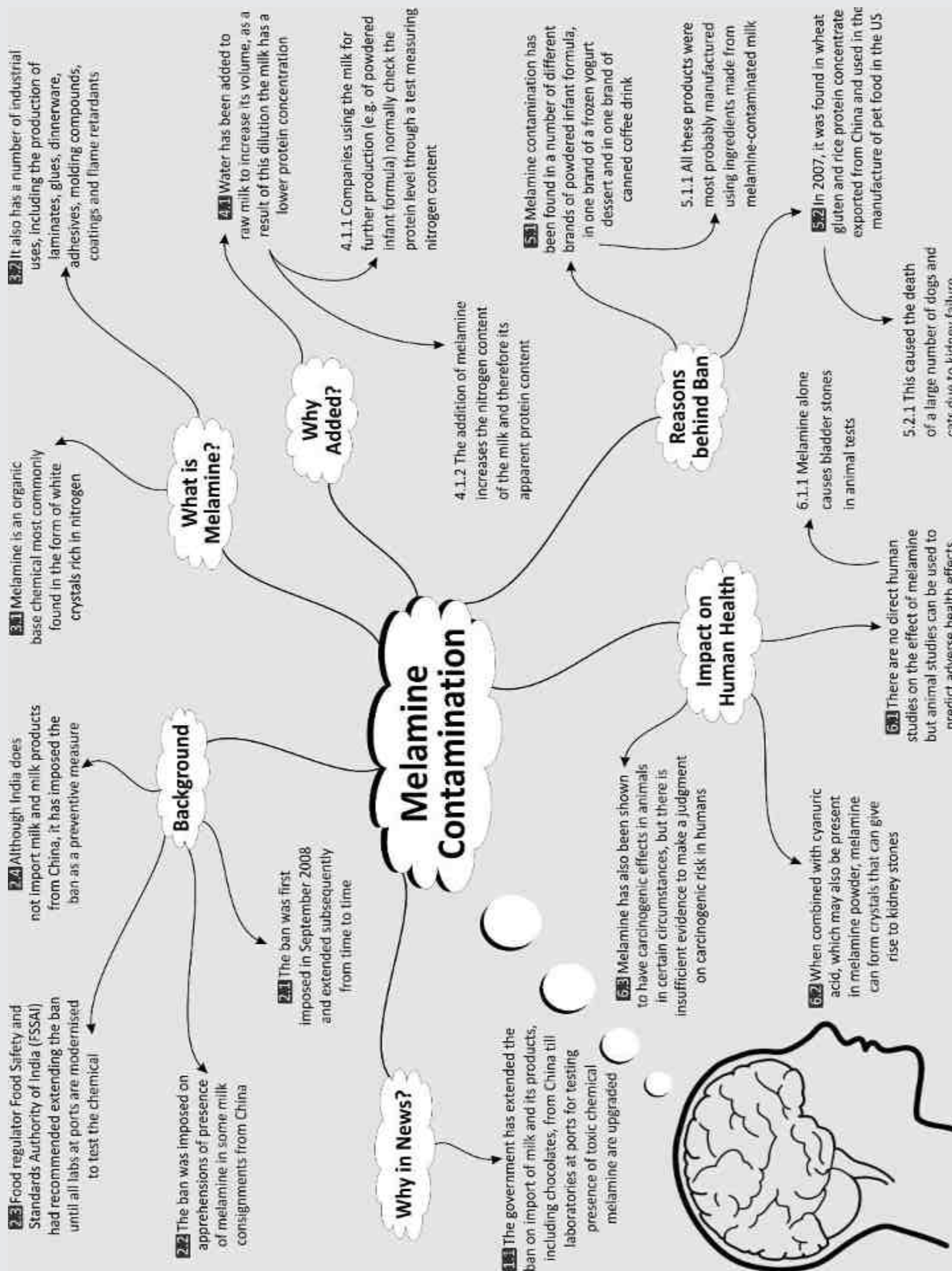
The use, for example, of biofuels combined with "carbon capture and storage"—the sequestration of CO₂ released when biofuels are burned—is widely seen as key in the transition to green energy on a global scale.

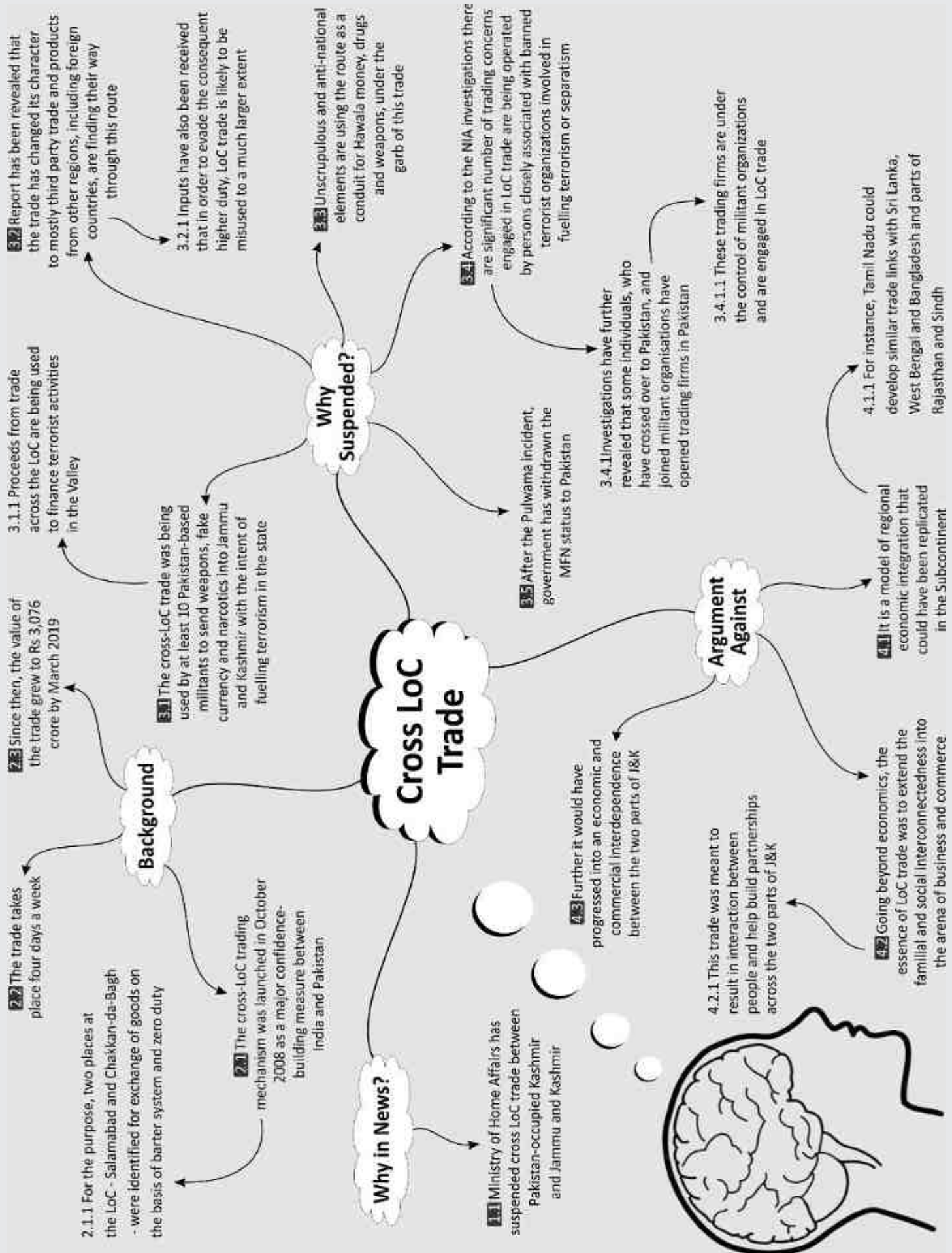
But the land needed to grow all those biofuel crops may wind up cutting into food production, the expansion of protected areas or reforestation efforts. ■

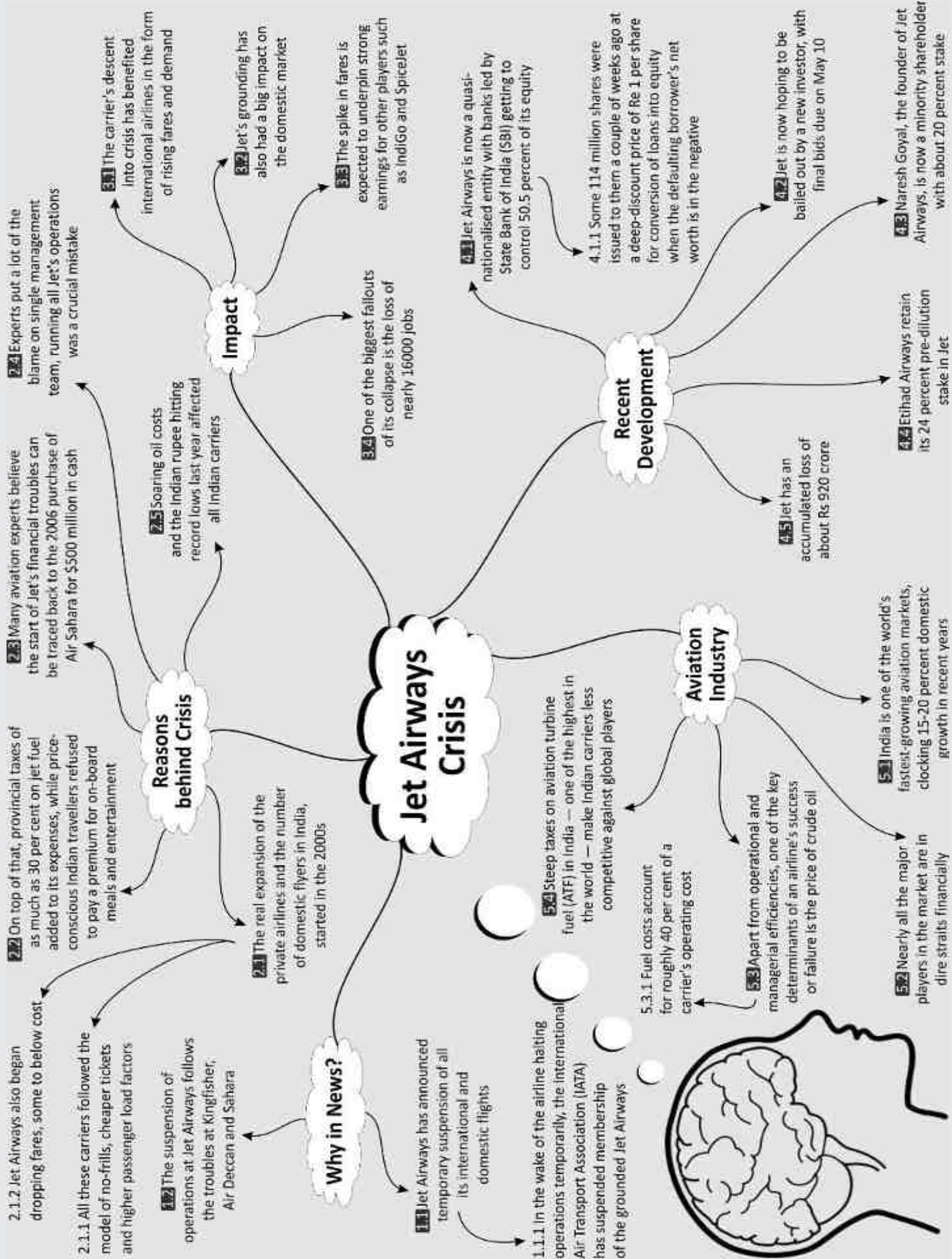
SEVEN BRAIN BOOSTERS

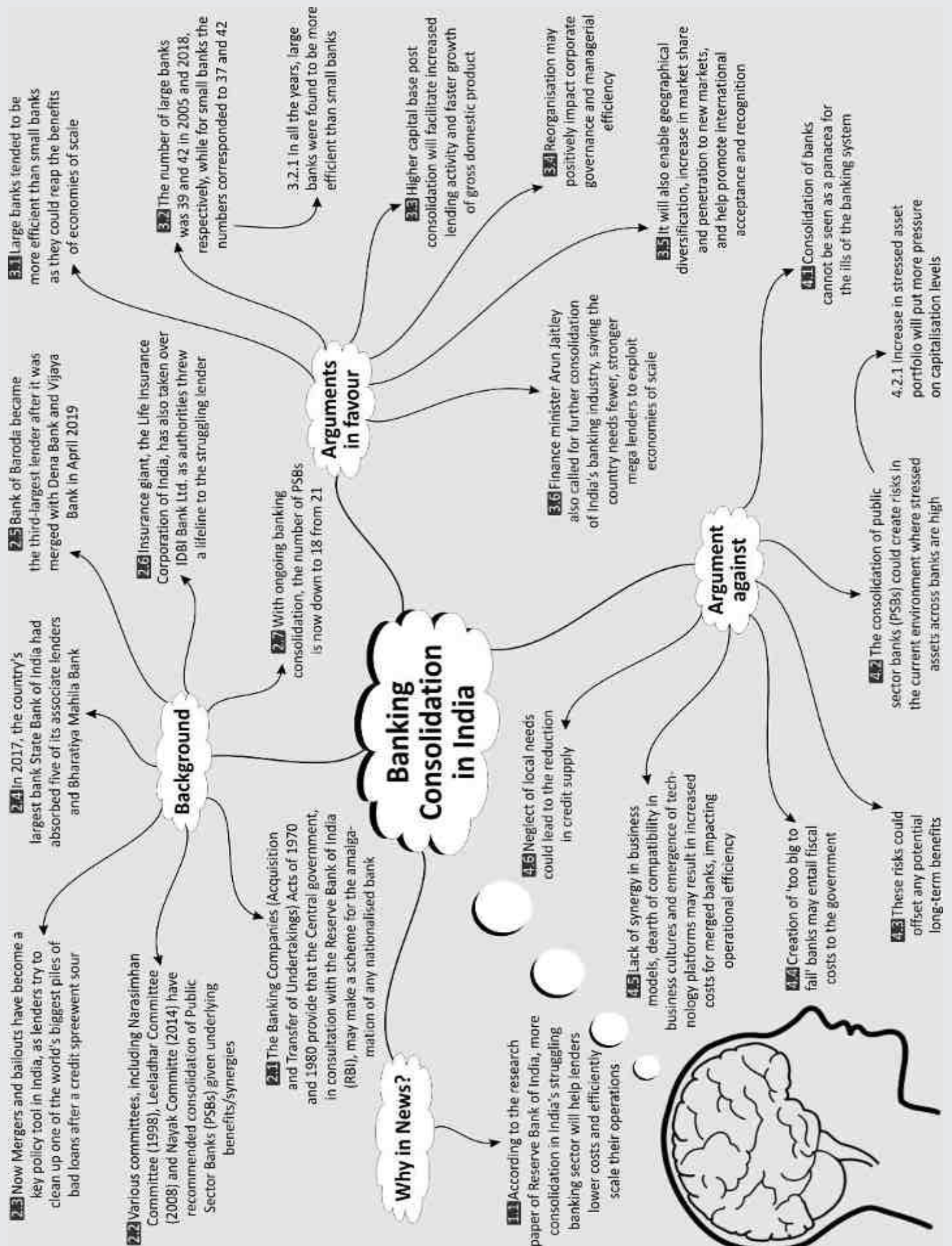


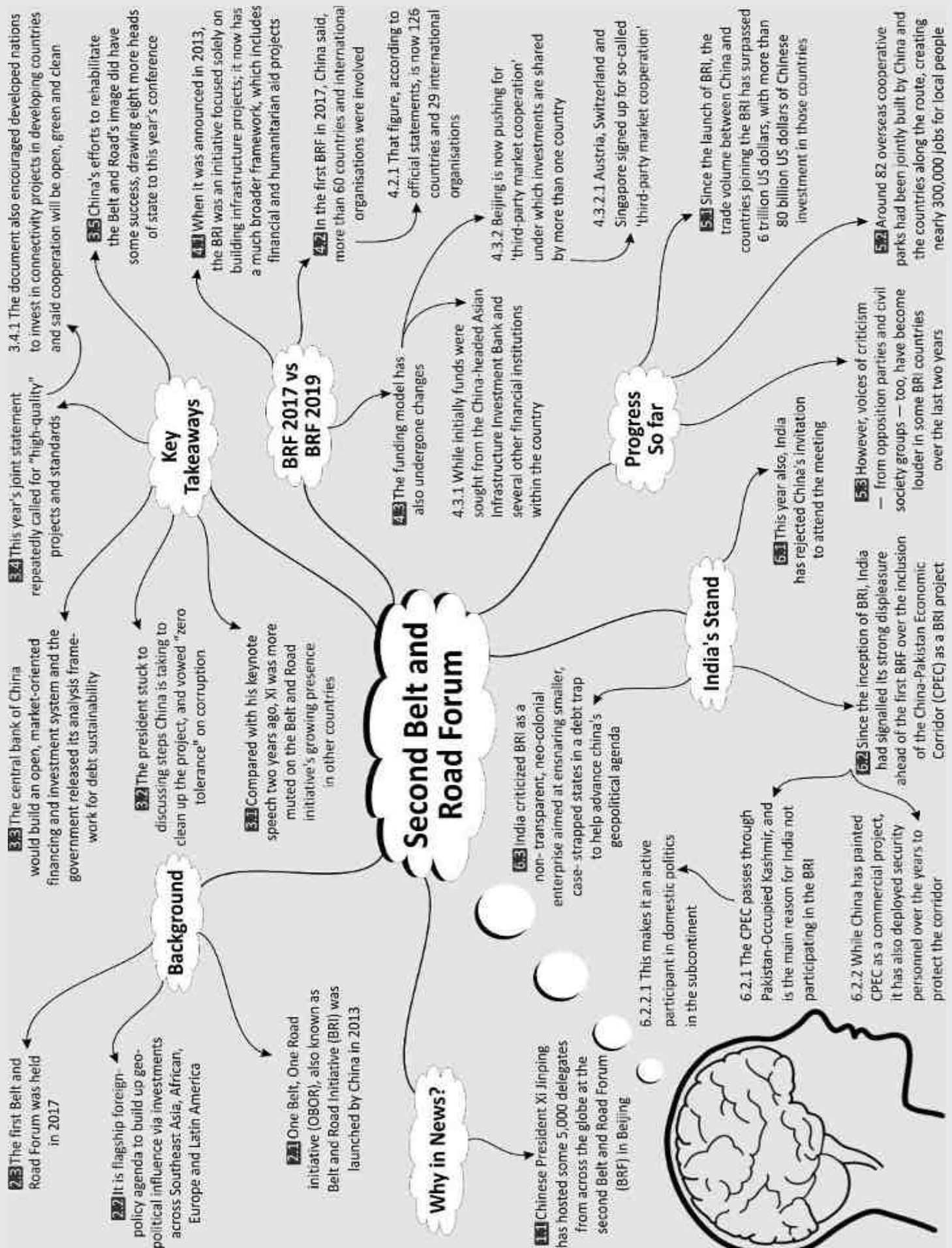












SEVEN MCQ's WITH EXPLANATORY ANSWERS

(Based on Brain Boosters)

Malaria Vaccine Pilot Project

Q1. Consider the following statements in respect of first ever Malaria vaccine pilot project:

1. Ghana has rolled out the world's first licensed malaria vaccine pilot project against Malaria to children below the age of 2 years.
2. RTS,S/Mosquirix is the first and to date, the only, vaccine that has demonstrated it can significantly reduce malaria in children.

Which of the statements given above is/are correct?

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

Answer: (b)

Explanation: Statement 1 is not correct. Malawi has rolled out the world's first licensed malaria vaccine pilot project in a landmark campaign against Malaria to children below the age of 2 years. The vaccine will also be introduced in Ghana and Kenya in the coming months.

Statement 2 is correct. RTS,S/Mosquirix is the first and to date, the only, vaccine that has demonstrated it can significantly reduce malaria in children. In clinical trials, the vaccine was found to prevent approximately 4 in 10 malaria cases, including 3 in 10 cases of life-threatening severe malaria.

US Ended Sanction Waiver

Q2. Consider the following statements:

1. The US government has decided not to renew waiver that allowed eight countries including India to buy Iranian oil without facing US sanctions.
2. India, the world's third-biggest oil consumer, meets more than 80 per cent of its oil needs through imports.

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 statements are correct. The US government has decided not to renew waiver that allowed eight countries including India buy Iranian oil without facing US sanctions. The temporary waiver ends on May 2.

India, the world's third-biggest oil consumer, meets more than 80% of its crude oil requirements and around 40% of its natural gas needs through imports. India is Iran's top oil buyer after China.

Melamine Contamination

Q3. Consider the following statements in respect of 'melamine contamination':

1. Melamine is an organic base chemical most commonly found in the form of white crystals rich in nitrogen.
2. The addition of melamine increases the nitrogen content of the milk and therefore its apparent protein content.

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 statements are correct. Melamine is an organic base chemical most commonly found in the form of white crystals rich in nitrogen. Because it is high in nitrogen, the addition of melamine to a food artificially increases the apparent protein content as measured with standard tests.

Cross LoC Trade

Q4. Consider the following statements:

1. Ministry of External Affairs has suspended cross-LoC trade between Pakistan-occupied Kashmir and Jammu and Kashmir.
2. The cross-LoC trading mechanism was launched in October 2008.

Which of the statements given above is/are correct?

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

Answer: (b)

Statement 1 is not correct. Ministry of Home Affairs has suspended cross LoC trade between Pakistan-occupied Jammu and Kashmir and Jammu and Kashmir.

Statement 2 is correct. The cross-LoC trading mechanism was launched in October 2008. For the purpose, two places at the LoC - Salamabad and Chakkan-da-Bagh - were identified for exchange of goods on the basis of barter system and zero duty. The trade takes place four days a week.

Jet Airways Crisis

Q5. Consider the following statements:

1. India is one of the world's fastest-growing aviation markets, clocking 15-20 percent domestic growth in recent years.
2. The International Air Transport Association has suspended membership of the grounded Jet Airways.

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 statements are correct. In the wake of the airline halting operations temporarily, the International Air Transport Association (IATA) has suspended membership of the grounded Jet Airways.

India is one of the world's fastest-growing aviation markets, clocking 15-20 percent domestic growth in recent years. Apart from operational and managerial efficiencies, one of the key determinants of an airline's success or failure is the price of crude oil. Fuel costs account for roughly 40 per cent of a carrier's operating cost.

Banking Consolidation in India

Q6. With reference to the 'consolidation of banks in India', consider the following statements:

1. Under the Banking Companies (Acquisition and Transfer of Undertakings) Acts of 1970 and 1980 only Reserve Bank of India is empowered to make a scheme for the amalgamation of any nationalised bank.

2. Bank of Baroda became the third-largest lender after it was merged with Dena Bank and Vijaya Bank.

Which of the statements given above is/are correct?

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

Answer: (b)

Explanation: Statement 1 is not correct. The Banking Companies (Acquisition and Transfer of Undertakings) Acts of 1970 and 1980 provide that the Central government, in consultation with the Reserve Bank of India (RBI), may make a scheme for the amalgamation of any nationalised bank.

Statement 2 is correct. Last year the country's largest bank State Bank of India had absorbed five of its associate lenders and Bharatiya Mahila Bank. Bank of Baroda became the third-largest lender after it was merged with Dena Bank and Vijaya Bank earlier this month. With this, the number of PSBs is now down to 18 from 21.

Second Belt and Road Forum

Q7. Consider the following statements in respect of 'Second Belt and Road Forum':

1. India has signed up 'third-party market cooperation' mechanism under One Belt, One Road Initiative of China.
2. One Belt, One Road initiative was launched in 2014.

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: (d)

Explanation: Both statements are incorrect. One Belt, One Road initiative (OBOR), also known as Belt and Road Initiative (BRI) was launched in 2013. 'Third-party market cooperation' is a funding model. Beijing is now pushing for 'third-party market cooperation' under which investments are shared by more than one country for its ambitious project 'One Belt, One Road'. Austria, Switzerland and Singapore signed up for so-called 'third-party market cooperation'.

This year also, India has rejected China's invitation to attend the meeting. Since its inception, India had signalled its strong displeasure ahead of the first BRF over the inclusion of the China-Pakistan Economic Corridor (CPEC) as a BRI project.

SEVEN IMPORTANT FACTS FOR PRELIMS

1. Which Ministry has launched the second stage of the Unnat Bharat Abhiyan (Unnat Bharat Abhiyan 2.0)?

–Ministry of Human Resource Development

2. Which industrial accident in India has been recognised as world's 'major industrial accidents' among others in 20th century?

–Bhopal gas tragedy in 1984

3. Which active volcano is erupted recently in Indonesia?

–Mount Agung Volcano

4. Which country has approved the national strategy for artificial intelligence, titled 'AI Strategy 2031'?

–United Arab Emirates

5. What is the name of Japan's new imperial era that has begun on May 1, 2019?

–Reiwa Era

6. Which planet in our solar system has solid inner core being roughly the same size, as Earth's inner core?

–Mercury

7. Which country was nominated as the Guest of Honour at the 29th edition of the Abu Dhabi International Book Fair?

–India



SEVEN IMPORTANT HIGHLIGHTS FROM PIB

1. Empowerment of Divyangjan

The Vice President, Shri. M. Venkaiah Naidu has said that the empowerment of differently abled persons should start with the complete and total annihilation of discriminatory tendencies against them.

Key Highlights

There should be the collective responsibility of the government and the society to support Divyangjan and empower them to lead a dignified life.

The idea of community welfare formed the core of India's social ethos. 'Sarvejanah sukhino bhavantu' has been the underlying theme of Indian philosophical thought. Caring and sharing has been at the centre of our cultural tradition. The differently-abled people need empathy, encouragement, facilitation and empowerment. Eliminating discriminatory tendencies against divyangjan should be the

first step in empowering them. As a society, we need to ensure that no stigma is attached to disability and learn to recognize the valuable human assets we have in people with special needs.

India is a cultural treasure house we can all be proud of. He made an earnest appeal to one and all to preserve and augment India's cultural heritage and to promote the message of peace, compassion and inclusion that is at the heart of our cultural and religious tradition.

Several initiatives have been taken by the union government and various State Governments for the welfare of the differently-abled people and to enable them lead a life of dignity. Although, many civil society organizations are partnering with the government, much more needs to be done. What the differently-abled people need is empathy, encouragement, facilitation and empowerment.

2. Integrated Farming needed to Increase Productivity of Livestock and Farmer's Income

The Vice President of India has stressed the need to promote integrated farming practices to improve the productivity of livestock and double farmers' income.

Key Highlights

There were no suicides in families of farmers who diversified into allied activities like poultry, dairy or aquaculture. The farming households with livestock would be able to better withstand distress caused due to extreme weather conditions and crop failures.

The rural India had an estimated 90.2 million agricultural households and facilitating sustainable income for all these households must be the primary endeavor for everyone.

A healthy and robust agricultural sector is an important prerequisite to ensure sustainable and inclusive growth in India. He called for measures to make farming a lucrative career opportunity, especially for the youth, by making agriculture economically viable and financially rewarding. Agriculture industry contributes 17% of India's total GDP,

out of which, the 27% comes from Animal Husbandry and overall, the dairy, poultry and aqua industries contribute 4.4% to the nation's GDP. These numbers signify the crucial role played by these sectors in our economy.

The rural economy is dependent on agriculture and its allied sectors such as poultry, dairy and others. It provides gainful employment to a large number of youngsters from rural areas. The universities should encourage research on veterinary sciences.

Allied activities like poultry, fisheries, Sericulture and other services have great potential to contribute towards employment and economic growth and there is a need to conserve and improve the productivity of our indigenous breeds.

He urged all Veterinary Universities and Agricultural Universities to have engineering and IT Departments to make use of the endless possibilities of technology in general and Information and Communication Technology (ICT) in particular.

3. Transformation through Education

The Vice President of India has called upon to people to take a pledge to preserve and promote their mother tongue. Stressing that there was a need to strengthen the campaign for preserving mother tongue.

Other Key Highlights

The educational institutions should cultivate the quest for innovation and spirit of scientific thinking in children.

In order to make students become responsible citizenry, schools should create an atmosphere of joyful learning and revamp curriculum to teach students the stories of great freedom fighters and inculcate Indian values.

Observing that the 21st century world and the economic progress of a nation were increasingly becoming knowledge dependent, the training can change the aspects of technology right from the school level so that they adapt to the changing scenario.

Opining that being just literate should not be the aim of education, the real education must allow an individual to seek the truth, knowledge and develop logical thinking and a bent to understand and be sensitive to the needs of others.

Pointing out that education must help in transforming the lives of the poor, suppressed and unreached and the marginalized sections of society, he opined that education is the most potent way to address challenges such as poverty, gender inequality, unemployment, discrimination, caste and economic disparities.

Women who constitute 50% of the population must be given equal opportunities.

The girl child and educating women is essential to India's growth. He called upon people to make campaigns such as 'Educating the Girl Child' must become peoples movements.

4. Reform System to Deliver High-quality Education

The Vice President of India has called upon universities and institutions to constantly reform the system and ensure that higher education institutions deliver high-quality education.

Key Highlights

Though we have expanded the number of higher education institutions, the quality of higher professional education, remains a major concern. Various studies and surveys have raised concern over the learning outcomes and employability of Indian graduates. We must address these issues and constantly reform the system and ensure that the higher education institutions deliver high quality education.

Stressing that quality higher education is necessary for accelerating the progress and development of our country, he wanted institutions of higher learning to open new horizons of knowledge and research at their institutions. Observing that one must not ignore rural India in our quest to scale new heights of growth, he called for an inclusive and all around development.

Stating that technology is a great democratic leveler, he asked students and the youth to take care of the technological needs of our villages, agriculture and allied industry. He called for leveraging technology's potential for rural development and bridging the rural-urban divide.

Technology is a great democratic leveler; we must leverage its potential for rural development and bridging the rural- urban divide. Technology must provide solutions to the issues of rural life and economy. India lives in Villages. The development of our country depends on rural India.

He asked the students and the youth to not to fall prey to the distractions of modern lifestyle and he advised them to shun junk food to stay healthy. While expressing concern over the prevalence of non-communicable diseases, he advised everybody to change their lifestyles and food habits.

India is a young nation with 65% of our population being below 35 years. Every year almost 1 crore youth join the job market. It is the demographic dividend we as a nation can ill-afford to lose.



5. Investor Education and Protection Fund Authority

In a major success, the Investor Education and Protection Fund (IEPF) Authority has been able to enforce 'The Peerless General Finance and Investment Company Limited' to transfer deposits worth about Rs 1514 Cr to IEPF. This depositor's money was pending with the company for the last 15 years.

This amount was taken by the company by issuing about 1.49 Cr Deposit Certificates and include more than 1 Cr individual investors. The majority of these investors are common citizens belonging to lower and middle income group including daily wage earners etc. Geographically, the investors involved belong to 30 states and Union territories of the Country. Majority of the investors belong to the state of West Bengal.

About IEPF Authority

IEPF Authority has been set up under the Ministry of Corporate Affairs as a statutory body under Companies Act, 2013 to administer the Investor Education and Protection Fund with the objective of promoting Investor's education, awareness and protection.

Functions of Authority

The IEPF Authority is in the process of commissioning an online facility to collect primary information directly from retail investors about the deposits which have matured and are still pending with various entities for repayment or payment of interests. The online report will capture only essential fields with various dropdown options.

The Authority has also acted against companies that have transferred the unpaid dividend amount to IEPF but have failed to transfer shares in accordance with section 124(6) of the Act. In some other cases, the companies are showing unclaimed and unpaid amounts in their Balance Sheets but have not transferred such amounts to IEPF even after seven years. Based on above, the authority has issued more than 4000 notices to the companies under section 206(4) of the Act for calling information. It has been noticed that there are many companies including non-banking finance companies (NBFC) which have neither refunded these amounts back to their entitled investors nor have transferred such amounts to IEPF even after expiry of the period of seven years.

6. Agreement on Offshore Wind Energy

The Union Cabinet has given its approval for a cooperation agreement between Ministry of New and Renewable Energy of India and Ministry for Energy, Utilities and Climate of the Kingdom of Denmark on strategic sector cooperation in the field of renewable energy with a focus on offshore wind energy and a 'Letter of Intent' to establish an Indo-Danish Centre of Excellence for renewable energy in India.

Key Highlights

The objective of the agreement is to promote cooperation between the two countries in the field of renewable energy with special focus on Off-shore wind. The areas of cooperation would include technical capacity building for management of offshore wind projects, measures to develop and sustain a highly efficient wind industry, onshore as well as offshore; measures to 'ensure high quality of wind turbines, components and certification requirements; forecasting and scheduling of off-shore wind.

The Indo-Danish Centre of Excellence in integrated renewable power would work on renewable energy resource assessments with focus on onshore and offshore wind; hybridisation of wind, solar, hydro and storage technologies; integration of renewable energy in high level of wind

energy, testing and R&D; and skill development / capacity building.

Energy Targets of India

India made a pledge that by 2030, 40% of installed power generation capacity shall be based on clean sources, it was determined that 175 GW of renewable energy capacity will be installed by 2022. This includes 100 GW from solar, 60 GW from wind, 10 GW from bio-power and 5 GW from small hydro power.

- ◆ The country currently has the fourth highest wind installed capacity in the world with total installed capacity of 34.98 GW as on October, 2018 against a target of 60 GW by 2022.
- ◆ The National Offshore wind energy policy was notified in October 2015 with an objective to develop the offshore wind energy in the Indian Exclusive Economic Zone (EEZ) along the Indian coastline.
- ◆ LiDAR was commissioned on the monopile platform in November 2017 at Gulf of Khambhat, off Gujarat coast for wind resource assessment.
- ◆ National targets for offshore wind capacity is 5 GW by 2022 and 30 GW by 2030.0

7. Anti-Submarine Warfare Shallow Water Crafts

Ministry of Defence has awarded a contract worth Rs. 6,311.32 crore to Garden Reach Shipbuilders & Engineers Limited (GRSE) for building eight Anti-Submarine Warfare Shallow Water Crafts (ASWSWCs) for Indian Navy.

Key Highlights

The 1st ship is to be delivered within 42 months from contract signing date and subsequent balance ships delivery schedule will be two ships per year.

The project completion time is 84 months from contract signing date. The GRSE is currently handling major projects to make three Stealth Frigates for Indian Navy under P17A Project, ASW Corvettes for Indian Navy, LCUs for Indian Navy, four Survey Vessels (Large) for Indian Navy, FPVs for Indian Coast Guard, etc.

The design and construction of these ships at GRSE is another significant milestone in the 'Make In India' Initiative of the Government of India.

Anti-Submarine Warfare Shallow Water Crafts

These craft are designed for a deep displacement of 750 tons, speed of 25 knots and complement of 57 and capable of full-scale subsurface surveillance of coastal waters



besides coordinated anti-submarine warfare operations with aircraft. In addition, the vessels shall have the capability to interdict/ destroy sub surface targets in coastal waters. These can also be deployed for Search and Rescue by day and night in coastal areas. In their secondary role, these will be capable to prosecute intruding aircraft and lay mines in the sea bed.

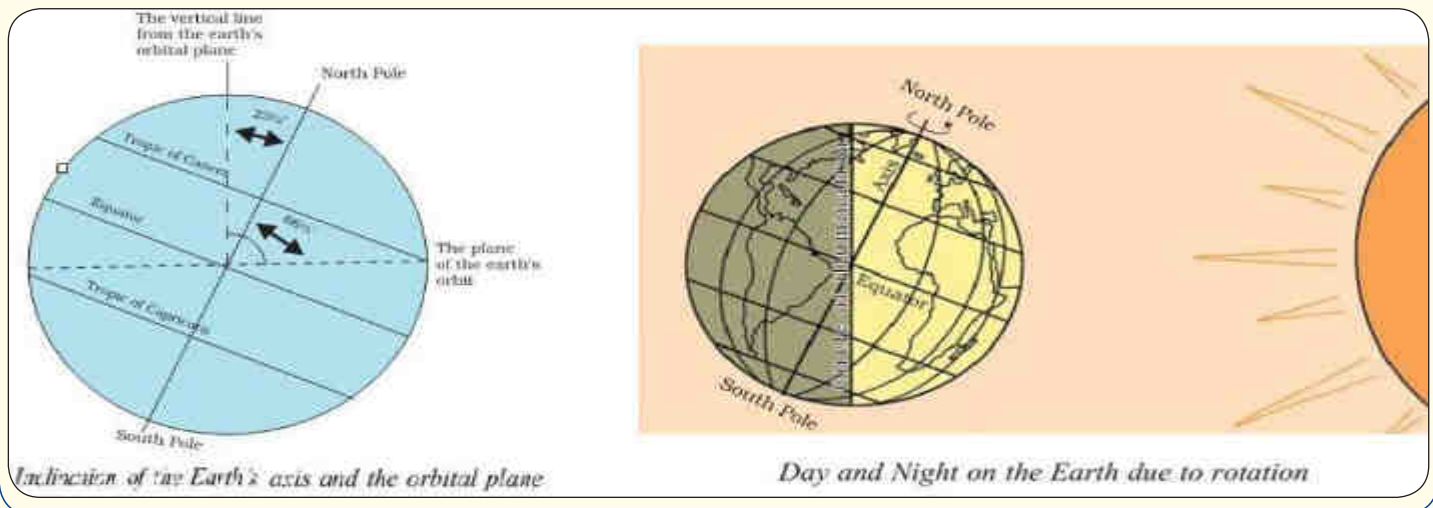
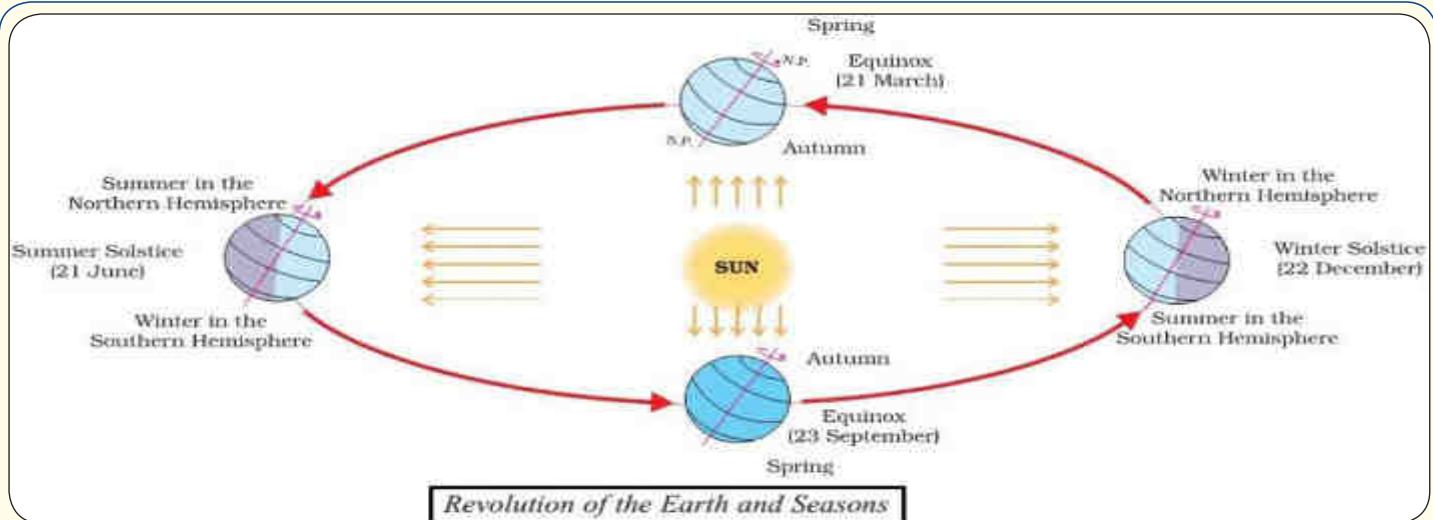
The vessels are equipped with highly advanced state-of-the-art integrated platform management systems including Propulsion Machinery, Auxiliary Machinery, Power Generation and Distribution Machinery and Damage Control Machinery, etc.

These warships will be built as per Classification Society Rules and Naval Ship Regulations and will conform to latest Marine Pollution Standards of the International Maritime Organization (IMO) and Safety of Life at Sea (SOLAS).



SEVEN IMPORTANT CONCEPTS THROUGH GRAPHICS

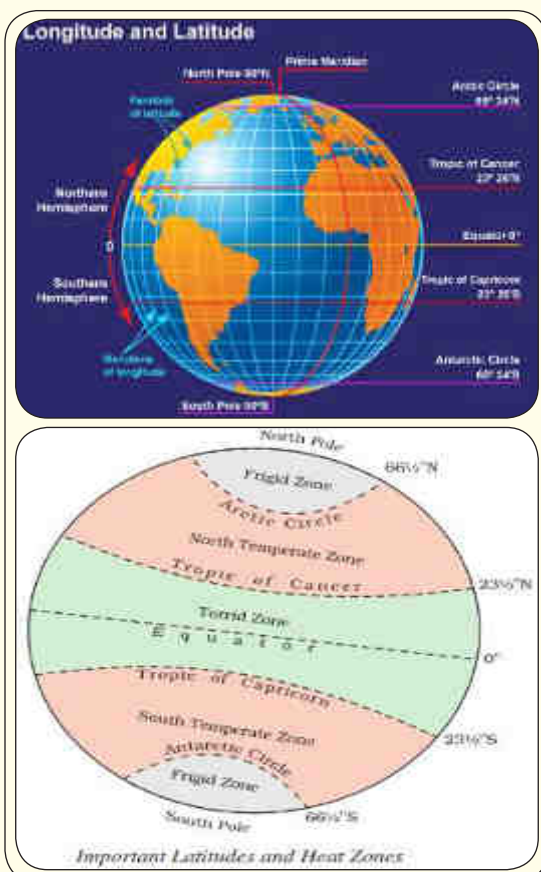
1. Motions of the Earth



Key Facts

- The Earth has two types of motions, namely rotation and revolution. 'Rotation' is the movement of the Earth on its axis. The movement of the Earth around the Sun in a fixed path or orbit is called 'revolution'.
- The Earth takes about 24 hours to complete one rotation around its axis. The period of rotation is known as the earthday. This is the daily motion of the Earth.
- The second motion of the Earth around the Sun in its orbit is called 'revolution'. It takes 365¼ days (one year) to revolve around the Sun.
- Summer Solstice (21st June) - On this day, the rays of the sun fall directly on the Tropic of Cancer. The North Pole is inclined towards the Sun and the places beyond the Arctic Circle experience continuous daylight for about six months, hence it is summer in the regions North of the equator. The longest day and the shortest night at these places occur on 21st June.
- Winter Solstice (22nd December) - On 22nd December, the Tropic of Capricorn receives direct rays of the sun as the South Pole tilts towards it, hence it is summer in the Southern Hemisphere with longer days and shorter nights. The reverse happens in the Northern Hemisphere.
- On 23rd September, it is autumn season in the Northern Hemisphere and spring season in the Southern Hemisphere. The opposite is the case on 21st March, when it is spring in the Northern Hemisphere and autumn in the Southern Hemisphere.

2. Latitudes and Longitudes



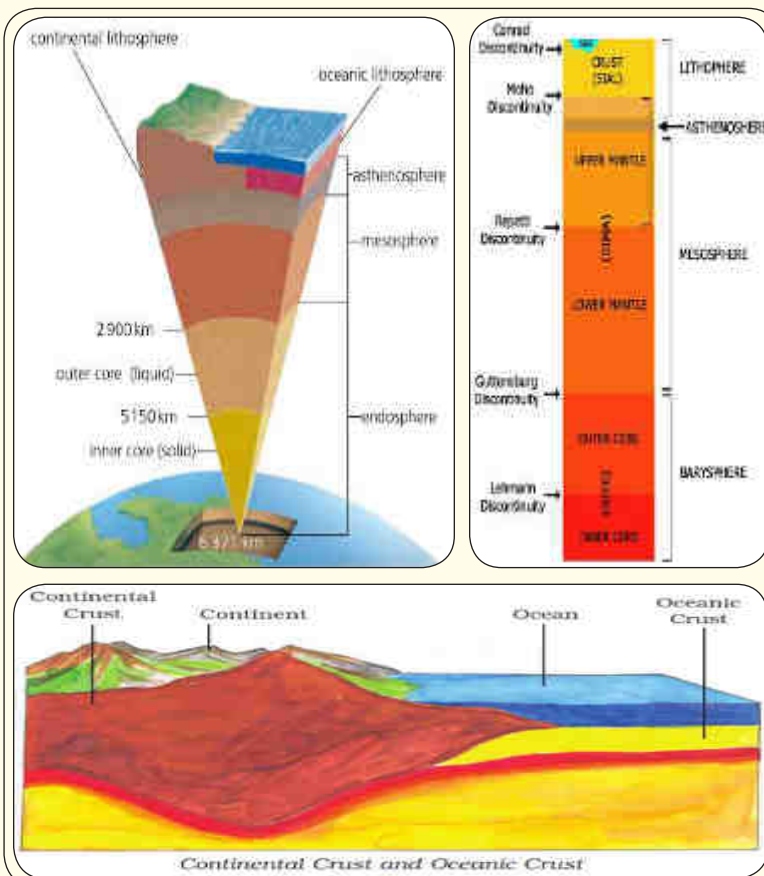
Key Facts

- The equator is an imaginary circular line and is a very important reference point to locate places on the Earth. All parallel circles from the equator up to the poles are called 'parallels of latitudes'. Latitudes are measured in degrees.
- The equator represents the zero degree latitude. Since the distance from the equator to either of the poles is one-fourth of a circle round the Earth, it will measure $\frac{1}{4}$ th of 360 degrees, i.e. 90°.
- Thus, 90 degrees North latitude marks the North Pole and 90 degrees South latitude marks the South Pole.
- As such, all parallels North of the equator are called 'North Latitudes.' Similarly all parallels South of the equator are called 'South Latitudes.'
- There are four important parallels of latitudes— Tropic of Cancer (23 $\frac{1}{2}$ ° N) in the Northern Hemisphere, Tropic of Capricorn (23 $\frac{1}{2}$ ° S) in the Southern Hemisphere, Arctic Circle at 66 $\frac{1}{2}$ ° North of the equator and Antarctic Circle at 66 $\frac{1}{2}$ ° South of the equator.
- In order to locate any place precisely, we must find out how far East or West these places are from a given line of reference running from the North Pole to the South Pole. These lines of references are called the 'meridians of longitude' and the distances between them are measured in 'degrees of longitude'.
- They are semicircles and the distance between them decreases steadily polewards until it becomes zero at the poles, where all the meridians meet.
- Unlike parallels of latitude, all meridians are of equal length.
- The value of Prime Meridian is 0° longitude and from it we count 180° eastward as well as 180° westward. The Prime Meridian and 180° meridian divide the Earth into two equal halves, the Eastern Hemisphere and the Western Hemisphere.

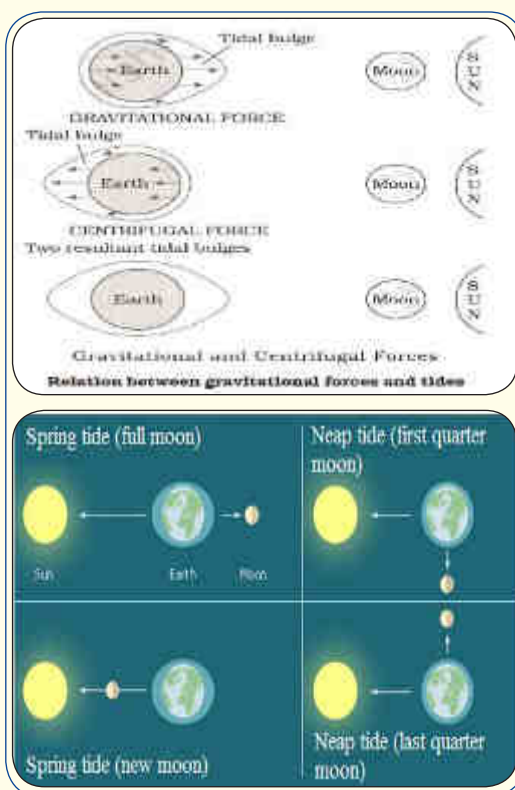
3. Interior of the Earth

Key Facts

- The uppermost layer over the Earth's surface is called the crust. It is the thinnest of all the layers. It is about 35 km.
- The main mineral constituents of the continental mass are silica and alumina. It is thus called 'sial' (si-silica and al-alumina).
- The oceanic crust mainly consists of silica and magnesium; it is therefore called 'sima' (si-silica and ma-magnesium).
- Just beneath the crust is the mantle which extends up to a depth of 2900 km. below the crust.
- The innermost layer is the core with a radius of about 3500 km. It is mainly made up of nickel and iron and is called 'nife' (ni – nickel and fe – ferrous i.e. iron).
- The central core has very high temperature and pressure.
- Conrad Discontinuity:** Discontinuity between the hydrosphere and crust.
- Mohorovich Discontinuity or Moho discontinuity:** Discontinuity between the crust and mantle.
- Repetti Discontinuity:** Discontinuity between the upper mantle and the lower mantle.
- Guttenberg's Discontinuity:** It separates the lower mantle from the outer core.
- Lehmann Discontinuity:** Discontinuity between the upper core and the lower core.



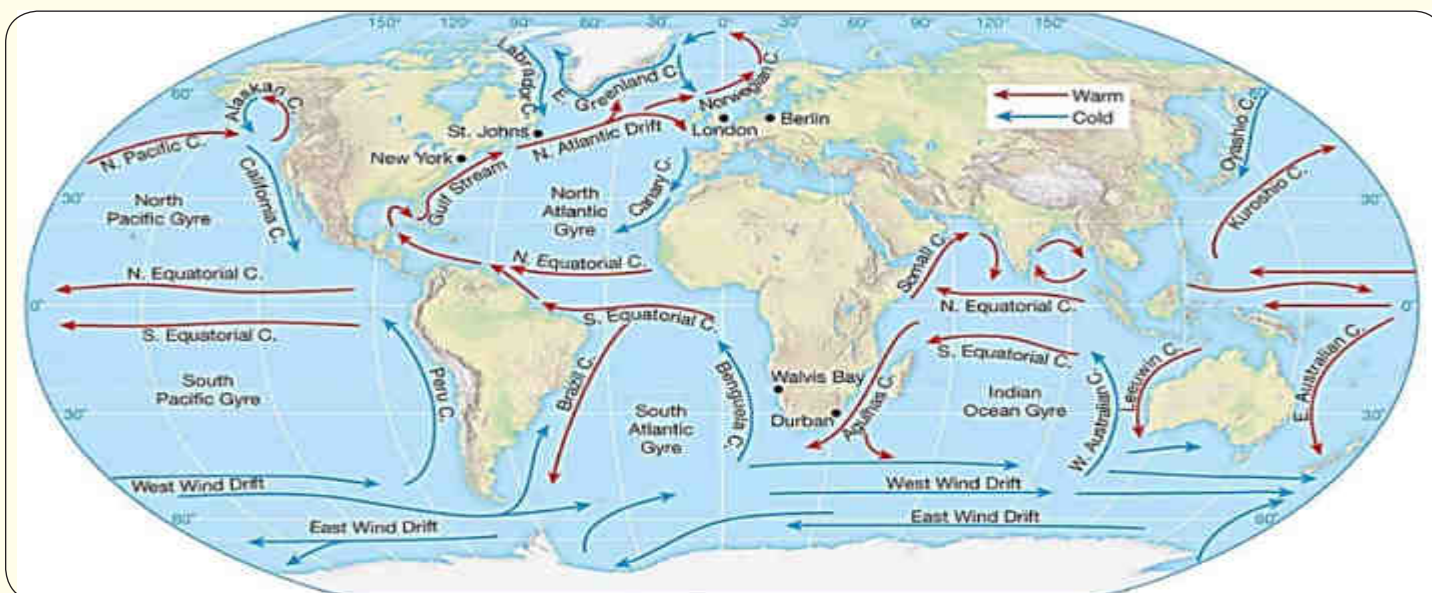
4. Tides



Key Facts

- The periodical rise and fall of the sea level, once or twice a day, mainly due to the attraction of the Sun and the Moon, is called a tide.
- The Moon's gravitational pull to a great extent and to a lesser extent the Sun's gravitational pull, are the major causes for the occurrence of tides.
- Another factor is centrifugal force, which is the force that acts to counter balance the gravity. Together, the gravitational pull and the centrifugal force are responsible for creating the two major tidal bulges on the Earth.
- On the side of the Earth facing the Moon, a tidal bulge occurs while on the opposite side though the gravitational attraction of the Moon is less as it is farther away, the centrifugal force causes tidal bulge on the other side.
- On the surface of the Earth, nearest the Moon, pull or the attractive force of the Moon is greater than the centrifugal force, and so there is a net force causing a bulge towards the Moon.
- On the opposite side of the Earth, the attractive force is less, as it is farther away from the Moon, the centrifugal force is dominant. Hence, there is a net force away from the Moon. It creates the second bulge away from the Moon.
- On the surface of the Earth, the horizontal tide generating forces are more important than the vertical forces in generating the tidal bulges.
- The tidal bulges on wide continental shelves, have greater height. When tidal bulges hit the mid-oceanic islands they become low.

5. Ocean Currents



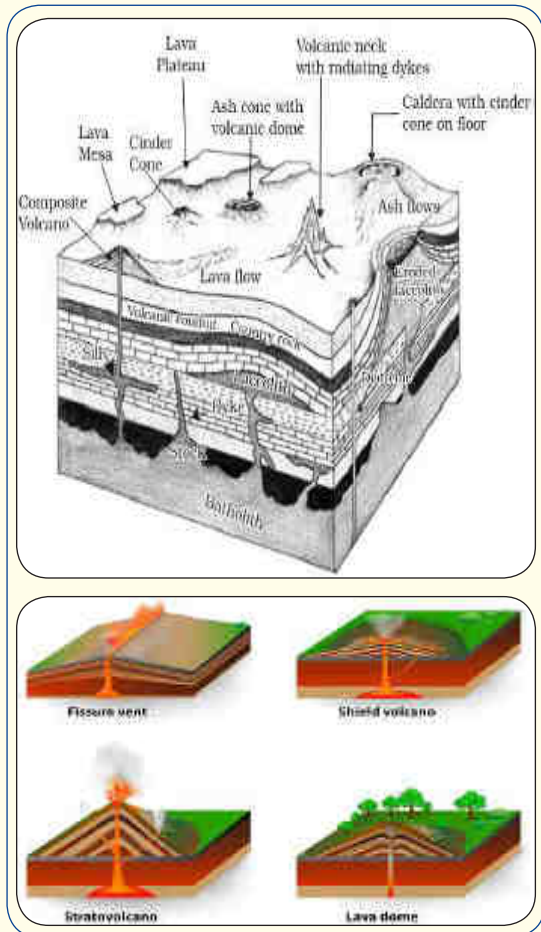
Key Facts

- Ocean currents are influenced by two types of forces namely: primary forces that initiate the movement of water and secondary forces that influence the currents to flow.
- The primary forces that influence the currents are: heating by solar energy; wind; gravity and coriolis force.
- The ocean currents may be classified based on their depth as surface currents and deep water currents.
- Major ocean currents are greatly influenced by the stresses exerted by the prevailing winds and coriolis force.
- The oceanic circulation pattern roughly corresponds to the earth's atmospheric circulation pattern.
- Generally, the warm ocean currents originate near the equator and move towards the poles. The cold currents carry water from polar or higher latitudes to tropical or lower latitudes.
- The areas where the warm and cold currents meet provide the best fishing grounds of the world.
- The areas where a warm and cold current meet also experience foggy weather making it difficult for navigation.

6. Volcanoes

Key Facts

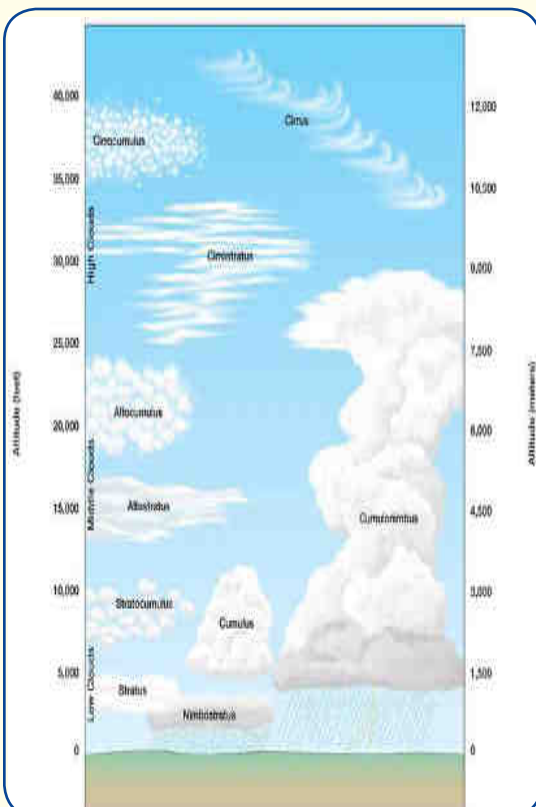
- A volcano is a place where gases, ashes and/or molten rock material – lava – escape to the ground.
- The material that reaches the ground includes lava flows, pyroclastic debris, volcanic bombs, ash and dust and gases such as nitrogen compounds, sulphur compounds and minor amounts of chlorine, hydrogen and argon.
- Volcanoes are classified on the basis of nature of eruption and the form developed at the surface.
- Major types of volcanoes are Shield Volcanoes, Composite Volcanoes, Caldera, Flood Basalt Provinces and Mid-Ocean Ridge Volcanoes.
- **Batholiths:** A large body of magmatic material that cools in the deeper depth of the crust develops in the form of large domes.
 - These are granitic bodies. Batholiths are the cooled portion of magma chambers.
- **Lacoliths:** These are large dome-shaped intrusive bodies with a level base and connected by a pipe-like conduit from below.
 - It resembles the surface volcanic domes of composite volcano, only these are located at deeper depths.
- **Lapolith:** If lava develops into a saucer shape, concave to the sky body, it is called lapolith.
- **Phacolith:** A wavy mass of intrusive rocks, at times, is found at the base of synclines or at the top of anticline in folded igneous country. Such wavy materials are called the phacoliths.
- **Sills:** The near horizontal bodies of the intrusive igneous rocks are called sill (thick) or sheet (thinner), depending on the thickness of the material.
- **Dykes:** When the lava makes its way through cracks and the fissures developed in the land, it solidifies almost perpendicular to the ground. It gets cooled in the same position to develop a wall-like structure. Such structures are called dykes.



7. Clouds

Key Facts

- Cloud is a mass of minute water droplets or tiny crystals of ice formed by the condensation of the water vapour in free air at considerable elevations.
- According to their height, expanse, density and transparency or opaqueness clouds are grouped under four types : cirrus; cumulus; stratus and nimbus.
- **Cirrus Clouds:** They are formed at high altitudes (8,000 - 12,000m). They are thin and detached clouds having a feathery appearance. They are always white in colour.
- **Cumulus Clouds:** They look like cotton wool. They are generally formed at a height of 4,000 - 7,000 m. They exist in patches and can be seen scattered here and there. They have a flat base.
- **Stratus Clouds:** As their name implies, these are layered clouds covering large portions of the sky. These clouds are generally formed either due to loss of heat or the mixing of air masses with different temperatures.
- **Nimbus Clouds:** Nimbus clouds are black or dark gray. They form at middle levels or very near to the surface of the earth. These are extremely dense and opaque to the rays of the sun. Sometimes, the clouds are so low that they seem to touch the ground. Nimbus clouds are shapeless masses of thick vapour.
- A combination of these four basic types can give rise to the following types of clouds: high clouds – cirrus, cirrostratus, cirrocumulus; middle clouds – altostratus and altocumulus; low clouds – stratocumulus and nimbostratus and clouds with extensive vertical development – cumulus and cumulonimbus.



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AN INTRODUCTION

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