

# PERFECT 7

## WEEKLY

CURRENT AFFAIRS

June: 2019 / Issue-04



## DESERTIFICATION AND LAND DEGRADATION

### Major Threats to Agriculture

- The World Population Prospects Report 2019 and India
- Food Wastage in India : An Alarming Issue
- India and Myanmar : Cooperation for Energy
- SCO Summit 2019 : Reinforcing Globalisation
- India's Ambitious Space Station Plan : An Introduction
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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  
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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  
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# 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 an 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

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## Our other initiative



Hindi & English  
Current Affairs  
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**DHYEYA TV**  
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by Mr. Qurban Ali  
(Ex. Editor Rajya Sabha, TV) & by Team Dhyeya IAS  
(Broadcasted on YouTube & Dhyeya-TV)

# SEVEN IMPORTANT ISSUES

## 1. DESERTIFICATION AND LAND DEGRADATION : MAJOR THREATS TO AGRICULTURE

### Why in News?

The government of India for the first time will host the 14<sup>th</sup> session of the Conference of Parties (COP-14) of the United Nations Convention to Combat Desertification (UNCCD) in September.

In order to reiterate its commitment to fight desertification, government of India has also launched a pilot project to restore degraded forest landscapes in five states over the next 42 months. In the first phase, the pilot will be conducted in Haryana, Madhya Pradesh, Maharashtra, Nagaland and Karnataka.

### Introduction

Land degradation is an issue of increasing global concern. It threatens not only the productivity of land but also water quality, human health and the fundamentals of ecosystems on which all life depend. It has also close connection with other major global issues, particularly climate change and biodiversity. It has been estimated that globally around 24 billion tons of fertile soil and 27,000 bio-species are lost each year. While land degradation is acutely felt in the world's arid lands, some 80 per cent is actually occurring outside these areas.

Desertification and land degradation are major threats to agricultural productivity in India. According to the State of India's Environment 2017, desertification

has increased to 90 per cent of states in India. Out of the total 328.72 million hectares (MHA) of India's total geographical area, 96.4 MHA are under desertification. In the past 10 years, 26 of 29 Indian states have reported an increase in the area undergoing desertification. Around 40 to 70 per cent of the land has undergone desertification in eight states, Rajasthan, Delhi, Goa, Maharashtra, Jharkhand, Nagaland, Tripura and Himachal Pradesh. The highest increase in land degradation is observed in Lunglei district of Mizoram (5.81 percent increase from 2003-05 to 2011-13). Rajasthan accounts for the most desertified land (23 Mha), followed by Gujarat, Maharashtra and Jammu and Kashmir (13 Mha each) and Odisha and Andhra Pradesh (5 Mha each). Around, 68 per cent of the country is prone to drought, and this will be further heightened because of the impact of climate change, particularly in dry lands.

According to the fifth National Report on Desertification, Land Degradation and Drought, which has been submitted to the Secretariat of the UN Convention to Combat Desertification by India, the government has conceded that land degradation continues to be a major environmental concern for the country with consequent implications for sustainable development. Citing different government sources, the

report states that 146.82 Mha of the country's total area is suffering from different kinds of land degradation, including water erosion (93.68 Mha), wind erosion (9.48 Mha), waterlogging (14.30 Mha), salinity or alkalinity (5.94 Mha), soil acidity (16.04 Mha) and other complex reasons (7.38 Mha). The major process of land degradation is soil erosion (due to water and wind erosion), which contributes to over 71% of the land degradation in the country. Soil erosion due to water alone contributes to about 61.7% and that by wind erosion to 10.24%. The other processes include problems of water logging and salinity/alkalinity.

### Difference between Land Degradation and Desertification

Land degradation refers to any diminishment of biodiversity and ecosystem functioning that negatively impacts the provisioning of ecosystem services and ultimately impedes poverty eradication and sustainable development. Land degradation is caused by human activities and natural processes and is being exacerbated by the adverse impacts of climate change. Those lands that have undergone irreversible degradation are called wasteland.

When degradation occurs in arid, semi-arid and dry sub-humid areas where productivity is constrained by water availability, it is called desertification.

### What is Desertification?

Desertification is defined as "a type of land degradation in which a relatively dry land region becomes increasingly

arid typically losing its bodies of water as well as vegetation and wildlife.” It is a continuous degradation of land under the influence of natural and anthropological causes in arid, semi-arid and dry-sub humid conditions.

As per United Nations Convention for Combating Desertification (UNCCD), Desertification is defined as land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors including climatic variations and human activities. Here “land” means the terrestrial bio-productive system and “land degradation” means reduction or loss of biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as:

- ◆ Soil erosion caused by wind and/or water;
- ◆ Deterioration of the physical, chemical and biological or economic properties of soil; and
- ◆ Long term loss of natural vegetation.

## Causes of Land Degradation and Desertification in India

### Land Degradation

The degradation was the result of loss of vegetation due to deforestation, cutting beyond permissible limits, unsustainable fuel wood and fodder extraction, shifting cultivation, encroachment on forest lands, forest fires and overgrazing.

Other factors leading to largescale degradation comprise extension of cultivation to lands of low potential or high natural hazards, non- adoption of adequate soil conservation measures, improper crop rotation, indiscriminate

use of agro- chemicals, improper planning and management of irrigation systems and excessive extraction of groundwater.

### The Rio Conventions

The three Rio Conventions—on Biodiversity, Climate Change and Desertification—derive directly from the 1992 Earth Summit. Each instrument represents a way of contributing to the sustainable development goals of Agenda 21. The three conventions are intrinsically linked, operating in the same ecosystems and addressing interdependent issues.

**Convention on Biological Diversity (CBD):** The objectives of the CBD are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from commercial and other utilization of genetic resources. The agreement covers all ecosystems, species and genetic resources.

**United Nations Convention to Combat Desertification (UNCCD):** The UNCCD aims to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa, through effective actions at all levels, supported by international co-operation and partnership arrangements, in the framework of an integrated approach which is consistent with Agenda 21, with a view to contributing to the achievements of sustainable development in affected areas.

**United Nations Framework Convention on Climate Change (UNFCCC):** The UNFCCC sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. Its objectives are to stabilize greenhouse-gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, within a time-frame sufficient to allow ecosystems to adapt naturally to climate change; to ensure that food production is not threatened; to enable economic development to proceed in a sustainable manner.

### Desertification

It leads due to overgrazing, over-exploitation, deforestation, inappropriate irrigation, population pressure, urbanisation, poverty,

inequitable sharing of resources. Other reasons that cause desertification in India are: water erosion (10.98 per cent), wind erosion (5.55 per cent), human-made/settlements (0.69 per cent), vegetation degradation (8.91 per cent), salinity (1.12 per cent), others (2.07 per cent).

### Drought

Condition caused by very low or deficit rainfall usually during monsoon; is a major cause of desertification and land degradation under dryland conditions. Dryland comprises the hot arid regions (like in Rajasthan, Gujarat, southern Punjab, Haryana and Deccan Peninsula) or warm deserts (like Thar in west Rajasthan) as well as cold deserts (like those in Jammu and Kashmir, Lahul- Spiti and Pooh in Himachal Pradesh).

### What does Land Degradation mean for Health?

These social and environmental processes are stressing the world's arable lands and pastures essential for the provision of food and water and quality air. Land degradation and desertification can affect human health through complex pathways. As land is degraded and in some places deserts expand, food production is reduced, water sources dry up and populations are pressured to move to more hospitable areas. The potential impacts of desertification on health include:

- ◆ Higher threats of malnutrition from reduced food and water supplies;
- ◆ More water- and food-borne diseases that result from poor hygiene and a lack of clean water;
- ◆ Respiratory diseases caused by atmospheric dust from wind erosion and other air pollutants;
- ◆ The spread of infectious diseases as populations migrate.

## Efforts for Combating Desertification

Desertification, along with climate change and the loss of biodiversity were identified as the greatest challenges to sustainable development during the 1992 Rio Earth Summit which paved the way for the conceptualization and formulation of the United Nations Convention to Combat Desertification (UNCCD). Established in 1994, the United Nations Convention to Combat Desertification (UNCCD) is the only legally binding international agreement linking environment and development issues to the land agenda. The Convention's 195 parties, including India, work together to improve the living conditions for people in drylands, maintain and restore land and soil productivity and mitigate the effects of drought.

India is signatory to the United Nations Convention on Combating Desertification (UNCCD) and is committed to achieve the land degradation neutral status by 2030. In order to achieve these objectives, the Government of India is implementing large number of National Level Programmes and Schemes in the country. The Ministry of Environment, Forest and Climate Change is the nodal Ministry for the implementation of the UNCCD.

The government of India has launched a flagship project on enhancing capacity on forest landscape restoration (FLR) and Bonn Challenge in India, through a pilot phase of 3.5 years implemented in the states of Haryana, Madhya Pradesh, Maharashtra, Nagaland and Karnataka. Ministry of Environment, Forest and Climate Change (MoEFCC) in partnership with The International Union for Conservation of Nature (IUCN), through this flagship project aims to

develop and adapt best practices and monitoring protocols for the Indian states and build capacity within the five pilot states on FLR and Bonn Challenge. This will be eventually scaled up across the country through subsequent phases of the project.

The Bonn Challenge is a global effort to bring 150 million hectares of the world's deforested and degraded land into restoration by 2020, and 350 million hectares by 2030. At the UNFCCC Conference of the Parties (COP) 2015 in Paris, India also joined the voluntary Bonn Challenge pledge to bring into restoration 13 million hectares of degraded and deforested land by the year 2020 and additional 8 million hectares by 2030. India's pledge is one of the largest in Asia.

India will also host the fourteenth session of Conference of Parties (COP - 14) from 29<sup>th</sup> August - 14<sup>th</sup> September 2019. One of the primary functions of the COP is to review reports submitted by the Country Parties detailing how they are carrying out their commitments. India will take-over the COP presidency from China for two years until the next COP is hosted in 2021.

Various other schemes also have been launched by the government of India such as: Pradhan Mantri Fasal Bima Yojana (PMFBY), Soil Health Card Scheme, Soil Health Management Scheme, Pradhan Mantri Krishi Sinchayee Yojna (PKSY), Per Drop More Crop, etc. which are helping to reduce land degradation.

## Way Forward

More than two billion hectares of degraded land in various parts of the world can be rehabilitated. The techniques include integrated farming, agro-forestry and farmer-managed natural regeneration. Small community

initiatives like closure of degraded lands for grazing, curtailing farming, growing fast-growing plants, raising tall trees that serve as a barrier against winds and sandstorms are very effective. Further sustainable management of soil, water and biodiversity are required for protecting the land from further degradation.

As far as India is concerned, India is one of the countries affected by desertification and is facing new challenges, among which are recurrent droughts and dust and sandstorms. The country has tremendous potential to turn these challenges into opportunities through improved land use management.

### The Bonn Challenge

The Bonn Challenge is a global effort to bring 150 million hectares of the world's deforested and degraded land into restoration by 2020, and 350 million hectares by 2030. It was launched in 2011 by the Government of Germany and IUCN, and later endorsed and extended by the New York Declaration on Forests at the 2014 UN Climate Summit.

Underlying the Bonn Challenge is the forest landscape restoration (FLR) approach, which aims to restore ecological integrity at the same time as improving human well-being through multifunctional landscapes.

The Bonn Challenge is not a new global commitment but rather a practical means of realizing many existing international commitments, including the CBD Aichi Target 15, the UNFCCC REDD+ goal, and the Rio+20 land degradation neutrality goal. It is an implementation vehicle for national priorities such as water and food security and rural development while contributing to the achievement of international climate change, biodiversity and land degradation commitments.

### General Studies Paper- III

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



## 2. THE WORLD POPULATION PROSPECTS REPORT 2019 AND INDIA

### Why in News?

The Population Division of the UN Department of Economic and Social Affairs has released a report titled, 'The World Population Prospects 2019: Highlights'. According to the report, the world's population is expected to increase by two billion people in the next 30 years, from 7.7 billion currently to 9.7 billion in 2050 and it could reach its peak around the end of the current century, at a level of nearly 11 billion.

### Introduction

Understanding global population trends and anticipating the demographic changes to come are crucial to the achievement of the 2030 Agenda for Sustainable Development. The 2030 Agenda emphasizes that people are at the centre of sustainable development, echoing the ideals set forth in the Programme of Action of the International Conference on Population and Development adopted in Cairo in 1994. Population trends observed over the past few decades point to substantial progress made towards several of the Sustainable Development Goals (SDGs) so far. Examples include reduced mortality, particularly among children, as well as increased access to sexual and reproductive health care and enhanced gender equality that have empowered women to decide freely and responsibly the number, spacing and timing of their children.

Recent demographic trends are harbingers of the future challenges to sustainable development. For example, countries experiencing rapid population growth, most of which are in sub-Saharan Africa, must provide schooling and health care to growing numbers of children and ensure education and employment

opportunities to increasing numbers of youth. Countries where population growth has slowed or stopped must prepare for an increasing proportion of older persons and, in some cases, decreasing population size. These and other challenges can be addressed in part by anticipating coming demographic trends and incorporating that information into policies and planning.

People, and thus populations, are at the centre of sustainable development. Each of the four global demographic "megatrends"— population growth, population ageing, migration and urbanization – holds important implications for economic and social development and for environmental sustainability. Timely and accurate population estimates and projections allow governments to anticipate future demographic trends and to incorporate that information into development policies and planning.

### World Population Prospects 2019

The population estimates and projections presented in the World Population Prospects describe two of the four demographic megatrends (population growth and ageing), as well as key trends in human fertility, mortality, and net international migration that are integral to sustainable development. Collectively, these data constitute a critical piece of the evidence base for monitoring global progress towards the achievement of the Sustainable Development Goals by 2030.

Within little more than a decade there are likely to be around 8.5 billion people on Earth, and almost 10 billion by 2050, compared to 7.7 billion

today. A small number of countries will account for most of the increase. While some countries continue to grow rapidly, others are seeing their populations decline. At the same time, the world is growing older, as global life expectancy continues to rise and the fertility level continues to fall. Such changes in the size and distribution of the world's population have important consequences for achieving the Sustainable Development Goals (SDGs) and ensuring that no one is left behind.

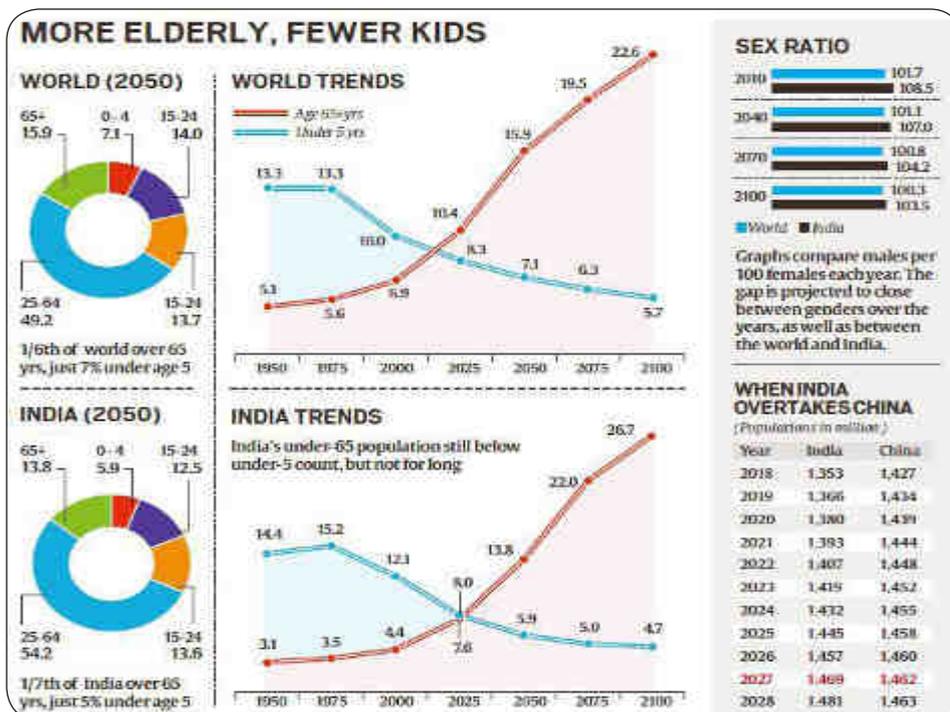
### Key Findings

- ◆ The world's population continues to grow, albeit at a slower pace than at any time since 1950, owing to reduced levels of fertility. From an estimated 7.7 billion people worldwide in 2019, the medium-variant projection indicates that the global population could grow to around 8.5 billion in 2030, 9.7 billion in 2050, and 10.9 billion in 2100.
- ◆ The largest increases in population between 2019 and 2050 will take place in: India, Nigeria, Pakistan, the Democratic Republic of the Congo, Ethiopia, the United Republic of Tanzania, Indonesia, Egypt and the United States of America (in descending order of the expected increase). Around 2027, India is projected to overtake China as the world's most populous country.
- ◆ Many of the fastest growing populations are in the poorest countries, where population growth brings additional challenges in the effort to eradicate poverty (SDG 1), achieve greater equality (SDGs 5 and 10), combat hunger and malnutrition (SDG 2) and strengthen the coverage and

- quality of health and education systems (SDGs 3 and 4).
- In most of sub-Saharan Africa and in parts of Asia, Latin America and the Caribbean, recent reductions in fertility have caused the population at working ages (25-64 years) to grow faster than at other ages, creating an opportunity for accelerated economic growth. To benefit from this “demographic dividend”, governments should invest in education and health, especially for young people and create conditions conducive to sustained economic growth.
- Today, close to half of all people globally live in a country or area where fertility is below 2.1 births per woman over a lifetime. In 2019, fertility remains above this level, on average, in sub-Saharan Africa (4.6), Oceania excluding Australia/ New Zealand (3.4), Northern Africa and Western Asia (2.9), and Central and Southern Asia (2.4). The global fertility rate, which fell from 3.2 births per woman in 1990 to 2.5 in 2019, is projected to decline further to 2.2 in 2050.
- Life expectancy at birth for the world, which increased from 64.2 years in 1990 to 72.6 years in 2019, is expected to increase further to 77.1 years in 2050. While considerable progress has been made in closing the longevity differential between countries, large gaps remain. In 2019, life expectancy at birth in the least developed countries lags 7.4 years behind the global average, due largely to persistently high child and maternal mortality, as well as violence, conflict and the continuing impact of the HIV epidemic.
- By 2050, one in six people in the world will be over age 65 (16%), up from one in 11 in 2019 (9%). Regions where the share of the population aged 65 years or over is projected to double between 2019 and 2050 include Northern Africa and Western Asia, Central and Southern Asia, Eastern and South-Eastern Asia, and Latin America and the Caribbean. By 2050, one in four persons living in Europe and Northern America could be aged 65 or over. In 2018, for the first time in history, persons aged 65 or above outnumbered children

under five years of age. The number of persons aged 80 years or over is projected to triple, from 143 million in 2019 to 426 million in 2050.

- The potential support ratio, which compares numbers of working-age people aged 25-64 to those over age 65, is falling around the world. In Japan, this ratio is 1.8, the lowest in the world. An additional 29 countries, mostly in Europe and the Caribbean, already have potential support ratios below three. By 2050, 48 countries, mostly in Europe, Northern America, and Eastern and South-Eastern Asia, are expected to have potential support ratios below two. These low values underscore the potential impact of population ageing on the labour market and economic performance as well as the fiscal pressures that many countries will face in the coming decades as they seek to build and maintain public systems of health care, pensions and social protection for older persons.
- Since 2010, 27 countries or areas have experienced a reduction in the size of their populations of one per cent or more. This is caused by low levels of fertility and, in some places, high rates of emigration. Between 2019 and 2050, populations are projected to decrease by one per cent or more in 55 countries or areas, of which 26 may see a reduction of at least ten per cent. In China, for example, the population is projected to decrease by 31.4 million, or 2.2 per cent, between 2019 and 2050.
- Between 2010 and 2020, Europe and Northern America, Northern Africa and Western Asia, and Australia/ New Zealand will be net receivers of international migrants, while other regions will be net senders. Fourteen countries or areas will see a net



inflow of more than one million migrants, while ten countries will see a net outflow of more than one million migrants. Some of the largest migratory movements are driven by the demand for migrant workers (Bangladesh, Nepal and the Philippines) or by violence, insecurity and armed conflict (Syria, Venezuela and Myanmar). Belarus, Estonia, Germany, Hungary, Italy, Japan, the Russian Federation, Serbia and Ukraine will experience a net inflow of migrants over the decade, helping to offset population losses caused by an excess of deaths over births.

- ◆ Males are projected to continue to outnumber females until the end of century. But the gap will close between genders, as well as between world and India.

## India and Population Prospects

According to the report, India, projected to surpass China as the world's most populous country around 2027, is expected to add nearly 273 million people between now and 2050 and will remain the most populated country through the end of the current century. China, with 1.43 billion people in 2019, and India, with 1.37 billion, has long been the two most populous countries of the world, comprising 19 and 18 per cent, respectively, of the global total in 2019. They are followed by the United States of America, with 329 million in 2019, and Indonesia, with 271 million.

Previous UN projections had estimated that India will surpass China as the world's most populous country as early as 2022. The 2017 world population report, released by the UN two years ago, had estimated that the population of India will surpass that of China's by around 2024. In its 24<sup>th</sup> round of estimates released in 2015,

the UN had projected that India will become more populous than China by 2022.

## Factors that affecting Population Growth in India

### Socio-Economic Development

The overarching factor that affects population growth is low socio-economic development. For example, Uttar Pradesh has lower literacy rate and small number of the women receive complete antenatal care. In contrast, in Kerala almost every person is literate and almost every woman receives antenatal care. Kerala records an average of two children per couple. Fertility usually declines with increase in education levels of women.

### Infant Mortality

In 1961, the Infant Mortality Rate (IMR), deaths of infants per 1000 live births, was 115. The current all India average is 33. However, in most developed countries this figure is less than 5. Empirical correlations suggest that high IMR leads to greater desire for children.

### Early Marriage

Despite the declining trend, the prevalence of child marriage continues to be high in India. The prevalence of girls getting married before 18 years of age in India has declined from 47 per cent in 2005-2006 to 27 per cent in 2015-2016. But, states like Bihar, West Bengal and Rajasthan continue to carry on with the harmful practice and there is nearly 40 per cent prevalence in these states. Not only does early marriage increase the likelihood of more children, it also puts the woman's health at risk.

### Male Child Preference

The desire for larger families particularly preference for a male child also leads to higher birth rates.

## Government Initiatives for Population Control

### The National Population Policy, 2000

The National Population Policy, 2000 gave a focused approach to the problem of population stabilization. The main objectives of National Population Policy, 2000 was to address the unmet needs for contraception and achieving a stable population by 2045, at a level consistent with the requirements of sustainable economic growth, social development and environmental protection.

Following the policy, the government also enacted the Constitution (84th Amendment) Act, 2002. This Amendment extended the freeze on the state-wise allocation of seats in the Lok Sabha and the Rajya Sabha to 2026. It was expected that this would serve 'as a motivational measure, in order to enable state governments to fearlessly and effectively pursue the agenda for population stabilization contained in the National Population Policy, 2000.

### Mission Parivar Vikas

The government has launched 'Mission ParivarVikas' for substantially increasing the access to contraceptives and family planning services in the 145 high fertility districts of seven high focus states with TFR of 3 and above. These high focus seven states are Uttar Pradesh, Bihar, Rajasthan, Madhya Pradesh, Chhattisgarh, Jharkhand and Assam. These 145 districts have been identified based on total fertility rate and service delivery (PPIUCD and Sterilization performance) for immediate, special and accelerated efforts to reach the replacement level fertility goals of 2.1 by 2025.

### Family Planning 2020

The key commitments of FP 2020 are as under:

- ◆ Increasing financial commitment on Family Planning whereby India commits an allocation of 2 billion USD from 2012 to 2020.
- ◆ Ensuring access to family planning services to 48 million (4.8 crore) additional women by 2020 (40% of the total FP 2020 goal).
- ◆ Sustaining the coverage of 100 million (10 crore) women currently using contraceptives.

### Jansankhya Sthirata Kosh

The Jansankhya Sthirata Kosh (JSK) (National Population Stabilization Fund) was setup as an autonomous society of the Ministry of Health and Family Welfare in 2005. In addition to it, JSK Fund has adopted the following strategies as a population control measure:

**Prerna Strategy:** JSK has launched this strategy for helping to push up the age of marriage of girls and delay in first child and spacing in second child the birth of children in the interest of health of young mothers and infants. The couple who adopt this strategy awarded suitably. This helps to change the mindsets of the community.

**Santushti Strategy:** Under this strategy, JSK, invites private sector gynaecologists and vasectomy surgeons to conduct sterilization operations in Public Private Partnership mode. The private hospitals/nursing home who achieved target to 10 or more are suitably awarded as per strategy.

### Is there a Need for Coercive Population Control Policies

In recent years, there have been ongoing debates, campaigns and demands for the implementation of coercive population control policies in India. Aimed at reducing population growth, these conversations are not backed by concrete evidence. On the contrary, review of policy measures that enforce a two-child or one-child norm demonstrate no evidence of

effectiveness of this point of view, and instead highlight their adverse outcomes.

The global experiences around the enforcement of a population control law reveal its potentially disastrous consequences. For instance, China's infamous one-child-per-couple policy and the subsequent two-child policy in 2015, have had several unintended consequences ranging from forced sterilizations and abortions to the abandonment of girl children, falling birth rates, skewed sex ratios, a rapidly growing ageing population, and a shrinking workforce. A coercive population control policy is not only a gross violation of fundamental human rights but will also have the maximum impact on the poorest, weakest and most marginalized sections of a country. It could have long-term, irreversible consequences, something perhaps China has learned the hard way.

The National Population Policy, 2000 includes a commitment towards "voluntary and informed choice and consent of citizens while availing reproductive health care services, and continuation of the target-free approach in administering family planning services". A coercive population control measure would be in direct contradiction to the tenets of this policy and stands against India's international commitments, including the landmark ICPD (International Conference on Population and Development) plan of action.

Furthermore, the implementation of a one-child or two-child policy law will not result in immediate population reduction. Past trends in fertility and mortality from 1951 to 1981 have shaped the Indian population structure in such a way that there is a 'bulge' in the proportion of people in their prime reproductive age. This group accounts for 53% of India's population today. Even if this group were to produce fewer children compared to

previous generations, there will still be an increase in the absolute number of people. This pattern of growth is termed as "Population Momentum". Approximately 70 percent of the total projected population increase today is due to this large young population in their childbearing years. India with its large proportion of young persons will take some time before the results of declining fertility start showing explicitly. The only way to slow down the momentum is to delay age at marriage, delay the first pregnancy and ensure spacing between births.

### Way Forward

30 percent of India's population comprises of young people (10-24 years) and about 65 percent are below the age of 35 today. Greater investments in this young population could have great socio-economic developmental outcomes for the nation in years to come. These investments include greater access to education and livelihood opportunities and meeting the health needs of this population, including their reproductive needs. Access to quality family planning and reproductive health services and counseling services implore urgent attention.

The focus needs to shift to measures that enable and empower young people and women, and expand access to quality reproductive health services. The country must invest in sustainable solutions that preserve the rights and interests of its citizens with non-coercive family planning policies as the fulcrum.

#### General Studies Paper- I

**Topic:** Role of women and women's organizations, Population and associated issues, Poverty and developmental issues, Urbanization, their problems and their remedies.



### 3. FOOD WASTAGE IN INDIA : AN ALARMING ISSUE

#### Why in News?

Union Minister of Health and Family Welfare Dr. Harsh Vardhan has inaugurated first-ever World Food Safety Day was celebrated by Food Safety and Standards Authority of India (FSSAI). He appealed to all the people of India to make 'Eat Right' movement a 'Jan Andolan' with 'Jan Bhagidhari' just as we all had come together and made India Polio-free. Food is everyone's responsibility-let us pledge to not waste even one grain of food and ensure that in our own personal capacities and in our institutions, contribute towards food security. This will help to eliminate poverty, hunger and malnutrition.

#### Introduction

Indians waste as much food as the whole of United Kingdom consumes – food wastage is an alarming issue in India. Our streets and garbage bins, landfills have enough proof to prove it. Weddings, restaurants, hotels, social and family functions, households spew out so much food. According to the United Nations Development Programme(UNDP), up to 40% of the food in India is wasted. About 21 million tons of wheat is wasted in India and 50% of all food across the world meets the same fate and never reaches the needy. In fact, according to the agriculture ministry, Rs. 50,000 crore worth of food produced is wasted every year in the country. India ranks 103 among 119 countries in Global Hunger Index 2018. Wastage of food is not indicative of only hunger or pollution, but also many economic problems in the country, such as inflation. Only government policies are not responsible for the problems we are facing today, but our culture and traditions are also playing a lead role in this drama. In India, the bigger the

wedding, the larger the party and the more colossal the waste.

#### Food Wastage - A Problem

- ◆ 25% of fresh water used to produce food is ultimately wasted, even as millions of people still don't have access to clean drinking water.
- ◆ Even though the world produces enough food to feed twice the world's present population, food wastage is ironically behind the billions of people who are malnourished. The number of hungry people in India has increased by 65 million more than the population of France.
- ◆ Acres of land are deforested to grow food. Approximately 45% of India's land is degraded primarily due to deforestation, unsustainable agricultural practices, and excessive groundwater extraction to meet the food demand.
- ◆ 300 million barrels of oil are used to produce food that is ultimately wasted.

#### Government Initiatives

The Ministry of Food Processing Industries is concerned with formulation and implementation of the policies for the food processing industries within the overall national priorities and objectives. If the surplus production of cereals, fruits, vegetables, milk, fish, meat and poultry, etc., are processed and marketed both inside and outside the country, there will be greater opportunities for adding to the income of farmers and employment.

Several policy initiatives have been taken from time to time to promote growth of the food processing sector in the country. Some of these are:

- ◆ Exempting all the processed food items from the purview of licensing

under the Industries (Development and Regulation) Act, 1951.

- ◆ Automatic approval for foreign equity upto 100% for most of the processed food items excepting alcohol and beer subject to certain conditions.
- ◆ 100% Foreign Direct Investment (FDI), under government approval route, for trading, including through e-commerce, in respect of food products manufactured or produced in India.
- ◆ Lower Goods and Service Tax (GST) for raw and processed product; nearby 80% food products are covered in lower tax slab of 0%, 5% and 12%.
- ◆ Provision of profit linked tax holiday under section 80 IB and investment linked deduction under section 35 AD of Income Tax Act, 1961.
- ◆ Classifying loan to food & agro-based processing units and cold chain under agriculture activities for Priority Sector Lending.
- ◆ Cold chain and food parks covered under Harmonized Master List of Infrastructure Sub-sector.
- ◆ Incentivizing creation of infrastructure, expansion of processing capacity and developing technology to convert raw produce into value added products.
- ◆ Setting up of a special fund of Rs. 2000 crore in National Bank for Agriculture and Rural Development (NABARD) to provide affordable credit for designated food parks and agro-processing units.
- ◆ Government agencies such as the Agricultural and Processed Food Products Export Development Authority (APEDA), National Horticulture Board (NHB) were set up to help provide financial

assistance and drive exports developing cold chain sector. The establishment of the National Centre for Cold Chain Development (NCCD) in 2012 gives a much needed impetus to the sector by focusing on promotion and development of an integrated cold chain for perishable products.

- ◆ Equally important is cold storage at the transport stage of the supply chain. The union agriculture ministry is working in coordination with fresh and healthy enterprises, a fully owned subsidiary of the government-owned Container Corporation of India, to launch a special purpose vehicle (SPV), a body to fund projects. In its initial phase, the SPV will provide complete cooling logistics for fruits such as kinnows, oranges, bananas, and mangoes.
- ◆ Similarly government has proposed schemes for creating backward and forward linkages to plug the loopholes of food wastages in the entire production chain.
- ◆ “Operation Greens” was announced on the line of “Operation Flood”, with an outlay of Rs.500 crore to promote Farmer Producers Organizations (FPOs), agri-logistics, processing facilities and professional management. Accordingly, the Ministry has formulated a scheme for integrated development of Tomato, Onion and Potato (TOP) value chain.

## Analysing Food Wastage in India

Food wastage is fast assuming serious dimensions. According to the Food and Agriculture Organisation (FAO), a staggering 1.3 billion tonnes of food is being wasted annually. The FAO report further states that one-third of the total global food production is wasted, costing the world economy about \$750 billion or Rs. 47 lakh crore.

Food wastage is an issue that has a global scale. According to a report by the National Resources Defence Council (NRDC), 40 per cent of the food goes uneaten in the US, whereas in Asia, India and China cause a loss 1.3 billion tonnes of food wastage every year. In terms of overall food waste — agricultural produce, poultry and milk — India ranks seventh, with the Russian Federation at the top of the list.

India’s lower ranking is because most of the countries ranking above it utilise much of their land in raising poultry, while a major chunk of land in India is under agriculture and this explains the highest wastage of cereals, pulses, fruits and vegetables that occurs in India. A recent study conducted by Indian Institute of Management, Kolkata, revealed that only 10 per cent of foods get cold storage facility in India, this factor, accompanied by inappropriate supply chain management, has resulted in India becoming a significant contributor towards food wastage both at pre and post harvest waste in cereals, pulses, fruits and vegetables.

The government has made many efforts to rein in food wastage but clearly, the depth of the problem is such that the impact of these efforts is hardly up to the mark. India should also take a cue from global practices that are both unorthodox and innovative in order to tackle food wastage problem. For instance, France has passed unanimous legislation requiring supermarkets to either give unsold food to charity or send it to farmers for use as feed and fertiliser.

Similarly, institutions in Canada are recovering unused and unspoiled food from retailers, manufacturers, restaurants and caterers and sending them to charities, in the process delivering ingredients for over 22,000 meals daily. These powerful initiatives have made a big difference in how these countries have approached a vexing issue.

India can effectively use technology to script a new chapter in prevention of food wastage. The government can speed up research in Nano technology with the help of which eco-friendly and healthy food preservation applications can be invented that are helpful in preserving food for longer duration and keeping farm produce fresh.

In addition to these efforts, the government must make it mandatory for the food retailers across the country to adopt technology standards that allow incentives for the customer to purchase perishable products that are approaching their expiration dates. This will help reduce food wastage, maximises grocery retailer revenue, and effectively reduces the global carbon footprint.

## The Technological Solutions

The adoption of proven technology solutions can help bring down operating costs, improve quality of produce and help the environment with wastage mitigations. Multiple and innovative solutions are emerging in India to help meet these goals.

- ◆ **Multi-commodity Cold Storages and Multipurpose cold storage facilities:** These are designed to store a range of commodities such as fruit, vegetables, dry fruits, spices, pulses and milk throughout the year.
- ◆ **Ripening Chamber:** Fruit such as mangoes, bananas and papayas are often harvested in a mature but unripe condition, and are subsequently allowed to ripen off the tree. In natural conditions they ripen slowly, leading to high fruit weight loss, desiccation and uneven ripening. A ripening chamber helps in maintaining precise conditions specific to the product’s requirement. The ripening is more uniform and the fruit has a firmer pulp texture and a better flavor. Farmers can also choose to pause

or hasten the ripening process based on market demand. This usually results in less food wastage and higher price realization.

- ◆ **Distributed Refrigeration Architecture:** A centralized refrigeration system consists of one or more large capacity refrigeration racks, housed in a mechanical room, located in the back of a supermarket. It is specifically designed for the store's entire refrigeration needs. Distributed systems, on the other hand, are one of the newer commercially adopted refrigeration technologies. A distributed system consists of several miniature parallel compressor racks, distributed throughout the store, located next to, or in close proximity to, their display case or walk-in cooler refrigeration loads.
- ◆ **Increased Usage of Electronic Controllers:** In conventional cold storages, the temperature adjustment and storage method depends upon the experience of the operator. This requires the operator to be physically present at the cold storages to adjust the temperature and manage the system by periodic measurement. However, negligence and inaccuracy due to human intervention can result in product spoilage. The use of electronic management systems and controllers assist by controlling the storage environment automatically, with the preset values which help in precise control, food safety and compliance. Electronic sensors help maintain precise conditions. A remote monitoring capability provides the user with the ability to control the system from any place, instead of remaining at the site all the time, while also maintaining a log of data for easy analysis.

## Conclusion

At the UN Conference on Sustainable Development (Rio+20) in Brazil in June 2012, Secretary-General Ban Ki-moon proposed 'Zero Hunger Challenge' which aims for a future where every individual has adequate nutrition. This requires comprehensive efforts to ensure that every man, woman and child enjoy their Right to Adequate Food; women are empowered; priority is given to family farming; and food systems everywhere are sustainable and resilient.

Zero hunger is the second top priority goals in UNSDG. The challenge of Zero Hunger means the following:

- ◆ Zero stunted children( less than 2 years).
- ◆ 100% access to adequate food( all year round).
- ◆ All food system are sustainable.
- ◆ 100% increase in marginal productivity and income.
- ◆ Zero loss or foodwastage.

While India produces enough food to feed its population, the country is home to 25 percent of the world's hungry population. The holistic approach to food security requires ensuring availability, accessibility and nutritious food to eliminate hunger and malnutrition in India.

A rising population coupled with changing climate and land use pressure, increases the burden on the ecosystem to ensure enough food production. An overwhelmingly majority of India's farmers are small and marginal farmers i.e. holding less than one hectare of land. Many are not able to generate enough income to keep their families out of poverty, yet increasing their productivity is crucial to meeting India's future food requirements. The challenge of food security is compounded by significant loss of food, much of which can be attributed

to poor post-harvest management and a lack of storage facilities.

At last , India accounts for 135 crore people. Food wastage can be controlled through social campaign similar to 'Swachh Bharat Abhiyaan' and we all should take responsibility not to waste food in our plate. Society should adopt this as habit and this idea of not to waste food should be injected in preliminary education and mass awareness.

### The Indian Food Sharing Alliance

The Indian Food Sharing Alliance, (IFSA) is a social initiative by the Food Safety and Standards Authority of India (FSSAI) to help solve India's food waste and hunger crisis by integrating various partner organizations, Food Recovery Agencies and NGO's.

#### Aims and Objectives

Food Safety and Standards Authority of India (FSSAI) plays a key role not only in food safety and hygiene but also in ensuring availability of wholesome food and encouraging citizens to eat the right foods. Therefore, the aim of FSSAI via IFSA is primarily to :

- **Care:** Help minimize food wastage across the supply chain by means of redistribution to poor and needy.
- **Aware:** Mobilize people to minimize their food wastage through widespread awareness program across the country by Food Recovery Agencies.
- **Share:** Facilitate safe distribution of surplus food by connecting trained food recovery agencies with food chains.
- **Prepare:** Educate food business on best practices and encourage them to adopt the same in order to prevent food loss along the supply chain.
- **Declare:** Provide strategic policy, regulatory, and programme support to food loss and waste reduction initiatives.

### General Studies Paper- II

**Topic:** Issues relating to poverty and hunger.



## 4. INDIA AND MYANMAR : COOPERATION FOR ENERGY

### Why in News?

Myanmar is reportedly planning to open fresh bids for its oil and gas blocks to international companies. In the last few years, the Myanmar government has taken concrete steps to restructure its energy sector and has identified natural gas as an important component of its energy master plan.

### Introduction

India's energy sector is set for a sea change with recent developmental ambitions of the government of India – 175 GW of installed capacity of renewable energy by 2022, 24X7 Power for all by 2022, Housing for all by 2022, 100 smart cities mission, 10% reduction of oil and gas import dependence by 2022 from 2014-15 levels and provision of clean cooking fuels.

India is envisaged to play a key role in the global energy scenario amidst the present trends in the favor of energy buyers rather than suppliers which are likely to continue in the medium term. India is likely to account for 25% of the rise in global energy demand by 2040 (International Energy Agency). As India's energy and electricity demand is likely to grow at a CAGR of 3.7%-4.5% and 5.4%-5.7% respectively till 2047, the pressure on natural resources to fuel the demand would only rise in the future. With a share of 18% in the world population, India consumes only 6% of the world's primary energy. This is evident from the low per capita energy consumption of India (521 kgoe in 2014) which is one-third of the world's average.

As far as natural gas based economy is concerned, in the last few years, the importance of natural gas as a key contributor for India's sustainable energy security has begun to receive greater acceptance within

India's energy policy making circles. The government of India has reiterated its intention to make India a "gas-based economy" by increasing the share of natural gas in India's energy mix to 15 % by 2030.

### Natural Gas based Economy

Gas has increasingly become a preferred choice of fuel globally as it is a cleaner source of energy in comparison with other conventional fuels (coal and oil), is found in abundance in the world as the production of natural gas has been on a rise and is more efficient way of producing useful energy and is cheaper on calorific value basis than oil. The share of gas in energy mix in India in 2015 was 6.5% whereas globally, the share was 24%.

India has embarked on a journey to increase its contribution in the nation's primary energy mix. Gradual steps are being initiated since the last few years to ensure steady evolution of a gas market in different parts of the country. Since its launch in 2016, under the Pradhan Mantri Ujjwala Yojana (PMUY), a scheme to provide LPG cylinders as a clean cooking fuel, the spread of cylinders increased substantially from 55% in 2014 to over 90% today. This jump is due to the addition of 60 million new connections with a target to reach 80 million connections by 2020. As of 2014, only 66 districts in India were under the City Gas Distribution network, but by 2018 work on city gas was already underway in 174 districts with a target to reach more than 400 districts in the coming years. Also, the number of CNG stations has increased to 1,400 in 2018 with a target of 10,000 stations in the coming decade. Additionally, as a result of emergence of new players in the global gas markets, India is now presented with the choice of choosing

between multiple gas producers to meet these future energy targets.

According to the several studies, gas connectivity in Northeastern states is poor, comparatively all India gas penetration. Thus, to bridge this gap, government of India has embarked on a journey to connect Northeastern states with the National Gas grid. Once connected with the National Gas Grid, the Northeastern states in India will have access to gas supplies to support their economic development activities. The City Gas Distribution network covering some prominent districts in Northeast India is being planned in three phases and it is envisaged that by 2030, the demand from this sector alone is slated to be 4.4 mmscmd. The overall gas demand by 2030 in Northeast India is estimated to be about 29.4 mmscmd, of which, the natural gas deficit is predicted to be about 8.7 mmscmd as per the Hydrocarbon Vision 2030 report for Northeast India. A sustained supply of an efficient and environment friendly natural gas would play a crucial role in supporting economic development and connectivity in Northeastern states of India.

In the Northeastern region of India, states like Assam, Arunachal Pradesh and Tripura are reported to have considerable volumes of natural gas reserves. The state of Tripura exports electricity generated from gas-fired Palatana power plant to Bangladesh.

### Role of Natural Gas in India

- ◆ Power and Fertilizer sector account for 60% of the gas consumption in India, so, these are the two major consumers, however, the former is not able to completely absorb the high cost of imported liquefied natural gas (LNG), though, a Power System Development

Fund (PSDF) initiative was started in March, 2015 to revive the stranded gas based capacity of 14305 MW, but it has not been very successful. Consequently, the PSDF scheme has been scrapped. The government has worked out a pooling mechanism for the fertilizer sector so that the fertilizer plants become viable and this mechanism was started in July, 2015 and is still continuing. However, it is to be kept in mind that pooling of gas is a short term solution for reviving the stranded gas based power and fertilizer plants, whereas these plants have to absorb the cost of imported LNG in the long run in order to become self-sustainable.

- ◆ Gas based installed capacity would be required for balancing the electricity generated from renewables.
- ◆ Natural gas will also aid the clean cooking initiative of the government through increased penetration of piped natural gas (PNG), especially in the urban areas. Moreover, increased penetration of compressed natural gas (CNG) vehicles in the transport sector would help in improving the air quality of the cities and mitigate emissions.
- ◆ Gas is also required as a feedstock for the steel, sponge iron and refineries.

### India - Myanmar Cooperation in Energy Sector

Myanmar is reportedly planning to open fresh bids for its oil and gas blocks to international companies. This is a welcome development for India, which has substantial experience of operating in Myanmar's energy sector. Besides, both India and Myanmar are keen to expand the scope of cooperation in the realm of energy sector. Earlier, though India could not secure the deal to build a gas pipeline from Myanmar to India's eastern region, India has continued to remain engaged with the energy sector

of its Eastern neighbour. For instance, India has positioned itself as a key stakeholder in the China - Myanmar gas pipeline.

In the mid-2000s, the government of India had entered the race to build a gas pipeline from Myanmar transiting through Bangladesh and then entering India. India had alternately also proposed to build a bilateral India-Myanmar gas pipeline, due to differences with Bangladesh. However, the proposed bid from India could not fructify and Myanmar then decided to allow China to build a bilateral pipeline. This pipeline, among many such sources of natural gas imports for China, is presently satiating its ever growing appetite for energy.

Currently Myanmar does not have any surplus natural gas which it could export. As per reports, Myanmar itself is contemplating importing LNG from abroad. However, it was indicated in another media report that Myanmar is considering opening bids for energy blocks in this year. If in the near future, Myanmar indeed makes some new discoveries of natural gas, India could pursue bidding for a pipeline to transport any surplus natural gas available with Myanmar to India's Northeastern states. Given Northeast India's geographical proximity to Myanmar, it would be worth considering the exploration of possibilities for cooperation and leveraging the energy development activities underway in Myanmar.

It would be pertinent for Myanmar to take note of the fact that on its western side, in Northeastern states of India, there lies a promise of a thriving energy market for Myanmar's gas. At the policy level, the Hydrocarbon Vision 2030 for Northeast India has already indicated the fact that the availability of any surplus supplies of natural gas in Myanmar could be imported to India's Northeastern states. These factors and others can ensure that India's Northeastern gas grid and Myanmar's promise of energy reserves complement each other.

### Advantages

One of the advantages of building natural gas pipeline (trilateral or bilateral) is the fact that given Myanmar's geographical proximity to Northeastern states of India, transportation of gas would be affordable.

Secondly, as India embarks on building new relations with countries in South-east Asia, a cross-border natural gas pipeline between India and Myanmar will be an important symbol of bilateral cooperation and regional connectivity.

### Challenges

The indication of possible bidding rounds for energy blocks can provide an opportunity for India to leverage its experience of having operated in Myanmar for more than a decade. India now has a good understanding of the political economy of energy development and the nuances of decision making in Myanmar. But, India must be careful and not underestimate the regional complications that might impact India-Myanmar energy relations.

First and foremost issue is related to the Rohingya refugees, the issue of Rohingya refugees has historically existed between Bangladesh and Myanmar, but the magnitude of the problem has substantially increased in recent years. This issue, at least for now, may create complications for any possible trilateral pipeline between India, Bangladesh and Myanmar. Yet, if the possibility of building a trilateral pipeline project faces challenges, then India could fall back on the alternative route mentioned in a feasibility report by the Gas Authority of India Ltd. (GAIL) in 2006, which had envisaged constructing a bilateral pipeline between India and Myanmar via India's North-eastern states. This alternative scenario in the current context must also explore the technical option of supplying natural gas to Bangladesh from the Indian side at a later stage.

Second issue that has historically played a key role in Myanmar's energy export decision making is the factor of energy exports diversification. The country has already been supplying natural gas to two of its neighbours i.e. Thailand and China. Perhaps in any future round of bidding for energy blocks, to strengthen its own energy export diversification strategy, Myanmar must consider exporting surplus gas to markets in India and Bangladesh.

Third, it would also be important to understand China's current energy strategy in Myanmar. In its efforts to make a transition to natural gas in a major way, China's appetite for natural gas is also increasing. Hence, it will not be surprising if China yet again competes in the proposed bidding rounds for energy blocks. Chinese companies, thus, may continue to

provide a stiff competition to Indian companies in Myanmar's energy sector.

Fourth, the future bidding rounds in Myanmar may be different and competitive. The last round (2013-14) showed that the interest of foreign companies to invest in Myanmar's energy sector was gradually increasing. So, the presence of foreign companies would make future bidding rounds more competitive for Indian companies. India must therefore explore a variety of arrangements such as going alone or joining hands with different foreign companies to undertake any future stakes in Myanmar and even for building a gas pipeline to India.

### Way Forward

India must engage proactively with the Myanmar government and present a commercially viable case for a greater share in Myanmar's

energy development. It would be pertinent to note that cooperation in the energy sector, in the coming years, between India and Myanmar will only complement the current bilateral efforts underway in the realms of infrastructure development, connectivity and social development. Hence, the government of India must consider reviving the idea of a bilateral natural gas pipeline with Myanmar to cater to the evolving energy needs of Northeast India.

#### General Studies Paper- II

**Topic:** India and its neighborhood-relations.

#### General Studies Paper- III

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



## 5. SCO SUMMIT 2019 : REINFORCING GLOBALISATION

### Why in News?

The 19<sup>th</sup> Shanghai Cooperation Organization (SCO) Summit was held from June 13 to 14 in Bishkek, Kyrgyzstan. Fourteen agreements, including those on cooperation in sports, healthcare and environment, were signed at the SCO summit.

### Introduction

The Shanghai Cooperation Organisation (SCO) is a permanent intergovernmental international organisation, the creation of which was announced on 15 June 2001 in Shanghai (China) by Kazakhstan, China, Kyrgyzstan, Russia, Tajikistan and Uzbekistan. It was preceded by the 'Shanghai Five' mechanism. In 2017, India and Pakistan has been admitted as full members of SCO. Currently, with inclusion of India and Pakistan, the SCO comprises eight member states. The organisation has two permanent bodies — the SCO Secretariat based in

Beijing and the Executive Committee of the Regional Anti-Terrorist Structure (RATS) based in Tashkent.

#### RATS Council

The Regional Anti-Terrorist Structure (RATS) of the SCO is a permanent organ to promote cooperation of member states against terrorism, separatism and extremism. In June 2004, RATS was established. The first joint military exercise of SCO namely Sary-Arka-Antiterror 2019 was announced during 34<sup>th</sup> meeting of RATS council held in Tashkent, Uzbekistan. All the SCO members of SCO participated in a joint counter-terrorism exercise.

Proceeding from the 'Shanghai Spirit', the SCO pursues its internal policy based on the principles of mutual trust, mutual benefit, equality, mutual consultations, respect for cultural diversity and a desire for common development, while its external policy is conducted in accordance with the principles of non-alignment, non-targeting any third country and openness.

### Need of SCO

It is believed that the regular SCO summit will promote regional stability and enhance regional interaction in terms of trade and connectivity, cultural exchanges and people-to-people contacts. All SCO member and observer states and dialogue partners have to take more practical step towards regional peace and stability, building infrastructure and enhancing economic activities through adhering to the principles of openness inclusiveness, and 'Shanghai Spirit'.

The goals and tasks of the SCO are pointed out in Article 1 of its Charter as, "Strengthening mutual trust, friendship and good neighborliness between the member states; development of multifaceted cooperation in the maintenance and strengthening of peace, security and stability in the region and promotion of a new democratic, fair and rational political and economic international

order; joint combating terrorism, separatism and extremism in all their manifestations, fighting against illicit narcotics and arms trafficking and other types of transnational criminal activity, etc." . With this in mind, the tasks and objectives of the SCO are highly extensive. Thus, it has to prioritize the issues in need of immediate address.

For instance, the three evil forces of terrorism, separatism, and extremism have to be addressed first and all SCO stakeholders need to join forces to put an end to terrorist activities across the region since terrorism has changed into a regional threat. Thus, if the issue of terrorism is not addressed forthwith, security situation will hamper trade and transit, mainly the smooth implementation of the China-proposed Belt and Road Initiative (BRI).

### Importance of SCO

The SCO region with its 18 countries comprises 44 percent of the population and 80 percent of the Eurasian landmass. The SCO region's total Gross Domestic Product (GDP) amounts to 21 percent of global output and its overall trade constitutes 19.8 percent of global trade.

SCO countries committed to strengthening economic cooperation and supporting the World Trade Organisation (WTO) structure, while building more people-to-people ties, tourism and cultural bonds within the grouping.

BRI is the massive infrastructure policy, pioneered by Xi, which seeks to build trade corridors through rail, road and ports between China, Europe, the Middle East and the rest of Asia. A vital component of the land trade route, the "Silk Road Economic Belt," runs through Central Asia.

Many Central Asian countries have struggled to fully integrate into the global economy following the collapse of the Soviet Union. Thus, the promise of large-scale Chinese infrastructure investments -- including the creation

of massive rail lines connecting Western Europe with China via Central Asia -- have helped to strengthen ties and promote China as a dependable regional partner.

Further, the SCO has another strategic importance in Asia due to its geography, which enables the bloc to have a strong connection with Central Asia, limiting the US' influence in the region.

Thus, importance of SCO has reached to all time high as the US President Donald Trump ratchets up tensions with both China and Russia. His renewal of American confrontation with Iran and the threat to pull out of Afghanistan have thrown the region into fresh turmoil and therefore, increased the need of regional organization like SCO for building consensus among member countries.

### The Bishkek Declaration

Terrorism, regional cooperation and the future of Afghanistan were major themes at the SCO's Heads of State summit in Bishkek.

Member states emphasized that the SCO, as an efficient and constructive multilateral cooperation mechanism, plays an important role in maintaining regional peace and stability, as well as promoting the development and prosperity of the member states.

The leaders strongly condemned terrorism in all forms, and called on the international community to fully implement relevant resolutions of the UN Security Council and the UN Global Counter-Terrorism Strategy. They noted that the interference in the domestic affairs of other states under the pretence of combating terrorism and extremism is unacceptable, as well as the use of terrorist, extremist and radical groups for one's own purposes. It's a major diplomatic success for India to get this declaration on terrorism. It may in all practical purposes mean little on the ground, but what's reassuring is that India have made Pakistan look for

cover even in the grouping where its 'best friend', China, calls the shots.

They also expressed their readiness to increase cooperation on drug control and emphasized the need to launch multilateral negotiations on an international convention for the suppression of acts of chemical and biological terrorism.

On other issues of regional and international concern, Iran, Syria and Afghanistan found mention in the final document. The declaration called for 'consistent implementation' of the Joint Comprehensive Plan of Action and asked all participants 'for comprehensive and effective implementation of the document,' a year after US pulled out of it. On Syria, the declaration noted the Astana format and the process of political settlement through the dialogue process. It also extended support to 'post-conflict restoration' by different states in Syria.

The 'Roadmap for Further Action of the SCO Afghanistan Contact Group' was signed by the leaders and the declaration argued for an 'inclusive peace process conducted and led by Afghans themselves' with UN playing the main role even as multilateral forums continue to interact on the issue.

It is significant to see that where the group has failed to find consensus, such as on India's opposition to China's BRI the declaration has mentioned only the other countries in a paragraph praising the project.

### Analysis

Though, fourteen agreements were signed at the SCO summit, there was no big bang agreement signed which can be said as complete reversal from previous year's approach.

On terror, the declaration largely followed language from the Qingdao Summit declaration, reiterating SCO's condemnation of terrorism 'in all its forms and manifestations.' There was

support for WTO and the multilateral trading system; and like other yearly declarations the members noted the need for increased cooperation between SCO member states in trade and services. However, concrete proposals for the same were few and far in between. The 2018 communique on simplifying trade procedures remains in its initial stages.

## India and SCO

The SCO's significance for India lies in economics and geopolitics. Having begun as the 'Shanghai Five' in 1996 and rechristened as the SCO in 2001, the member states occupy the huge landmass adjacent to India's extended neighbourhood where India has both economic and security imperatives. The recent summit represents a structured forum where India can leverage its interests that would help it both on the domestic and the international front.

With India indicating that it sees little use for South Asian Association for Regional Cooperation (SAARC), the SCO provides the only multilateral platform for it to deal in close proximity with Pakistan and Afghanistan. In addition to it, the invitation of Sooronbay Jeenbekov, the president of Kyrgyzstan, to Prime Minister Narendra Modi's swearing-in ceremony apart from the Bay of Bengal nations was a signal of India's desire to increase its engagement with Eurasia.

SCO region and history, civilization and culture of India are interconnected for thousands of years. Since the break-up of the Soviet Union, the development of India's relation with Central Asian countries was constrained by a lack of overland access because of both political and security reasons. Today, the region is in great need of better connectivity in the modern era. Initiatives like the International North-South Transport Corridor, Chabahar Port, Ashgabat Agreement, clarify the focus of India on connectivity. However, respect for sovereignty, regional integrity, good

governance, transparency, practicality and reliability should be the basis of connectivity initiatives.

Though, Eurasian integration through SCO is organic, its avatar is decidedly Chinese, given that all its members except India support that country's BRI. But, India's strategy at the SCO, however, is not to counter China but rather enhance economic cooperation with the Eurasian states and benefit from the security framework.

SCO is seen as an eastern counter-balance to NATO. Being India as its member will allow the country to take an effective action in combating terrorism and security related issues as well.

Further, in last two years, since India became member of the SCO, India's e-tourist visa facility is available to most of the SCO member countries to encourage people-to-people contact between countries. In addition to it, India has planned to launch a new 24x7 helpline in the Russian language for the convenience of tourists from the SCO countries.

## Challenges and Opportunities for India

The SCO has eight member countries. They cover 20 per cent of the world's GDP and 42 per cent of the world's population. The commercial potential is immense. Yet Central Asia hasn't been the traditional focus of India when it comes to trade. India's bilateral trade with Central Asia is one-fiftieth that of China's. While India's figures stood at less than \$2 billion, China's trade with Central Asia crossed \$50 billion in 2018. Same case is with Russia. The bilateral trade between India and Russia is barely \$10 billion. That number for China and Russia is more than \$100 billion. Why hasn't India done more?

Further, India shares no land border with any of the Central Asian countries. It must travel via Pakistan or China. Poor connectivity results in

poor trade, that's a no-brainer. The operationalisation of the Chabahar Port may change that, but it's early days. Geography remains a constraint. India is the only SCO country that has not endorsed China's BRI. By the looks of it, that may not change. So India will have to create alternatives.

In addition to it, India must balance ties with the Americans. Buying the S-400 missile defence system from Russia despite objections from Washington, working with China to counter trade protectionism in the middle of Beijing's trade war with Washington - it's walking the diplomatic tightrope. We call it strategic autonomy.

So challenges abound. As do opportunities. SCO isn't just about photo ops. Central Asian countries want a bigger role for India. They aren't beholden to China. They shot down Beijing's proposal for an SCO development bank and free trade agreement. If India makes the right moves, it can emerge as the more reliable partner and regional power for countries that have always lived under the shadow of Russia and China.

## Benefits of SCO Membership to India

The SCO membership produces a great potential in providing long-term gains to both India and the SCO. Some of potential benefits accruing to India are as under:

- ◆ The current ties between India and Pakistan are at nadir. Since SCO charter doesn't allow the member countries to bring their bilateral issues at the platform, Pakistan would not succeed in using SCO as a platform to internationalise the Kashmir issue. On the other hand, India can raise its concerns regarding terrorism at the SCO as terrorism is a global security threat.
- ◆ Pakistan had always denied India the access to Afghanistan and Central Asian countries. The membership of SCO can enable

India to engage Pakistan in wider dimensions and use the platform for enabling land access to the Central Asian economies.

- ◆ The leaders of the Central Asian Muslim countries are secular in their orientation and their opposition to religious extremism is a strategic asset for the region and important for Indian security particularly when Pakistan, which is a safe haven for several international terrorists and radicals, has also become the fulltime member of SCO.
- ◆ The goals enshrined under the SCO charter include promoting cooperation in politics, trade, economy, technology and so on and to making joint efforts to promote peace, security and stability. The goals of SCO are complementary to the Indian objectives. Modern technology and trade are considered as the future engines of growth.
- ◆ The SCO has the potential to open the vast ventral Asian market for Indian exports while the resource rich Central Asia will also help in fuelling the Indian economic growth.
- ◆ For many years, projects like IPI (Iran - Pakistan - India) and TAPI (Turkmenistan - Afghanistan-Pakistan - India) pipelines were halted due to security reasons. With India and Pakistan now joining the organization, it is highly possible that the projects may finally take off.
- ◆ Central Asian region is also rich in the uranium which is in scarce supply in India. In order to ensure the continuous operation of its civilian nuclear reactors, India needs regular imports of fissile material.
- ◆ The Central Asian region holds significant proportion of the world energy reserves. The SCO membership will help in developing closer ties with the Central Asian countries and thereby providing access to the vast energy resources.

## Way Forward

It is clear that SCO has become an important venue for the member states to interact but it is telling that bilateral meetings on the sidelines have garnered more attention than the multilateral summit itself. That is also because concrete, collective measures by the organization have been few and far in between. With the inclusion of India and Pakistan, it still remains to be seen if the bilateral frictions between member states would preclude more meaningful collaboration at the SCO or whether it would overcome the differences to play an active role in a changing international order.

### General Studies Paper- II

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



## 6. INDIA'S AMBITIOUS SPACE STATION PLAN : AN INTRODUCTION

### Why in News?

Indian Space and Research Organization (ISRO) has announced its ambitious plan to put up a space station in the next decade. The space agency's chief, K. Sivan, said the idea is to build the space station in the next seven years and launch it by 2030.

### Introduction

Space station is also called orbital station. It orbits around Earth. Basically, it is a large spacecraft or man-made station in space, a home where astronauts live and also receives several spacecrafts from the Earth. It is a kind of science lab, many countries worked together to build it and also, work together to use it. The United States (U.S.) and Russia

have had orbiting space stations since 1971. The first space stations were the Russian Salyut program, the U.S. Skylab program and the Russian Mir program. And since 1998, the U.S., Russia, the European Space Agency, Canada, Japan and other countries have been building and operating the International Space Station (ISS) in Earth orbit. With the ISS, humans have been living and working in outer space for more than 18 years.

By April 2018, there are two space stations orbiting around the Earth: International Space Station (Operating and permanently inhabited) and Tiangong-2 of China (Operating but not permanently inhabited).

### Need of Space Station

There are a variety of reasons for building and operating space

stations, including research, industry, exploration and even tourism. The first space stations were built to study the long-term effects of weightlessness on the human body. After all, if astronauts will ever venture to Mars or other planets, then we must know how prolonged microgravity on the order of months to years will affect their health.

Space stations are a place to do cutting edge scientific research in an environment that cannot be done on Earth. For example, gravity alters the way that atoms come together to form crystals. In microgravity, near-perfect crystals can be formed. Such crystals can yield better semi-conductors for faster computers or for more efficient drugs to combat diseases. Another effect of gravity is that it causes convection currents to form in flames,

which leads to unsteady flames. This makes the study of combustion very difficult. However, in microgravity, simple, steady, slow-moving flames result; these types of flames make it easier to study the combustion process. The resulting information could yield a better understanding of the combustion process, and lead to better designs of furnaces or the reduction of air pollution by making combustion more efficient.

Further, scientific researches, which are done on space stations, benefit people on Earth. Space research is even used in everyday life. The results are products called "spinoffs." Scientists also study what happens to the body when people live in microgravity for a long time.

From high above the Earth, space stations offer unique views to study the Earth's weather, landforms, vegetation, oceans and atmosphere. In addition, because space stations are above the Earth's atmosphere, they can be used as manned observatories where space telescopes can look out upon the heavens. The Earth's atmosphere doesn't interfere in the views of space station telescopes. In fact, we've already seen the advantages of unmanned space telescopes like the Hubble space telescope, Kepler telescope, Astrosat and many more.

In addition to above, space stations might be used for space hotels. Here, private companies like 'SpaceX' could ferry tourists from Earth to space hotels for brief visits or extended stays.

## The International Space Station

In 1984, President Ronald Reagan proposed that the U.S. in cooperation with other countries, build a permanently inhabited space station. Reagan envisioned a station that would have government and industry support. To help with the enormous costs of the station, the U.S. forged a cooperative effort with 14 other countries (Canada,

Japan, Brazil and the European Space Agency). During the planning of the ISS and after the fall of the Soviet Union, the U.S. invited Russia to cooperate in the ISS in 1993; this brought the number of participating countries to 16. NASA took the lead in coordinating the ISS's construction.

The assembly of the ISS in orbit began in 1998. More pieces were added over the next two years before the station was ready for people to live there. On October 31, 2000, the first crew of the ISS was launched from Russia. People have lived on the space station ever since. More pieces have been added over time. NASA and its partners from around the world completed construction of the space station in 2011.

ISS orbits Earth at an average altitude of approximately 250 miles. It travels at 17,500 mph. This means it orbits Earth every 90 minutes.

Further, the space station has the volume of a five-bedroom house or two Boeing 747 jetliners. It is able to support a crew of six people, plus visitors. On Earth, the space station would weigh almost a million pounds. Measured from the edges of its solar arrays, the station covers the area of a football field including the end zones.

## India's Ambitious Space Station Plan

India is planning to launch its own space station. The space station, which is estimated to weigh around 20 tonnes and placed in an orbit 400 km above Earth, would be an extension of the Gaganyaan Mission — India's first manned mission into space. India will set up its separate space station in the next 5-7 years after Gangayaan is successfully completely in 2022.

The preliminary plan for the space station is to accommodate astronauts for up to 15-20 days in space but specific details will emerge after the Gaganyaan Mission is complete. There

will be no collaboration with any other country for this project. The space station will most likely be used to conduct microgravity experiments.

The only countries that have had space stations so far are the the U.S., Russia, China and a consortium of nations that own the International Space Station.

## Analysis of India's Plan

Constructing a space station after being able to safely orbit a crew in Low Earth Orbit (LEO) is a natural progression that many advanced space-faring countries have pursued to expand their space capabilities. The announcement by ISRO also falls in line with such a progression.

The first indication came in 2017 when Rs. 10 crore was budgeted for an orbital rendezvous and docking experiment between two satellites. Docking expertise is essential when two separate free-flying units in space are required to physically link with each other. This technique is important to link the space shuttle with the space station. These foundations should provide leverage to further carry out larger scale and precision experiments in space to cement the know-how required for human-rated vehicle transfers in orbit. The second indication was when the human space flight mission (2021/22) was announced in August 2018.

### Importance of Gaganyaan Programme for Indian Space Station

ISRO's Gaganyaan programme will establish mature capabilities in India: having a human-rated rocket, the ability to train crew and the capacity to sustain life and safety of the crew on orbit and return them. The major technical leap required to establishing a space station beyond simply having these capabilities is in the ability to also carry larger payloads into space and achieving the ability to precisely rendezvous and dock spacecrafts to a space station in orbit. This will allow scaling up of infrastructure on orbit – a must to provide more room for astronauts to live and carry out experiments over longer time frames.

ISRO has now called for proposals for experiments, including docking, to be carried out on the orbiting platform (PS4-OP). For the last few years, ISRO has been experimenting with its Polar Satellite Launch Vehicle (PSLV) rocket in different ways. Now, a single PSLV rocket can put satellites in different orbits. PSLV launch vehicle is a four-stage rocket. On two occasions (PSLV-C44 and PSLV-C45 missions) in 2019, ISRO successfully converted the fourth stage (PS4) of the rocket into an orbital laboratory. Such laboratories are normally hosted on space stations.

#### The PS4-Orbital Platform (PS4-OP)

The PS4-Orbital Platform (PS4-OP) refers to a novel idea formulated by ISRO to use the spent PS4 stage (fourth stage of PSLV which until now used to go waste after putting the spacecraft into the desired orbit) to carry out in-orbit scientific experiments for an extended duration of one to six months. The advantage being the stage has standard interfaces & packages for power generation, telemetry, tele-command, stabilization, orbit keeping & orbit manoeuvring.

Among the experiments ISRO is looking to put onboard PS4-OP are microgravity experiments; robotic arm smart space robot technology demonstration; rendezvous & docking experiments; small satellites technology development; laser communication technology development and low-cost platform for testing inflatable systems.

### Challenges for India

From a budgetary standpoint, the project proposal that shall estimate the cost for India's space station. This shall be made after the Gaganyaan project for the approval from the government. This may pose important challenge to the Indian Space Station Project.

The ISS which spreads as long as a football field and costs \$3 billion a year (Rs. 20,000 crore) for NASA alone in maintenance and has exceeded more than \$100 billion (Rs. 6,50,000 crore) in assembling it. Finances of such magnitude is very difficult to provide for any Indian space research project in near future.

To keep the cost as a smaller multiple of the Gaganyaan project, ISRO could well choose such strategies to limit the architecture of the space station and the goals to be achieved on orbit. Apart from it, India can involve the private sector in such projects. Recently, NASA has declared that the ISS would be open for commercial business and people could "purchase" a ticket to visit ISS. India could think of developing such projects under a public-private partnership model.

Further, ISRO's project proposal for such a space station will require plan to upgrade the payload carrying capacity of the Geosynchronous Satellite Launch Vehicle Mark III (GSLV Mark III) (which is going to carry Indian astronauts into space as a part of Gaganyaan) by a considerable magnitude.

### Benefits of Having Indian Space Station

Though, India has the option of joining the ISS, rather than making its own space station, it will not have enough significance for India. This is because the ISS is now in the last leg of its existence and is expected to become redundant during 2024-28. In heyday of the ISS also, India could not have been a part of the ISS since it was excluded from such projects because of Delhi's nuclear policy; ISRO and Defence Research and Development Organisation (DRDO) were taken out of the export control list only in 2011.

Further, owning space station will offer the Indian scientific community a range of subjects to conduct research in, from astronomy and meteorology to biology and medicine. Also, material is one arena where India should make major investments. Breakthroughs in this field would have major commercial and strategic benefits.

### Future of Space Stations

We are just beginning the development of space stations. The ISS will be a vast improvement over Salyut, Skylab and Mir; but none of our space stations thus

far have had any gravity. One reason for this is that we want a place without gravity so that we can study its effects. Another is that we lack the technology to practically rotate a large structure, like a space station, to produce artificial gravity. In the future, artificial gravity will be a requirement for space colonies with large populations.

Further, till now all space stations need periodic reboosting because of their position in Low Earth orbit. However, there are two places between the Earth and Moon called Lagrange Points L-4 and L-5. At these points, the Earth's gravity and the Moon's gravity are counter-balanced so that an object placed there would not be pulled toward the Earth or Moon. The orbit would be stable and require no boosting. In future, there is need to put space stations at Lagrange Points L-4 and L-5.

### Conclusion

From successful lunar missions and multiple satellite launches, ISRO believes it has reached a technological point where it can create a more dynamic space program. More advanced operations in space would reflect India's overall growth as a tech breeding ground where innovations are happening at a rapid pace. While the plan for an Indian space station within 10 years seems ambitious, India is increasingly becoming a potent tech player and is well-placed for its plans to become a reality.

#### General Studies Paper- III

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

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



## 7. THE DARKNET : AN ANONYMOUS INTERNET

### Context

The Dark Net is at the center of the debate over whether online anonymity should be maintained in spite of the illegal activity that it enables. Policy-makers must gain an understanding of the Dark Net in order to engage intelligently in the debate and enact effective Dark Net policy. This article aims to provide context and policy recommendations pertaining to the Dark Net based on open-source research.

### What is the Dark Net?

Dark Net is portrayed as a den of mysterious and illicit network of activities. Like most stereotypes, that is a misconception with some truth behind it. To shed light on the Dark Net, one must first understand what it is and how it differs from what most users wrongly consider to be the internet. Actually, the internet comprises every single server, computer and other device that is connected together in a network of networks. It can then be divided into two elements: the 'Surface Net' and the 'Deep Net'. The Surface Net is what the average user thinks of as 'the internet'. It is a collection of websites indexed by search engines like Google, Yahoo, and Bing that can be easily accessed through standard browsers and internet protocols. This may seem like a vast quantity of information, but the Surface Net is just the tip of the iceberg. The Deep Net is the full body of the iceberg that remains mostly hidden from surface Net users. Estimating the size of the Deep Net is challenging, but researchers estimate that it is between 4000 and 5000 times larger than the Surface Net. The Deep Net accounts for 90% of the traffic on the internet, which is a surprise to most users who do not realize they are accessing the Deep Net regularly. Data from sites like Facebook, Twitter,

or Snap chat are classified as the Deep Net because it can only be accessed through application program interfaces. Other large sections of data include instant messaging data and file-sharing services such as Drop box and Google Drive. The Dark Net, by contrast, is a very small, hard-to-access portion of the Deep Net. It accounts for less than 0.01% of the sites on the internet: there are around 45,000 Dark Net sites and hundreds of millions of regular ones. As explained below, the only way to access the Dark Net is by using a special browser like The Onion Router (TOR) and, often, a password.

The Dark Net is generally anonymous, which makes it a sanctuary for cybercriminals and political dissidents alike. It has remained largely unregulated by the government, and the first step in better monitoring and policing the Dark Net is better understanding it. The Dark Net is very often confused with the Deep Net, but the distinction between the two is very important. The Dark Net is a specific portion of the Deep Net and there are a few distinguishing characteristics that a site must meet to be considered a Dark Net site. The site must only be able to be accessed anonymously through a service such as ToR and cannot be accessed through the Surface Net. The site also must require a user to input its unique ToR address. The reason most of the Deep Net is not considered part of the Dark Net is because it can be accessed through Surface Net applications. The Dark Net has existed for a long time underneath the surface of the internet. The internet's development began in the 1960s as part of the U.S. Department of Defense's effort to network their computer systems, but the internet did not become a household name until the 1990s. The Dark Net itself remained obscure to most people, but it gained a

measure of infamy in 2013, when Ross William Ulbricht, operator of the Silk Road, was arrested. The Silk Road was a marketplace for illegal goods and services accessed through ToR.

### The Onion Router (ToR) – An Anonymous Browser

ToR was originally developed for very different purposes. The Naval Research Laboratory (NRL) developed it at the turn of the twenty-first century with the aim of providing anonymity to U.S. military personnel engaged in operations abroad. To ensure the anonymity of military users, the NRL deployed it in October of 2003 as a free-to-the-public, open-source browser. This meant that military traffic was hidden anonymously in a crowd of anonymous civilian users. The mechanics behind ToR's anonymity are actually fairly simple. The system works by sending a site request through at least three randomly chosen computers called relays. ToR's name – 'The Onion Router' – actually comes from the fact that each computer adds a layer of encryption to the signal that only it can decrypt.

### Benefits

ToR's creators remain strong advocates of ToR's benefits. Roger Dingledine, an original developer, said, 'There are important uses for hidden services, such as when human rights activists use them to access Facebook or to blog anonymously,' and that 'These uses for hidden services are new and have great potential'. ToR is a tool which can be used anonymously for both legal and criminal purposes. While it is essential to acknowledge the important role that anonymity plays in protecting human rights activists from oppressive regimes, it is also important to consider the challenges that anonymity poses to the law enforcement community.

Today's internet actually resides on a few central servers that can be targeted and taken down or controlled by governments. Free net distributes data across the network so that it is stored in a decentralized way that protects information from being tampered with by hackers, government or otherwise.

There are many legal uses of ToR. Many people use it to protect browsing privacy. For example, e-book collections of subversive works are available on the Dark Net, away from government censors. There are also sites set up specifically for journalists to share files and stories. These sites serve as an important pipeline that reporters can use to smuggle out important stories that portray authoritarian regimes in a negative light. Finally, there are secure image-sharing sites that offer ordinary citizens an additional layer of privacy when sharing sensitive photos. All these uses may be perfectly legal and understandable, but the reality remains that they only account for a portion of Dark Net traffic. Much of the traffic on the Dark Net is illegal.

## Drawbacks

Indeed, most ToR users are just seeking privacy and may be using ToR for legitimate reasons. Only 1.5% of ToR users are actually accessing the Dark Net, although they generate a lot of traffic. The trouble is that ToR and the Dark Net are virtually inseparable. It is impossible to make a tool that keeps users anonymous while also tracking their activity to make sure that they are not accessing illegal websites. ToR's creators would like to think that the browser mainly carries the traffic of journalists valiantly writing stories from countries without laws protecting free speech, but that is not the case. The majority of traffic to hidden Dark Net sites using ToR is for viewing and distributing images of child abuse and purchasing illegal drugs. Child abuse accounts for the largest portion of Dark Net traffic. Researchers at the

University of Portsmouth, conducted a six-month study that explored ToR's usage and hidden services. They concluded that more than 80% of ToR traffic requests to hidden sites that were observed in the study were directed towards known child abuse sites. Even if half of the child abuse traffic observed were police activity, much user traffic remains on the Dark Net targeting child abuse sites. Indeed, child abuse images are not isolated to the Dark Net. A charitable foundation, called the Internet Watch Foundation, performed a study in 2014 as part of their work to minimise the distribution of images of child abuse. They found 31,266 internet URLs with images of child abuse on them, but only 51 (about 0.2%) were on the Dark Net. This statistic indicates that the Dark Net, while it enables cybercrime, is not the only way that cybercrime is enabled.

Drug traffic is the subject that is most commonly associated with the Dark Net, and it is an integral part of Dark Net marketplaces. These sites are actually easier for enforcement officers to infiltrate because the officers are capable of better hiding their identity when they go undercover. Additionally, the drugs do have to be physically delivered, which leaves a window open for traditional policing to apprehend the dealers.

## Conclusion

The Dark Net is, by its nature, anonymous and incapable of discriminating between criminals and ordinary users. Enforcement agencies must address this issue by employing tactics that maintain the privacy of the average user while unmasking the criminal. The most effective way of doing this is by looking for the illegal sites instead of the illegal users. Under proper legal authority, government hackers can place deanonymising tools onto the computers of users accessing the site. If the government merely shuts down the site, another will pop

up in its place. On the other hand, if enforcers bring charges against the users of an illicit site, future users who are considering accessing illegal sites will be more hesitant to do so because of the risk of getting caught. The final option would be for the government to attempt to break ToR, in other words, to identify every ToR user. This, given the past trend with Silk Road, would likely result in a more robust version of the service being created, thwarting the government's efforts. It would also destroy a useful tool for legitimate users, like dissidents. Understanding the best enforcement techniques is just the first step. Some countries wish to have complete control of the traffic on the internet.

They see freedom of speech as a threat to their power and the Dark Net as a tool that enables dissidents to speak freely. The internet is by its nature an international network of computers. Enforcement jurisdiction is foggy at best, so governments must find ways to cooperate in establishing at least some mutually agreeable regulations that govern the Dark Net. The debate surrounding the Dark Net is by no means over. Online anonymity is a double-edged sword that must be handled delicately. As policy-makers move forward, they must monitor vigilantly the evolution of the Dark Net and ensure that enforcement agencies have the resources and legal support to police successfully the Dark Net. Dark Net policy, like all good policy, must be nuanced and thoughtful in order to strike the balance between the needs of privacy-minded users and the government's responsibility to stop illegal activity.

### General Studies Paper- III

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



# SEVEN SUBJECTIVE QUESTIONS WITH MODEL ANSWERS

## Desertification and Land Degradation : Major Threats to Agriculture

**Q 1. India is heavily affected by desertification and is facing new challenges, among which are recurrent drought and dust and sandstorms. Discuss the efforts of government for combating these issues.**

### Hints:

- ◆ Desertification and land degradation are major threats to agricultural productivity in India. According to the State of India's Environment 2017, desertification has increased to 90 per cent of states in India. Around 40 to 70 per cent of the land has undergone desertification in eight states, Rajasthan, Delhi, Goa, Maharashtra, Jharkhand, Nagaland, Tripura and Himachal Pradesh.
- ◆ Condition caused by very low or deficit rainfall usually during monsoon; is a major cause of desertification and land degradation under dryland conditions.
- ◆ India is signatory to the United Nations Convention on Combating Desertification (UNCCD) and is committed to achieve the land degradation neutral status by 2030.
- ◆ The government of India has launched a flagship project on enhancing capacity on forest landscape restoration (FLR) and Bonn Challenge in India, through a pilot phase of 3.5 years implemented in the states of Haryana, Madhya Pradesh, Maharashtra, Nagaland and Karnataka.

## The World Population Prospects Report 2019 and India

**Q 2. Around 2027, India is projected to overtake China as the world's most populous country. Critically analyse the measures, which are taken by government for control the population growth.**

### Hints:

- ◆ The government has launched several measures for population control such as, implementation of the National Population Policy, 2000, Mission Parivar Vikas

scheme, family planning scheme 2020, Jansankhya Sthirata Kosh including Prerna Strategy and Santushti Strategy, among others.

- ◆ In recent years, there have been ongoing debates, campaigns and demands for the implementation of coercive population control policies in India. Aimed at reducing population growth, these conversations are not backed by concrete evidence.
- ◆ The global experiences around the enforcement of a population control law reveal its potentially disastrous consequences. For instance, China's infamous one-child-per-couple policy and the subsequent two-child policy in 2015, have had several unintended consequences ranging from forced sterilizations and abortions to the abandonment of girl children, falling birth rates, skewed sex ratios, a rapidly growing ageing population, and a shrinking workforce.
- ◆ The National Population Policy, 2000 includes a commitment towards "voluntary and informed choice and consent of citizens while availing reproductive health care services, and continuation of the target-free approach in administering family planning services". A coercive population control measure would be in direct contradiction to the tenets of this policy and stands against India's international commitments, including the landmark ICPD (International Conference on Population and Development) plan of action.
- ◆ Thus, there is a need to shift to measures that enable and empower young people and women, and expand access to quality reproductive health services. The country must invest in sustainable solutions that preserve the rights and interests of its citizens with non-coercive family planning policies as the fulcrum.

## Food Wastage in India : An Alarming Issue

**Q 3. "Food Wastage is an alarming issue in India and it can be controlled through social campaign similar to 'Swachh Bharat Abhiyan'." Critically discuss.**

### Hints:

- ◆ Indians waste as much food as the whole of United Kingdom consumes – food wastage is an alarming issue in India. Our streets and garbage bins, landfills have enough proof to prove it.
- ◆ The government has made many efforts to rein in food wastage but clearly, the depth of the problem is such that the impact of these efforts is hardly up to the mark. India should also take a cue from global practices that are both unorthodox and innovative in order to tackle food wastage problem.
- ◆ The challenge of food security is compounded by significant loss of food, much of which can be attributed to poor post-harvest management and a lack of storage facilities.
- ◆ In India, food wastage can be controlled through social campaign similar to 'Swachh Bharat Abhiyaan' and we all should take responsibility not to waste food in our plate. Society should adopt this as habit and this idea of not to waste food should be injected in preliminary education and mass awareness.

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### **India and Myanmar : Cooperation for Energy**

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**Q 4. Critically discuss India-Myanmar Cooperation in energy sector.**

**Hints:**

- ◆ Myanmar is reportedly planning to open fresh bids for its oil and gas blocks to international companies. This is a welcome development for India, which has substantial experience of operating in Myanmar's energy sector. Besides, both India and Myanmar are keen to expand the scope of cooperation in the realm of energy sector.
- ◆ Given Northeast India's geographical proximity to Myanmar, it would be worth considering the exploration of possibilities for cooperation and leveraging the energy development activities underway in Myanmar.
- ◆ It would also be important to understand China's current energy strategy in Myanmar. In its efforts to make a transition to natural gas in a major way, China's appetite for natural gas is also increasing. Hence, it will not be surprising if China yet again competes in the proposed bidding rounds for energy blocks.
- ◆ India must engage proactively with the Myanmar government and present a commercially viable case for a greater share in Myanmar's energy development.

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### **SCO Summit 2019 : Reinforcing Globalisation**

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**Q 5. The SCO membership produces a great potential in providing long-term gains to India. Critically discuss.**

**Hints:**

- ◆ Since SCO charter doesn't allow the member countries to bring their bilateral issues at the platform, Pakistan would not succeed in using SCO as a platform to internationalise the Kashmir issue. On the other hand, India can raise its concerns regarding terrorism at the SCO as terrorism is a global security threat.
- ◆ Pakistan had always denied India the access to Afghanistan and Central Asian countries. The membership of SCO can enable India to engage Pakistan in wider dimensions and use the platform for enabling land access to the Central Asian economies.
- ◆ The SCO has the potential to open the vast ventral Asian market for Indian exports while the resource rich Central Asia will also help in fuelling the Indian economic growth.
- ◆ The Central Asian region holds significant proportion of the world energy reserves. The SCO membership will help in developing closer ties with the Central Asian countries and thereby providing access to the vast energy resources.

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### **6. India's Ambitious Space Station Plan : An Introduction**

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**Q 6. India is planning to launch its own space station. Discuss the challenges and benefits of having space station.**

**Hints:**

- ◆ India is planning to launch its own space station. It would be an extension of the Gaganyaan Mission – India's first manned mission into space. India will set up its separate space station in the next 5-7 years after Gaganyaan is successfully completed in 2022.
- ◆ From a budgetary standpoint, the project proposal that shall estimate the cost for India's space station. The ISS which spreads as long as a football field and costs \$3 billion a year (Rs. 20,000 crore) for NASA alone in maintenance and has exceeded more than \$100 billion (Rs. 6,50,000 crore) in assembling it. Finances of such magnitude is very difficult to provide for any Indian space research project in near future.

- ◆ Owning space station will offer the Indian scientific community a range of subjects to conduct research in, from astronomy and meteorology to biology and medicine. Also, material is one arena where India should make major investments. Breakthroughs in this field would have major commercial and strategic benefits.
- ◆ While the plan for an Indian space station within 10 years seems ambitious, India is increasingly becoming a potent tech player and is well-placed for its plans to become a reality.

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## The Darknet : An Anonymous Internet

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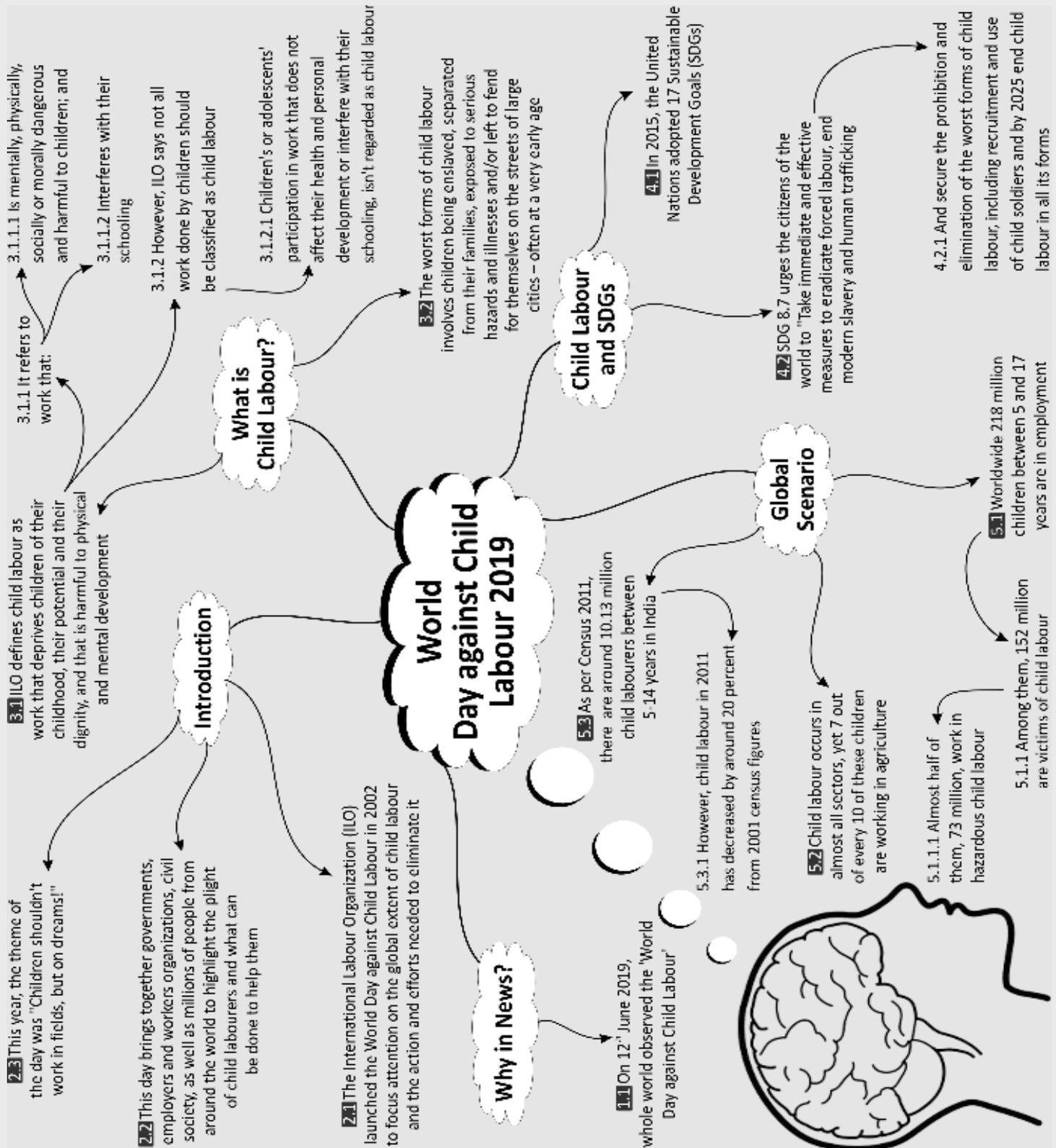
**Q 7. What is 'Dark Net'? Discuss its challenges and benefits.**

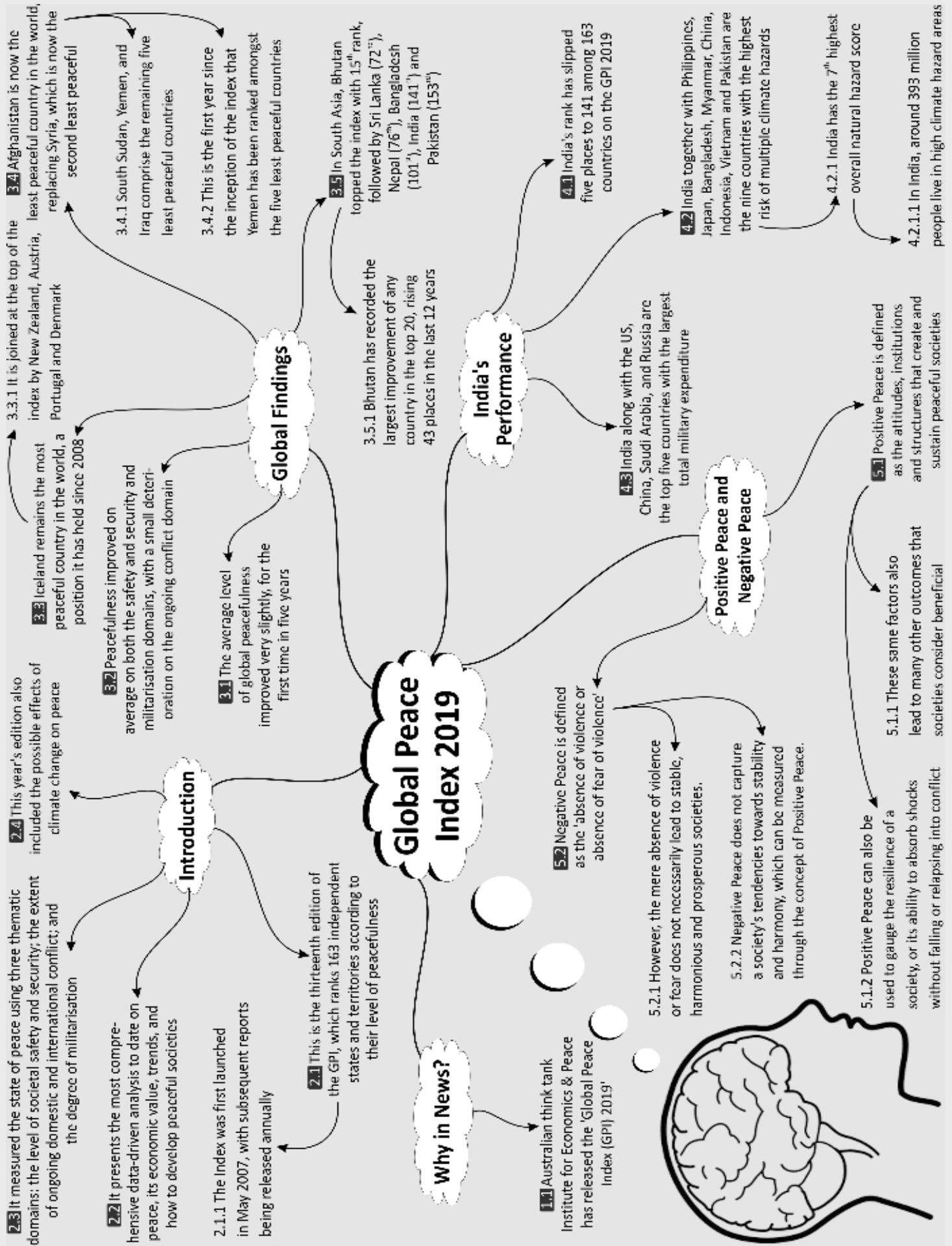
**Hints:**

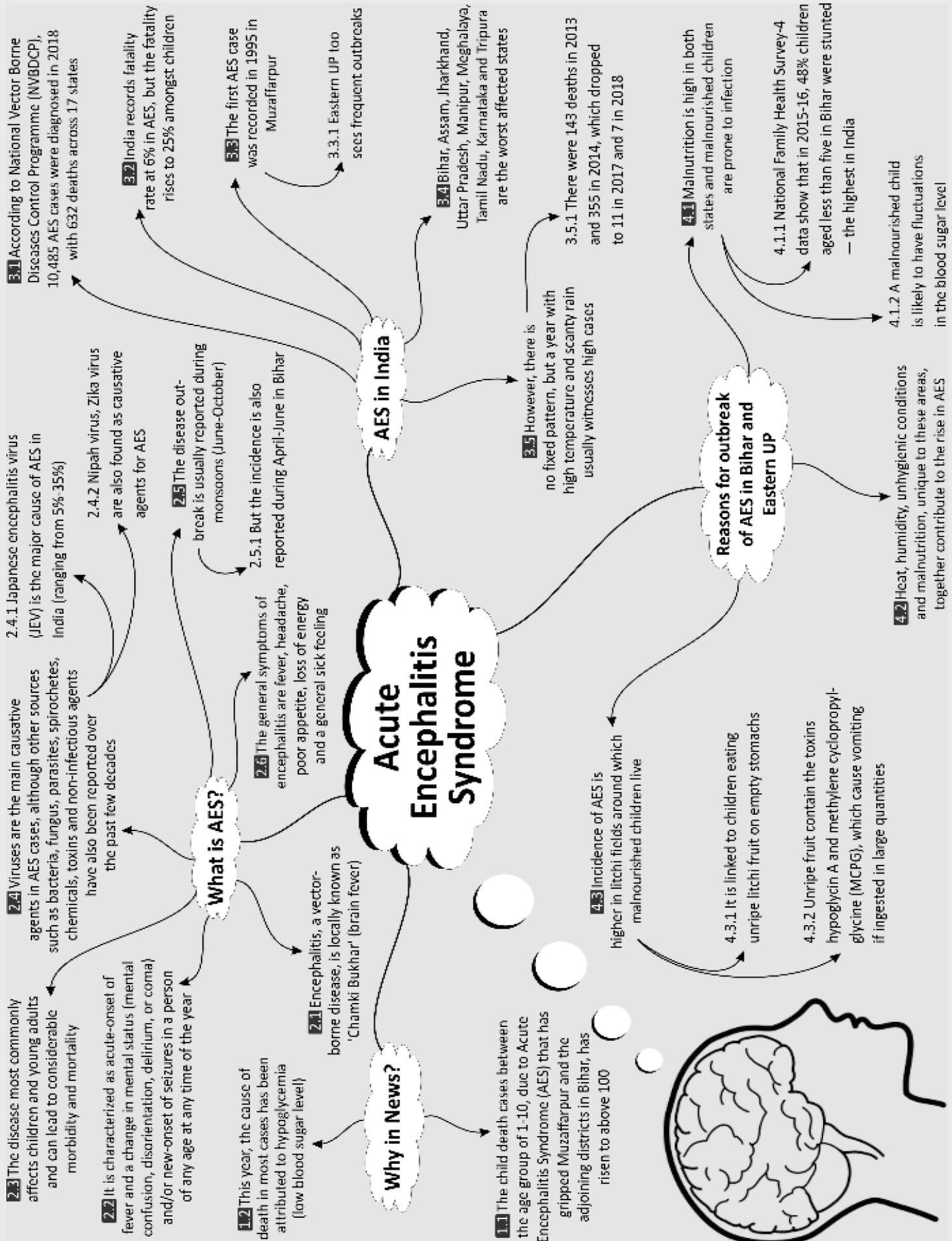
- ◆ Dark Net is portrayed as a den of mysterious and illicit network of activities. It can then be divided into two elements: the 'Surface Net' and the 'Deep Net'. The Dark Net is generally anonymous, which makes it a sanctuary for cybercriminals and political dissidents alike. It has remained largely unregulated by the government, and the first step in better monitoring and policing the Dark Net is better understanding it.
- ◆ ToR is a tool which can be used anonymously for both legal and criminal purposes. While it is essential to acknowledge the important role that anonymity plays in protecting human rights activists from oppressive regimes, it is also important to consider the challenges that anonymity poses to the law enforcement community.
- ◆ The majority of traffic to hidden Dark Net sites using ToR is for viewing and distributing images of child abuse and purchasing illegal drugs. Child abuse accounts for the largest portion of Dark Net traffic.
- ◆ Online anonymity is a double-edged sword that must be handled delicately. As policy-makers move forward, they must monitor vigilantly the evolution of the Dark Net and ensure that enforcement agencies have the resources and legal support to police successfully the Dark Net.

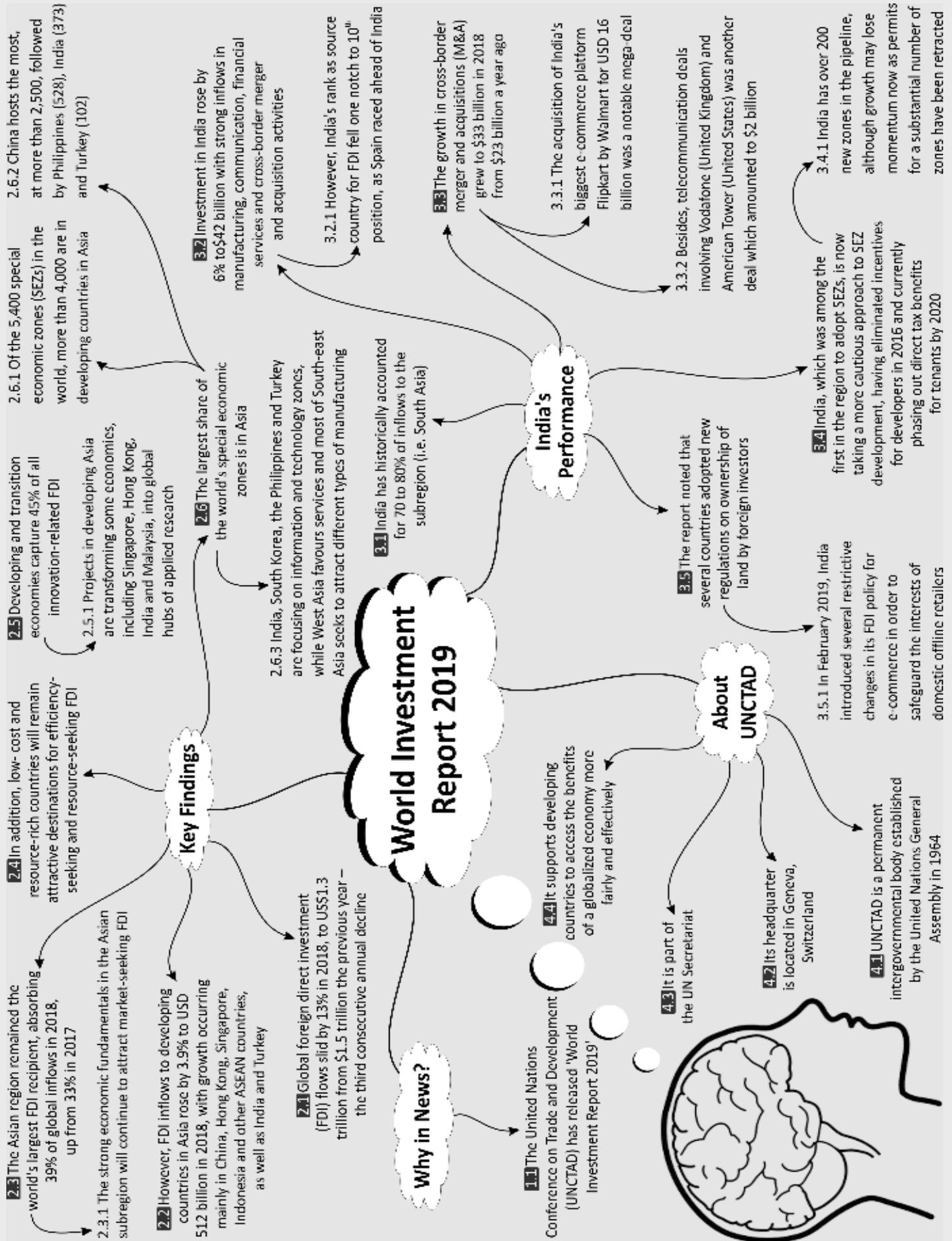


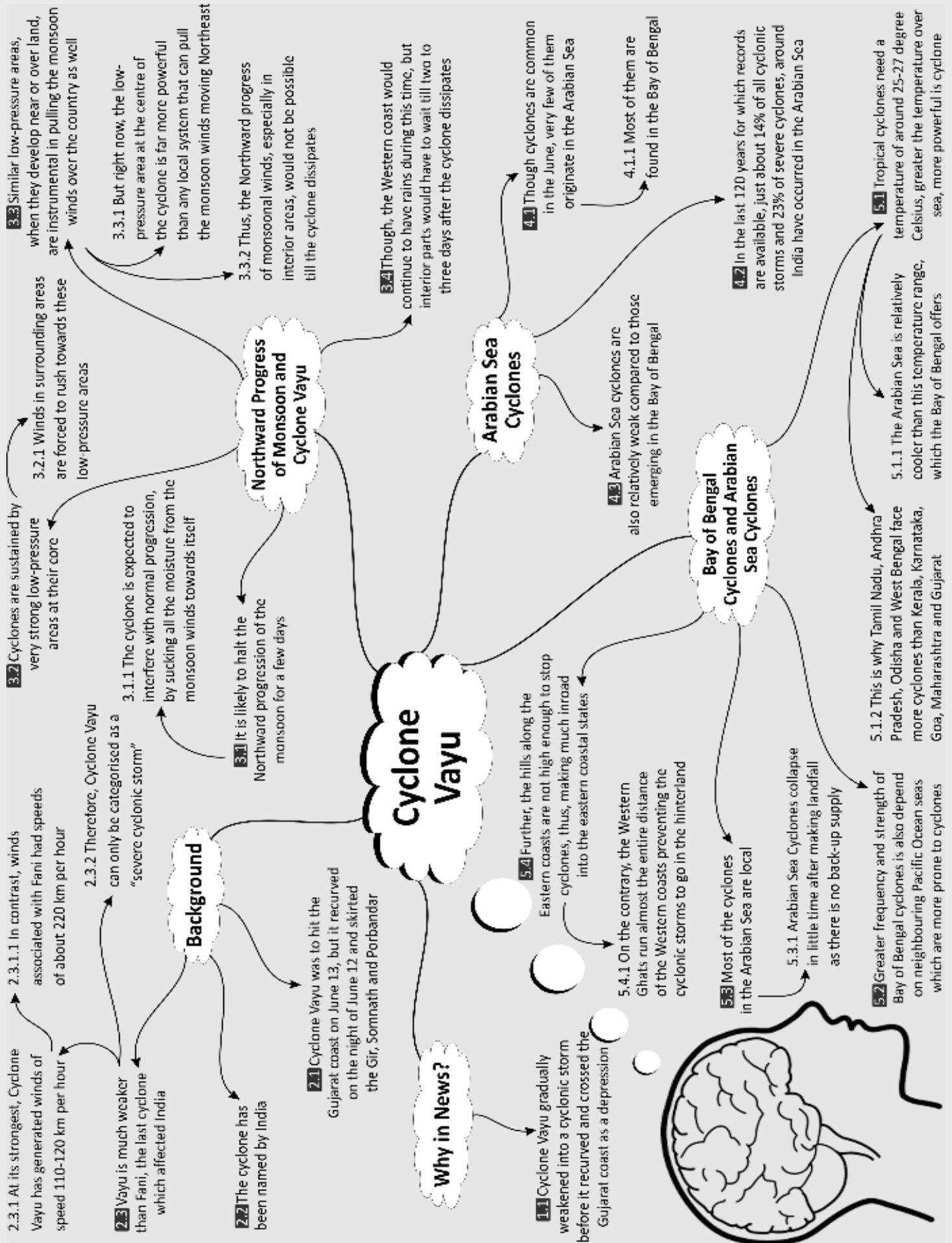
# SEVEN BRAIN BOOSTERS

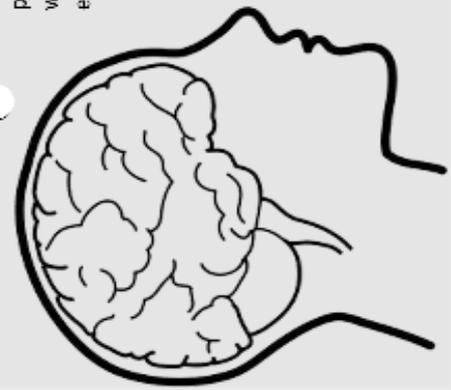
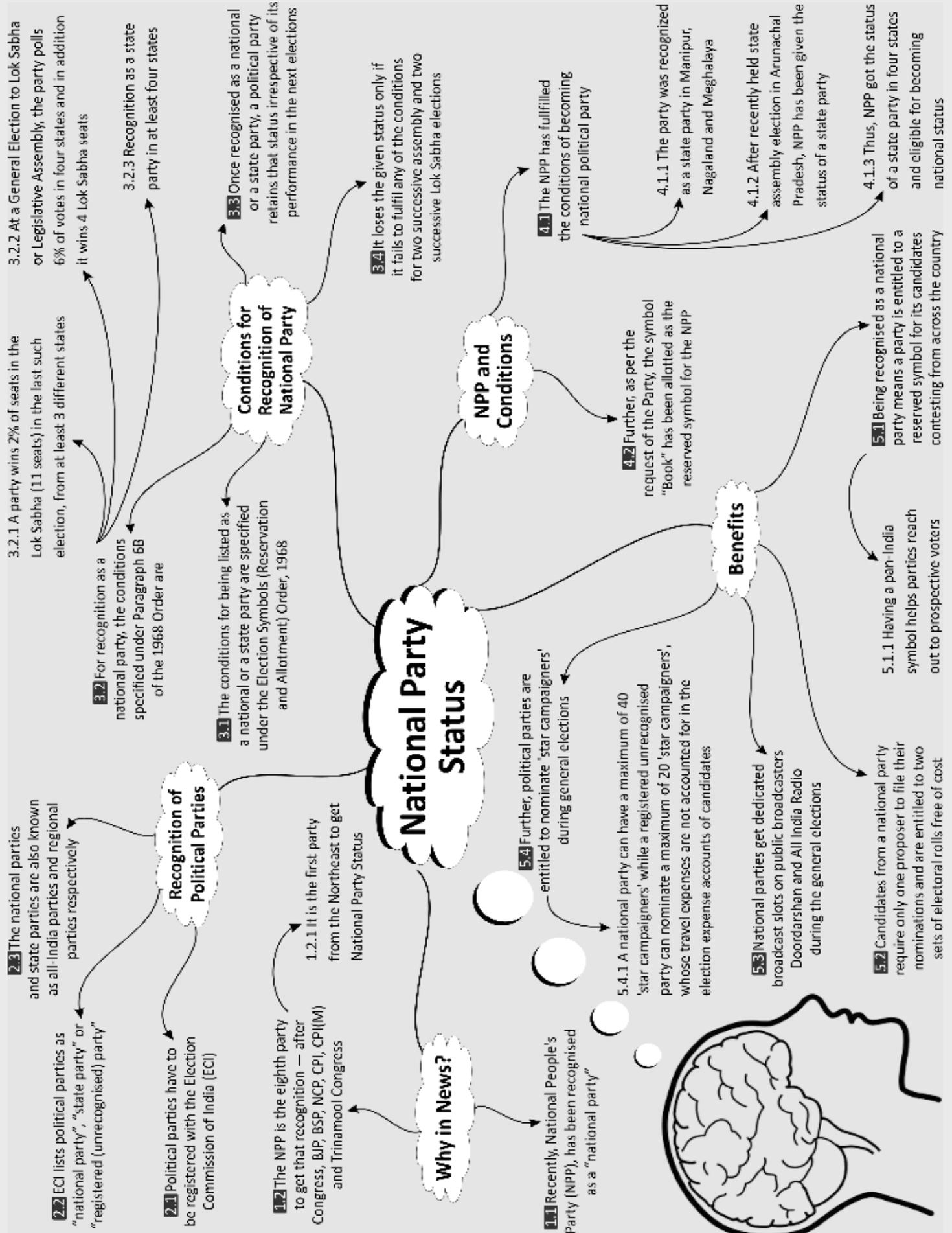


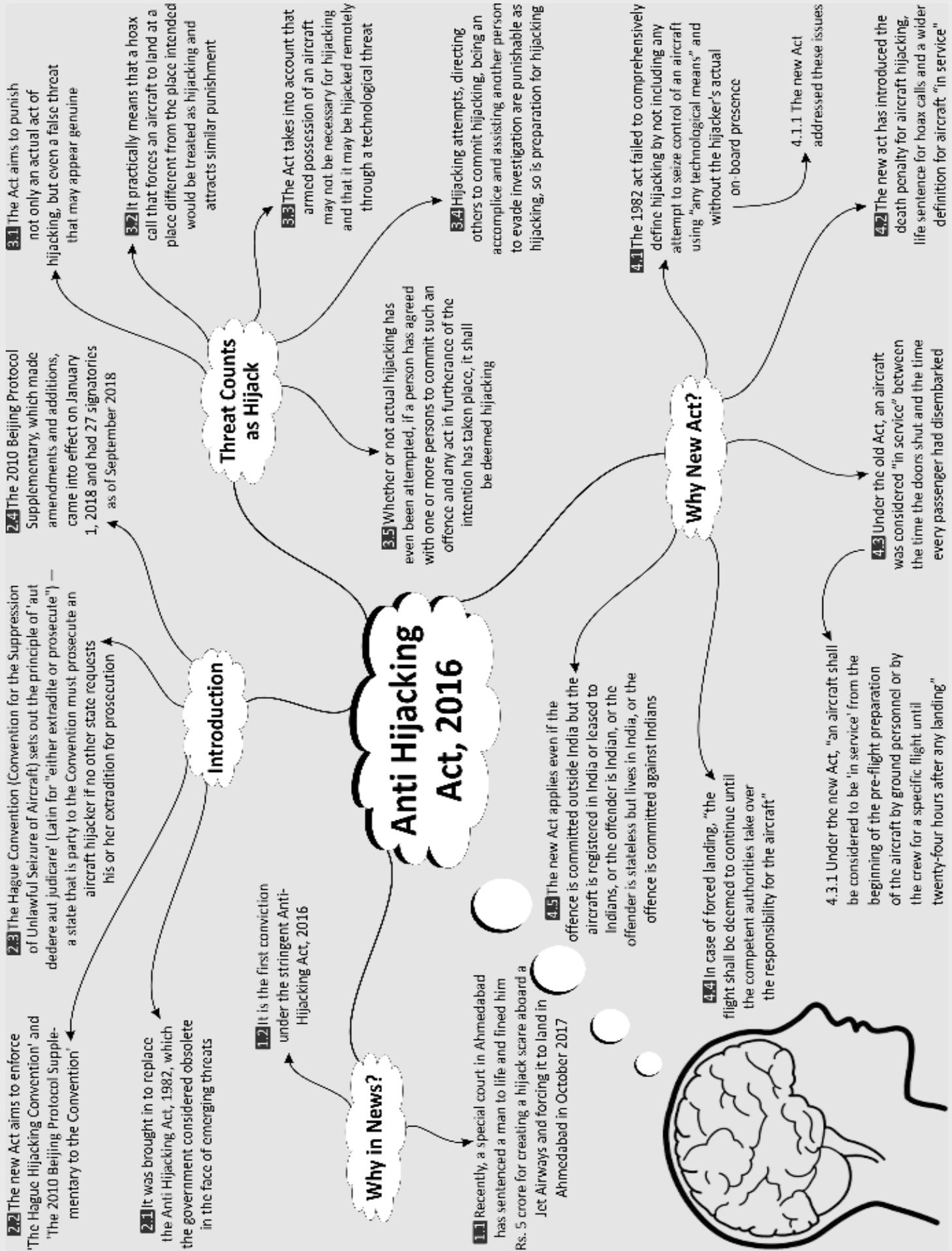












# SEVEN MCQ'S WITH EXPLANATORY ANSWERS (Based on Brain Boosters)

## World Day against Child Labour 2019

**Q1. Consider the following statements in respect of 'World Day against Child Labour 2019':**

1. Target 8.7 of the Sustainable Development Goals (SDGs), adopted by world leaders in 2015, calls for global commitment to eliminate worst forms of child labour.
2. The theme of this year's edition was "Children shouldn't work in fields, but on dreams!"
3. The International Labour Organization (ILO) had launched the World Day against Child Labour in 2002 to eliminate child labour.

Which of the statements given above is/are correct?

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

**Answer:** (d)

**Explanation:** All statements are correct. On 12<sup>th</sup> June 2019, whole world observed the World Day against Child Labour. The theme of the day was "Children shouldn't work in fields, but on dreams!"

SDG 8.7 urges the citizens of the world to "Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers and by 2025 end child labour in all its forms".

## Global Peace Index 2019

**Q2. Consider the following statements in respect of 'Global Peace Index 2019':**

1. It is flagship report of World Bank.
2. India has secured 141<sup>st</sup> rank among 163 countries on the GPI 2019.
3. Norway remains the most peaceful country in the world, a position it has held since 2008.

Which of the statements given above is/are correct?

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

**Answer:** (c)

**Explanation:** Statement 1 is not correct. Australian think tank Institute for Economics & Peace has released the 'Global Peace Index (GPI) 2019'.

**Statement 2 is correct.** India's rank has slipped five places to 141 among 163 countries on the GPI 2019.

**Statement 3 is not correct.** Iceland remains the most peaceful country in the world, a position it has held since 2008. It is joined at the top of the index by New Zealand, Austria, Portugal and Denmark.

## Acute Encephalitis Syndrome

**Q3. With reference to the 'Acute Encephalitis Syndrome (AES)', consider the following statements:**

1. Viruses are the main causative agents in AES cases.
2. Other sources such as bacteria, fungus, parasites, spirochetes, chemicals, toxins and noninfectious agents have also been reported as causative agents over the past few decades.

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. Encephalitis, a vector-borne disease, is locally known as Chamki Bukhar (brain fever). Viruses are the main causative agents in AES cases, although other sources such as bacteria, fungus, parasites, spirochetes, chemicals, toxins and noninfectious agents have also been reported over the past few decades.

## World Investment Report 2019

**Q4. Consider the following statements in respect of 'World Investment Report 2019':**

1. It has been released by International Monetary Fund.
2. According to it, the Asian region is the world's largest FDI recipient.

3. The report highlighted that India has the second largest share of the world's special economic zones.

Which of the statements given above is/are correct?

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

**Answer:** (b)

**Explanation: Statement 1 is not correct.** The United Nations Conference on Trade and Development (UNCTAD) has released 'World Investment Report 2019'.

**Statement 2 is correct.** The Asian region remained the world's largest FDI recipient, absorbing 39 per cent of global inflows in 2018, up from 33 per cent in 2017. The strong economic fundamentals in the Asian subregion will continue to attract market-seeking FDI.

**Statement 3 is not correct.** The largest share of the world's special economic zones is in Asia. Of the 5,400 special economic zones (SEZs) in the world, more than 4,000 are in developing countries in Asia. China hosts the most, at more than 2,500, followed by Philippines (528), India (373) and Turkey (102).

## Cyclone Vayu

**Q5. Consider the following statements in respect of 'Cyclone Vayu':**

1. It was originated in Arabian Sea.
2. Cyclones are common in the June, but very few of them originate in the Arabian Sea.
3. Arabian Sea cyclones are more powerful than those emerging in the Bay of Bengal.

Which of the statements given above is/are correct?

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

**Answer:** (d)

**Explanation: Statement 1 and 2 are correct.** Cyclone Vayu was originated in Arabian Sea. Though cyclones are common in the June, very few of them originate in the Arabian Sea. Most of them are found in the Bay of Bengal.

**Statement 3 is not correct.** Arabian Sea cyclones are relatively weak compared to those emerging in the Bay of Bengal. The Arabian Sea is relatively cooler than Bay of Bengal.

## National Party Status

**Q6. Consider the following statements:**

1. Once recognised as a national or a state party, a political party permanently retains the status

irrespective of its performance during future elections.

2. National People's Party (NPP) is the eighth party to get the national political party in India.

Which of the statements given above is/are correct?

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

**Answer:** (b)

**Explanation: Statement 1 is not correct.** Once recognised as a national or a state party, a political party retains that status irrespective of its performance in the next elections. It loses the given status only if it fails to fulfil any of the conditions for two successive assembly and two successive Lok Sabha elections.

**Statement 2 is correct.** The NPP is the eighth party to get that recognition — after Congress, BJP, BSP, NCP, CPI, CPI(M) and Trinamool Congress and the first from the Northeast.

## Anti Hijacking Act, 2016

**Q7. With reference to the 'Anti Hijacking Act, 2016', consider the following statements:**

1. The new Act aims to enforce the Hague Hijacking Convention and the 2010 Beijing Protocol Supplementary to the Convention.
2. It introduced the death penalty, life sentence for hoax calls and a wider definition for aircraft "in service".

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 new Act was brought in to replace the Anti Hijacking Act, 1982, which the government considered obsolete in the face of emerging threats. The new Act aims to enforce the Hague Hijacking Convention and the 2010 Beijing Protocol Supplementary to the Convention.

The key new introductions are the death penalty, life sentence for hoax calls and a wider definition for aircraft "in service". Under the new Act, "an aircraft shall be considered to be 'in service' from the beginning of the pre-flight preparation of the aircraft by ground personnel or by the crew for a specific flight until twenty-four hours after any landing.



# SEVEN IMPORTANT FACTS FOR PRELIMS

1. Who has been awarded the 'Danny Kaye Humanitarian Award' by the UNICEF?  
*–Indian actress Priyanka Chopra*
2. Which state government has recently launched a new initiative to provide social security to old age parents (Children who do not take care of their parents will be sent behind bars if their parents complain about ill-treatment at the hands of their wards)?  
*–Bihar*
3. Who has been elected as the Speaker of 17<sup>th</sup> Lok Sabha?  
*–Om Birla*
4. Who has been appointed as interim Chief Vigilance Commissioner?  
*–Sharad Kumar*
5. Which Indian personality has been elected as member of American Philosophical Society?  
*–Romila Thapar*
6. Which Indian state has launched world's first emission trading scheme (ETS) for particulate matter, to reduce air pollution?  
*–Gujarat*
7. Who has won 'Femina Miss India World 2019' beauty pageant?  
*–Suman Rao*



# SEVEN PRACTICE QUESTIONS FOR MAINS EXAM

1. There has been a growing chorus of alarm about the existential threat of Artificial Intelligence (AI). Is rising machine intelligence is a double-edged sword? Critically discuss.
2. "Holding simultaneous polls to Parliament and state Assemblies is fundamentally anti-federal and anti-democratic and thus against the Constitution." Justify
3. The prevailing and emerging international order, characterised by a new form of internationalism and hazy geopolitics, finds centrality in the Indo-Pacific region. Discuss how India can play a key role in claiming the Indo-Pacific region.
4. What do you understand by 'Acute Encephalitis Syndrome (AES)'? What causes AES? What makes Bihar so vulnerable to this disease?
5. "The draft emigration Bill is more about managing the export of human resources than being a humanitarian framework." Critically analyse.
6. Discuss economical and political importance of the Strait of Hormuz?
7. "Fixing India's water crisis will need saner policies, meticulous strategy and a massive amount of public participation." Discuss.



# SEVEN IMPORTANT NEWS

## 1. Hypersonic Technology Demonstrator Vehicle

The Defence Research and Development Organisation (DRDO) has conducted the maiden test of an indigenously developed Hypersonic Technology Demonstrator Vehicle (HSTDV) along with several technologies. The only other countries that possess this technology are the US, Russia and China. This test today puts India in an elite club of nations definitely, but India will have to perfect the technology with many more tests. The aim of the mission was to "prove a number of critical technologies for futuristic missions".

### What is HSTDV?

The HSTDV is an unmanned scramjet

(allowing supersonic combustion) demonstration vehicle that can cruise up to a speed of mach 6 (or six times the speed of sound) and rise up to an altitude of 32. km in 20 seconds. It has a range of uses, including missiles of the future, and energy-efficient, low cost and reusable satellite-launch vehicle.

### Applications

The HSTDV cruise vehicle is mounted on a solid rocket motor, which will take it to a required altitude, and once it attains certain mach numbers for speed, the cruise vehicle will be ejected out of the launch vehicle.

The scramjet engine gets ignited automatically later. Besides its utility for long-range cruise missiles of the future, the dual-use technology will have multiple civilian applications too. For instance, it can be used for launching satellites.

In scram-jet technology, combustion of fuel takes place in a chamber in the missile at supersonic speeds. This is different from a ram jet system where the system collects the air it needs from the atmosphere during the flight at subsonic speeds and the propellants burn in the combustion chamber.

## 2. World's Highest Weather Station at Mount Everest

Climate scientists have installed world's highest operating weather station at Mount Everest's Death Zone, including five other automated stations on other parts of the mountain. The team of scientists and engineers stood on the Mount Everest's flank at 27,650 feet (8,430 metres), and erected seven-foot- building of a weather station that can withstand extreme winds and cold weather.

### Key Highlights

The Balcony weather station is the first weather station installed at an elevation above 8,000 metres, meaning it will also be the first to sample the stratosphere as natural variations in the atmospheric boundaries change

over time. The weather station will record data on temperature, relative humidity, barometric pressure, wind speed, and wind direction. Besides, the new weather stations will also give scientists direct observations to understand jet stream, and will also help understand how the climate change is affecting the Himalayas.

The other five weather stations that are located in the Mount Everest are in Balcony area (8,430 m), South Col (7,945m) at Phortse (3,810 m), Everest Base Camp (5,315 m) and Camp 2 (6,464 m).

The successful installation of the stations will help continuously monitor the upper reaches of the atmosphere,

which is critical to tracking and predicting weather patterns around the globe.

The National Geographic Society has worked in partnership with Tribhuvan University, the Nepal government, and received funds from Rolex to launch the two-month expedition involving over 30 scientists.

The team members from eight countries, including 17 Nepali researchers, the expedition team conducted trailblazing research in biology, glaciology, meteorology, geology and mapping to understand environmental changes and their impacts.

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### 3. Heavyweight Torpedo Varunastra

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In a bid to boost its underwater firepower, the Indian Navy has decided to induct the indigenous developed heavyweight torpedo Varunastra into its arsenal. This will put India in a group of only eight countries that have the capability to manufacture heavyweight torpedoes. The weapon has been developed by the Naval Science and Technology Laboratory (NSTL), Visakhapatnam.

Bharat Dynamics Limited (BDL) has signed a contract worth Rs1,187.82 crore for supply of heavyweight torpedoes to Indian Navy. The torpedoes will be manufactured at BDL Visakhapatnam unit, in collaboration

with the Defence Research and Development Organisation (DRDO).

#### About Torpedo

The heavyweight torpedo Varunastra, is a ship-launched, electrically-propelled underwater weapon equipped with one of the most advanced automatic and remote-controlled guidance systems. The weapon system uses its own intelligence in tracing the target.

Capable of hitting stealth submarines underwater, the 1,500-kg Varunastra can carry a warhead weighing 250 kg and has an operational range of 40 km. The anti-submarine electric torpedo is seven to eight metres long with a diameter of 533

mm. The weapons equipped with self-guided systems using artificial intelligence would have higher speed and accuracy to hit the targets. It can travel at 74 kph carrying a warhead of 250 kg.

#### What is Torpedo?

Torpedo is the most preferred lethal underwater weapon for naval platforms such as submarines, surface vessels, aircraft and helicopters. It is a self propelled weapon with explosive or nuclear warhead, which launched underwater detonate near or proximity of the target. ■

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### 4. Kimberley Process Intersessional Meeting 2019

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India hosted the Intersessional meeting of Kimberley Process (KP) in Mumbai. India is currently the Chair of Kimberley Process Certification Scheme (KPCS) since 1st January 2018. It was handed Chairmanship by the European Union during KPCS Plenary 2018, which was held in Brussels, Belgium.

#### What is Kimberley Process?

The Kimberley Process is a joint initiative involving Government, international diamond industry and civil society to stem the flow of Conflict Diamonds. Conflict Diamonds means rough diamonds used by rebel movements or

their allies to finance conflict aimed at undermining legitimate governments. It is also described in United Nations Security Council (UNSC) Resolutions.

The Kimberley Process (KP) is open to all countries that are willing and able to implement its requirements. At present, it has 55 members representing 82 countries including European Union with 28 members. The Kimberley Process is chaired, on a rotating basis, by participating countries. KP Vice-Chair is generally elected by KP Plenary each year, who becomes the Chair in the next year. ■

#### Rough diamond trading under the KPCS

As per the Scheme, each shipment of rough diamonds being exported and imported by crossing an international border be transported in a tamper proof container and accompanied by a validated Kimberley Process Certificate. The shipment can only be exported to a co-participant country in the KPCS. No uncertified shipments of rough diamonds are permitted to enter a participant country. ■

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### 5. Sheath Blight Disease in Rice

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A team of scientists at Delhi-based National Institute of Plant Genome Research has unraveled the genomic diversity associated with aggressiveness of two Indian strains of *Rhizoctonia solani*, the fungal

pathogen that causes the dreaded Sheath Blight disease in rice. The researchers have identified several genes and gene families in the strain that might account for their disease aggressiveness. This genomic insight is

expected to help develop rice varieties resistant to sheath blight disease. Sheath Blight disease is a major issue in rice cultivation. It can cause up to 60 per cent reduction in rice yield. It is difficult to breed disease resistant rice varieties, as

there is lack of natural source of disease resistance. Consequently, controlling the disease in a sustainable manner has remained a challenge.

### Key Findings

Analysis revealed that there has been expansion and emergence of various genes and gene families in both these Indian strains. In the process, they

have identified various pathogenicity associated genes and gene families that might account for their disease aggressiveness.

The researchers, who have been working to characterize the Indian strains of the fungal pathogen for the past four to five years, decided to study the genome of two of the hyper aggressive strains.

### Significance

The characterisation of the identified genes will be helpful to understand their role in the pathogenesis of the fungus. The genetic manipulation of the pathogenicity-associated genes in rice through various biotechnological approaches may prove helpful in developing sheath blight resistant rice. ■

## 6. Mysterious Mass found under the Moon's South Pole

Scientists have discovered a mysterious large mass of material, hidden beneath the largest lunar crater, that is altering the Moon's gravitational field. The mass was found under the Moon's South Pole – Aitken basin and may contain metal from the asteroid that crashed into the Moon and formed the crater.

### Key Highlights

The crater itself is oval-shaped, as wide as 2,000 kilometres and several miles deep. Despite its size, it cannot be seen from Earth because it is on the far side of the Moon.

To measure subtle changes in the strength of gravity around the

Moon, researchers analysed data from spacecrafts used for the National Aeronautics and Space Administration (NASA) Gravity Recovery and Interior Laboratory (GRAIL) mission.

Computer simulations of large asteroid impacts suggest that, under the right conditions, an iron-nickel core of an asteroid may be dispersed into the upper mantle (the layer between the Moon's crust and core) during an impact. Scientists suggested two possibilities to explain the subsurface mass. First, it could be remnants of dense oxides that formed in the final stages of cooling back when the moon was covered in ancient magma oceans. But the researchers don't have

a mechanism to precisely explain the formation of such a layer specifically under the basin.

In addition to spotting the mysterious blob, the new study retraced the boundary of the basin's inner rim, revealing that scientists previously underestimated the crater's size, a potentially important find as NASA and others prepare to send missions to the basin and the nearby lunar south pole.

NASA's GRAIL mission was launched in 2011 and spent about a year mapping the Moon's gravity before being crashed into the Moon in one final maneuver. GRAIL used two spacecraft in the same lunar orbit. ■

## 7. Libra - Cryptocurrency of Facebook

Facebook has launched a new cryptocurrency called 'libra'. Libra will be controlled by the Libra Association, which is a non-profit based in Geneva, Switzerland. But Facebook will have a leadership role for all of 2019, though later on it will be just one of the many members part of the association. Facebook also announced a dedicated wallet app called 'Calibra', which will be built into WhatsApp and Messenger as well, to let users store and use these Libra coins.

### What is Libra?

Libra is like any other cryptocurrency powered by blockchain technology.

Blockchain technology functions like an open ledger that gets updated in real time, and each transaction made on a blockchain network is preserved. Reversing a record is impossible on blockchain and with cryptocurrency, the idea is a decentralised network, which is not controlled by one bank or a government.

### What will Libra be used for?

Libra will be like a digital coin and the idea is to let users rely on these for virtually anything. If businesses start accepting Libra, then you could use to buy coffee to pay your taxi. Of course, it will depend on whether businesses

accept Libra, and how many customers have faith in the system, given the trust issues with Facebook, though this will be separate from the social network.

### Will Libra work in India?

Cryptocurrency is illegal in India and the draft bill right now is recommending a maximum of 10 year punishment for those who mine, trade, buy or sell these. In India, if the bill passes, trading in cryptocurrency could result in hard punishment. So one of the biggest markets, which is India, will not be able to use Libra, which could limit its potential. ■

# SEVEN IMPORTANT HIGHLIGHTS FROM PIB

## 1. The Central Educational Institutions (Reservation in Teachers' Cadre) Bill, 2019

Giving a major push to the reforms in education sector, making it inclusive and keeping in mind the aspirations of the people from different categories, the Union Cabinet has approved the introduction of a Bill namely "The Central Educational Institutions (Reservation in Teachers' Cadre) Bill, 2019". It will address the long standing demands of persons belonging to Schedule Castes (SCs), Schedule Tribes (STs) and Socially and Economically Backward Classes (SEBCs) and ensure their rights envisaged under the Constitution. It will also ensure providing of 10% reservation to Economically Weaker Sections (EWS). The Bill will replace "The Central Educational Institutions (Reservation in Teachers' Cadre) Ordinance, 2019".

### Impact

- ◆ It will allow filling up of more than 7000 existing vacancies by direct recruitment in Teachers' Cadre with 200 point roster. Ensure compliance of the Constitutional Provisions of Articles 14, 16 and 21.

- ◆ It will ensure full representation of SCs, STs, SEBCs and EWS in direct recruitment in teachers' cadres.
- ◆ It will improve the teaching standards in the higher educational institutions by attracting all eligible talented candidates belonging to SCs, STs, SEBCs and EWS.

### Implementation

- ◆ It will consider the university/ college as one unit restoring earlier reservation system based on 200 point roster. No longer will 'department / subject' be treated as one unit.
- ◆ The unit for reservation of posts in direct recruitment in teachers' cadre will be the university/educational institutions and not the department.
- ◆ The Cabinet decision will address the long standing demands of persons belonging to SCs, STs, SEBCs and ensure their rights envisaged under the Constitution. It will also ensure providing of 10% reservation to EWS.

## 2. Protecting the Rights of Married Muslim Women

The Union Cabinet has approved the Muslim Women (Protection of Rights on Marriage) Bill, 2019.

### Impact

The Bill would ensure gender equality and gender justice to Muslim women. The Bill would also help in protecting the rights of married Muslim women and prevent divorce by practice of 'talaq-e-biddat' by their husbands.

### Implications

- ◆ The Bill proposed to declare the practice of triple talaq as void and illegal.
- ◆ It also made an offence punishable with imprisonment up to three years and fine.
- ◆ It also provided for payment of subsistence allowance to married Muslim women and dependent children.

- ◆ It also proposed to make the offence cognizable, if information relating to the commission of an offence is given to an officer in charge of a police station by the married Muslim woman upon whom talaq is pronounced or by any person related to her by blood or marriage.
- ◆ The offence is made compoundable with the permission of the Magistrate at the instance of the married Muslim woman upon whom talaq is pronounced.
- ◆ The Bill further provides for hearing the married Muslim woman upon whom talaq is pronounced, before the accused is released on bail by the Magistrate.
- ◆ The Muslim Women (Protection of Rights on Marriage) Bill, 2019 is on similar lines of the Muslim Women (Protection of Rights on Marriage) Second Ordinance, 2019.

### 3. New Delhi International Arbitration Centre Bill, 2019

Making India as the hub of international arbitration, the Union Cabinet has approved the 'New Delhi International Arbitration Centre (NDIAC) Bill, 2019'.

#### NDIAC – The Future International Hub of Arbitration

NDIAC will be headed by a Chairperson, who has been a Judge of the Supreme Court or a Judge of a High Court or an eminent person, having special knowledge and experience in the conduct or administration of arbitration, law or management, to be appointed by the Central Government in consultation with the Chief Justice of India. Besides, it will also have two Full-time or Part-time Members from amongst eminent persons having substantial knowledge and experience in institutional arbitration in both domestic and international.

#### Aims and Objectives of NDIAC

- ◆ Bring targeted reforms to develop itself as a flagship institution for conducting international and domestic arbitration.
- ◆ Provide facilities and administrative assistance for conciliation, mediation and arbitral proceedings.
- ◆ Maintain panels of accredited arbitrators, conciliators and mediators both at national and international level or specialists such as surveyors and investigators.
- ◆ Facilitate conducting of international and domestic arbitrations and conciliation in the most professional manner.
- ◆ Provide cost effective and timely services for the conduct of arbitrations and conciliations at Domestic and International level.
- ◆ Promote studies in the field of alternative dispute resolution and related matters, and to promote reforms in the system of settlement of disputes.
- ◆ Co-operate with other societies, institutions and organisations, national or international for promoting alternative dispute resolution.

### 4. The Aadhaar and Other Laws (Amendment) Bill, 2019

In a major move aimed at making Aadhaar making people friendly, the Union Cabinet has approved 'The Aadhaar and Other Laws (Amendment) Bill, 2019'.

#### Impact

The decision would enable Unique Identification Authority of India (UIDAI) to have a more robust mechanism to serve the public interest and restrain the misuse of Aadhar.

Subsequent to this amendment, no individual shall be compelled to provide proof of possession of Aadhaar number or undergo authentication for the purpose of establishing his identity unless it is so provided by a law made by Parliament.

For the convenience of general public in opening of bank accounts, the proposed amendments would allow the use of Aadhaar number for authentication on voluntary basis as acceptable KYC document under the Telegraph Act,

1885 and the Prevention of Money Laundering Act, 2002.

#### Key Features

The key features of the amendments are as follows:

- ◆ Provides for voluntary use of Aadhaar number in physical or electronic form by authentication or offline verification with the consent of Aadhaar number holder.
- ◆ Provides for use of twelve-digit Aadhaar number and its alternative virtual identity to conceal the actual Aadhaar number of an individual.
- ◆ Prevents denial of services for refusing to, or being unable to, undergo authentication.
- ◆ Provides for civil penalties, its adjudication, appeal thereof in regard to violations of Aadhaar Act and provisions by entities in the Aadhaar ecosystem.

### 5. The Public Premises (Eviction of Unauthorised Occupants) Amendment Bill, 2019

In a crackdown on the unauthorised occupants of residential accommodations in public premises, the Union Cabinet has

approved 'The Public Premises (Eviction of Unauthorised Occupants) Amendment Bill, 2019'.

## Key Highlights

The new bill comes in place of "The Public Premises (Eviction of Unauthorised Occupants) Amendment Bill, 2017".

The amendments will facilitate smooth and speedy eviction of unauthorised occupants from Government residences, and those vacant residences will be available for allotment to eligible persons on maturity of their turn in the waiting list. This will decrease the waiting time for availing the facility of residential accommodation.

The proposed amendments would enable the Estate officer to apply summary proceedings for evicting

unauthorised occupants from residential accommodations and to levy damage charges for accommodation held during the period of litigation. The decision is yet another reflection of the Government's commitment for a transparent and hassle-free governance for the citizens of the country.

## Background

The government of India has to evict unauthorised occupants from Government accommodations under the provisions of PPE Act, 1971. However, the eviction proceedings take unusually long time, thereby reducing the availability of Government accommodations to new incumbents.

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## 6. Tax Treaty Related Measures to Prevent Base Erosion and Profit Shifting

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The Union Cabinet has approved the ratification of the Multilateral Convention to Implement Tax Treaty Related Measures to Prevent Base Erosion and Profit Shifting (MLI).

### Key Highlights

The Convention will modify India's treaties in order to curb revenue loss through treaty abuse and base erosion and profit shifting strategies by ensuring that profits are taxed where substantive economic activities generating the profits are carried out and where value is created.

The Multilateral Convention is an outcome of the OECD / G20 Project to tackle Base Erosion and Profit Shifting (the "BEPS Project") i.e., tax planning strategies that exploit gaps and mismatches in tax rules to artificially shift profits to low or no-tax locations where there is little or no economic activity, resulting in little or no tax being paid. The BEPS Project identified 15 actions to address base erosion and

profit shifting (BEPS) in a comprehensive manner. The Convention will operate to modify tax treaties between two or more Parties to the Convention. It will not function in the same way as an amending protocol to a single existing treaty, which would directly amend the text of the Covered Tax Agreement. Instead, it will be applied alongside existing tax treaties, modifying their application in order to implement the BEPS measures.

The Convention enables countries to implement the tax treaty related changes to achieve anti-abuse BEPS outcomes through the multilateral route without the need to bilaterally re-negotiate each such agreement which is burdensome and time consuming. It ensures consistency and certainty in the implementation of the BEPS Project in a multilateral context. Ratification of the Multilateral Convention will enable application of BEPS outcomes through modification of existing tax treaties of India in a swift manner.

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## 7. Digitization for Improve Governance and Timely Delivery of Services

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The Vice President of India has called for adopting digital technology to improve governance and timely delivery of services to citizens.

### Key Highlights

Technology has been a game changer and is progressively helping in eliminating corruption, ensuring transparency and improving the delivery of services in several areas like healthcare, land registrations, transport, tax collection and urban planning.

The adoption of digital technology helped the elimination of bogus ration cards and resulted in a saving of Rs.6,000 crore in one State. Digitization has the potential not only to boost core sectors like IT, digital communication

and online retail but also transform financial services, agriculture, logistics and education.

Digitization could contribute to inclusive development in more ways than one. So there is a need to make digital delivery and online public interface more universal and more effective.

Information Technology sector could greatly contribute to economic prosperity by generating better means of employment.

There is a need to harness the untapped potential of technology to not only improve the 'ease of business' but also utilize its power to enhance people's 'ease of living' and the 'happiness quotient'.



# SEVEN IMPORTANT CONCEPTS THROUGH GRAPHICS

## 1. Sugarcane

### Key Facts

- Sugarcane belongs to bamboo family of plants and is indigenous to India.
  - Sugarcane is a tropical plant, therefore, requires a year warm weather to reach maturity (10 to 15 and even 18 months). The areas having temperature of 20° to 26°C and an average rainfall of 75 - 150 cm are suitable for its cultivation. Too heavy rainfall results in low sugar content and deficiency in rainfall produces fibrous crop.
  - Frost is detrimental to sugarcane. Therefore, it must be harvested before frost season, if it is grown in Northern parts of the country where winters are very cold and frost is a common phenomenon. On the other hand, hot dry winds are also inimical to sugarcane.
  - It can grow on a variety of soils including loams, clayey loams, black cotton soils, brown or reddish loams and even laterites.
  - In fact, sugarcane can tolerate any kind of soil that can retain moisture. But deep rich loamy soils are ideal for its growth.
  - However, the soil should be rich in nitrogen, calcium and phosphorus but it should not be either too acidic or too alkaline.
- 
- In addition to its sugarcane exhausts the fertility of the soil quickly and extensively and its cultivation requires heavy dose of manures and fertilizers.
  - Flat plain or level plateau is an advantage for sugarcane cultivation because it facilitates irrigation and transportation of cane to the sugar mills. Thus, the Satluj-Ganga plain from Punjab to Bihar contains major area of production. Other areas are the black soil belt from Maharashtra to Tamil Nadu along the Eastern slopes of the Western Ghats and coastal Andhra and the Krishna Valley.
  - Sugarcane is the main source of sugar, gur and kandsari. About two-thirds of the total sugarcane produced in India is consumed for making gur and kandsari and only one third of it goes to sugar factories. It also provides raw material for manufacturing alcohol.
  - Bagasse, the crushed cane residue, is used as a source of cellulose for manufacturing animal feeds or is burned as fuel in the sugarcane mill. However, it can be more effectively used for manufacturing paper instead of using it as fuel in the mills.

## 2. Coconut

### Key Facts

- Coconut plays a significant role in the agrarian economy of India.
- Apart from the importance of copra and coconut oil which is widely used in the manufacture of soaps, hair oil, cosmetics and other industrial products, its husk is a source of fibre which supports a sizable coir industry.
- Coconut is essentially a tropical plant. It requires mean annual temperature of 27°C with a diurnal variation of 6°C to 7°C and relative humidity more than 60% for optimum growth and maximum yield.
- The coconut palm thrives well under an evenly distributed annual rainfall ranging from 100 cm to 300 cm. However, a well distributed rainfall of about 200 cm is the ideal rainfall for proper growth and higher yield.
- Frost and drought are very harmful to coconut.
- The coconut palm can tolerate wide range of soil conditions. The major soil types that support coconut in India are laterite, alluvial, red sandy loam, coastal sandy and reclaimed soils with a pH ranging from 5.2 to 8.0.
- In addition, it grows well on sandy loams along sea-coasts and in adjoining river valleys.
- Traditional areas of coconut in India are the states of Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Odisha, Goa, West Bengal, Puducherry, Maharashtra and Islands of Lakshadweep and Andaman and Nicobar. However, several states like Assam, Gujarat, Madhya Pradesh, Bihar, Tripura, Manipur, Nagaland and Arunachal Pradesh have emerged as non-traditional areas for the cultivation of coconut.



## 3. Cotton

### Key Facts

- Cotton is a kharif crop which requires 6 to 8 months to mature.
- Cotton is the important fibre crop and provides the basic raw material (cotton fibre) to cotton textile industry.
- Its seed (binola) is used in vanaspati industry and can also be used as part of fodder for milch cattle to get better milk.
- It is tropical and sub-tropical crop and requires uniformly high temperature varying between 21°C and 30°C. The growth of cotton is retarded when the temperature falls below 20°C.
- Frost is harmful for the production of cotton.
- The modest requirement of water can be met by an average annual rainfall of 50- 100 cm. However, it is successfully grown in areas of lesser rainfall with the help of irrigation.
- Moist weather and heavy rainfall at the time of boll-opening and picking are detrimental to cotton as the plant becomes vulnerable to pests and diseases. High amount of rainfall in beginning and sunny and dry weather at ripening time are very useful for a good crop.
- Cotton cultivation is closely related to deep black soils (regur) of the Deccan and the Malwa Plateaus and those of Gujarat. It also grows well in alluvial soils of the Satluj-Ganga Plain and red and laterite soils of the peninsular regions. Cotton quickly exhausts the fertility of soil. Therefore, regular application of manures and fertilizers to the soils is very necessary.
- In India, cotton is grown in three distinct agro-ecological zones, viz., Northern (Punjab, Haryana and Rajasthan), Central (Gujarat, Maharashtra and Madhya Pradesh) and Southern zone (Andhra Pradesh, Tamil Nadu and Karnataka).



## 4. Jute

### Key Facts

- Jute is another important fibre crop in India.
- It is used for manufacturing a large variety of articles such as gunny bags, hessian, ropes, strings, carpets, rugs and clothes, tarpaulins, upholstery and decoration pieces.
- Jute is the crop of hot and humid climate.
- It requires high temperature varying from 24°C to 35°C and heavy rainfall of 120 - 150 cm with 80 - 90 per cent relative humidity during the period of its growth.
- Small amount of pre-monsoon rainfall varying from 25cm - 55cm is very useful because it helps in the proper growth of the plant till the arrival of the proper monsoon.
- Light sandy or clayey loams are considered to be best suited soils for jute. Since jute rapidly exhausts the fertility of soil, it is necessary that the soil is replenished annually by the silt-laden flood water of the rivers.
- Jute is generally sown in February on lowlands and in March-May on uplands. The crop takes 8- 10 months to mature but different varieties take different time to mature. The harvesting period generally starts in July and continues till October.
- The major jute growing states in India are West Bengal, Bihar and Assam.
- Among the other producers are Odisha, Uttar Pradesh (along the Himalayan foothills), Maharashtra, Kerala, Madhya Pradesh, Tripura, Meghalaya and Andhra Pradesh.



## 5. Rubber

### Key Facts

- Rubber is a coherent elastic solid obtained from latex of a number of tropical trees of which *Hevea brasiliensis* is the most important.
- Rubber is used for a variety of purposes from erasing pencil marks to manufacturing of tyres, tubes and a large number of industrial products.
- Rubber tree (*Hevea brasiliensis*) is a quick growing tall tree acquiring 20-30 metre height. It begins to yield latex in 5-7 years after planting.
- It requires hot and humid climate with temperature of 25°-35°C and annual rainfall of over 200 cm. The rainfall should be well distributed throughout the year.
- Dry spell and low temperatures are harmful for rubber plantation. However, daily rainfall followed by strong Sun is very useful.
- It thrives well in deep well drained acidic soils of red lateritic loams or clayey loams with a pH varying from 4.5 to 6.0.
- Deep well drained loamy soils on the hill slopes at elevation ranging from 300 to 450 metres above sea level provide best conditions for its growth.
- But, the yields decline at higher elevations and no rubber plantations are found above 700 m elevation.
- India one of the largest rubber producing countries in the world. In India it is grown in the states of Kerala, Tamil Nadu, Karnataka, Tripura and Andaman & Nicobar Islands.
- The rubber board has identified North Eastern region, parts of West Bengal, Odisha, Maharashtra and Karnataka as potential regions of rubber cultivation.



## 6. Tobacco

### Key Facts

- Tobacco, is an important cash crop of India.
- Tobacco is mainly used for smoking in the form of insecticides.
- It is a plant of tropical and sub-tropical climates and can withstand a wide range of temperature varying from 16° to 35°C.
- It normally requires 100 cm of annual rainfall but it can also be successfully grown in areas of 50 cm annual rainfall provided the rainfall is fairly distributed.
- Frost is injurious to its growth.
- For tobacco production, soil is more important than climate.
- Well drained friable sandy loams, not too rich in organic matter but rich in mineral salts allowing full development of roots are best suited for tobacco.
- There are two types of tobacco are grown in India.
  - **Nicotiana Tobacum** is of better quality and is used for cigarette, cigar, cheroot, bidi, chewing, snuff, hookah and pipe.
  - **Mocptoma Rustica** needs cool climate and is mainly grown in Northern and North-eastern parts of the country. Its plant is comparatively shorter and has round and puckered leaves and yellow flowers.
- Cultivation of tobacco is done all over the country, although the commercial cultivation of tobacco is concentrated in the states of Andhra Pradesh, Telangana, Karnataka, Gujarat, Maharashtra, Bihar, Tamil Nadu and West Bengal.



## 7. Oilseeds

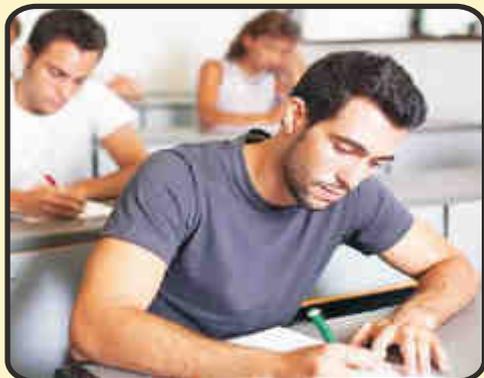
### Key Facts

- The oil extracted from oilseeds form an crucial ingredient of our diet.
- It is also used as raw materials for manufacturing large number of items like paints, varnishes, hydrogenated oil, soaps, perfumery, lubricants, etc.
- Oil-cake which is the residue after the oil is extracted from the oilseeds, forms an important cattle-feed and manure.
- The major oil seeds which are grown in India are groundnut, sesamum (til), rapeseed and mustard, linseed, soyabean, cotton seed, sunflower, safflower, nigerseed and castor seed.
- In India, oilseeds is grown in the states of Madhya Pradesh, Rajasthan, Haryana, West Bengal, Maharashtra, Tamil Nadu, Odisha and Himachal Pradesh.
- Groundnut grown well in the tropical climate and requires 20°-30°C temperature and 50-75 cm rainfall. Well drained light sandy loams, loams, red, yellow and black cotton soils are well suited for cultivation.
- Sesamum is a rainfed crop and requires 45-50 cm rainfall. It thrives well in areas having 21° – 23°C temperature. Well-drained light loamy soils are best suited to sesamum.
- Like wheat and gram, Rapeseed and Mustard thrive only in cool climate of the Satluj-Ganga plain and very small quantity is grown in the peninsular India. They are mainly grown as rabi crop in pure or mixed form with wheat, gram and barley.
- Linseed prefers cool, moist climate with about 20°C temperature and 75 cm rainfall. Clay loams, deep black soils and alluvial soils are best suited for its cultivation.



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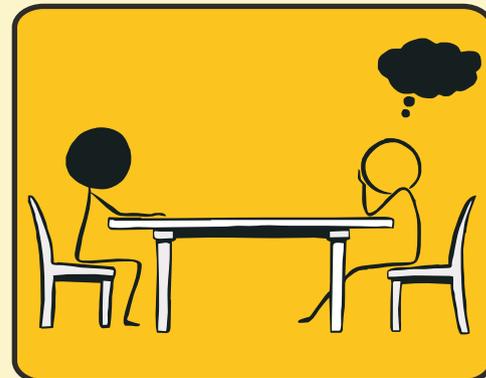
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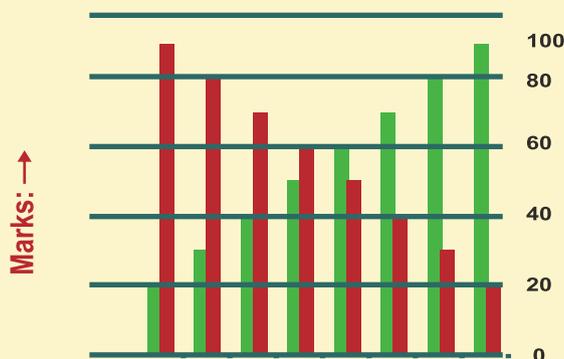


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