# Monsoon, El Nino And Their Impact on Agriculture

**For Prelims:** Monsoon, Kharif crop, El Nino, Groundwater, Droughts, Food inflation, Oceanic Nino Index.

**For Mains:** Impact of Monsoon and El Nino on Indian Agriculture

**Source: IE**

## Why in News?

The **2023 southwest monsoon season in India** started late, with the initial two weeks experiencing a **significant rainfall deficiency of 52.6% below the normal long-period average(LPA).**

- However, as of July 30, 2023 there was an overall **6% surplus rainfall**. This **turnaround has positively impacted kharif crop plantings**. However, concerns persist regarding the **potential impact of the approaching El Nino phenomenon on rabi crops.**

## What is the Long-Period Average (LPA) of Rainfall?

- The IMD defines the "LPA of rainfall" as the **average rainfall recorded over a specific region for a long period**, like **30 or 50 years**. Based on this, the IMD classifies rainfall into five categories on an all-India scale:
    - **Normal or near normal:** Rainfall between 96-104% of LPA.
    - **Below normal:** Rainfall between 90-96% of LPA.
    - **Above normal:** Rainfall between 104-110% of LPA.
    - **Deficient:** Rainfall less than 90% of LPA.
    - **Excess:** Rainfall more than 110% of LPA.

## What are Kharif and Rabi Crops?

- **Kharif crops:**
    - Kharif crops are sown during the **monsoon season**, from **June to October,** and harvested in the **late summer or early autumn.**
    - They depend on the **southwest monsoon for irrigation and growth.**
    - Major Kharif crops include rice, maize, sorghum, pearl millet (bajra), finger millet (ragi), groundnut and pulses like **pigeon pea (arhar) and green gram (moong).**
    - They account for about **55% of the total foodgrain production in India.**
- **Rabi Crops:**
    - These crops are sown around the **Retreating Monsoon and Northeast monsoon season,** which begins in October and are called rabi or winter crops.
    - The harvest for these crops happens typically during April and May, during the summer season.

- Major Rabi crops **are wheat, gram, peas, barley etc.**
- A warm climate is required for seed germination and cold climate for the growth of crops.

## What is the Impact of Monsoon on Indian Agriculture?

- **Positive Impacts:**
  - **Increased Crop Production**: A **major portion of the country's crop area is completely dependent on Monsoon rains** as they're not equipped with methods of manual irrigation.
    - Adequate rainfall during the monsoon season leads to **increased soil moisture and promotes the growth of crops,** resulting in higher agricultural output.
    - The availability of water supports the cultivation of a variety of crops, including **rice, wheat, millets, and pulses.**
  - **Economic Boost:** Successful monsoon seasons contribute to **rural prosperity by providing income to farmers and laborers,** which, in turn, stimulates **demand for goods and services in the rural economy.**
    - This increased economic activity has a positive impact on overall national growth.
  - **Recharge of Groundwater:** The monsoon helps **recharge** groundwater **resources**, which is crucial for sustainable agricultural practices in regions where water scarcity is a challenge.
- **Negative Impacts:**
  - **Erratic Monsoon Patterns:** The monsoon's timing, intensity, and distribution are unpredictable, **leading to uncertainties in agricultural planning and crop management.**
    - Delayed or early monsoons can **disrupt planting schedules** and affect crop yields.
  - **Droughts and Floods:** Monsoon failure or **excess rainfall can lead to droughts or floods,** respectively.
    - Both scenarios can be disastrous for agriculture. **Droughts result in water shortages,** crop failures, and reduced yields, **while floods can damage crops,** wash away fertile topsoil, and lead to livestock losses.
  - **Crop Losses:** Prolonged and excessive monsoon rains can cause **crop diseases, reducing crop quality and yield.** These conditions also hinder farmers' ability to conduct agricultural operations effectively.
  - **Soil Erosion**: Heavy rainfall can lead to soil erosion, **which depletes soil fertility and affects agricultural productivity** in the long run.
    - Soil erosion also impacts water bodies and can lead to **siltation in reservoirs,** reducing their storage capacity.
  - **Food Price Inflation:** Inconsistent monsoon patterns can affect crop production and **lead to shortages, resulting in food price inflation.**
    - This can have **adverse effects on the economy, especially for low-income households** that spend a significant portion of their income on food.

## What is El Nino and Its Implications on Agriculture?

- **About:**
  - **El Nino** is a climate phenomenon that occurs **irregularly in the tropical Pacific Ocean**, characterized by the **warming of sea surface temperatures.**
    - It can have significant impacts on weather patterns around the world, including India.


- The **Oceanic Nino Index (ONI)** reached 0.8 degrees Celsius in **June, 2023** surpassing the **El Nino threshold of 0.5 degrees.**
    - Global weather agencies forecast El Nino to persist and strengthen through the 2023-24 winter.

- **Impacts:**
    - **Temperature Extremes:** El Nino is often associated with **higher temperatures in some parts of India.**
        - Elevated temperatures can adversely impact crops, leading to heat stress and reduced yields, especially for sensitive crops like fruits and vegetables.
    - **Pest and Disease Outbreaks:** El Nino conditions can create a **conducive environment for certain pests and diseases** that affect crops.
        - Warmer temperatures and altered precipitation patterns can lead to increased pest populations, posing additional challenges to farmers.
    - **Impact on Livestock:** Reduced availability of fodder and water scarcity during El Nino can affect **livestock** and animal husbandry, **leading to lower milk and meat production.**

## UPSC Civil Services Examination, Previous Year Question (PYQ)

### *Prelims*

**Q. With reference to 'Indian Ocean Dipole (IOD)' sometimes mentioned in the news while forecasting Indian monsoon, which of the following statements is/are correct? (2017)**

1. IOD phenomenon is characterised by a difference in sea surface temperature between tropical Western Indian Ocean and tropical Eastern Pacific Ocean.
2. An IOD phenomenon can influence an El Nino's impact on the monsoon.

**Select the correct answer using the code given below:**

**(a)** 1 only
**(b)** 2 only
**(c)** Both 1 and 2
**(d)** Neither 1 nor 2

**Ans: (b)**

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## *Mains:*

**Q.** How far do you agree that the behaviour of the Indian monsoon has been changing due to humanizing landscape? Discuss.**(2015)**

**Q.** Most of the unusual climatic happenings are explained as an outcome of the El-Nino effect. Do you agree? **(2014)**