

Gist of
YOJANA

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Environment

India at
UNFCCC COP 25

Kayakalp: Transforming
Public Health
Facilities

Sustainable Sanitation
in the Cities

Water Management:
Building a Resilient Nation

Role of Community Radio in
Disaster Management
and **Climate Change**

INCREDIBLE RESULTS

CSE 2018 Results

11 Ranks in Top 50

28 Ranks in Top 100

183 Ranks in the Final List



Rank 11
Puja Priyadarshni



Rank 16
Dhodmise Trupti Ankush



Rank 21
Rahul Jain



Rank 24
Anuraj Jain

CSE 2017

5 Ranks
in top 50

34 Ranks
in top 100

236 Ranks
in the final list



Rank 3
Sachin Gupta



Rank 6
Koya Sree Harsha



Rank 8
Anubhav Singh



Rank 9
Soumya Sharma



Rank 10
Abhishek Surana

CSE 2016

8 Ranks
in top 50

18 Ranks
in top 100

215 Ranks
in the final list



Rank 2
Anmol Sher
Singh Bedi



Rank 5
Abhilash Mishra



Rank 12
Tejaswi Rana



Rank 30
Prabhash Kumar



Rank 32
Avdhes Meena

CSE 2015

5 Ranks
in top 50

14 Ranks
in top 100

162 Ranks
in the final list



Rank 20
Vipin Garg



Rank 24
Khumanthem
Diana Devi



Rank 25
Chandra Mohan
Garg



Rank 27
Pulkit Garg



Rank 47
Anshul Agarwal

CSE 2014

6 Ranks
in top 50

12 Ranks
in top 100

83 Ranks
in the final list



Rank 4
Vandana Rao



Rank 5
Suharsha Bhagat



Rank 16
Ananya Das



Rank 23
Anil Dhameliya



Rank 28
Kushaal Yadav



Rank 39
Vivekanand T.S.

CSE 2013

5 Ranks
in top 50

62 Ranks
in the final list



Rank 9
Divyanshu Jha



Rank 12
Neha Jain



Rank 23
Prabhav Joshi



Rank 40
Gaurang Rathi



Rank 46
Udit Singh

YOJANA – JANUARY 2020 ISSUE

ENVIRONMENT

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Chapter 1: Introduction

The environment is showing signs of this degradation. The air quality index touches alarmingly dangerous levels frequently; contamination of groundwater is a stark reality; water tables are receding; oceans are rising; air is being polluted by vehicles and industries; plastic waste is clogging the entire ecosystem and landfills are becoming a part of the skyline of our Cities. Frequent floods, drought, abrupt weather cycle, crop pattern changes, receding coastal areas are some of these red flags glaring at the humanity.

- Decades of environmental decay is eventually posing threat to the entire ecosystem— living standards are compromised, health is affected, and above all, it questions the entire existence of the current models of growth and development.

Global Efforts in Environment Conservation:

- Together, the world has to come to a Consensus to stand as one to overcome the challenges posed by environmental degradation.
- With the time running out to contain the ill-effects on environment, the recently held Conference of the Parties under the United Nations Framework Convention on Climate Change (UNFCCC COP 25) in Madrid, Spain was seen as a window of opportunity.

India's Contribution in Environment Conservation Efforts:

- India has shown leadership and commitment on environmental issues.
- Achieving targets for renewable energy under the Paris Agreement; push for e-vehicles and vehicle emission norms; Coalition for Disaster Resilient Infrastructure; International Solar Alliance are some of the fronts in which India has led by example.

It is the collective responsibility to work together for ensuring sustainable development. There is an economy around environment, and also the economy in general is impacted by climate change and its mitigation. Sustainability and development need to go hand in hand.

Chapter 2: India at UNFCCC COP 25

Climate change is real. The world recognised it and adopted a comprehensive agreement in Paris. It is essential that there are efforts from across the globe for implementation of Paris Agreement.

India's efforts:

- India has reduced emissions intensity of GDP by 21 percent and is on track to achieve the goal of 35% emissions reduction as promised in Paris.
- Prime Minister Modi has announced 175 Giga Watts targets for renewables under Paris Agreement. India has already achieved 83 Giga Watts.
- Prime Minister has subsequently increased the target to 450 Giga watts at the recent climate action summit.
- India is simultaneously progressing on solar, biomass and wind energy.
- India has leapfrogged from Bharat Stage IV vehicle emission norms to Bharat Stage VI.
- There has been a strong push for the use of e-vehicles by introducing multiple policy interventions and incentives.
- 360 million LED bulbs have been fitted in homes and 10 million conventional streetlights have been replaced with LED lights.
- Under the Ujjwala scheme, 80 million LPG gas connections have been provided replacing conventional firewood for cooking.
- India has promised creation of additional carbon sinks of 2.5 to 3 billion tonnes of carbon equivalent by increasing the green cover.
 - In the last 5 years, the green cover in the country has increased by 15000 sq kms.
- Special projects like urban forests, school nursery, agro forestry, water and fodder augmentation in the forest areas are being undertaken.
- India will be investing about 50 million dollars in water conservation.
- India has taken up a target for restoration of 26 million of degraded land by 2030 during the 14th COP of UN Convention to Combat Desertification (UNCCD) in Delhi.
 - This is one of the largest programmes in the world to ensure carbon sink in land resources.
- India launched the Coalition for Disaster Resilient Infrastructure which is a partnership to support countries through knowledge exchange and provide technical support on developing disaster and climate resilient infrastructure.
- Only 6 countries are on track to meet their NDCs announced in Paris, and India is leading the pack.

Way forward:

- Technology development and transfer at affordable costs is crucial for developing countries. Therefore, it is essential to have more joint research and collaboration, finance for meeting the targets.
- COP 25 is an important step in the collective journey towards a green, clean and healthy planet.
- India must continue to do its bit – expecting commensurate multilateral action with developed countries taking the lead.

Chapter 3: Kayakalp: Transforming Public Health Facilities

Kayakalp initiative of the Ministry of Health and Family Welfare began in 2015 with the aim of improving infrastructure upkeep, hygiene and sanitation, and infection control practices in Central Government institutions and public health facilities in all States and UTs.

Mahatma Gandhi and Sanitation

Mahatma Gandhi was concerned about Sanitation which was also a part of his Sathyagraha campaign.

- “Everyone is His Own Scavenger”, he said, reiterating the fact that cleanliness is a personal responsibility and the key to removing untouchability.
- He firmly emphasised on the need for education on hygiene and sanitation among Indians. He asserted, “The Scavenger’s Work Must be Our Special Function in India”.
- “Swaraj Ought to Begin with Our Streets”. “Sanitation is More Important than Independence”. Are some of his sayings.

India’s efforts:

- Taking inspiration from Gandhiji’s idea on hygiene, the Government of India started a campaign, ‘Swachh Bharat Abhiyan’ or ‘Clean India Mission’.
- The drive has been categorized in two sub-missions, Swachh Bharat Abhiyan (Urban) that operates under the Ministry of Housing and Urban affairs and Swachh Bharat Abhiyan (Rural) that falls and operates under Ministry of Jal Shakti.
- To contribute to this national movement and addressing the growing challenges of sanitation and hygiene, the Ministry of Health and Family Welfare (MoH&FW) adopted a multi-pronged strategy and launched many initiatives for improving hygiene and sanitation holistically.

Kayakalp Initiative:

- Kayakalp Initiative of MoH&FW began in 2015 with the aim of improving infrastructure upkeep, hygiene and sanitation, and infection control practices in Central Government institutions and public health facilities in all the states and UTs.
- Health facilities are assessed and scored on a number of parameters, and every year the highest- scoring facilities at each level receive recognition through Kayakalp Awards.
- The scheme has resulted in significant improvement in the level of cleanliness, hygiene, and infection control practices at public healthcare facilities. It has also inculcated a culture of on-going assessment and peer review to promote hygiene and sanitation.
- MoHFW has also used the platforms of Village Health Sanitation and Nutrition Committees under the National Health Mission and Mahila Arogya Samitis under the NUHM to promote sanitation in vulnerable urban communities.
- Not only healthcare professionals or health department, MoHFW has worked on inter-ministerial collaboration for hygiene and sanitation.
- Leveraging the momentum achieved under the Kayakalp initiative, MoHFW and Ministry of Jal Shakti started an integrated scheme, the “Swachh Swasth Sarvatra” in December 2016.
- Under this initiative, resources have been provided to Centre for Health Care Strategies (CHCs) located in Open Defecation Free blocks, which are yet to meet Kayakalp criteria.
- In 2019, the country’s three best Primary Health Centres (PHCs) under Kayakalp from Andhra Pradesh,

Gujarat and Karnataka were also felicitated by Ministry of Jal Shakti.

- Swachh Bharat Abhiyan along with Kayakalp has given thrust to the country's efforts to achieve Sustainable Development Goal 3 (Good Health and Well Being) and Goal 6 (Clean water and sanitation) respectively.

Conclusion:

- Swachh Bharat Abhiyan has been able to create a ripple of movement in Public Health Sector. This has been possible due to the collaborative efforts of all the states.
- Overall activities to maintain hygiene have now developed into a habit, sustaining a Kayakalp certification or an ODF certification has led to people practicing hygiene practices in their daily lives.
- The synergy and momentum achieved under SBM shall continue to expand and deliver a 'Clean India, a Healthy India'.

Chapter 4: Sustainable Sanitation in the Cities

The Sustainable Development Goals (SDGs) place significant emphasis on sanitation, cleanliness and hygiene. There is significant evidence globally that better sanitation; hygiene and cleanliness will help in effective control of various vector-borne diseases, parasite infections, and nutritional deficiencies. There have been studies linking cleanliness and hygiene with reduction in gastrointestinal diseases, psychological issues and allergic conditions.

Urban Sanitation in India:

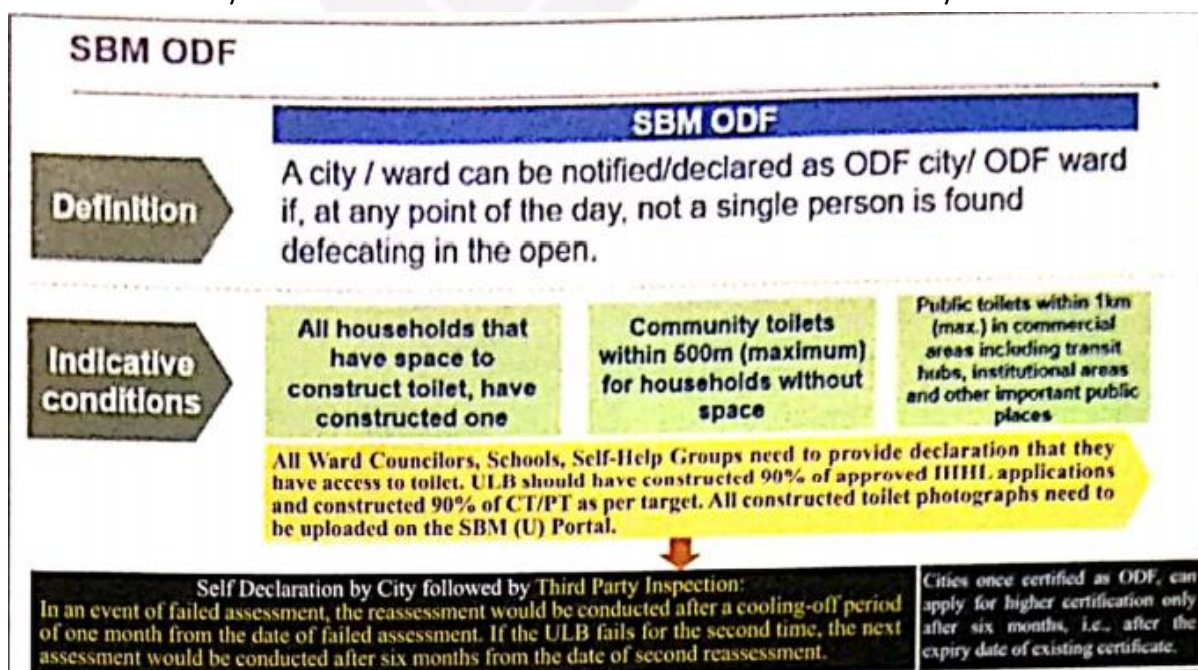
- The Census (2011) revealed that 12.6% of household in Urban India were practicing Open Defecation.
- A bigger cause of worry was that 75% of fresh water resources used for drinking purpose was contaminated with sewage contributing to 60% of total pollution load.

The Cost of Poor Sanitation:

- As per a UNICEF report (2011), almost 90% of child deaths from diarrhoeal diseases are directly linked to contaminated water, lack of sanitation, or inadequate hygiene.
- In addition to the impact on the communicable diseases, better sanitation leads to reduction in occurrence of low birth weight in babies, spontaneous abortions and occurrences of birth defects.
- It has significant impact on social and economic development, particularly in developing countries. For example, an independent study conducted by UNICEF in India in August 2017 established that every Indian family will save about Rs. 50,000 annually if open defecation is eliminated.

Journey to Sustainable Urban Sanitation:

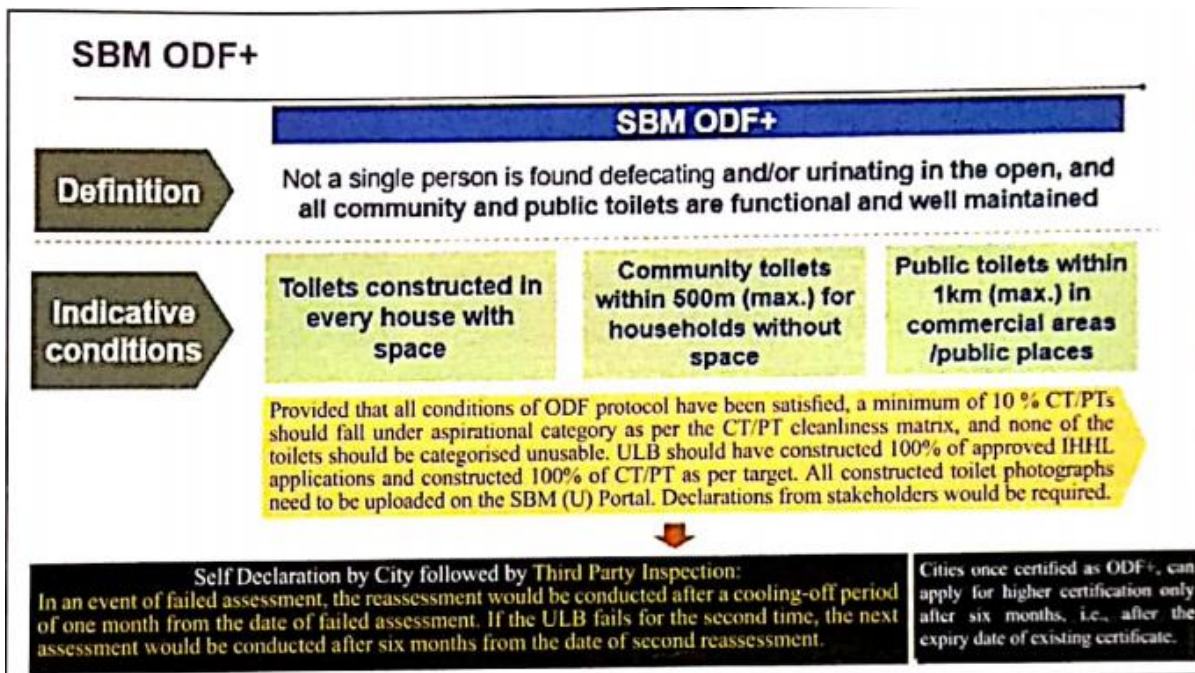
- On 2 October, 2019, Urban India became Open defecation Free and this feat was achieved in only a short span of five years.
- MoHUA has been implementing various missions such as Swachh Bharat Mission (Urban), AMRUT, Smart Cities Mission, NERUDP – all of which address the issue of urban sanitation.
- MoHUA has also partnered with Google to upload and make available on Google maps all the public and community toilets in cities so that citizens and visitors are able to easily locate these facilities in their vicinity.



A Graded Approach to Scaling Up and Sustaining Urban Sanitation:

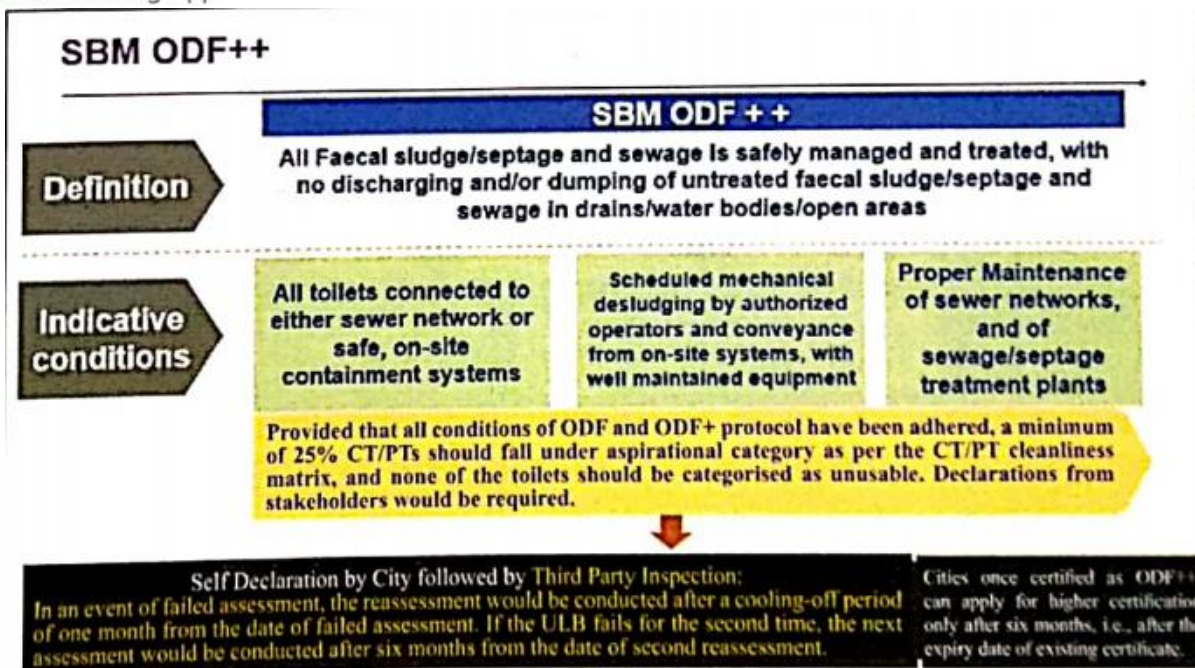
- The ODF protocol, a first-of-its-kind initiative in the country was launched by the Government, where an independent third party would certify a city as ODF on satisfactorily complying with the protocol requirements.
- Moreover, in order to prevent slippage of ODF status, the ODF certificate was made valid only for 6 months.
- Despite these efforts, cities faced different challenges in the form of households with space constraints, residents of slum colonies or any floating population respond to nature’s call.
- For this, ODF+ Protocol was launched with the requirement for third party certification as the ODF protocol.

SBM ODF+



- The next level of challenges faced was while toilets were now functional and being used, so that Open Defecation and open urination were curbed. The issue was: what was happening with the faecal sludge being discharged from these toilets?
 - Most of the faecal sludge was ending up as open discharge in fields and water bodies, thereby posing even greater damage to the environment compared to OD.
- Hence, next endeavor at sustaining the sanitation impacts was to launch the ODF++ protocols to address the issue of complete faecal sludge management.

SBM ODF++



- It involved scheduled emptying of septic tanks, safe containment and transportation, and finally safe processing of faecal sludge and septage.

Achievement:

As on date, we have 739 cities already under certified ODF+ and 292 cities certified ODF++. Under AMRUT mission, significant progress has been made in Faecal Sludge management coverage with 637 projects already completed in Sewerage and Septage Management.

- While the faecal sludge was being managed safely, the waste water (grey water – from Kitchen; Black water – from toilets) were flowing into open drains and polluting our water bodies.
- Hence, the Water Plus protocol has been launched to ensure that no untreated waste water is released into environment or water bodies.

Swachh Survekshan – A Tool for Mission Monitoring and Governance:

- The Swachh Survekshan (SS) is an innovative survey conducted by MoHUA under SBM-U, to rank cities on various sanitation and cleanliness parameters.
- For Swachh Survekshan 2020, MoHUA has introduced the concept of ‘continuous survekshan’ to ensure that the Mission outcomes are sustained through a system of continuous monitoring and verification.

Addressing the Challenge of Manual Scavenging and Hazardous Entry

- Various laws and regulatory reforms have been enacted by the government to ensure that the practice of manual scavenging is eliminated comprehensively.
- MoHUA has been constantly endeavouring to ensure that hazardous cleaning of sewers and septic tanks is completely eliminated and even when manual entry is unavoidable, to ensure that it be done with proper safety precautions.
- It has further strengthened its drive towards sustainable sanitation by mandating the setting up of Emergency Response Sanitation Units (ERSU) which represents an innovative approach to institutionalising measures to counter manual scavenging while systematising human entry into septic tanks in a professional and well equipped manner.

Other Key Enablers: Leveraging Technology, Intensive Behaviour Change & Capacity Building of ULBs

- Leveraging technology and 'smart solutions to widen outreach (e.g. Google mapping of public toilets, swachhta app etc.).
- Robust online Management Information System (MIS) and portal for real time data capture
- Swachh Manch for large scale citizen engagement
- Behaviour change initiatives (engagement of celebrities as ambassadors, mass media audio/video campaign).
- Continuous capacity building of ULBs.

Way Forward:

- The issue of maintenance of the community/public toilets needs to be strengthened further to ensure that the toilets do not fall into disuse.
- Similarly, the issue of safe containment, transportation and disposal of faecal sludge and septage from toilets, as also the grey and black water from households and establishments need to be strengthened further.
- There is need to institutionalizing the concept of Swachhta, so that the holistic impacts from safe sanitation are achieved in line with our SDG commitments.
- Focus is needed on Sustainable Sanitation and Waste Water Treatment.
- All these need to be planned and implemented under the overarching principle of 'Swachhata se Sampannata'.
- Additionally, an enabling environment would need to be created through conducive policy support and reforms, leveraging technology for Mission implementation, robust and real-time, data-driven monitoring supported by 3rd party verifications, capacity building of municipal staff and private sector participation.
- Continued efforts in a sustained manner would lead to a 'Swach, swasth, Samarth and sashakt' New India.

Chapter 5: Water Management: Building a Resilient Nation

UNICEF is a key technical partner to the GoI on water and sanitation programming and is dedicated to supporting the nation's progress towards SDG Goal 6 – Universal access to safely managed water and sanitation by 2030.

Environment and Community: How Maharashtra is Investing in Women's Leadership for Sustainable Development in Water – Stressed Areas

- Maharashtra has declared drought in three of the past five years.
- Almost 70% of the state's geographical area lies in semi-arid region, rendering it vulnerable to water scarcity; this is exacerbated by further drought.
- 'Women-led Water, Sanitation, Hygiene and Resilient Practices Project' or W-SHARP was implemented in 2018 to test the effectiveness of risk-informed planning driven by local contexts and communities such as those of Marathwada, especially during lean periods, March to June.
- W-SHARP targeted women's and vulnerable families' participation as a core aspect of the project.
- The project took an innovative approach by positioning women as key change agents who charged forward in mobilizing their communities, local bodies, and government institutions for shared causes.
- One key outcome of this project was to encourage community participation in local governance and foster partnership with relevant government and civil society institutions.
- This allowed W-SHARP to provide spaces for peer learning exchanges and dialogue fora.

Key Interventions:

- **Household-level Engagement:** The Arogya Sakhis mobilized women's groups in their villages to discuss information and practices relevant to good water management practices at the household level. Water budgeting was practiced by all targeted households.
 - Water Budgeting involves understanding a household's overall water requirement based on the number of family members, major areas of consumption and identifying potential measures for reuse of water.
- **Community-level Engagement:** Communities were engaged in discussions on climate resilient practices and options for livelihoods.
- **Convergent Governance:** A unique aspect of this project was the use of National flagship programmes to empower the communities. Construction of soak pits, toilets and adoption of new agricultural innovations were done through convergent funds.

Environment and Governance: The Story of Fluorosis Mitigation in Rajasthan

- The state of Rajasthan makes for a classic case on the socio-cultural and environmental implications of sourcing safe drinking water in a semi-arid and water scarce region.
- Over-exploitation of the groundwater, which has increased due to recent climatic changes, along with recurrent droughts have contributed to the leaching of rocks with fluoride compounds, thereby releasing the volatile element into the water sources, making it unsafe for drinking.
- UNICEF supported the Government of Rajasthan in demonstration of Integrated Fluorosis Mitigation Approach pilot in Dungarpur in 2018.
- It is a people-centric district platform, led by District Magistrate to have focus on holistic fluorosis mitigation while leveraging programme funds across districts to support the planned activities.

Way forward:

- Fluorosis cannot be mitigated only by providing fluoride-free water and must be integrated with health and nutrition-sensitive initiatives for holistic mitigation of the menace of fluorosis.
- Community participation and climate resilient water safety and security must be a part of the initiatives.
- To protect environment, identification and promotion of reuse of water and recharging of aquifers and sources for creating a balance between the discharge and recharge of water are needed.
- The Jal Shakti Abhiyan is a great initiative by the government which had shown good intent by converging all the line departments on a common platform of the integrated approach in water management.

Environment and Intersectionality : Impact of Water and Sanitation Policies on Environmental Health in India.

While safe drinking water as a part of environmental health has long been realised as critical to healthy life, improved sanitation facility in India has been recognised as an essential for providing safe drinking water. This is because the people get exposed to Faecal Transmitted Infections (FTI) due to poorly constructed toilets and open defecation.

- Approximately 88% of the diarrheal deaths in children can be attributed to unsafe water supply and inadequate sanitation.
- The system for solid and liquid waste management including faecal sledge management and drainage are important for better prevention of faecal contamination in the environment. This is in line with Sustainable Development Goals (SDG 6).

Policies on Water Supply and Sanitation:

- 2019 has been a significant year for the rural water supply and sanitation movement.
- The launch of the 2019-29 National Rural Sanitation strategy post Swachh Bharat Mission's deadline, Jal Jeevan Mission, and the Revised Uniform Water Quality Monitoring Protocol are not stand-alone policy decisions but parts of a well-thought out holistic and integrated strategy to provide universal access and promote inclusion of last-mile populations.
- If these policies can be implemented convergently while incorporating the recommendations below, they have great potential for positively impacting resource management practices and the status of environment health.

Investing in Retrofitting and Waste Management:

- Since the launch of SBM-G in 2014, over 10 crore toilets have been built in rural areas; over 5.9 lakh villages, 699 districts, and 35 States and Union Territories have declared themselves ODF.
- The 10 Year Rural Sanitation Strategy (2019-29) aims to achieve the vision of ODF-Plus, which focuses on sustaining behaviour change achieved under SBM-G, universal usage of sanitation facilities, inclusion of new households, as well as effective solid and liquid waste disposal.
- The type of toilets constructed in the entire sanitation programming in India is mainly of three categories: single leach pit, twin leach pit, and septic tanks.
 - Single pits need retrofitting- either converting it into twin pits with consideration of space, so that the human excreta over the time degrade completely and turn to solid pathogen-free manure for agricultural use or making provisions to empty the pit periodically.
 - Similarly, the effluent from septic tank, under no circumstances, should be allowed into an open channel drain or body of water without treatment.
 - As per the Indian standard code for installation of septic tank, the unsatisfactory design, construction, and maintenance of septic tanks constitute health hazard.
 - It is therefore important to lay down minimum standards and guidelines for the guidance of concerned authorities.

Formation of Jal Jeevan Mission (JJM) and Provisioning Pipe Water Supply (PWS) to all Households:

- According to the Ministry of Jal Shakti, only 18.33% of the rural households are connected through Piped Water Supply (PWS).
- Through the JJM, the government plans to bring piped water to households.
- Under Jal Jeevan Mission, the government envisages renewed efforts to provide water supply to every household by 2024.
- The Jal Jeevan Mission is set to be based on various water conservation efforts like point recharge, desilting of minor irrigation tanks, use of grey water for agriculture and source sustainability.
- The Jal Jeevan Mission will converge with other Central and State Government Schemes to achieve its objectives of sustainable water supply management across the country.

Standardising Water Quality Testing and Monitoring:

- Water Quality Testing is a tool that is universally used to identify drinking water, whether at source, within a piped distribution system, or at point of use by consumers.
- As per WHO, the most effective means of consistently ensuring the safety of a drinking-water supply is using a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer.
- Considering the importance of ensuring safe drinking water, the erstwhile Ministry of Drinking Water and Sanitation published the revised Uniform Drinking Water Quality Monitoring Protocol in March 2019.
 - The protocol is suggestive in nature and plays an advisory role in guiding and supporting the States and Union Territories in water quality testing, monitoring, and surveillance activities effectively.
 - The protocols speaks in details on the monitoring of water quality using field test kit at the gram panchayat level and confirmation test at water testing laboratories and water quality surveillance to detect the risk through an investigative activity for identifying and evaluating the factors that can pose risk to health directly or through undesirable environmental conditions.

Conclusion:

- It is important to look at the possible challenges posed by intermittent water supply and the interaction between pipes and their external surroundings due to flux in water pressure.
- To ensure the success of JJM or any other programme catering to rural communities, it is important to involve gram panchayats and village water and sanitation committees in the decision making processes. This will ensure ownership and sustainability of achievements.

Chapter 6: Role of Community Radio in Disaster Management and Climate Change

Community Radio specialises in providing local information to the local people. It can play an important role in disaster risk reduction, pre disaster preparedness and mitigation through raising awareness. The Ministry of Information and Broadcasting is committed to develop a vibrant Community Radio movement through participation, involvement and ownership of the local community for greater information dissemination and further empowerment of the people.

Community Radio in India:

- In December 2002, the Government released a policy that allowed well-established educational institutions to set up Community Radio Station.
- The Government in November 2006 implemented new Community Radio Guidelines permitting non-profit organizations to own and operate community radio stations.

Importance of Community Radio:

- Community Radio provides an opportunity to the community to speak about issues concerning their lives.
- They are also prominently being used in Nepal, Bangladesh, and Philippines for rural development.
- They are equally popular in Canada, America, Australia, and South Africa.
- **It is useful in:**
 - Speaking to communities in local languages using terms and phrases that are easily and locally understood.
 - Communicating local knowledge, needs, and demands beyond the community to inform policy, research, and other communities.
 - Bringing together people from frequently disconnected stakeholder groups such as livelihoods, community leaders, Organizations and governance.

Community Radio and Disaster Management:-

- The presence of community radio in every phase of a disaster (mitigation, preparation, early warning, response, recovery and revitalization) is essential.
- It enables the exchange and sharing of information and dialogue among residents as well as the enhancement of the community's capability and of self-governance ability.
- Community radio can play a crucial role in disaster management via assisting the community at 3 stages:-
- **Pre-Disaster**
 - In the pre-disaster stage community radio stations can provide guidance regarding its preparedness.
 - Information regarding gathering locations and safety shelters can be disseminated.
 - Another important task is broadcasting warning signals in case there is a calamity foreseen or likely to occur.
 - It breaks the barriers of literacy and economic status in bringing people together in times of disaster.
 - While television networks break down almost instantly in face of natural disasters, radio carries with it the potential for continued functioning in such times.
- **During Disaster**
 - At the time of a disaster, most forms of communication are disrupted barring radio signals;
 - Community radio can help the community link with the relief agencies and Government control room.
 - Information and announcement regarding vulnerable areas, which require immediate evacuation,

can be broadcasted and the community members can be guided to safety shelters where they can access aid and rescue facilities.

- Locals can call in and provide first-hand information regarding the ongoing in the affected areas.

- **Post Disaster**

- Having a medium of communication in their own language or dialect can help in the strengthening the morale of the community.
- Community radio provides an indigenous solution to a problem that is being faced at a large scale in the country these days.
- It can be an important component of rescue, relief and rehabilitation efforts.
- The need is to build the capacity of operating personnel of community radio and equip them to handle and disseminate disaster-related information in an optimal manner.

Conclusion

During forest fires in summer, landslides in monsoon, etc. rural communities constantly struggle and their isolated situation does not help the cause. Community radio has the power to organize and provide information and connect these communities to the much needed aid and relief. Also, since the content is in the local dialect it can help curb miscommunication and misinformation in times of panic.

Chapter 7: Mitigation of Carbon Footprint

Global warming with the burgeoning anthropogenic greenhouse gas (GHG) emissions (400 parts per million from 280 ppm CO₂, emissions of pre-industrial era) has been altering the climate, eroding the ecosystem productivity and sustenance of water, thus affecting the livelihood of people.

- Anthropogenic activities such as burning fossil fuels, polluting water bodies, industrial effluents etc are responsible for increasing GHG footprint of which 72% constitutes CO₂.
- GHG footprint needs to be in balance with sequestration of carbon to sustain ecosystem functions.
- Forests are the major carbon sink (about 45%) that aid in mitigation global warming.
- The Land Use Land Cover (LULC) dynamics leading to deforestation and land degradation is the prime driver of global warming due to the loss of carbon sequestration potential as well as emission.

Western Ghats (WG):

- Western Ghats are among the 36 global biodiversity hotspots and forests in this region help in sequestering Carbon which aid in moderating the climate.
- It covers an area of approximately 16,000 sq kms.
- It is considered as a water tower of India due to numerous streams originating and draining millions of hectares.
- Rivers of WG ensure water and food security of 245+ million people in the peninsular Indian states.
- The region has tropical evergreen forests, moist deciduous forests, scrub jungles, sholas and savannas including high rainfall savannas of which 10% of the forest area is under legal protection.

Carbon Sequestration:

- The Carbon Sequestration of WG have been quantified, which confirms that the forests of WG are incredible reservoirs of biomass and carbon stock, highlighting the role of forests in lowering atmospheric carbon. And mitigation of global warming.
- The Southern and Central WG regions endowed with rich native forests have soils rich in carbon.
- Similar trend is noticed in carbon captured by soil and higher carbon content increment per year is noticed in Karnataka and Central Kerala parts of the WG.

Carbon Footprint

- Carbon footprint is contributed by emissions from the energy sector (68%), agriculture (19.6%), industrial processes (6%), Land Use (LU) change (3.8%) and forestry (1.9%), respectively in India with CO₂, emission of about 3.1 MGg (2017) and the per capita CO₂ emission of 2.56 metric tonnes.
- India has committed at the Paris Climate Change Agreement to reduce its emissions by 33-35% by 2030, which necessitates immediate implementation of carbon capture (with afforestation of degraded landscapes with native species, regulations of LULC change) and de-carbonisation (through large-scale implementation of renewable and sustainable energy alternatives).
- For this, stringent norms must be developed towards
 - Protection of ecologically fragile regions
 - Dis-incentives for continued higher emission based on 'polluter pays' principle
 - Adoption of cluster-based decentralized development approaches
 - Incentives for reduced emission
- The carbon trading has demonstrated the potential in monetary values across the globe of Indian forests in capturing carbon.
- The carbon credit mechanism and streamlining stakeholder's active participations would dramatically reduce the abuse of forests.

Water and food security towards sustainable and healthy living:

- Alternations of landscape structure in the catchment areas influence the hydrological regime leading to variations in the hydrological status.
- The streams are perennial when its catchment is dominated by vegetation (>60%) of native species. This is mainly due to infiltration or percolation in the catchment as soil is porous with the presence of native species.
- Fragmented governance and the deteriorating ecological ethics with the lack of vision among the decision makers are the principal reasons of deforestation and land degradation.
- Streams with its catchment dominated native species vegetation (>60%) have higher soil moisture and groundwater in comparison to the catchment (of seasonal streams) during dry spell of the year. It facilitates farming of commercial crops with higher economic returns to the farmers.
- Sustenance of water in a river ensures the food security in the region which is dependent on the land use dynamics (forest vegetation cover) in its catchment.

Conclusion:

- Thus, catchment integrity plays a decisive role in sustaining water for societal and ecological need.
- Recent unfortunate instances of floods and subsequent drought (drying up of water bodies) in Karnataka, Maharashtra, and Kerala is a pointer towards the mismanagement of forests in the Western Ghats region.
- Hence, ecologically fragile regions such as Western Ghats need to be conserved on priority to sustain the agriculture and horticulture in the peninsular India.

Chapter 8: Emerging Civil Society Initiatives in Agriculture

Agriculture of today is witnessing several sustainable initiatives by farmers to improve farming techniques and to prop up their livelihoods and income. Government too has, in a way, recognized this changing landscape of agricultural development. The recent conferment of Padma Shri awards to 12 such farmer-leaders in 2019 is a case in point.

Innovation in Agriculture:

- Farmers play pivotal role in improving technology and productivity.
- The achievements of some of the awardees endorse this hypothesis.
 - One of the Padma Shri awardee farmer - Vallabhbhai Vasambhai Marvaniya, has been doing innovation in carrot farming since late 1940s in Junagadh of Gujarat.
 - Subsequently, he developed 'Mudhuvan-Gajar'. The Rajasthan Agricultural Research Institute tested this variety and endorsed its cultivation.
- Experimenting with cauliflower cultivation since 1970, Jagdish Prasad Parikh from Rajasthan developed "'Ajita Nagar Selection' variety for better size and quality.
 - It can be cultivated without much chemical use and the crop tolerates heat waves conditions.
- Sultan Singh demonstrated use of re-circulating aquaculture systems (RAS) for fish cultivation in adverse climate with very limited use of water in Karnal of Haryana.

Minimizing Chemical Use:

- Reducing chemical use by following organic methods of agriculture has been the focus of many of these awardees.
- They also organize training for farmers on best agricultural practices and on ways for preserving local cultivars of several crops.
- They encouraged fellow farmers to adopt better agronomic practices by demonstrating virtues of intercropping and crop rotation.
- They have also formed Self Help Groups to create awareness about best agricultural practices.

Diversification of Agriculture:

- Some of these awardees moved against traditional cropping pattern and towards improved livelihood options as well as employment opportunities for rural youth through diversification.
- Rajakumari Devi (Bihar) experimented with food crops in place of mono-cropped tobacco.
 - She promoted innovative agronomical methods of cultivation as per the terrain with the knowledge of soils, value addition and marketing.
- A desert like area around Hulikal village of Ramnagar in Karnataka was transformed to green belt by the dedicated efforts of Saalumarada Thimmakka by growing more than 8000 trees.

Shifting Consumption Patterns:

- As the priority shifts from food security to nutrition security, the focus of the policy makers is moving towards micro-nutrient dense foods like minor millets and pulses, often called 'orphan crops'.
- The Government of India declared 2018 as "National Year of Millets" for promoting cultivation and consumption of these foods.
- It re-designated coarse cereals like sorghum, pearl millet, finger millet, and minor millets as nutria-cereals in 2018. All this is in the 'Decade of Action on Nutrition' (2016-25) as per the United Nations under SDGs.
- Research has to focus on increasing the productivity of minor millets that has been stagnant since the sixties.
- Therefore, huge task lies ahead for the development community that includes civil society, researchers, and

the Government alike in fostering a level-playing field for minor millet farmers.

Urban Agriculture through Terrace Gardening:

- It is desirable to produce as much as possible using urban agriculture methods.
- The most crucial of the urban agriculture is the rooftop gardening that can make use of unused open spaces to provide food for the family, apart from reducing carbon load on environment.
- While there are plenty of hobbyists and family-and-friends farmers, neither the Governments nor the non-profit organizations have recognized the full potential or need of the process.

Conclusion:

- The activities of these Padma Shri awardees has to be viewed as a trend of emerging private initiatives in various parts of the country in the challenging area of agricultural extension.
- These private initiatives have to be tailor-made to the welfare needs of masses and adopt a practical approach to agriculture diffusing good agricultural practices suited to disparate agro-ecological zones.
- Their efforts will achieve better results when they work in tandem with governmental and quasi-governmental agencies on addressing key challenges of the times.
- Policymakers must recognise successful private initiatives and internalise their efforts by mainstreaming their activities.

Chapter 9: Managing Electronic Waste

Electronic industry is one of the world's largest and fastest growing manufacturing industries. It has provided some leverage to the socio-economic and technological growth of the developing society of India. However, it creates new environmental challenges- "Electronics Waste" or "e-waste" that consists of obsolete electronics devices. Solid waste management, which is already a critical task in India, is becoming more complicated by the invasion of e-waste, particularly computer waste.

Challenges Posed by e-Waste

- Advancement in information technology has radically changed the lives of people. Its mismanagement has led to new problems of contamination and pollution.
- Personal Computers (PCs) contain certain components, which are highly toxic, posing environmental and health challenges.
 - This fast growing waste stream has been accelerating because the global market for PCs is far from saturation and the average life span of a PC is decreasing rapidly.
- Rapid economic growth, coupled with urbanisation and a growing demand for consumer goods, has increased both the production and consumption of electronics and electrical equipments.
- India's recycling sector is still underdeveloped. Most people are unaware of potential negative impact of growing E-waste.
 - When these products are dumped in landfills or incinerated, they pose health risks because of the hazardous materials they contain.
- The Global E-waste Monitor, 2017 published by the United Nations University estimated that India generates about 20 lakh ton of e-waste annually, nearly 82% of which is personal devices.

Effects on Air, Water, and Soil:

- When electronic items containing heavy metals are improperly disposed, these heavy metals leach through the soil to reach groundwater channels which eventually run to the surface as streams or small ponds of water.
- Burning of e-waste in open landfill for obtaining gold and other precious metals produces fine particulate matter and causes cardio-vascular and pulmonary ailments in children.
- Drinking water contaminated with lead affects the central and nervous system and causes poor brain growth, dwarfism, hearing disability, and impaired formation and function of blood cells.
- Since, these chemicals are not biodegradable; they persist in the environment for long time, increasing the risk of exposure.

Some Solutions Addressing the Issue:

- The product designers must ensure the longevity of the products through their re-use, repair, and/or upgradability features.
- Recycling and reuse of materials are next options to reduce generation of e-waste.
- Recovery of metals, plastic, glass and other materials reduce the magnitude of e-waste.
- Clear regulatory instruments adequate to control both exports and imports of e-waste and ensuring their environmentally sound management should be in place.
- Manufacturers of products must be made financially, physically, and legally responsible for their products.
- All vendors of electronic devices shall provide take-back and management services for their products at the end of life of those products.
- Collection systems are to be established so that e-waste is collected from the right places ensuring that this directly comes to recycling unit.

- Extended Producer Responsibility (EPR) authorisation has been provided to producers by the CPCB specifying the collection targets for the specified time (five years); but unfortunately, no independent mechanism has been put in place to check or verify the claims made in authorisations resulting in slack implementation.
- Recently, Ministry of Electronics and Information Technology (MeitY) has developed a guideline on uniform inventorisation of e-waste in the country.

Salient features of the E-waste (Management) Amendments Rules, 2018

(E-waste management rules of 2016 have been amended in 2018)

- The phase-wise collection targets for e-waste in weight shall be 10% of the quantity of waste generation as indicated in the EPR plan during 2017-18, with a 10% increase every year until 2023.
- Separate e-waste collection targets have been drafted for new producers, i.e. those producers whose number of years of sales operation is less than the average lives of their products.
- Producer Responsibility Organisations (PROs) shall apply to the Central Pollution Control Board (CPCB) for registration to undertake activities prescribed in the Rules.
- Under the Reduction of Hazardous Substances (RoHS) provisions, cost for sampling and testing shall be borne by the government for conducting the RoHS test. In the event that the product does not comply with the RoHS provisions, the cost of the test will be borne by the Producers.

Challenges Ahead:

- Only 1.5 per-cent of e-waste generated in India gets recycled.
- Lack of awareness about e-waste and its recycling as well as the role of the unorganised sector are the added challenges to the problem.
- The base metals which can be reused are lost and result in soil contamination due to unorganised and crude dismantling.
- A consumer of an electric or electronic device is not apprised of the end of value chain of the product. Often, information is not provided along with the product packing about the e-collection centre for the product sold.
- The responsibility of the consumers is also not specified along with the product.

Conclusion:

- Technical and policy-level interventions, proper implementation, capacity building, and increasing the public awareness are the need of the hour.
- They only can convert this challenge into an opportunity and set global credible standards concerning environmental and occupational health.

Chapter 10: Development and Environment: Maintaining the Fine Balance

With the advent of Industrial Revolution in the 19th Century, the world moved fast towards better living- terming it as growth – but at the same time, degrading the purity of nature in all forms.

- The Stockholm Conference 1972, on the “human environment” brought to light the urgency of tackling environmental problems through various efforts.
- Environment is a critical challenge to continuation of our growth and to the extent of which growth translates into improved quality of life.
- The purpose of economic development in any region is to provide opportunities for improved living and jobs to people.
- While industrial development invariably creates more jobs in any region, possibilities of adverse effects on the environment also increase.
- Environmental protection measures have become necessary for development and to sustain environment at the same time.
- Indiscriminate degradation of environment in the name of economic progress is unwarranted.
- Growth without environmental safety can prove to be counterproductive in the long-run.
- A balance has to be struck between industrial development and environmental protection.

Sustainable Development:

- Sustainable development does not end with sustainability of environment and resource system; it also requires sustainability of economic and social systems.
- Development and environmental protection can easily go together.
- It would be better to begin new projects with built-in environmental safeguards rather than to make haste only to regret later.

Steps taken by India in Environmental Protection:

- India’s installed capacity of diesel generating sets forms a third of its total grid connected capacity.
- As a deterrent, incentives for both capital investment and power generation by solar rooftop have been encouraged.
- The gap between the thermal power and solar power has been narrowing. In 2018, renewable energy has reached 73 GW accounting for over 20 per cent.
- The installed capacity of renewable energy in the country recorded 83.4 GW as on 31 October, 2019 while wind energy accounts for 37 GW and Solar 31.7 GW.
- The growth in clean technology will further help in making sustainable and safe environment. For example, sustainable mobility solutions can increase access while reducing congestion and increasing productivity.
- The Government has launched National Clean Air Programme (NCAP).
 - It is a long-term, time bound, national level strategy to achieve 20 to 30 percent reduction in PM10 and PM2.5 concentration by 2024.
 - Overall objective of the NCAP is comprehensive mitigation actions for prevention, control, and abatement of air pollution besides augmenting the air quality monitoring network and strengthening the awareness and capacity building activities.
- India inked Paris Climate Change deal to combat climate change and limit global temperature rise to well below 2 degrees Celsius.
- India announced its new plan, also known as Intended Nationally Determined Contribution, (INDC) in 2015 (175 GW of renewable energy capacity by 2022).
- The Indian companies are increasingly adopting internal carbon pricing (ICP) as an important tool for

managing climate risks. ICP provides incentives to relocate resources towards low-carbon activities. Just 478 units reduced 2 per cent of India's annual CO₂ emission.

Action taken Worldwide:

- The UNFCCC defines "climate change" as a change in climate attributed directly or indirectly to human activity that alters the composition of global atmosphere.
- The efforts needed to address climate change include mitigating greenhouse gas (GHG) emissions on one hand and building adaptive capacities on the other.
 - India is committed to the UNFCCC and Kyoto Protocol.
- Japan plans on contributing to Global Climate Fund and focusing on adaptation efforts in vulnerable areas like Pacific Islands.

Concerns:

- Seeking to boost the global economy's shift to clean energy, the World Bank announced that it would stop financing oil and gas exploration and extraction from 2019.
- Despite such development, however, according to annual audit report of UNEP, national pledges on emission reduction made by countries under Paris Agreements will only account for one-third of what is needed to avoid the worst impact of climate change.
- Even full implementation of the countries' unconditional 'NDC' (Nationally Determined Contributions) would lead to temperature increase of at least 3 degree Celsius by 2100.

Way Forward:

- To a large extent, an effective pollution regulating system will reduce the emissions of GHGs.
- At the operational level, the industries have to be closely monitored by a responsive and competent body.
- There is need to improve the capabilities as well as strengthen our regulatory institutions.
- The Central and State Pollution Control Boards are understaffed and often lack infrastructure.
- There is an urgent need to strengthen these agencies by recruiting professionals, taking up R&D work and provision of better infrastructural support.

Chapter 11: Plastic Waste in Construction and Road Making

Melting down plastic waste to repurpose it into useful new items is one of the ways of reducing the plastic in oceans and landfills. Initiatives are being taken to use plastic waste out of landfills in building roads. Plastic road is a circular product based on recycled plastics. It has significantly smaller carbon footprint than traditional road construction materials used because of its longer lifespan and reduced transportation of materials involved.

- It is not just the accumulation of plastics that harms the environment- it is also the fragments and toxins released during photo-decomposition that pollute our soil and water.
- The Government of India is encouraging waste plastic usage for roads and highway construction.
- Post- consumer Recycled (PCR) garbage is used in creating new polymer modified asphalt roads.
- These are found to be more resistant to erosion from weather and vehicle use, and the number of new potholes formed is reduced.

Major Findings:

- Use of plastic along with bitumen in construction of roads not only increases its life and smoothness but also makes it economically sound and environment friendly.
- It has been found that such roads were not subject to stripping when come in contact with water.
- Use of higher percentage of plastic waste reduces the need of bitumen by 10%.
- It also increases the strength and performance of the road.

Other uses of plastic:

- The world does not appear to be approaching the end of the 'plastic age'. There is much that plastic can contribute to the society.
- Plastic materials have the potential to bring scientific and medical advances – including tissue and organ transplants.
- Light weight components in modern aircrafts will reduce fuel usage.
- Components used for generation of renewable energy and insulation will help in reducing carbon emissions.

Initiatives taken by the government to keep a check on plastic usage:

- Under “Swacchata hi Sewa” programme of the Government of India, awareness programmes are being organized.
- Government is discouraging the use of plastic.
- Several state governments are in the process/ have banned single use plastics.

Way forward:

- Plastics offer considerable benefits for the future. But it is also evident that our current approaches to production, use and disposal of plastic are not sustainable and present concerns for the wild life and also human health.
- There is a role for:
 - Individuals via appropriate use and disposal, particularly recycling;
 - For industry by adopting green chemistry, material reduction and by designing products for reuse;
 - For governments and policy makers by setting targets, by defining appropriate product labeling to inform and incentivize change, funding academic research and technological developments.
- These measures must be considered within a framework of lifecycle analysis and this should incorporate all the key stages in plastic production, including synthesis of the chemicals that are used in production, together with usage and disposal.

Chapter 12: National Voters' Day 2020- Electoral Literacy for a Stronger Democracy'

A voter is the central unit of Democracy. National Voter's Day connects voters with the electoral process and renews both, their relevance and contribution to the democracy.

National Voter's Day (NVD):

- NVD is being celebrated on January 25 every year since 2011, all across the country at over ten lakh locations across the nation, to mark the Foundation day of Election Commission of India, which was established on 25th January 1950.
- It is being celebrated in order to encourage more young voters to take part in the political process.
- The main purpose of the celebration is to encourage, facilitate, and maximise the enrolment, especially for the new voters.
- Dedicated to the voters of the country, the Day is utilized to spread awareness among voters for promoting informed participation in the electoral process.
- Mandate for universal equal suffrage emanates from Article 326 of the Constitution. The Mandate was further enhanced with the Constitution (Sixty-first Amendment) Act, 1988 that reduced the voting age to 18 years.

National Voter's Day 2020:

- Theme for NVD 2020 is 'Electoral Literacy for Stronger Democracy'.
- This year marks an important milestone in the history of Indian democracy as Election Commission of India (ECI) completes 70 years of its journey.
- Belief in the Ballot-2, an anthology of 101 human stories from across the nation about Indian elections, developed in collaboration with the Publication Division will be launched on the occasion.
- 'The Centenarian Voters: Sentinels of Democracy' with 51 stories of veteran voters across the nation who braved difficult terrain, poor health and other challenges to come out and vote was launched on the occasion by the President.
- The National Awards for the Best Electoral Practices was conferred on District and State level Officers for their outstanding performance in the conduct of elections in different spheres such as IT initiatives, Security Management, Election Management and contribution in the field of voter awareness and outreach.

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