

The significance of the monsoon for India's agriculture is unquestionable as it serves as a crucial water source for agricultural activities. Approximately 50% of the country's net sown area relies on the monsoon rains, which also replenish water reservoirs. The summer monsoon season, spanning from June to September, accounts for 80% of the total annual rainfall, coinciding with the main crop-growing season, Kharif. The season is responsible for producing major crops such as rice, pulses, oilseeds, cotton, and sugarcane. States with limited access to irrigation rely even more heavily on a normal monsoon.

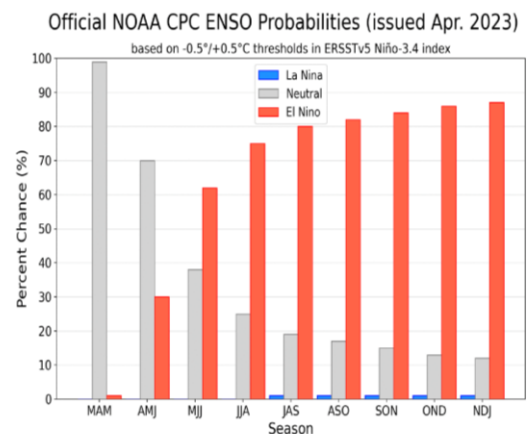
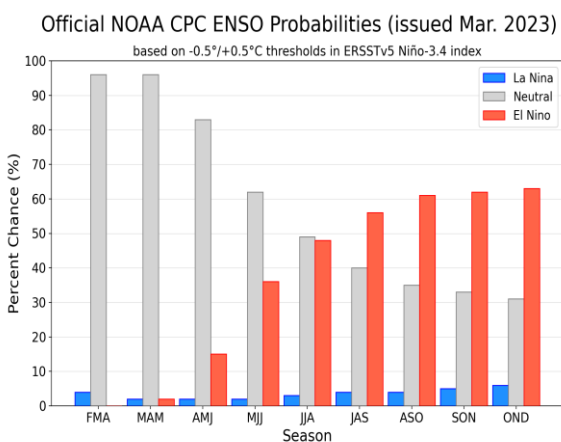
Despite contributing only around 18% to India's GVA, agriculture employs around half of the country's workforce (Niti Aayog, 2022). Improved agricultural production can also alleviate pressure on food inflation, especially in cereals and pulses. Therefore, a favourable monsoon is critical in supporting rural demand and keeping food prices in check.

Prospects of a Normal Monsoon in 2023

The concept of a normal monsoon is based on the rainfall volume's departure from the long-period average (LPA). Generally, the monsoon is termed normal if it is within +/-4% of the LPA. In the last four years, India has witnessed a normal monsoon. However, in an adverse signal to India's monsoon this year, a US-based agency, National Oceanic and Atmospheric Administration (NOAA) has indicated the possibility of El Nino's arrival by mid of this year. El Nino refers to the unusual warming of the surface ocean waters in the equatorial Pacific region which affects the global climate. In the case of India, the occurrence of El Nino is linked with the poor monsoon implying below-normal or deficient rainfall during the June-September period.

As per the latest monthly update issued by NOAA in April, the probability of El Nino developing has increased sharply to 62% from below 40% in the period MJJ (May-June-July) compared to the earlier month's forecast (refer to Exhibit 1). This period coincides with the beginning of the monsoon season in India. However, the chances of El Nino developing during the later part of the year are even higher between 80% - 90%. The arrival of El Nino after September would not be a major concern for India's monsoon.

Exhibit 1: Increased Chance of El Nino During May-July

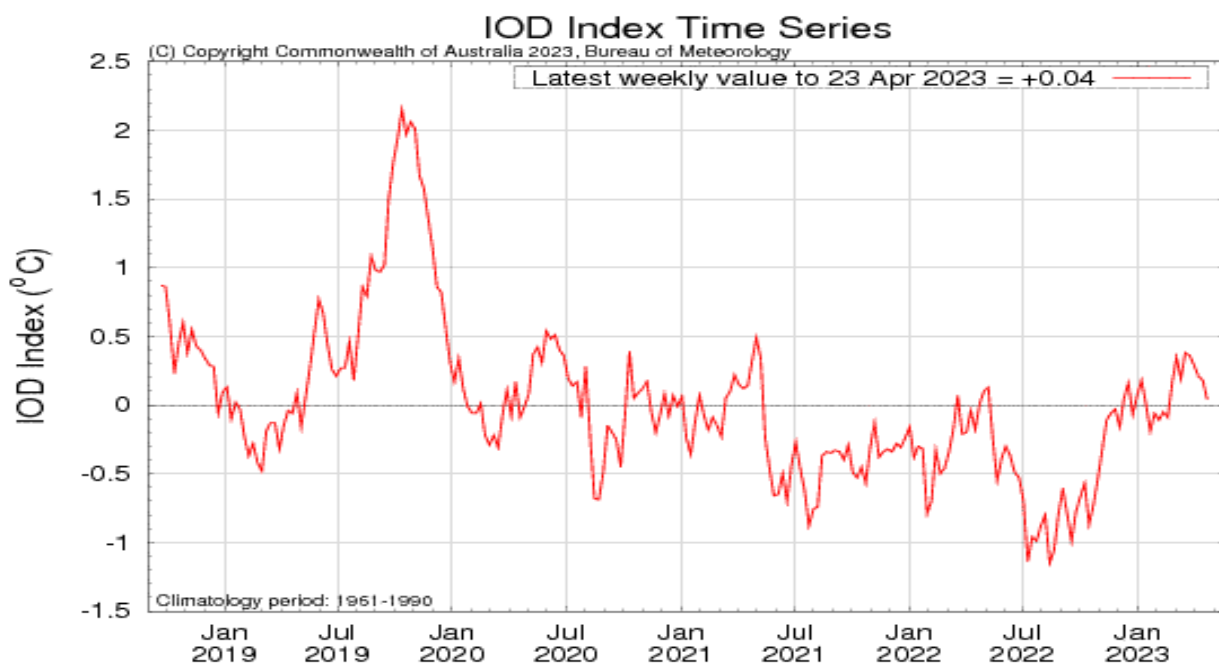


Source: National Oceanic and Atmospheric Administration (NOAA); Note: The probability of El Nino development is given on an overlapping 3-month season basis. FMA refers to the Feb-Mar-Apr period.

In India, two conflicting views have emerged regarding the status of the southwest monsoon. India's official weather forecast agency - India Meteorological Department (IMD) – has predicted a normal monsoon (96% of LPA) whereas, another private forecaster Skymet indicated a below-normal monsoon following the development of the El Nino weather pattern.

According to the IMD, a positive Indian Ocean Dipole (IOD) is likely to counter the impact of evolving El Nino conditions on India's monsoon. A positive IOD favours increased rainfall during the southwest monsoon in India even in case of an El Nino event. India witnessed above-normal seasonal rainfall in 2019 when the IOD index was significantly positive and touched a high of 2.0 (refer to Exhibit 2). Currently, the IOD has returned to neutral conditions. However, as per the Australian Bureau of Meteorology, there is a possibility of a positive IOD event developing with an IOD index ranging between (0.8-1.0) during the June-August period. This could work in favour of the Indian monsoon.

Exhibit 2: IOD Index Turns Neutral



Source: Australian Bureau of Meteorology; Note: The IOD index value for the week ending 23 April 2023 was +0.04 °C, which is within neutral bounds (−0.40 °C to +0.40 °C).

For now, these are only predictions and a clearer picture will emerge only by the end of May. Whether India will receive a normal or below-normal monsoon will depend on the intensity and timing of the occurrence of El Nino. The development of an El Nino during April-June is particularly risky for India's southwest monsoon season. Additionally, the positive phase of IOD should be significantly strong to offset the negative impact of El Nino as the latter has a stronger impact on the Indian monsoon.

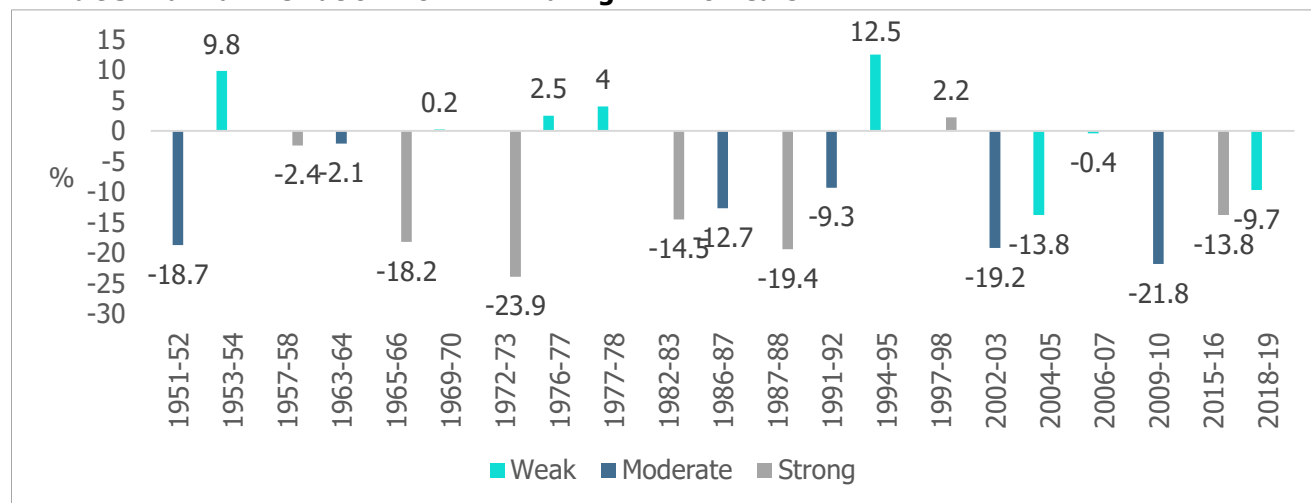
Having said that, the possibility of a poor monsoon cannot be completely ruled out. Against this backdrop, it is important to understand India's experience with El Nino and what has been its economic impact on the economy.

India's Past Experience with El Nino

Since 1950, there have been 21 El Nino years and 15 drought events in India. Interestingly, 10 of these 15 droughts were led by El Nino events (Exhibit 3). Looking at the past data reveals that the likelihood of poor rainfall is nearly 70% in case of a strong or moderate El Nino event.

However, not all El Nino years lead to below-normal monsoons. The past data shows that even during El Nino years, rainfall during southwest monsoon was normal owing to favourable offsetting factors (Table 1). For example, despite 1994, 1997 and 2006 being El Nino years, India received normal/excess rainfall as IOD was significantly positive. In 1969, 1976, and 1977, India received normal rainfall either because the intensity of El Nino was weak or its arrival was towards the end of India’s monsoon season. The last El Nino year was observed four years ago in 2018-19 when India received a below-normal monsoon (90.3% of the LPA). In the last four years, India has observed normal monsoons due to prevailing La Nina conditions which favour good monsoons.

Exhibit 3: Rainfall Deviation from LPA During El Nino Years



Source: IMD and NOAA; Note: Years shown in chart corresponds to El Nino years. Intensity is classified as weak, moderate and strong based on the ONI index published by NOAA.

| | El Nino intensity | Arrival of El Nino during Apr-June | IOD Status | Rainfall deviation from normal (%) |
|---------|-------------------|------------------------------------|------------|------------------------------------|
| 1969-70 | Weak | No | Neutral | Normal |
| 1976-77 | Weak | No | Neutral | Normal |
| 1977-78 | Weak | No | Neutral | Normal |
| 1994-95 | Weak | No | Positive | Excess |
| 1997-98 | Strong | Yes | Positive | Normal |
| 2006-07 | Weak | No | Positive | Normal |

Source: NOAA, Australian Bureau of Meteorology, IMD, CareEdge

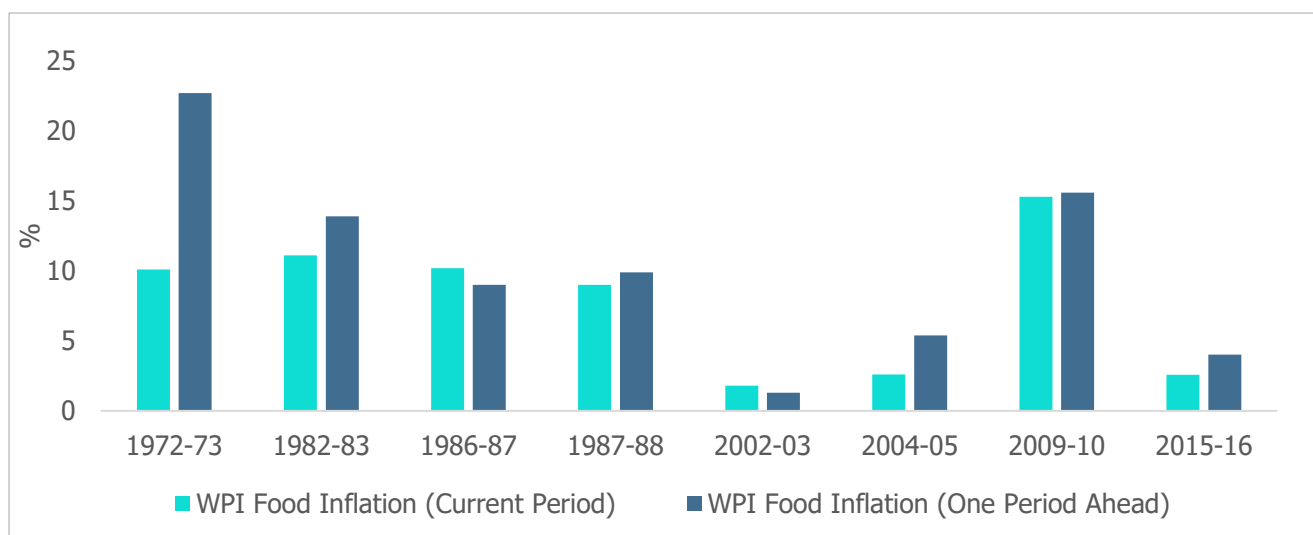
If we look at the data for the past 50 years, it can be said that on average, an episode of a strong or moderate El Nino has led to deficient or drought-like situations in India which not only affected agricultural production adversely but also corresponded to lower GDP growth (Table 2).

The story on the food inflation front was mixed though as many other factors such as underlying strength in demand, crop buffer stock, supply-side government measures etc., come into play. In the 15 El Nino years since the 1970s, only seven years saw a spike in WPI food inflation. Between 1972-73 and 1990-91, deficient rainfall generally resulted in a double-digit WPI food inflation, persisting into the next year as well (Exhibit 4). However, in the past two decades, the impact of poor rainfall on food inflation has weakened as WPI food inflation has mostly remained in single digits even when the rainfall was deficient (barring 2009-10). This could be because other factors such as improved supply, government intervention etc. have contributed to keeping the overall food inflation at low levels.

| 1972-73 to 2022-23 | Number of Episodes | Average Deviation of Rainfall from LPA (%) | Average GDP Growth (%) | Average Agriculture GVA growth (%) | Average Growth in Kharif Production (%) |
|--------------------|--------------------|--|------------------------|------------------------------------|---|
| El Nino years | 15 | -9.2 | 5.0 | -0.3 | -5.4 |
| Strong | 5 | -13.9 | 3.8 | -1.8 | -6.1 |
| Moderate | 4 | -15.8 | 4.4 | -2.5 | -12.0 |
| Weak | 6 | -0.8 | 6.3 | 2.4 | -0.5 |
| Non-El Nino Years | 36 | 0.6 | 5.6 | 4.6 | 5.7 |

Source: CEIC; Note: Growth rates are average of annual growth rate for the specified years.

Exhibit 4: WPI Food Inflation in Drought Years



Source: RBI; Note: Years on the X-axis correspond to El Nino events when rainfall was below 90% of the LPA (drought/deficient rainfall).

Evaluating the Risk of El Nino on Indian Economy in FY24

The prediction of El Nino has come at a time when India is already battling with high inflation, growth slowdown concerns and weather fluctuations (heatwaves and unseasonal rains). A below-normal monsoon can further aggravate the situation. It is worth noting that prices of major Kharif crops such as rice and pulses are already at elevated levels. A bad monsoon could affect the production of these commodities putting upward pressure on food inflation. Poor rainfall could also deplete reservoir levels which could have a bearing on Rabi crops (such as Wheat) as well. What is even more important is the temporal and spatial distribution of rainfall. While states such as Punjab and Haryana have good irrigation facilities, other major crop-producing states such as Rajasthan, Maharashtra, and Karnataka are more dependent on rains (Table 3). Even in case of below normal monsoon, if these states receive abundant rainfall, the harm can be contained.

India’s Inflation outlook could further worsen if there is an uptick in global commodity prices as well. An IMF study (2016), shows that El Nino weather phenomenon has varied economic impacts across different regions and can significantly affect global commodity prices (including crude oil). Economies like Australia (a key exporter of wheat) and Indonesia (a key producer of rice and exporter of palm oil) get adversely impacted due to El Nino which could push up food prices in international markets. This could have an adverse impact on inflation in India too.

Table 3: Irrigation Status of Major Crop Producing States

| States | % of Irrigated Area* | Some Major Kharif Crops |
|----------------|----------------------|----------------------------------|
| Punjab | 99.8 | Rice |
| Haryana | 90.9 | Rice, Maize |
| Uttar Pradesh | 87.0 | Rice, Sugarcane |
| Madhya Pradesh | 74.6 | Pulses, Oilseeds |
| Bihar | 60.3 | Rice, Maize, Oilseeds |
| West Bengal | 59.2 | Rice |
| Tamil Nadu | 56.0 | Oilseeds |
| Gujarat | 51.9 | Oilseeds, Cotton |
| Rajasthan | 46.6 | Pulses, Coarse Cereals, Oilseeds |
| Karnataka | 37.8 | Sugarcane, Pulses |
| Maharashtra | 18.7 | Pulses, Sugarcane, Cotton |

Source: RBI, Economic Survey 2022-23; *as % of net sown area

Damage in domestic agricultural production could also mean lower income for rural households as about 60% of the rural population is still employed in the agriculture sector. This could be detrimental to the rural demand which has been struggling to witness any durable pickup. A number of other sectors including, FMCG, auto (two-three wheelers and tractors), and agrochemicals could also feel the heat of muted rural demand. This in turn could weigh on overall GDP growth. However, one important point to note here is that the rural economy extends beyond just the agriculture sector. There has been a significant diversification in the rural economy in the past 50 years with an increasing contribution of non-farm sectors to rural income. About two thirds of rural income is contributed by non-agricultural sectors such as manufacturing, construction and services (Niti Aayog, 2017). The government's led infrastructure push and focus on the tourism sector are expected to boost non-farm employment further. This could contribute positively to rural income and limit the downside risk of El Nino on rural demand and India's GDP.

Overall, while El Nino poses risks on the inflation and growth front, the negative impact could be mitigated by prudent policy response and timely support measures. The government needs to be cautious and plan to ameliorate the effect of such weather-related shocks.

To begin with, the government should ensure enough buffer stock of essential food items such as wheat, rice and pulses. As on April 1, wheat stocks stand at a six-year low of 8.35 million tonnes and only marginally above the minimum required 7.46 million tonnes for this date. In this regard, the procurement of wheat must be watched closely and in case of any shortfall, the option of import should be kept open to fill the demand-supply gap. Rice, which is a main Kharif crop, is quite sensitive to the amount and spatial distribution of rainfall. Last year, the government imposed curbs on rice exports amid concerns over production due to below-average monsoon rainfall in key growing states. If there is a shortfall in rice production this year too due to below-normal monsoon, these export bans should be extended to ensure adequate domestic supplies.

Conclusion

To summarise, the possibility of a below-normal monsoon this year hinges on a combination of several factors such as the timing and intensity of El Nino and the strength of positive IOD. Additionally, the impact on agricultural production will depend on the spatial and temporal distribution of rainfall. Given the existing macroeconomic scenario of elevated inflation and volatile commodity prices, any shortfall in the production of essential food items could pose an upside threat to the inflation outlook. Also, a lower agricultural output would have a bearing on farm income which could weigh on nascent rural demand recovery. However, due to the sizable diversification of the rural economy towards non-farm sectors, the overall impact on rural demand and GDP is expected to be limited. Nevertheless, the government should be vigilant and prepare in advance to mitigate the harm in case of any production shortfall.

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