

UPSCprep Free Daily Answer Writing Initiative

Subject: GS 3

Syllabus: Environment and Disaster Management

Questions

Q1. The increased frequency and intensity of climate extremes in the Indian subcontinent can have grave implications. Comment. Also, suggest some measures that can be taken towards building climate resilience in India. (250 words) 15

Q2. With the increasing incidences of desertification, define desertification. Explain how climate change affects the process of desertification and in turn get affected by it? (250 words) 15

Model Structures

Q1. The increased frequency and intensity of climate extremes in the Indian subcontinent can have grave implications. Comment. Also, suggest some measures that can be taken towards building climate resilience in India. (15 Marks)

Introduction:

- As per “**Assessment of Climate Change over the Indian Region**” report, the Indian subcontinent has witnessed climate extremes-(any one data can be taken)
 - Average temperature has risen by around 0.7° C during 1901-2018.
 - Rainfall in summer monsoon declined by 6% during 1951 to 2015.
 - Drought affected area increased by 1.3% per decade during 1951-2016.
 - Sea surface rise in the North Indian Ocean has accelerated to 3.3 mm per year between 1993 and 2007.

Main Body:

Increased frequency and intensity of climate extremes can have grave **implications:**

- **Food Security:** These changes can disrupt rainfed agricultural food production which accounts for 60% of agricultural GDP of India.
- **Water Security:**
 - Frequent droughts and floods hinders surface and groundwater recharge.
 - Rising sea level leads to intrusion of saltwater in the coastal aquifers contaminating the groundwater. E.g. in Gujarat, Tamil Nadu, and Lakshadweep etc.
 - Retreat of glaciers in the Hindukush Himalayan region may impact the water supply in the major rivers and streams.
- **Energy demand:** Rising temperatures are likely to increase energy demand for cooling.
- **Human Health:** Risk of heat strokes, cardiovascular and neurological diseases, stress related disorders.
 - Spread of vector-borne diseases such as malaria and dengue fever etc.
- **Biodiversity:** Many species may face increasing threats, particularly those species which are adapted to narrow environmental conditions. Ex- coral reefs.
- **Economy:**
 - The loss in productivity by 2030 because of heat stress could be the equivalent of India losing 34 million full-time jobs (**ILO**).
 - According to the Union Government, Desertification, land degradation and drought cost India about 2.5% of gross domestic product in 2014-15.
 - Sea-level rise increases the vulnerability of some large cities located on the coastline.
- **Social issues:**
 - Climatic disasters such as droughts, cyclones and floods induce large scale migration.
 - Repeated crop failures add to the burden of already distressed farmers who then commit suicides.

Major initiatives of the Government towards combating climate change:

- **National Action Plan on Climate Change (NAPCC):** The Action plan covers eight major missions.

- **State Action Plan on Climate Change (SAPCC):** to align climate strategies with the eight National Missions under the NAPCC.
- **International Solar Alliance (ISA):** To provide a dedicated platform for cooperation among solar resource rich countries.
- **FAME Scheme for E-mobility:** Faster Adoption and Manufacturing of Hybrid and Electric vehicles (FAME) – India Scheme to boost sales of eco-friendly vehicles in the country.
- **Atal Mission for Rejuvenation & Urban Transformation (AMRUT)** for Smart Cities.
- **Pradhan Mantri Ujjwala Yojana:** The scheme provides LPG connections to poor people.
- **UJALA scheme:** target of replacing incandescent lamps with LED bulbs.
- **Swachh Bharat Mission:** The campaign seeks to clean the streets, roads and infrastructure of the country.
- International agreements like the Kigali agreement and Paris Climate deal (India's Panchamitra).

Following steps can be taken towards building climate-resilience in India:

- Make **vulnerability assessment central to long-term planning** for developing region and sector-specific adaptation and mitigation strategies
- Greater emphasis on widening observational networks, sustained monitoring, expanding research on regional changes in climate and their impacts.
 - Ex- networks of tide gauges with GPS along the Indian coastline would help monitor local changes in sea level.
- **Afforestation efforts:** Helps to mitigate climate change through carbon sequestration
 - To improve resilience against droughts, protecting coastal areas and supporting native wildlife and biodiversity.
- **Building community awareness:** Strategies should be formulated to effectively engage citizens by disseminating public messages through media outlets
- **Utilising traditional knowledge:** The in-depth traditional knowledge of land and nature can be used as a reference while formulating the climate-resilient strategy.
 - For example – Kuttanad Below Sea Level Farming System in Kerala.

Conclusion:

- Equity and social justice should be ensured for building climate resilience since the most vulnerable people such as the poor, the disabled, outdoor labourers and farmers will bear the brunt of climate change impacts. *or*
 - India needs to take a leading role in bringing developed as well as developing and underdeveloped nations on common platforms to build climate resilience.
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Q2. With the increasing incidences of desertification, define desertification. Explain how climate change affects the process of desertification and in turn get affected by it?

(15 Marks)

Model Structure

Introduction:

- As per the United Nations, desertification is defined as land degradation in arid, semi-arid, and dry sub-humid areas, collectively known as drylands, resulting from many factors, including human activities and climatic variations. *or*
- As per the MOEFCC, nearly 30 per cent of India is degraded or facing desertification. 26 Indian states have reported an increase in the area undergoing desertification in the past 10 years.

Main Body:

- The **main factors responsible for desertification in India** are:
 - Extension of cultivation in marginal lands, inadequate soil and water conservation measures.
 - Intensive cropping systems and poor irrigation management and overexploitation of groundwater.
- **Climate change exacerbating the process of desertification**
 - **Climate change is intensifying water scarcity** in some dryland areas and **increasing the frequency of droughts.**
 - E.g. Water table in **Barkitand village of Giridih district** has fallen from 8 metre below the ground level in 2013 to about 10 m in 2017.
 - Climate change is projected to **increase the potential for water driven soil erosion** in many dryland areas.

- This leads to soil organic carbon decline and leaching in some dryland areas.
- E.g. **Dhule district of Maharashtra**, where land has become shallow, unfit for plantation.
- Due to climate change, **total rainfall in the Himalayas has decreased in the past century** while winter rain has almost disappeared.
 - 50 percent of the Himalayan springs have dried up or turned seasonal.
 - Rapidly disappearing springs will eventually impact rivers and cause desertification in the plains.
- **The area at risk of salinization is projected to increase due to climate change** or hydrological change.
 - E.g. dwindling rainfall, dependence on borewell for water-guzzling horticulture **increase soil aridity in Ananthapuram district of Andhra Pradesh.**
- **Rising CO2 levels due to global warming favour more rapid expansion of some invasive plant** species in some regions.
 - Invasive plants, especially exotic annual grasses, contribute to desertification and loss of ecosystem services in many dryland areas.
- Increasing human pressures on land, combined with climate change, will **reduce the resilience of dryland populations and constrain their adaptive capacities.**

While climate change can drive desertification, the process of desertification can also alter the local climate.

- **Desertification affecting climate change**
 - Desertification exacerbates climate change through several mechanisms such as **changes in vegetation cover, sand and dust aerosols and greenhouse gas fluxes.**
 - **When land is degraded, it becomes less productive**, restricting what can be grown and reducing the soil's ability to absorb carbon.
- **Government Steps**

- **Integrated Watershed Management Programme:** to restore ecological balance by harnessing, conserving and developing degraded natural resources with the creation of Rural Employment.
- **Desert Development Programme:** to minimise the adverse effect of drought and to rejuvenate the natural resource base of the identified desert areas.
- **United Nations Convention to Combat Desertification (UNCCD):** India is working to restore 26 million hectares of degraded land by 2030.
 - National commitment on Land Degradation Neutrality (LDN) (Sustainable Development Goal target 15.3).
- **National Afforestation Programme:** for the afforestation of degraded forest lands.
- **National Action Programme to Combat Desertification:** to address issues of increasing desertification and to take appropriate actions.
- **National Mission on Green India:** objective of protecting, restoring and enhancing India's diminishing forest cover with a deadline of 10 years.

Conclusion

- The government needs to focus on multifunctional landscape approach, farming for multiple benefits, managing the rural-urban interface, creation of wind breaks, conservation of land in rangeland, wetland and mining areas etc. in order to find the dual challenge of climate change and desertification.

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