

TOPIC 1

What are droughts and drought prone areas of India?

Relevancy

- GS Prelims, GS Mains paper III
- Droughts in India, disaster management
- Reasons, Drought prone areas

What is a Drought?

- IMD defines drought as situation occurring in any area where mean annual rainfall is less than 75% of the normal rainfall.
- It is referred to as relatively long time where there is not enough water than there usually is, as a result of dry weather, to support human, animal and plant life.
- While India is a country rich in natural resources and manpower, it is far behind other developed countries of the world in matters of conquering the forces of nature.
- India is often visited by long spells of drought or abundance of rains causing floods, most recent in 2014.

Causes of drought

- **Inadequate Rainfall:**
 - Failure of monsoons is a major reason for droughts in India.
 - Inadequate rainfall causes crop failure leading to famines.
 - There is not much water in the soil or water reservoirs for the rain cycle and hence a drought is caused.
- **Moisture flux:**
 - The process of water vapour transport is an important physical process influencing the monsoons.
 - Our oceans are getting warmer and the temperature gradient between land and ocean is becoming lesser.

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- There are changes in the mechanism of moisture availability to land from sea.
- Studies show that by measuring the convergence and divergence patterns of the water vapours we can predict the rainfall and drought trends.
- The magnitude of convergence agreed with the rainfall in quantity and divergence caused drought.
- **Climate change:**
 - The increasing heat during the summers causes more water to evaporate and unless there is rains to compensate for the loss, droughts are imminent.
 - Burning of fossil fuels is contributing to climate change and imminent rise in temperature, thus evaporating more and more water from the land surface.
- **Ocean temperatures and El Nino:**
 - The El-Nino effect is responsible for controlling monsoons in the Indian subcontinent.
 - Abnormally high sea surface temperatures have resulted in increased evaporation and heavy rains across many places in India.
 - But, instead of the high pressure air mass above the southern part of the Indian Ocean, the El-Nino creates a low pressure which pulls out dry air from Central Asia and dehydrate the Indian landmass.
 - The El Nino effect on 2014 monsoon rainfall was very small as the air-sea coupling weakened the effect, resulting in ENSO neutral conditions.
- **Changes in Jet Stream:**
 - Jet streams are narrow bands of air that move around the earth at very high speeds.
 - Jet streams can stall high pressure system resulting in sunny weathers and no rain.
 - This is again a major contributing factor to droughts.
- **Changes in local landscape:**
 - Deforestation, changes in the vegetation type and drainage causes changes in the landscape that can cause droughts.
 - Due to these factors, the water retention capacity of the soil is reduced and hence droughts are caused.
- **Erosion and human activities:**

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- Human activity directly triggers factors such as over farming, excessive **irrigation, and deforestation**.
- Soil **erosion** adversely impact the ability of the land to capture and hold water.
- Soil loss due to erosion can be as much as 6100 times greater in drought years than in wet years.
- **Other factors:**
 - Studies show that there is very small relationship between Indian monsoon seasonal rainfall and other factors.
 - The intrusion of western Asian desert air towards central India is an important feature for the dry spells.

What are drought prone areas?

- **Drought prone areas:**
 - These are the areas that receive an annual rainfall up to 60 cm.
 - It is defined as one in which the probability of a drought year is greater than 20%.
- **Chronic drought prone area:**
 - It is one in which the probability of a drought year is greater than 40%.

Drought Prone Areas of India

- Out of the total geographical area of India almost one-sixth area with 12% of the population is drought prone.
- Most of the drought prone areas are found in arid, semi-arid and sub-humid regions of the country.
- Broadly, the drought affected areas in India can be divided into two tracts.
- **Semi-Arid Regions:**
 - It comprises the desert and the semi-arid regions covers an area of 0.6 million sq km.
 - It is rectangle shaped area whose one side extends from Ahmedabad to Kanpur and the other from Kanpur to Jullundur.
 - In this region, rainfall is less than 750 mm and at some places it is even less than 400 mm.
- **Arid Regions:**

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- The second tract comprises the dry region lying in the leeward side of the Western Ghats up to a distance of about 300 km from coast.
- It is known as the rain shadow area of the Western Ghats; rainfall in this region is less than 750 mm and is highly erratic.
- **Other isolated pockets:**
 - Outside these two main regions, there are isolated pockets which experience frequent droughts.
 - They are Coimbatore and Nellore districts in Tamil Nadu, Saurashtra and Kutchh regions, Janshi, Lalitpur region, Mirzapur plateau, Kalahandi region, Odisha, Purulia district of West Bengal etc.

TOPIC 2

What is the 'The International Solar Alliance'?

Relevancy

- GS Prelims, GS Mains paper III
- Environment, International organisations
- International Solar Alliance

What is ISA?

- The International Solar Alliance (ISA) is an alliance of more than 121 countries, most of them being sunshine countries.
- It is the India's first international and inter-governmental organization to have headquarters in India in Gurgaon, with United Nations as Strategic Partner.
- The alliance is a treaty-based inter-governmental organization, 44 countries have already signed the treaty.
- Countries that do not fall within the Tropics can join the ISA and enjoy all benefits as other members, with the exception of voting rights.
- The initiative was launched by India at the 2015 India Africa Summit.
- Multilateral development banks and other financial institutions are providing support for solar projects through low-cost finance mechanism.

Aims and Objectives of ISA

- The alliance's primary objective is work for efficient exploitation of solar energy to reduce dependence on fossil fuels.
- It creates a collaborative platform for increased deployment of solar energy technologies to enhance energy security and sustainable development.
- It improves access to energy and opportunities for better livelihoods in rural and remote areas and to increase the standard of living.

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- It will work with partner countries to formulate projects and programmes to accelerate development and deployment of existing clean solar energy technologies, the potential for which largely remaining untapped.
- It develops innovative financial mechanisms to reduce cost of capital and builds a common knowledge e-Portal.
- It also facilitates capacity building for promotion and absorption of solar technologies and Research and Development among member countries.
- It will encourage multilateral bodies like IRENA, REEEP, IEA, REN21, UN bodies, bilateral organizations, corporates, industry, and other stakeholders to contribute towards the goal of increasing utilization of solar energy in the member countries.

Key focus areas of ISA

- Facilitating affordable finance for solar.
- Scaling up solar applications for agriculture.
- Promoting solar mini-grids in member nations.

TOPIC 3

Mitigation of Air Pollution in India

Relevancy

- GS Prelims, GS Mains paper III
- Environment, Pollution
- Air pollution, Reasons, Mitigation

Introduction

- Every breath we are inhaling at the moment is toxic.
- The kind of pollution these days is in the entire region and not just Delhi.
- Example, Patna is more polluted than Delhi.

Reasons for recent Air pollution

- **Weather and winds:**
 - It is a weather pattern which brings winds from Iraq, Saudi Arabia and Kuwait to India.
 - It brings a lot of dust, huge wind storms which collide with the wind system coming from the east which was brings moisture.
 - This is deadly because the moisture locks in the dust and becomes a cloud.
 - At the same time there are no winds at the ground level.
 - So high suffocation is felt amongst the masses.
- **High vehicular traffic:**
 - Huge number of vehicles and the pollutants released by them make up a large quantity of pollution.
- **Stubble burning:**
 - In Delhi, Punjab and Haryana also contributed because of crop burning.
 - Crop residue burning releases huge amount of pollutants in the air.

Current challenges

- **Poor forecasting:**
 - The forecasting data is very poor in India.
 - Before the recent Delhi crisis we had no indication of the kind of cloud and the weather pattern that would change.
 - After the pollution spiked it was stated that pollution levels are high.
- **Weak Government plans:**
 - The current plan of the Government is weak because a comprehensive plan hasn't been put in place.
 - India is in severe-plus (air quality) today.
 - It is in this condition even after construction is banned, industries are banned, thermal plants have been shut down, brick kilns have been banned, generator sets have been banned, and the public transport system has been intensified.
- **Infrastructure deficit:**
 - India doesn't have the infrastructure to bring in long-term and emergency measures for long-term relief.

Response by the Government

- **Short term response to the emergency:**
 - With every episode of severe air pollution Governments rush to enforce urgent but temporary measures.
 - An example of this is the the odd-even (car scheme) and the shutting of schools.
 - So the court asked the Environment Ministry to come up with what is now called the Graded Response Action Plan (GRAP).
 - This response plan has reduced pollution levels by about 15% (compared) to what it would have been over a few days.
 - Other solutions like increasing car parking costs, and taking the pressure off cars should be opted for.
- **Long term response to the emergency:**
 - The long term efforts are yet to implemented across states in India and are only at policy making stage.

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- Yet there are efforts being made to improve GRAP so that it becomes more responsive and effective.
- Governments need to provide clean fuel, gas or electricity and not just for Delhi-NCR, but for the whole of India.
- Indian Meteorological Department should integrate weather forecast with pollution monitoring.
- India needs a better system and protocol in place to inform people about spiked pollution levels.
- It also needs a protocol in place and mechanisms to ramp up public transport.

TOPIC 4

'Performance of Swachh Bharat Mission' so far

Relevancy

- GS Prelims, GS Mains paper II, III
- Swachh Bharat Mission, Cleanliness mission
- Environment, Open Defecation free India

Recently

- On October 2, 2017, the Swachh Bharat Mission (SBM) completed its third year.

What is Swachh Bharat Mission?

- Swachh Bharat Mission was launched on 2nd October, 2014.
- Its main objective is to accelerate the efforts to achieve universal sanitation coverage and to put focus on sanitation.
- The Mission Coordinator is Ministry of Drinking Water and Sanitation (MDWS).
- It has two Sub-Missions:
 - the Swachh Bharat Mission (Gramin)
 - the Swachh Bharat Mission (Urban)
- The Mission aims to achieve a Swachh Bharat by 2019, as a tribute to Mahatma Gandhi on his 150th birth anniversary.

Recent studies on 'Performance of Swachh Bharat Mission' so far

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- Over ₹60,000 crore has been spent on the programme, but despite its scope and importance, there is very little positive outcome from it.
- Except the government's data, the only other data source is provided by the 'Swachh Survekshan Gramin'.
- SSG survey was conducted by the Quality Council of India (QCI).
- QCI is a body set up jointly by the Government of India and Industry.
- Both sources reflect a similar picture on the condition of sanitation data.
- They both rated nation-wide latrine coverage at around 63%.
- The QCI survey also claimed that 91.29% of those with access to a latrine put use to it.

Loopholes in the Swachh Mission

- There have not been enough large scale studies on the topic but small regional ones.
- These independent studies on a smaller scale have largely contradicted the official versions of the claims.
- **Building versus usage:**
 - Implementation of the SBM was highly number intensive with focus on building physical structures.
 - Under the programme, after the targeted number of latrines is constructed, a village will be declared open defecation free.
 - Hence, there is a need to look into whether the latrines are being used and open defecation has gone down in real.
- **Faulty counting of latrines:**
 - Unused structures constructed under UPA government's latrine building programme "Nirmal Bharat" have also been counted under SBM.
 - The pictures of many such defunct latrines can be seen on the SBM website categorised as uploaded, approved and counted.
 - Also, certain villages have been declared "ODF verified villages" where less than 30% households have a latrine.
- **Faulty questionnaire techniques:**
 - QCI survey says that 91% of those having access to latrines use them which is incorrect.

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- According to some researchers the questionnaire used for surveys by government was biased to get an outcome in support of latrine use.
- The questionnaire itself was structured to show the appearance of latrine use.
- In contrast the surveys that posed a balanced questionnaire captured more open defecation practices.

Concerns related to the implementation of SBM

- **Pressure on public:**
 - The study found that in most villages coercive measures and threats were used to promote the SBM.
 - Name shaming and harassment of people by officials burdened with targets were flagged in many places.
 - This is in contrast to the government's claim that SBM is a people's movement.
 - SBM was supposed to change mindset of people for achieving sustained cleanliness which seems to be proving wrong.
- **Debt Burden:**
 - The program policy is based on 'build first and get reimbursed later' model.
 - This was done to promote project ownership among people.
 - But on ground it costs anywhere between Rs. 12-25 thousand to build a latrine.
 - There is a kind of institutional pressure to comply on public so many were forced to borrow from informal source on high interest rates.

Conclusion

- Unfortunately there exist no credible, representative country-wide estimates of latrine use in India.
- On one hand, government data and the Swachh Survekshan show the programme to be achieving what it is meant to achieve.
- But, independent studies by sanitation researchers present the opposite.
- The programme seems to be running on a check mark-based approach.
- Between all this widespread open defecation in India continues to kill babies, and stunts those who survive.

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