

1. Why does Delhi-NCR experience high levels of air pollution during the month of November? What can be the sustainable remedies to this problem? Discuss.

Approach

In introduction the candidate can start with writing what the problem in Delhi -NCR is regarding pollution. In next part discuss what are the reasons for the chronic problem of pollution. In next part write what can remedies to mitigate the pollution in long run. In conclusion take a reform and correction oriented stand.

Introduction

India is among the most polluted countries, with most places in the country exceeding WHO defined safe air quality standards multiple times over. Nearly half of the worst 50 polluted cities in the world are in India. The technological advancement and speedy development since India's Independence has come at a great environmental cost. This gets reflected each year in months of October and November in Delhi and NCR region where the air becomes unbreathable, roads with zero visibility, school's need to be shut down and an acute and chronic health crises.

Body

Air pollution in Delhi-NCR and the Indo Gangetic Plains is a complex phenomenon that is dependent on a variety of factors.

- **Change in Wind Direction:** October and November usually marks the withdrawal of monsoons in Northwest India and during this time, the predominant direction of winds is northwesterly. The direction of the wind is northwesterly in summers as well, which brings the dust from northern Pakistan and Afghanistan.
- **Reduced Wind Speed:** High-speed winds are very effective at dispersing pollutants, but winters bring a dip in wind speed overall as compared to in summers which makes the region prone to pollution.
- **Land locked :** Also, Delhi lies in a landlocked region which does not have a geographical advantage that eastern, western or southern parts of the country enjoy where the sea breeze disperses the concentrated pollutants.
- **Stubble Burning:** Stubble burning in Punjab, Rajasthan and Haryana is blamed for causing a thick blanket of smog in Delhi during winters. It emits large amounts of toxic pollutants in the atmosphere which contain harmful gases like methane (CH₄), carbon monoxide (CO), volatile organic compounds (VOC) and carcinogenic polycyclic aromatic hydrocarbons. Farm fires have been an easy way to get rid of paddy stubble quickly and at low cost for several years.
- **Vehicular Pollution:** It is one of the biggest causes of dipping air quality in Delhi in winters and around 20% of PM_{2.5} in winters comes from it.
- **Dust Storms:** Dust storms from Gulf countries enhance the already worse condition. Dry cold weather means dust is prevalent in the entire region, which

does not see many rainy days between October and June. Dust pollution contributes to around 56% of PM10 and the PM2.5 load.

- **Dip in Temperatures:** As temperature dips, the inversion height is lowered and the concentration of pollutants in the air increases when this happens. Inversion height is the layer beyond which pollutants cannot disperse into the upper layer of the atmosphere.
- **Firecrackers:** Despite the ban on cracker sales, firecrackers are a common sight on Diwali. It may not be the top reason for air pollution, but it definitely contributed to its build-up.
- **Construction Activities and Open Waste Burning:** Large-scale construction in Delhi-NCR is another culprit that is increasing dust and pollution in the air. Delhi also has landfill sites for the dumping of waste and burning of waste in these sites also contributes to air pollution.

Sustainable Remedies to air pollution in Delhi.

- **Alternate Solutions to Burning Crop Stubble –** Farmers need to be provided alternate options. Government agencies should provide shredder machines free of cost rather than just providing subsidy. Also, farmers should be educated and made aware of the harmful effects of crop burning.
- **Adopting Renewable Solar Power and promoting Solar Rooftops –** A lot of government buildings in Delhi have rooftop solar installations which is praiseworthy. This should be further encouraged not just in government buildings but across all kinds of commercial buildings in the city and suburb towns of Delhi NCR. Government can also mandate residential plots measuring above a certain size to install solar rooftops.
- **Public Transport –** Improve public transport systems. Although metro has been a great success, the network is mostly concentrated in Delhi. Also, last mile connectivity and overcrowding remains an issue which prevents a lot of people from using the network. The various agencies involved in public transport infrastructure should work towards improving the efficiency of public transport networks.
- **Promote CNG as fuel –** The government should encourage CNG as a fuel for private vehicles. Most of public transport buses in the capital already use CNG as primary fuel. This should be encouraged for private vehicles as well by providing subsidies and increasing the number of CNG pumps
- **Electric Vehicles and related infrastructure –** There have been a thrust on electric vehicles in the past few years. The government should develop the necessary infrastructure – the most important of them being charging stations to help wide adoption of these vehicles. Subsidies should also be provided to people who want to buy electric vehicles.
- **Sprinkling of Waste Water in Construction Sites –** Waste water can be used to sprinkle construction sites so that pollutants emanating from these sites can be controlled
- **Large Scale Afforestation Drives –** The government should identify large tracks that can be planted with trees for green cover across the city. Also, hill ranges like the Aravallis should be preserved and they should be planted with trees.

Conclusion

The problem of air pollution has been becoming severe in Delhi each year. Further at least 30.7% of deaths in India can be attributed to air pollution from fossil fuels, that means about 2.5 million people die every year after breathing toxic air. This doesn't bode well for a developing economy which intends to become superpower. Also pollution has long-term implications on health and economy. Therefore there is a need to take immediate measures to bring the pollution down through National Clean Air Program, e-vehicle policy and education of farmers to reduce stubble burning.



2. Examine the factors that have led to the formation of the 'great garbage patch' in the Pacific ocean? Also explain its damaging effects on the marine ecosystem.

Approach

Define in introduction what is meant by Great garbage patch. In next part examine the factors which are responsible for this patch connect these to adverse effects it has on the marine ecology. In way forward suggest some reformation measures.

Introduction:

The Great Pacific Garbage Patch is a collection of marine debris in the North Pacific Ocean. Also known as the Pacific trash vortex, the garbage patch is actually two distinct collections of debris bounded by the massive North Pacific Subtropical Gyre. It is located about halfway between Hawaii and California. It's the largest accumulation zone for ocean plastics on Earth. The trash mainly comprises of plastic debris which was discovered in 1997 and is said that it can be viewed from space station.

Body

It is a mix of both anthropogenic and natural factors that have contributed to formation of great garbage patch:

Anthropogenic causes :

- **Dumping:** Dumping of wastes into water sources which ultimately find their way into oceans. It includes industrial, domestic wastes dumped intentionally.
- **Disaster:** Industrial disasters, oil spills, accidents lead to exposure of waste into water sources resulting in accumulation over period of time.
- **Merchant ships** expel cargo, sewage, used medical equipment, and other types of waste that contain plastic into the ocean.
- The largest ocean-based source of plastic pollution is discarded fishing gear (including traps and nets).
- **Continental plastic litter** such as Food Wrappers & Containers, Bottles and container caps, Plastic bags, Straws and stirrers etc. enters the ocean largely through storm-water runoff.
- **Micro plastics** (particles of less than 5 mm) such as those used in scrubbers and cosmetics
- Unlike POPs (Persistent Organic Pollutants) or chlorofluorocarbons (CFCs), Plastic pollution has received little attention in terms of international agreements.

Natural causes:

- **Ocean currents:** The Pacific Ocean Garbage Patch is a phenomenon that occurs due to ocean currents swirling in the North Pacific waters. These ocean currents called the sub-tropical gyre are perpetually present in the North

Pacific Ocean waters and they are the main reason behind the accumulated waste.

- **Direction:** The gyre currents move in a clockwise direction and carry the trash and the waste along in their path from the land right in the middle of the North Pacific Ocean. The entire process of the gyre collecting and depositing trash happens in the East and the West part of the Pacific Ocean, thus making the Pacific Ocean Garbage Patch a convergence of the East garbage patch and the West garbage patch in the North Pacific.

Impact on marine ecosystem

- **Affects movement of marine organisms:** Ghost nets, a term coined to describe purposely discarded or accidentally lost netting, drift through the ocean, entangling whales, seals, and turtles. An estimated 100,000 marine animals are strangled, suffocated, or injured by plastics every year.
- **Direct harm to species:** Of the 1.5 million Laysan albatrosses that inhabit Midway, nearly all are likely to have plastic in their digestive system. Approximately one-third of their chicks die, and many of those deaths are due to being fed plastic by their parents. Fish and whales may also mistake the plastic as a food source.
- **Indirect harm to species via the food chain:** Besides the particles danger to wildlife, on the microscopic level the floating debris can absorb organic pollutants from seawater, including PCBs, DDT, and PAHs. These toxin-containing plastic pieces are also eaten by jellyfish, which are then eaten by fish. Many of these fish are then consumed by humans, resulting in their ingestion of toxic chemicals
- **Spreading invasive species:** Marine plastics also facilitate the spread of invasive species that attach to floating plastic in one region and drift long distances to colonize other ecosystems. Research has shown that this plastic marine debris affects at least 267 species worldwide.
- **Affects Food-chain:** Because the garbage blocks sunlight, algae is not growing as it should. With less algae, the entire food chain is experiencing a negative disruption. In addition, the plastics floating in the ocean are leeching harmful chemicals into the water, which are likely entering the food chain.

Way forward:

Humans have played a major role in causing this damage so they have to take a bigger role in solving the issue. It might be impossible to clean this mess for now but certain measures can be taken to prevent further contribution to the mess like:

- Using biodegradable items instead of the toxic and non-biodegradable ones, it minimises the effect of the gyre carrying and depositing the waste and thus adding to the Pacific Ocean Garbage Patch.
- Creating awareness to people about their mistakes regarding the use of plastics which can prove to be hazardous not just to sea creatures and mammals but to entire mankind.

- The two organisations such a 4-Oceans and The ocean cleanup are already involved in the cleanup effort's.This shows the ability of civil society to cope up a collective response.



3. Are global negotiations on climate change heading in the right direction? Critically examine.

Approach

In introduction defined what is meant by climate change negotiations and provide a time period from when it has attained prominence. In next part write what are the successes attained until now under climate negotiations and what are still the obstacles which have hindered its progress. In conclusion write a reform oriented conclusion.

Introduction:

The climate negotiation process occurs through the United Nations Framework Convention on Climate Change (UNFCCC) and its related agreements is the primary forum for international cooperation on stabilising atmospheric greenhouse gas concentrations at a level that would prevent catastrophic anthropogenic interference with the climate system. The Paris climate agreement signed in 2015 is the primary instrument which governs climate negotiations and sets longterm targets.

Body:

Positive trends:

- The earlier stand of majority of the countries was based on the denial of climate change. But after climate change negotiations has been pocked up there is global consensus towards the need of sustainable development.
- Initially the whole effort was focused on international bodies such a United nations for a response to climate change but after climate change negotiations the message has been adopted at bilateral and national levels as seen in Indo-Germany climate memorandum and India's own National climate change plans.
- Kyoto protocol only required wealthy nations to cut emissions, which was a bone of contention; however this anomaly was corrected with the signing of Paris agreement in 2015.
- UNFCCC initiatives helped create Public awareness regarding climate change, which is much higher today than in the late 90s.
- Although climate science in the late 90s was certainly strong enough—to negotiate an international treaty, it is hard to deny that the scientific understanding of the climate crisis has improved considerably over the past two decades in which UNFCCC played a significant role.
- UNFCCC has enabled planning and implementation of concrete adaptation activities under the National Adaptations Programme of Action (NAPAs) and the Nairobi work programme.
- UNFCCC helped create innovative ideas in mitigating climate change like the Clean Development mechanism (CDM) under which developing country's

projects that reduce emissions earn credits that can be sold to countries or companies with a commitment to reduce emissions.

- Since the establishment of UNFCCC national governments have encouraged and increased cooperation on the development and transfer of technology.
- UNFCCC efforts support the developing countries in combating climate change by providing a platform for finance, technology transfers, discussions, global partnerships, etc.
- Finance: including delivering on the \$100 billion mobilisation goal and starting talks on the post-2025 goal in earnest.

Some issues which persist in the negotiations:

- Non-inclusive: Most scientists agree the most dangerous environmental air pollutants today are microscopic particulates that come from car engines and combustion-based power plants, but these pollutants are largely ignored by the Kyoto Protocol.
- Slow progress: It took a long time for COP to bring Russia to agree into participating in the Kyoto Protocol. (until 2005)
- UNFCCC failed to persuade USA to ratify the Kyoto protocol thereby keeping one of the largest emitter of greenhouse gases away from commitments.
- Unsustainable targets: The world reached at almost 1degree Celsius warming post industrialization and the Paris contributions are not enough to maintain 2 degree Celsius levels.
- Unsatisfactory Response: Many countries argued for a tougher target of 1.5C - including leaders of low-lying countries that face unsustainable sea levels rises in a warming world.
- Financial Constraints: The agreement requires rich nations to maintain a \$100bn a year funding pledge beyond 2020, which is not enough as highlighted by several pacific island countries.
- Non-binding agreement: The US withdrawal from the 2015 Paris climate agreement, citing, that the deal punished" the US and would cost millions of American jobs", has created new barriers and more pressure on rest of the nations in achieving the targets of Paris agreement.
- As part of the US withdrawal, USA has stopped the payment of the extra \$2bn that had been promised in to the Green Climate Fund.
- No enforcement mechanism: Under the Paris agreement, each country determines, plans, and reports its own efforts to mitigate global warming. The only penalty for non-compliance is a so-called "name and shame" — or "name and encourage" — system whereby countries that fall out of compliance are called out and encouraged to improve.

Conclusion:

The recent heatwaves and simultaneous floods in North America and Europe is grim reality due to impact of climate change. Therefore , the global divide on climate change related issues needs to be narrowed. Further, any healthy negotiations must be

followed by adequate steps to enforce what is decided. It is time global leaders rise above politics and see that both adaptation and mitigation efforts are strengthened.

