

VISIONIAS

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Classroom Study Material
**ENVIRONMENT GEOGRAPHY AND
DISASTER MANAGEMENT**

September 2016 – October 2016

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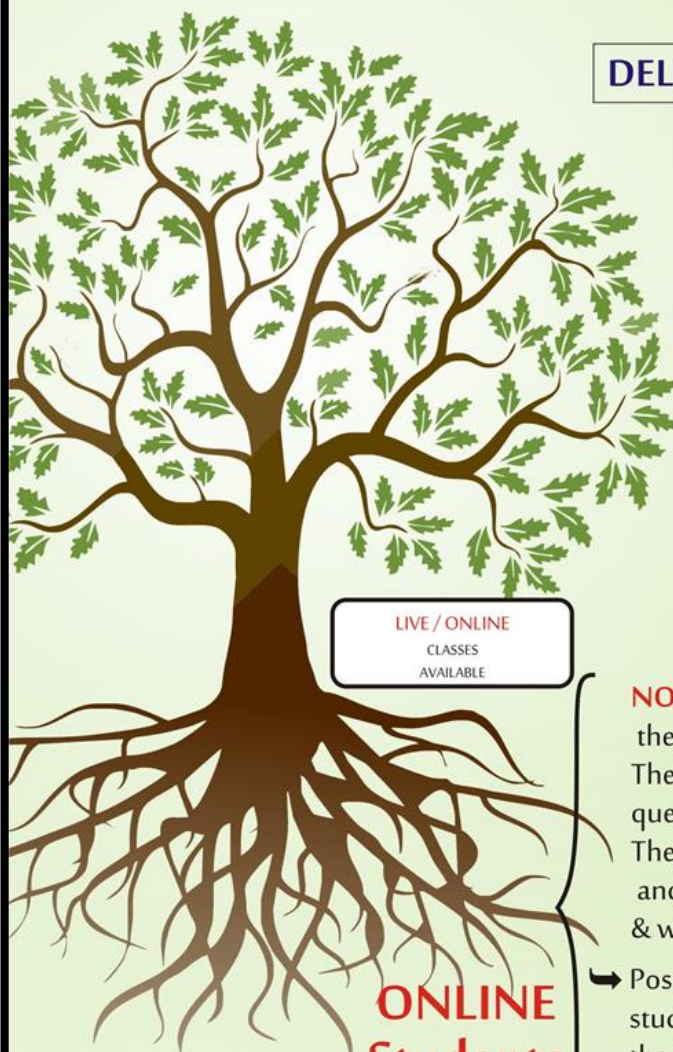
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1. POLLUTION

1.1. WHO STUDY ON AIR POLLUTION LEVELS

Why in news?

- Fine particulate matter from industries, cars and biomass is causing premature mortality as observed by WHO.
- A study conducted by the World Health Organisation and made public in September 2016 revealed that air pollution could have killed at least 600,000 Indians in 2012.
- This is about a fifth of the 3 million who died worldwide because they were exposed to fine particulate matter (PM2.5).

Method of the study

- The study findings are based on data derived from satellite measurements, air transport models and ground station monitors for more than 3000 locations, both rural and urban.
- It also relies on publicly available national data on pollutant levels.
- It is developed by WHO in collaboration with the University of Bath in UK.

Key points from the study

- **India comes just behind China** which witnessed an estimated 800,000 deaths in same period, according to study.
- The detailed study for India suggested the reason for deaths in absolute number as shown below.
 - ✓ 2,49,388 Deaths due to Ischemic heart disease
 - ✓ 1,95,001 deaths due to stroke
 - ✓ 1,10,500 deaths due to Chronic Obstructive Pulmonary Disease (COPD)
 - ✓ 26,334 deaths due to lung cancer
- According to study, the actual impact of air pollution is a **“conservative figure,”** as it does not include the separate impacts on health from other air pollutants such as nitrogen oxides (NOx) or ozone (O3).
- According to study, all regions of the world are affected, however, populations in **low-income cities** are the most impacted.
- As per the study, of all of pollutants, **fine particulate matter has the greatest impact** on health. PM 2.5 is responsible for aggravating or is directly responsible for many cardiovascular diseases and lung cancer.

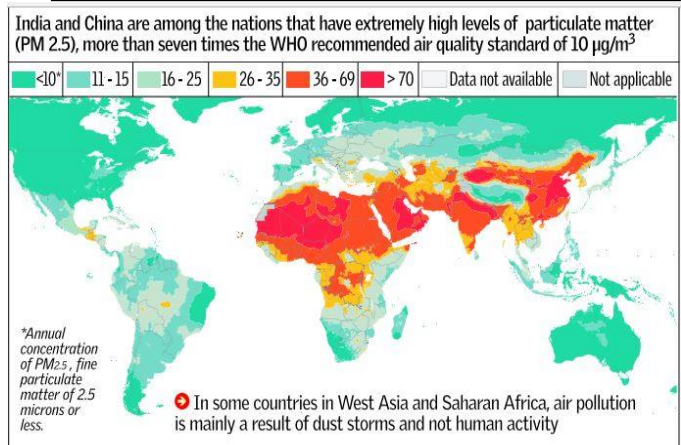
Significance

There is nothing new to be known about air pollution. But the WHO report serves as an eye opener again. The study points out the level of impact in numerical terms.

- It shows the degree of neglect and indiscriminate levels of pollution in our country and its adverse impacts.
- This should serve as warning to policy makers and the citizenry about the negative consequences of PM 2.5
- There is a need of collective effort from all the stakeholders to mitigate the impacts of air pollution.

Major causes of Air Pollution

- Air pollution is caused when air in the atmosphere is filled with particulate matter.
- The largest source air of pollution in cities is from vehicle exhaust fumes.
- Filters that are not changed regularly in your air conditioning units will accumulate dirt and cause the spread of pollutants in the air you breathe inside your home.
- Chemicals and toxic pollutants like sulphur dioxide, nitrogen oxides and carbon dioxide react with water molecules in the atmosphere to produce acid rain. These pollutants come from factories, automobiles and any industrial or manufacturing plants.
- Another source of air pollution is from dust and dirt that goes airborne due to every day labour in the agricultural and construction industry.
- Dust is lifted from tractors working on fields, and from land clearing and general demolition in the construction industry.
- Using household chemicals without adequate ventilation is a major source of indoor air pollution.
- Volcanoes, dust storms, and forest fires are causes of natural air pollution



Way forward

- The forest cover should be protected. Adequate forest cover is essential for maintaining the quality of air.
- Green belts should be created. Such areas should be developed around densely populated cities.
- There should be strict restriction for establishment of large buildings and industries along the Green belt areas.
- Automobile engines should be redesigned in such a way that their emissions cause minimum pollution.
- The burning of fossil fuels produces harmful gases and particulate matter that are released into the air. Alternatives to this should be promoted especially green energy technologies.
- Provide cleaner fuels and scientifically designed cook stoves to reduce indoor pollution.
- Industrial areas should be located at a safe distance from the residential areas.
- Forest fires should be checked. Adequate preventive measures should be adopted to protect the forests.
- Cheap devices for controlling air pollution should be developed.

Social and Economic Cost of Air Pollution

- A World Bank study revealed that welfare costs and lost labour income due to air pollution amounted to 8.5% of India's GDP in 2013.
- The cost imposed on people living in regions where pollution and environmental degradation is higher.
- According to a joint study by World Bank and University of Washington, total welfare losses between 1990 and 2013 because of premature deaths from air pollution increased by 94%.

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- A current affairs classroom course of PT 365 & Mains 365 of year 2018/2019 (for students enrolling in 2019 program)



2. WILDLIFE/BIODIVERSITY CONSERVATION

2.1. WORKING OF BIODIVERSITY ACT 2002

Why in news?

- The National Green Tribunal (NGT) had recently asked for action against top State officials who had failed to respond to an application filed before the tribunal for effective implementation of the act.
- For the first time since the enactment of the Biological Diversity Act, 2002, States have now been forced to look into its implementation.

Critical appraisal of the Act

- India's famed "green judge", Justice Kuldip Singh, had observed in **ICELA v. Union of India, 1996** case that "enacting of a law and tolerating its infringement is worse than not enacting a law at all". This is typically true for the present state of biodiversity act 2002.
- RTI responses from 15 States have revealed that out of more than **61,000 PRIs, only 14 per cent (less than 1,400) have PBRs (People's Biodiversity Register)**.
- The act has mostly failed in terms of implementation though the act has immense potential to safeguard India's threatened biodiversity.

Failure of BD Act

This act is the most neglected of India's environmental laws, and one of the least implemented.

- Measures to conserve its rich biodiversity have not been sufficient. Despite many laws in place (Wildlife Protection Act, 1972, Forest (Conservation Act), 1980, Biological Diversity Act, 2002), the report admits that there is lack of effective enforcement of the laws to protect biodiversity.
- Much of India's forestland has been given away for industrial and infrastructural activities.
- Over 40 per cent of India's forests face different levels of degradation. The plan blames domestic demand for timber, fuel-wood and grazing for the crisis. About 80 per cent of the forest area faces heavy grazing while fire affects 50 per cent of the forest cover.
- India now has just 12 varieties of food, which provide 80 per cent of the food energy. Changing lifestyles have affected variety, taste and nutritional value of food.
- Agricultural biodiversity has been declining in India with more number of crops being commercially cultivated. Number of varieties grown under different agricultural systems has also fallen. Over 300,000 samples of indigenous plants kept in the National Gene Bank have gone out of cultivation.
- Nearly 140 native breeds of farm livestock are facing survival threat. Low genetic diversity in natural conditions has affected the evolutionary development of indigenous wild species.
- About 90 per cent of India's traditional herbs are being traded. India's share in the global complementary medicine market valued at us \$62 billion is only 0.3 per cent, out of which 70 per cent comes from the export of raw materials.
- Grasslands, rivers, wetlands and coastal and marine ecosystems are under threat causing widespread damage in support system for various species.
- Grassland species like the Great Indian Bustard are under threat.
- With just 180 left across the world, the gharial (*Gavialis gangeticus*), a riverine species, is in the critically endangered category of the Red List of the International Union for the Conservation of Nature and Natural Resources (iucn).

Way forward

- The NGT action shows the right direction of implementing provisions of BD act with regard to BMCs and PBRs.

- PBRs could be an effective tool to counter false and misleading statements given in forest diversion proposals and EIA reports.
- They could help a community present the facts before the government in order to highlight the 'true value' of the ecological entity proposed to be 'sacrificed'.
- Steps should be taken towards facilitating in creation and capacity building of BMC's and PBRs in all the Panchayats.

2.2. WORLD'S LARGEST MARINE PARK CREATED IN ROSS SEA IN ANTARCTICA

Why in news

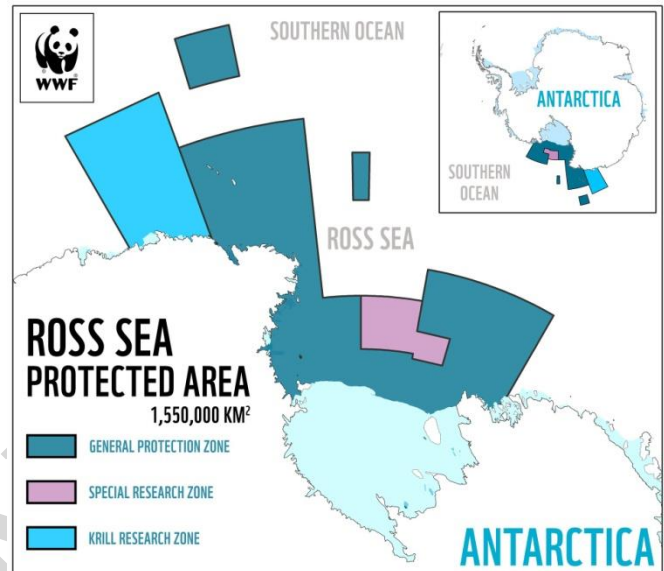
- EU and 24 countries sign long-awaited landmark deal agreement to protect 1.1m sq km of water in Southern Ocean.

Key facts

- It will be **world's largest marine park** covering more than 1.5m sq km of the **Ross Sea around Antarctica**.
- It will be set aside as a no-take "general protection zone", where no fishing will be allowed.
- The protections are set to **expire in 35 years**.
- The agreement was signed at meeting of **Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)**.
- The agreement also establishes a large "krill research zone" and "special research zone" where catching of krill and toothfish will be allowed **only for research purposes**.
- The agreement was facing **opposition from China and Russia**, which have fishing industries in the region.
- It is the **first marine park created in international waters**.

Significance

- It will set a precedent for further moves to help the world achieve the **IUCN's recommendation that 30% of the world's oceans be protected**.
- The region is also home to most of the world's **penguins and whales**.
- This is important not just for the incredible diversity of life that it will protect, but also for the contribution it makes to **building the resilience of the world's ocean** in the face of climate change.
- **Importance of Ross Sea:**
 - ✓ It is sometimes called the "**Last Ocean**" because it is largely untouched by humans and hence the least altered marine ecosystem on Earth
 - ✓ Its nutrient-rich waters are the **most productive in the Antarctic**, leading to huge plankton and krill blooms that support vast numbers of fish, seals, penguins, and whales.
 - ✓ Home to **high concentrations of wildlife** and an incredible array of animals, many found nowhere else on the planet.
 - ✓ Ross Sea is a **living laboratory** providing scientists with the last chance to understand how a healthy marine ecosystem functions.



Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR):

- It was established by international convention in 1982 with the objective of conserving Antarctic marine life.
- It has 25 Members, and a further 11 countries have acceded to the Convention.
- India is also a member of this commission.

It is headquartered in Tasmania, Australia.

2.3. WWF'S LIVING PLANET REPORT 2016

Why in News?

- Global population of mammals, fish, amphibians and reptiles declined by 58 percent between 1970 and 2012, according to World Wide Fund for Nature (WWF) report.

Highlights

- The report is compiled with data from the Zoological Society of London (ZSL) to measure the abundance of biodiversity.
- The index tracks about 14, 200 populations of 3700 species of vertebrates.
- Biodiversity population is expected to fall 67 percent by 2020, if the current situation persists.
- Rivers and lakes are the worst hit with animal population down by 81 percent since 1970.
- The report points out we have ushered in the era of **Anthropocene – a geological period dominated by humans.**
- The report warns that increased human pressure could trigger human-nature conflicts.
- It can increase the risk of water and food insecurity and competition over natural resources.

Causes

- The report states that food production to meet the complex demands of an expanding human population is the primary factor responsible for the destruction of habitats and overexploitation of wildlife. At present, agriculture occupies about one-third of the Earth's total land area and accounts for almost 70 % of water use.
- Forest areas are cleared up farming and logging. As of now, only 15 percent of the Earth's land area is protected for nature.
- Poaching and exploitation for food is another major factor, due to unsustainable fishing and hunting.
- Pollution is another problem. Many sea animals are being harmed due to high levels of pollutants.
- Pollutants also travel down the food cycle and harm other animals.

The Upside

- Population of endangered species like tigers are known to be increasing. The Giant Panda has recently been removed from the list of endangered species.
- The Paris Climate Treaty 2015 which has been ratified by most nations also holds hope of bringing positive climate change.
- Additionally, the UN sustainable development goals for 2030 will help proper implementation of sustainable development policies.

2.3.1. ANTHROPOCENE EPOCH - HUMAN-INFLUENCED AGE

Why in news?

- An expert group at the World Geological Congress in Cape Town recommended that the new Anthropocene epoch, start from the mid-20th century, be officially declared. The approval process is likely to take at least two years and requires ratification by three other academic bodies.

What is Anthropocene?

- The Anthropocene, coined in 2000 by the Nobel prize-winning scientist Paul Crutzen, is a proposed epoch that begins when human activities started to have a significant global impact on Earth's geology and ecosystems.
- Neither the International Commission on Stratigraphy nor the International Union of Geological Sciences has yet officially approved the term as a recognized subdivision of geological time
- An epoch is a subdivision of the geologic timescale that is longer than an age and shorter than a period.

- Epochs are most commonly used for the younger Cenozoic Era, where a greater collection of fossils has been found and paleontologists have more detailed knowledge of the events that occurred during those times.
- We are currently living in the Holocene Epoch of the Quaternary Period
- The **Holocene epoch** began 12,000 years ago at the end of the last ice age. All human civilisations have developed during this climatically and geologically stable period.

Evidences of the Anthropocene

Since the 1950s, human beings have begun to alter the earth's surface and atmosphere in unalterable ways. Human activity has:

- **Pushed extinction rates:** The Earth is on course to see 75% of species become extinct in the next few centuries if current trends continue.
- Doubled the nitrogen and phosphorous in our soils in the past century with fertiliser use. This is likely to be the largest impact on the nitrogen cycle in 2.5bn years.
- Left a permanent layer of airborne particulates in sediment and glacial ice such as black carbon from fossil fuel burning.

Need for recognition

- It sends out the statement that humans have fundamentally changed the planet to the point it will preserve sediments for millions of years to come that record a world that is now fundamentally different to the one that preceded it.
- For the first time since the dawn of Darwinian theory — which showed human beings as just another character on the evolutionary stage — the world, literally, is of our own making.
- The significant geological changes, which usually take thousands of years, have occurred in less than a century and the long-term impact of an inhospitable planet may well be something we deal with sooner than expected.

Concerns in declaring Anthropocene as a separate epoch

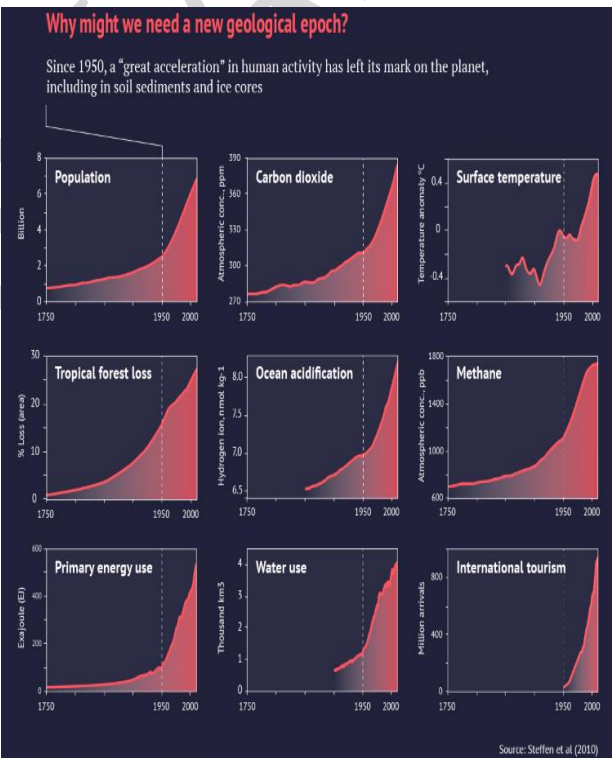
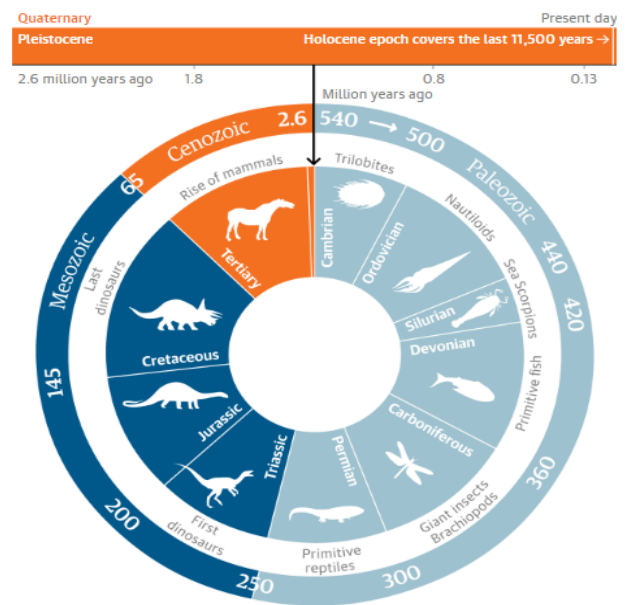
- The Anthropocene is in many ways different to traditional geological units and so is harder to define using traditional techniques.
- Many would argue that it is too short a timescale and there is need to wait and make judgment once the planet has gone through this pulse of rapid change and has stabilised into a new state.

Way forward

- The Anthropocene marks a new period in which human's collective activities dominate the planetary machinery. This name change stresses the enormity of humanity's responsibility as stewards of the Earth.
- The hope now is that mankind and its leaders can collectively and consciously take their new responsibility seriously.

Geological periods

Division of geological periods from 540m years ago to the present



(3 hours class, 30 min MCQ test, 30 min discussion)

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3. TACKLING CLIMATE CHANGE

3.1. OCEAN WARMING AND ITS EFFECTS

Why in news?

- Recently a research report "Explaining ocean warming: causes, scale, effects and consequences" released by the International Union for Conservation of Nature (IUCN) – has shown the effects of ocean warming.

Observations-Concerns

Oceans Impacted

- World's waters have absorbed more than 93 per cent of the enhanced heating from climate change since the 1970s, curbing the heat felt on land but drastically altering the rhythm of life in the ocean.
- Ocean has been shielding us and the consequences of global warming.

Food security

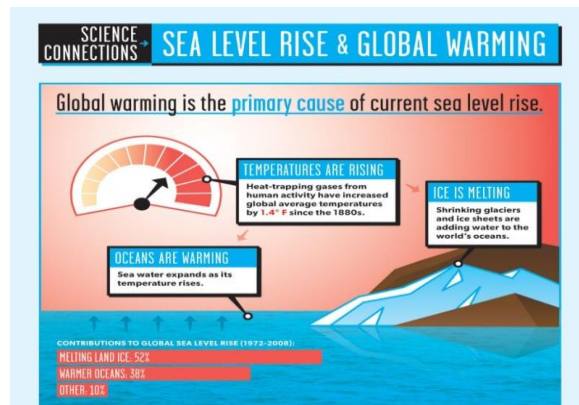
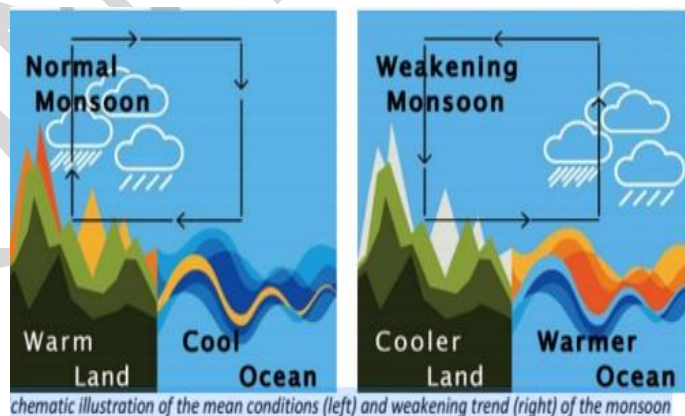
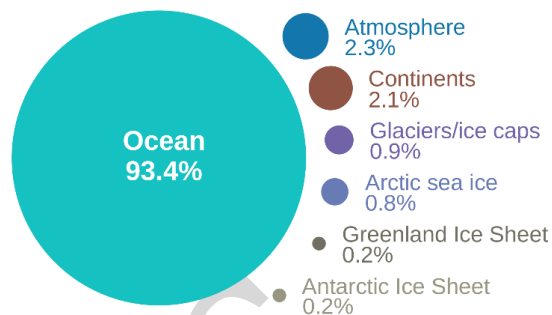
- Food security of India and several other major key food producing countries are threatened by changing weather patterns due to warming of the oceans, which may well be the "greatest" hidden challenge for the present generation
- Rainfall patterns affected: already been changes to precipitation patterns in a number of areas of the planet resulting from large-scale atmospheric tele-connections with ocean warming
 - ✓ Increased rainfall in some mid-latitude and monsoon areas and decrease over various sub-tropical regions.
- Yield is impacted:
 - ✓ Correlations between wheat and maize yields with the NAO (North Atlantic Oscillation) and PDO (Pacific Decadal Oscillation), so changes in these ocean-focused atmospheric patterns have direct implications on food production.
 - ✓ Similarly *ceteris paribus*, increasing temperatures tend to reduce rice, pulses and maize yields.
- Global warming is making the spread of diseases among animals and humans. This is threatening food security across the planet

Effects on monsoon (refer infographic)

Impacts on eco-system

- Changes in the ocean are happening between 1.5 and 5 times faster than those on land. Such range shifts are potentially irreversible
- Climate change is altering the hibernation periods of animals, disturbing their breeding patterns and metabolism
- Large-scale climatic anomalies affecting marine predator foraging behaviour and demography
 - ✓ Proliferation of East Antarctic Adélie penguins in response to historical deglaciation

Where is global warming going?



Fisheries

- At sea, warming temperatures will cause changes to the abundance and range of marine species used for food.
- Huge implications for:
 - ✓ The billion people who depend on fish for their principal source of protein and
 - ✓ Fishing and aquaculture industries linked to this harvesting

Along with ocean warming, we also have increasing atmospheric temperatures.

- According to NASA's records, July month was the hottest month ever on the planet since we started taking records back in 1880. But now NASA has updated '**the record warm to August**'. **This continued a streak of 11 consecutive months dating back to October 2015.**
- Generally, the seasonal temperature cycle typically peaks in July, But unusually August 2016 wound up tied with July 2016 for the warmest month ever recorded.

This is causing de-glaciation, and rise of sea levels. According to Danish Meteorological Institute (DMI)

- Around 12% of the ice sheet was found to be melting almost one month earlier than the previous top three dates for when more than 10% of the ice had begun to melt.
- The average summer temperature was 8.2 degrees Celsius (46.8 degrees Fahrenheit) in Tasiilaq on Greenland's southeast coast, the highest since records began in 1895.
- The Greenland ice sheet, a potentially massive contributor to rising sea levels, lost mass twice as fast between 2003 and 2010 as during the entire 20th century, researchers said in December.
- According to study by **University of Washington**: This year, Arctic sea-ice has reached the second lowest extent ever recorded by satellites.
 - ✓ A yacht of the Polar Ocean Challenge was able to sail the Arctic's Northwest passage in only 14 days as it was "almost totally ice free"

Effect on polar bears according to a new study

- Sea ice season across all polar bear subpopulations in the Arctic has reduced by seven weeks since 1979,
- Polar bears depend on sea ice to hunt seals, their main prey. They use the ice as a platform to ambush seals at breathing holes or break through the ice to reach their dens.
- The findings of the study are being used by the International Union for Conservation of Nature to decide the conservation status of the species.

3.2. AVIATION CLIMATE DEAL

Why in News?

- **International Civil Aviation Organisation** approved a landmark accord at its assembly session in Montreal to curb aviation pollution.

More about the Deal

- The proposal includes a mechanism for a '**carbon emission tax**' on airlines in order to offset emissions in the aviation sector.
- The agency's carbon offsetting system is expected to slow the growth of emissions from commercial flights costing the industry less than 2 percent of revenues.
- The accord requires participating countries to reduce emission by 2020 and limit it after it comes into effect from 2021.
- Participation in the deal is voluntary from 2021 to 2026. The deal becomes mandatory from 2027.
- Countries like US and China have agreed to go with the accord while Russia has refused to participate during the voluntary period.

India's Stand

- Although India has ratified the Paris Climate Deal, it has not agreed to the Aviation Climate Accord.
- India feels that reducing "emissions" in the sector would be injustice to the country's growing economy.

3.3. ASIA-PACIFIC'S FIRST 'CARBON NEUTRAL' AIRPORT

Why in news?

- The Indira Gandhi International Airport in Delhi has become Asia-Pacific's only and one of the world's few airports to achieve a "carbon neutral" status.
- Currently, 25 airports in the world, most of them in Europe, have earned carbon neutral status.

Importance of the tag

- The Indira Gandhi International airport boasts of **green buildings, solar power plants, rainwater harvesting system** etc., which have helped reduce and offset carbon emissions.
- The airport has taken a series of measures to reduce carbon footprint, including setting up of a 7.84MW solar power plant.
- This would mean, Delhi Airport will get highest level of certification "level 3+ neutrality" available to airports across the world.

Significance

- This achievement will set a new benchmark for other airports in our region.
- The achievement is a good step to showcase progress of India and its commitment towards clean energy and new technologies.
- There should be enhanced focus on **energy conservation** and exploring **alternative solution for generating green energy**. IGI Delhi Airport now aims to increase its solar power generation capacity to **20MW** by 2020.



What is carbon neutrality?

- Carbon neutrality occurs when the net carbon emissions over an entire year are zero or when the airport absorbs or offsets the same amount of emission that was generated.
- This achievement is accredited by ACI under Airport Carbon Accreditation that monitors the efforts of airports to manage and reduce their carbon emissions.

3.4. NATIONAL GANGA COUNCIL

Why in News?

- The Union Cabinet has cleared the River Ganga (Rejuvenation, Protection and Management) Authorities Order, 2016.
- The Order enforces an **institutional structure** for policy and implementation and empowers National Mission for Clean Ganga (NMCG) to discharge its functions in an independent and accountable manner.
- A **mission status will be granted to the Authority** with corresponding power under the Environment (Protection) Act (1986).

Major Takeaways

- The **new council** for River Ganga will replace the existing **National Ganga River Basin Authority (NGRBA)** for pollution prevention and rejuvenation of Ganga.

Background

- Ganga Action Plan. Phase 1 was launched in 1985 and completed in 2000. Parts of Phase 2 projects began in 1993.
- In 2015, the government launched the Namami Gange Programme (Central Scheme) for rejuvenation of the river and its tributaries. However, it did not bear fruit.
- NMCG has been functional as a registered society since 2012. But its role has been largely limited to fund the projects to implementing organisations.

- Setting of an Empowered Task Force that will ensure the existence and implementation of an action plan under various Departments, Ministries and States.
- The NMCG will have a two tier structure with a Governing Council and an Executive Committee.
- The NMCG will comply with the decisions of the National Ganga Council.
- At the state level, State Ganga Committees would be formed for proper implementation.
- Similarly, District Ganga Committees would be formed in each Ganga Bank District and they shall be monitored by the State Committees.
- The special focus of the revamped structure would be to maintain ecological flows in Ganga with an aim to ensure water quality and environmentally sustainable development.
- An innovative model based on Hybrid Annuity has also been approved for fast track creation of sewerage and treatment infrastructure in the Ganga basin.
- NMCG will only take action in case of non-compliance when CPCB (Central Pollution Control Board) does not do so. CPCB can also take action jointly with NMCG.

Significance

- The NMCG will now have the power to issue orders and also exercise the powers under the Environment Protection Act. It can **now fine polluters**.
- The said infrastructure will ensure ecological flows, abatement to pollution and rejuvenation of the river.
- The authority will also be able to impose restrictions on polluting industries and carry out inspections to ensure compliance.

3.5. INTERNAL CARBON PRICE

Why in news

Mahindra & Mahindra became first Indian firm to announce an internal Carbon Price of \$10 per ton of carbon emitted.

What is internal carbon price?

- It is an internationally recognised business tool that enables companies to create resources which are invested in low carbon technologies, which help reduce future emissions and lower operating costs.
- Some of the global companies that have announced carbon pricing are Unilever, Microsoft, Google.

A carbon price is a cost applied to carbon pollution to encourage polluters to reduce the amount of greenhouse gas they emit into the atmosphere.

There are two main types of carbon pricing:

- ✓ emissions trading systems (ETS)
- ✓ carbon taxes.

An **ETS** – sometimes referred to as a cap-and-trade system – caps the total level of greenhouse gas emissions and allows those industries with low emissions to sell their extra allowances to larger emitters.

A **carbon tax** directly sets a price on carbon by defining a tax rate on greenhouse gas emissions or – more commonly – on the carbon content of fossil fuels.

Benefits

- Help accelerate innovation and drive our investments in energy efficient and renewable technologies.
- Taking advantage of low-carbon investment opportunities while managing carbon risk.
- Mahindra partnered with the World Bank and IFC led Carbon Pricing Leadership Coalition along with the World Resources Institute, India to enhance its understanding of the Carbon price mechanism.

THE REAL RACE BEGINS. ARE YOU READY?



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- Approach is completely analytical and focussed on demands of the Mains examination
- Includes comprehensive, relevant and updated study material
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3.6. INDIA'S FIRST 'GREEN CORRIDOR'

Why in news

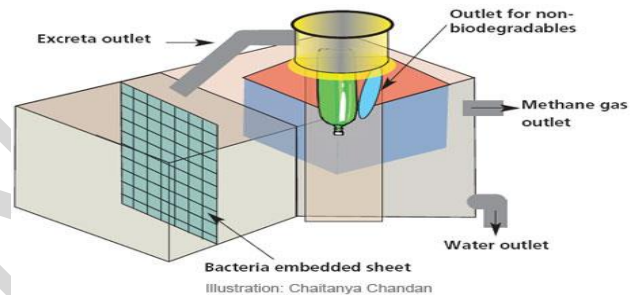
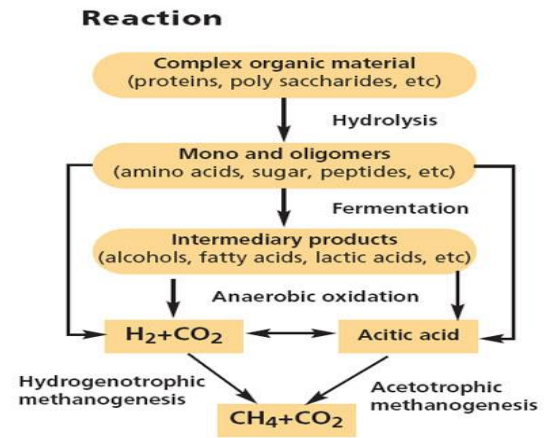
- The 114-km-long **Manamadurai– Rameswaram** stretch of Southern Railway became **India's first 'Green corridor'**.
- **All the trains** in this route will have **bio-toilets** and there would be **zero discharge of human waste on tracks** in the section.
- **Rameswaram** railway station had already been developed as a **'Green Station'** to handle the bio-toilets in the coaches.

About Bio toilets

- Indian Railway had developed the environment friendly **'IR-DRDO Bio-toilets'**, in association with Defence Research and Development Organisation (DRDO).
- Indian railways aims to install human waste discharge free **bio-toilets in all its coaches** and the same would be completed **by September 2019**.
- It will help in proving **cleanliness and hygiene** besides **preventing corrosion** of the tracks.
- It is **part of the Swachh Bharat Mission**.

HOW BIO-TOILETS WORK

Bio-toilets have a colony of anaerobic bacteria that converts human waste into water and small amounts of gases. The gases are released into the atmosphere and the water is discharged after chlorination on the tracks



3.7. INDIA RATIFIES PARIS CLIMATE DEAL

Key facts

- India is the 62nd country to ratify the agreement and accounts for 4.1 per cent of the emissions.
- Ratified on 147th birth anniversary of Mahatma Gandhi, also observed as the International Day of Nonviolence by UN.
- The Paris Agreement entered into force on 4 November 2016, thirty days after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55 % of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depository.

A UN postal administration **stamp to honour singer M.S. Subbulakshmi** was also released during the function at UN headquarters.

3.8. KIGALI AGREEMENT

Why in news?

- 197 countries have struck a new landmark deal at Kigali in Rwanda to reduce the emissions of category of greenhouse gases (GHGs) which leads to hydro fluorocarbons (HFCs)
- Its reduction could prevent up to 0.5 degrees Celsius of global warming by year 2100.
- The Amendment is considered absolutely vital for reaching the Paris Agreement target of keeping global temperature rise to below 2-degree Celsius compared to pre-industrial times.

What is the Montreal Protocol on Substances?

The treaty was originally signed in 1987 and substantially amended in 1990 and 1992 is aimed at reducing the production and consumption of ozone depleting substances in order to protect the earth's fragile ozone layer.

This agreement was one of the few successes of multilateral negotiations.

Significance

- The Kigali Amendment **amends the 1987 Montreal Protocol** that was conceived only to plug gases that were destroying the ozone layer (like CFCs), to now include gases responsible for global warming.
- It will be binding on countries from 2019 and has provisions for penalties for non-compliance.
- Under it, developed countries will also provide enhanced funding support estimated at billions of dollars globally. The exact amount of additional funding from developed countries will be agreed at the next Meeting of the Parties in Montreal in 2017.

Different timelines

All signatory countries have been divided into three groups with different timelines to go about reductions of HFCs. This agreement shows a new form of grouping:

- **First group:** It includes richest countries like US and those in European Union (EU). They will freeze production and consumption of HFCs by 2018. They will reduce them to about 15% of 2012 levels by 2036.
- **Second group:** It includes countries like China, Brazil and all of Africa etc. They will freeze HFC use by 2024 and cut it to 20% of 2021 levels by 2045.
- **Third group:** It includes countries India, Pakistan, Pakistan, Iran, Saudi Arabia etc. They will be freezing HFC use by 2028 and reducing it to about 15% of 2025 levels by 2047.

NOT A COOL REFRIGERANT

India follows up Paris treaty ratification with promise to phase out Hydrofluorocarbons

Q: What is HFC-23?
It is a potent greenhouse gas that results when producing a refrigerant, HCFC-22 — more popularly known as R-22.
1 kg of HFC-23 in the air traps **14,800 times** more heat than an equivalent amount of CO₂.

Q: What's happening in Kigali?
198 countries agreed to phase out gases like HFC-23, which in turn are only one among 19 HFCs, by the late 2040s

Q: What is India's plan?
It will "freeze" HFC use by 2028 on a 2024-2026 'baseline', which means it will not emit more HFC after 2031 than it does in 2024-2026

The catch | This is contingent on countries such as the U.S. agreeing to a freeze year of 2019 or earlier. In return, India also wants its domestic companies be compensated by developed countries for transitioning to low global-warming-threatening refrigerants

India's installed cooling capacity | Stated to increase by 5 times by 2030

5.4%
HFCs to cause 5.4% of economy's warming impact in 2050

More time required | Developing countries such as India are pushing for more time to phase out HFC gases due to the high cost of patents that govern alternative refrigerants

Burning problem | Incineration of HFC by-product will avoid 444 mn tonnes of CO₂

Q: Will A/Cs become costlier?
Not clear. Refrigerant manufacturers will spend Rs. 19 to burn every kilo of HFC-23

• It isn't yet clear if they will pass it on to end consumers

We were flexible, accommodative and ambitious. The world is one family and as a responsible member of the global family, we played our part to support and nurture this agreement.

— ANIL DAVE
Environment Minister

With the heat rising, more Indian homes are investing in ACs.

Steps taken by India for eliminating use of HFC-23

- India announced domestic action on HFC-23 (trifluoro-methane), a super greenhouse gas with a GWP of 14,800, which is produced as a byproduct of HCFC-22 (chloro-difluoro- methane). Currently, HCFC-22 is the most commonly used refrigerant in India.
- India has mandated five manufacturers — who fully control the domestic market — to capture and incinerate HFC-23 so that it is not released into the atmosphere. This action will eliminate release of HFC-23 equivalent to about 100 million tonne of Carbon dioxide emissions over the next 15 years.
- It also directed the companies to create and maintain sufficient storage capacity to ensure that all HFC-23 is stored
- Companies have been asked to internalize the cost of this environmental externality and create sufficient storage facility to take care of down time and run the incinerators to ensure that HFC-23 is not released in the atmosphere.

3.9. ANTARCTIC CIRCUMPOLAR EXPEDITION

Why in news?

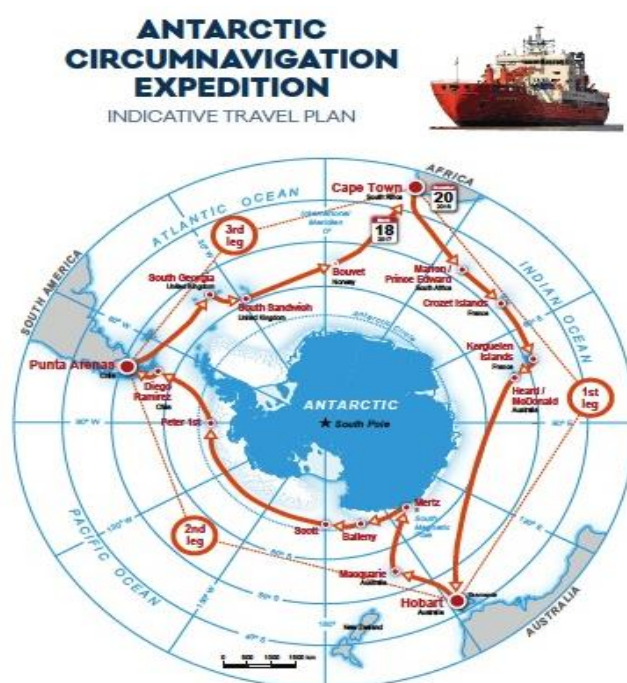
More than 50 researchers from 30 countries are to carry out the first scientific full circumnavigation of Antarctica in an attempt to measure pollution and climate change.

What is it?

ACE is the first project of the newly-created Swiss Polar Institute (SPI) to "enhance international relations and collaboration between countries, as well as to spark the interest of a new generation of young scientists in polar research."

Significance

- The ACE will be the **first scientific mission** to study all the major islands in the Antarctic Ocean, as well as the Antarctic land mass as
 - ✓ Antarctica acts as global thermometer for any ecological change.
 - ✓ A better understanding of Antarctica is critical, not just for its preservation, but for the whole planet
- **Global collaboration** – More than 50 researchers from 30 countries have collaborated for the expedition.
- **Pollution and biodiversity:** ACE will help to make strategies to reduce pollution in Antarctic region which is important for entire world.
 - ✓ Help to map the effect of pollutants on whales, penguins and albatrosses in the Southern Ocean. Information on whales is important for the conservation and management of the Antarctic marine environment.
 - ✓ Investigate the extent to which micro plastics have reached the Southern Ocean ecosystem and whether they have entered the food web.
- **Biodiversity** – the rise in sea water will affect the aquatic habitats of the Antarctic sea and impact on beaches and places near the sea where humans live will be impacted too.
- **Climatology:** Scientists will also take ice core samples and study biodiversity on the continent in an attempt to reveal conditions before the onset of the Industrial Revolution.
 - ✓ Our understanding of Monsoon, ENSO, Madden-Julien oscillation etc will be enhanced



3.10. HIMANSH

Why in News?

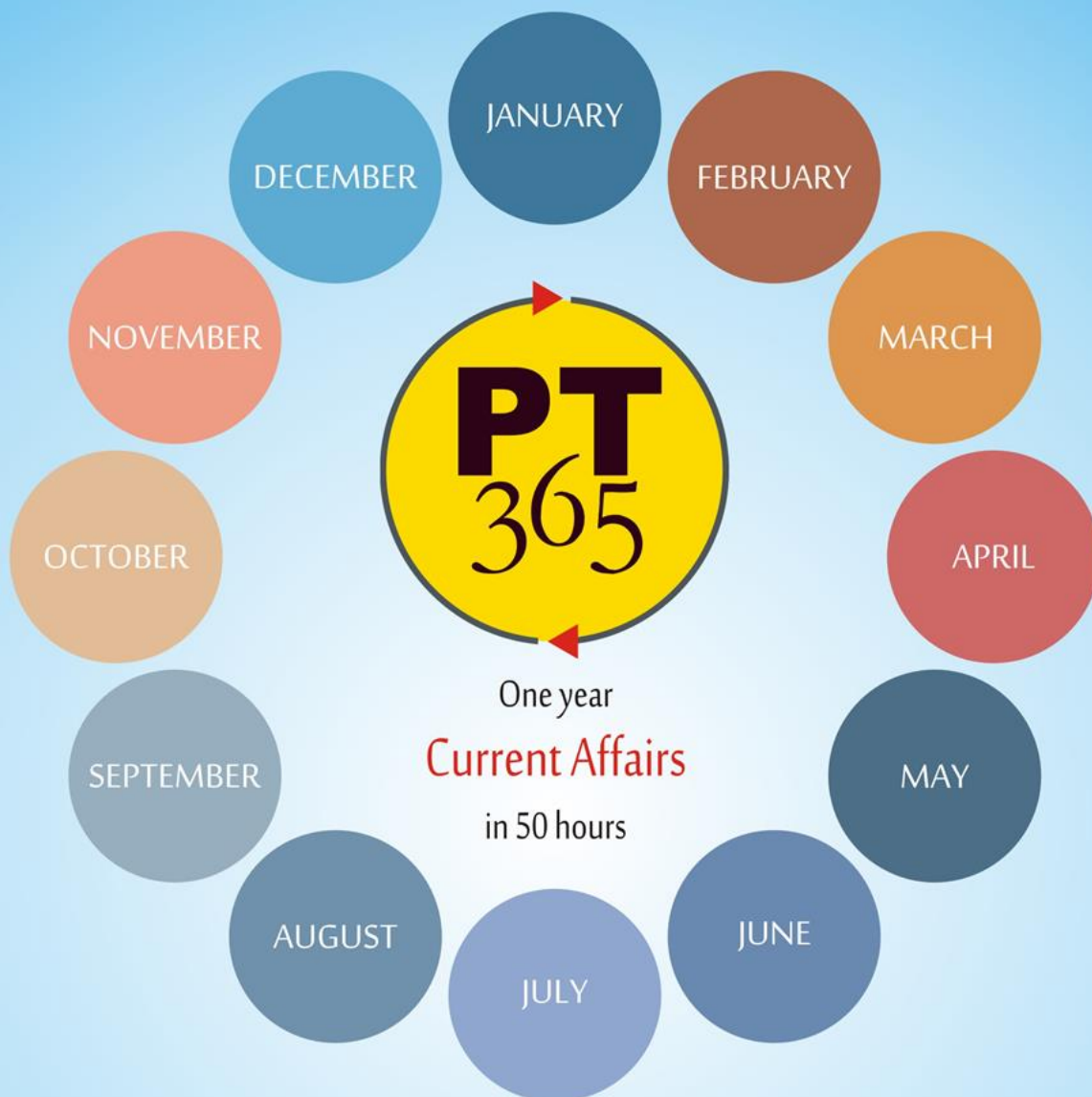
A **high-altitude research station in Himalaya called HIMANSH** has been established by the National Centre for Antarctic and Ocean Research, under the Ministry of Earth Sciences at 13,500 ft (4000m) in a remote region in Sipti in Himachal Pradesh.

Objective

The centre has been established as a part of Indian government's initiative to study and quantify the Himalayan glacier responses towards the climate change.

Significance of HIMANSH

- Help researchers to quantify the glacier melting and its relation to changing climate.
- For undertaking surveys using Terrestrial Laser Scanners(TLS) and Unmanned Aerial Vehicles (UAV).
- Help in digitizing the glacier motion and snow cover variations with utmost precision.
- Functions of installed Instruments:
 - ✓ Automatic Weather Station for weather monitoring,
 - ✓ water level recorder for quantifying the glacier melt,
 - ✓ ground penetrating radar to know the thickness of glaciers,
 - ✓ geodetic GPS systems to study glacier movements,
 - ✓ snow fork for studying snow thickness, steam drill, snow corer, temperature profilers as well as various geological tools.
- Some of the glacier that are already being studied under this project include Bada Shigri, Samudra Tapu, Sutri Dhaka, Batal, Gepang Gath and Kunzam.



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4. DISASTER MANAGEMENT

4.1. DISASTER PLANNING AND MANAGEMENT

4.1.1. NDMA'S GUIDELINES ON CROWD MANAGEMENT, SAFETY PRECAUTIONS

Why in news?

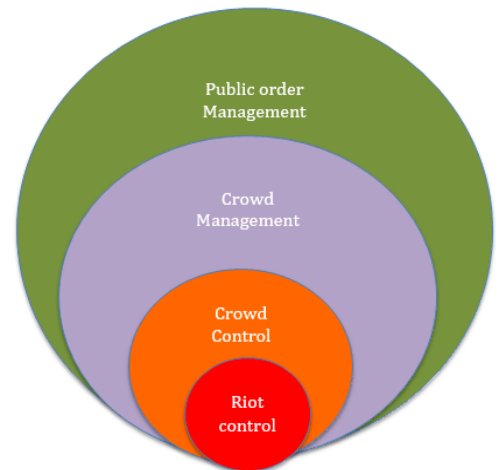
Recently NDMA has released crowd management guidelines to 'Reduce risks this festive season'.

Necessity for guidelines

- An undercurrent of uncertainty prevails at huge gatherings.
- A crowd can become a stampede - a man-made disaster - in a moment and can result in casualties.
- A crowd can give in to baseless rumours or may just follow a herd-like mentality.
- Also the risk of fire is high especially during Ram leela celebrations of Dussehra.
- Once triggered, it is very difficult to contain this fluid mass of people. It is, therefore, important that the organisers of these pandals and Dussehra celebrations take simple precautions to ensure safety.

Guidelines

- **Free movement:** The first step is to regulate traffic in areas surrounding the pandals and Dussehra grounds.
 - ✓ For pedestrians, route maps for reaching the venue and emergency exit route should be put up at strategic points.
 - ✓ Barricading to ensure the movement of people in a queue is key to control a burgeoning crowd.
 - ✓ Unauthorised parking and makeshift stalls eating into pedestrian space also need to be taken care of.
- **Monitoring:** CCTV cameras to monitor movement and police presence to reduce the risk of snatching and other petty crimes should also be on the organisers' agenda.
- Medical emergencies can occur in claustrophobic spaces. An ambulance and health care professionals on stand-by can save lives in exigencies.
- **For participants**
 - ✓ Familiarising with exit routes, staying calm and following instructions will help prevent stampede-like situations.
 - ✓ In case a stampede breaks out, protect chest by placing your hands like a boxer and keep moving in the direction of the crowd.
 - ✓ Stay alert to open spaces and move sideways wherever the crowd gets thinner. Stay away from walls, barricades or bottlenecks such as doorways.
 - ✓ Stay on your feet and get up quickly if you fall. If you can't get up, use your arms to cover your head and curl up like a foetus so that your exposure area is reduced.
- **Fire related:** Unplanned and unauthorised electrical wiring at pandals, LPG cylinders at food stalls and crackers hidden in the Ravana effigies pose the danger of a fire breaking out.
 - ✓ Organisers should ensure authorised use of electricity, fire safety extinguishers and other arrangements meeting safety guidelines. A list of neighbourhood hospitals would come in handy.



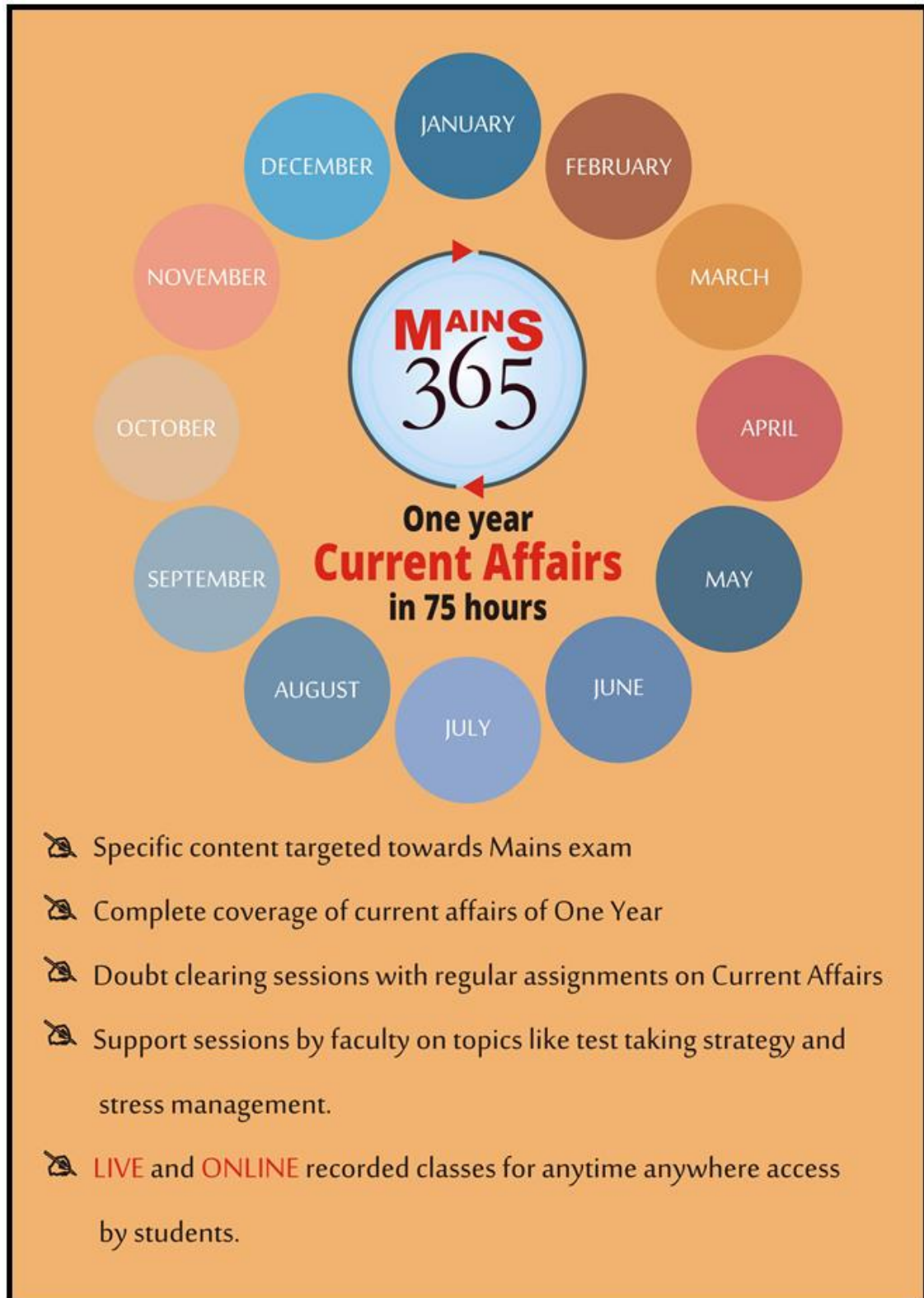
4.2. PRAKAMPANA-2016

Why in news?

- The three day long Joint Disaster Management Exercise named Prakampana ('Cyclone' in Sanskrit) was held in Visakhapatnam (Vizag) in September 2016.
- The exercise was aimed at synchronizing resources and efforts of all agencies involved in disaster management.
- It was conducted by the **Eastern Naval Command** in liaison with concerned Centre and State authorities.

Significance

- **Prakampana** is a synergy between armed forces and civil administration during the Humanitarian Assistance and Disaster Relief (HADR) situations.
- The armed forces, in association with the National Disaster Management Authority and the NDRF participated in these exercises.
- The exercise holds importance in current scenario as India is prone to natural hazards and disasters.
- Similar exercises can be held for disasters in specific areas like landslides in Himalayan region, drought situation in central India and even road accidents at high danger zones.



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5. MISCELLANEOUS

5.1. NEW URBAN AGENDA - HABITAT – III

Why in news?

- The New Urban Agenda was officially adopted at the UN Conference on Housing and Sustainable Urban Development (referred as “Habitat III”) held recently in Quito, Ecuador.
- The UN’s Habitat conferences are held in a bi-decennial cycle, with previous editions being held in Vancouver (1976) and Istanbul (1996).

What is New Urban Agenda?

- It is a set of 175 commitments that countries need to adhere to tackle the staggering challenges of urbanization.
- It sets the global vision of sustainable urbanization for the next 20 years.
- It is a roadmap for building cities that can serve as engines of prosperity and centres of cultural and social well-being while protecting the environment.
- It also provides guidance for achieving the Sustainable Development Goals and provides the underpinning for actions to address climate change.

Constituents of the New Urban Agenda

In the New Urban Agenda, leaders have committed to:

- **Provide basic services for all citizens:** These services include: access to housing, safe drinking water and sanitation, nutritious food, healthcare and family planning, education, culture and access to communication technologies.
- **Ensure that all citizens have access to equal opportunities and face no discrimination:** The New Urban Agenda calls on city authorities to take into account the needs of women, youth and children, people with disabilities, marginalized groups, older persons, indigenous people, among other groups.
- **Promote measures that support cleaner cities:** In the Agenda, leaders have committed to increase their use of renewable energy, provide better and greener public transport, and sustainably manage their natural resources.
- **Strengthen resilience in cities to reduce the risk and the impact of disasters:** Some of the measures include: better urban planning, quality infrastructure and improving local responses.
- **Take action to address climate change by reducing their greenhouse gas emissions:** Leaders have committed to involve not just the local government but all actors of society to take climate action taking into account the Paris Agreement on climate change which seeks to limit the increase in global temperature to well below 2 degrees Celsius.
- **Fully respect the rights of refugees, migrants and internally displaced persons regardless of their migration status:** Leaders have recognized that migration poses challenges but it also brings significant contributions to urban life. Because of this, they have committed to establish measures that help migrants, refugees and IDPs make positive contributions to societies.
- **Improve connectivity and support innovative and green initiatives:** This includes establishing partnerships with businesses and civil society to find sustainable solutions to urban challenges
- **Promote safe, accessible and green public spaces**
 - ✓ Human interaction should be facilitated by urban planning, which is why the Agenda calls for an increase in public spaces such as sidewalks, cycling lanes, gardens, squares and parks.
 - ✓ Sustainable urban design plays a key role in ensuring the liveability and prosperity of a city.

Significance of New Urban Agenda

- More than half of the world’s population now lives in cities. So it makes sense that the New Urban Agenda will significantly shape the UN 2030 Agenda for Sustainable Development.

- Sustainability is at the core of the “New Urban Agenda” with a substantial focus on various “transformative commitments for sustainable urban development”, linking it further with themes like social inclusion, urban prosperity and resilience.
- It commits to a “vision of cities for all” where “all inhabitants” are able to “inhabit and produce just, safe, healthy, accessible, affordable, resilient, and sustainable cities and human settlements.”

Relevance for India

- India was also one of the signatories. For India, the New Urban Agenda is significant because of the following reasons-
 - ✓ Though the pace of urbanization was slow until now, with only 31.16% of Indians living in cities, it is expected to accelerate.
 - ✓ It took 40 years for 230 million Indians to become urban citizens. For the next 250 million, it is expected to take only 20 years.
 - ✓ Presently, cities are anything but liveable, crumbling under congestion, pollution and lack of basic facilities for a huge segment of the population—65 million people—who live in slums.
 - ✓ The Agenda provides a vision wherein government initiatives like Smart Cities, AMRUT and ‘Housing For All’ can be seamlessly integrated.
- Therefore, at a time when India has grandiose visions for its cities, even while they struggle to meet the basic needs of its inhabitants, the “New Urban Agenda” offers a normative framework for guiding India’s urban future.

Concerns

- Since it is a **non-binding document** without concrete mechanisms for implementation, its ability to effect change is limited.
- The agenda is built around a series of Sustainable Development Goals (SDGs), particularly **SDG 11**, which aims to “make cities and human settlements inclusive, safe, resilient and sustainable”. However, the New Urban Agenda has been criticised for lacking direct links to the targets set out within Goal 11.
- Under the umbrella of smart cities, using open data networks for better urban planning provided an optimistic, technology-based future for cities. However, questions about the security, ethics, and oversight of large-scale information gathering remain largely unanswered.

Way Forward

- All countries will need to step up their commitments if the aspirations set out in Habitat III are to be achieved. Key concepts, such as integrated planning and models for local-national government cooperation, will need further work.
- With the New Urban Agenda as a road map, it is hoped that we can rise to the challenge of creating more liveable, resilient and sustainable cities. Because without global urban transformation, we cannot achieve sustainable development as a whole.
- As for India, UN Habitat plans to review country-level progress on its New Urban Agenda in Kuala Lumpur in 2018. India’s performance on improving the quality of life in its cities will be watched.

5.2. SEAWEED FARMING

Why in news

Central Marine Fisheries Research Institute (CMFRI) has transferred seaweed cultivation technology to the Andaman administration.

About seaweed farming

- It gained prominence during **13th century**, after the **discovery of agar-agar** in Japan and **Alginic Acid** in European continent.
- It is considered as the **medicinal food of the 21st century**.
- Many types of seaweed are **rich in vitamins and minerals** and are eaten in various parts of the world.

- **China produces over half of the world's seaweed** harvest and Indonesia 27% of world production.
- Most of that seaweed ends up in our food, though there is a growing market in seaweed-based cosmetics and drugs.

Benefits

- It is widely perceived as one of the **most environmentally benign types of aquaculture activity**, as it does not require additional feed or fertilisers.
- Seaweed cultivation also **filters undesired nutrients** and improves the marine environment and **reduce eutrophication**.
- Indirectly, seaweed farming has **reduced over-fishing** in many regions, providing coastal communities with an alternative livelihood.
- It has been actively promoted by government in many developing countries where communities have reduced access to **alternative livelihoods** or are involved in destructive fishing methods like dynamite fishing. In some places, **women** have become economically active for the first time.
- Seaweed is also used in landscaping or to **combat beach erosion**.

Seaweed culture in India

- In India the Gulf of **Mannar, Gulf of Kutch, Calh Bay, Hanshadweep and Bay islands** are the important areas for seaweed culture.
- Research programmes on seaweed resources and their culture were taken up by the **Central Marine Fisheries Research Institute** and **Central Salt and Marine Chemicals Research Institute**.

5.3. INDIA AND SRI LANKA JOINT EXERCISE TO PREVENT OIL SPILL

Why in news?

- Sri Lanka and India held joint oil spill prevention exercise onboard the Indian Coast Guard Ship "**Samudra Paharedar**".
- As both India and Sri Lanka are located close to one of the busiest network of international shipping lanes, the readiness is of paramount importance for both countries to take remedial action against oil spills.
- Oil spills from vessels that occur as a result of sudden collisions with oil platforms and various other related reasons, had posed a significant threat on the marine environment to date.

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