

Is Normal Monsoon a good indicator for Agriculture?

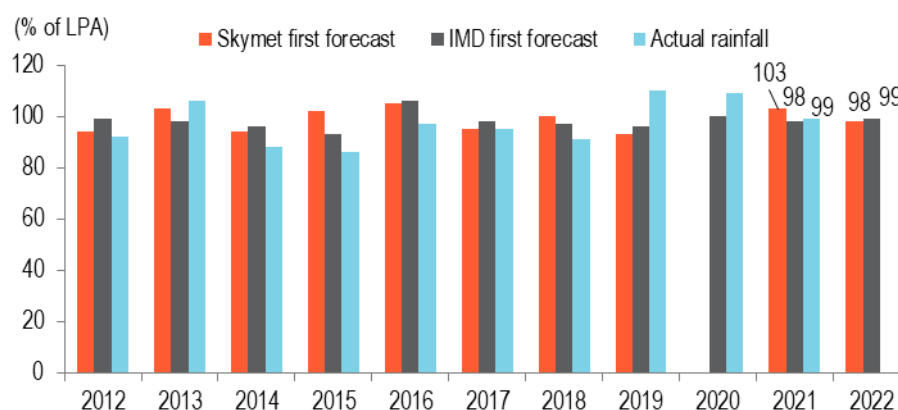
Background

Every year, before the beginning of the monsoon season, different agencies predict if the rainfall will be normal or not. How have these conditions fared in the past? Does normal monsoon translate in to good crop production? Is this the sole criteria or are there other factors at play. While there is no denying that monsoon is critical condition for higher crop production, as 60% of the cultivable land in India relies on South West Monsoon, uniform distribution of rainfall along with other climatic conditions drive the production higher/lower. This note attempts to shed light on the same and see how other host of factors are responsible for agriculture growth.

1. **How do we measure normal monsoon:** A normal Monsoon is defined as rainfall between 96%-104% of LPA (Long period average). LPA of June-Sep'22 period is basically average rainfall received in the past 50-years for the period of 1971-2020 (revised this year from 1961-2010) and is estimated at 88cm for the current year. While normal rainfall is 96-104% of the LPA, less than 90% of LPA is termed as deficit rainfall and more than 110% in excess rainfall. For the LPA range between 90-96% of the LPA, is referred to as below normal and between 104-110% of LPA is categorized as above normal rainfall. South-West monsoon lasts for the period of June to September in every year.

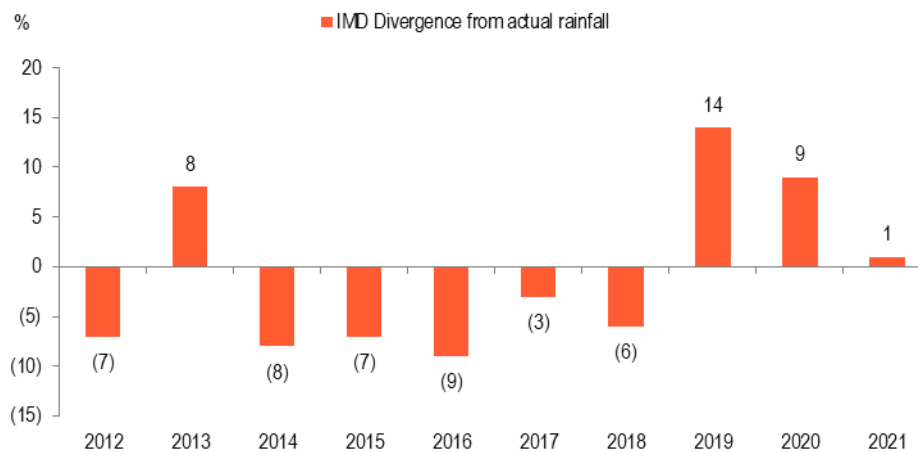
Private organizations such as Skymet and government organization namely IMD predicts monsoon each year. Both Skymet and IMD forecast carry the model error of (+ -) 5% and have estimated normal monsoon for the current year. It is interesting to notice, that in the past there has been much higher deviation in actual rainfall compared with the first IMD forecast. Specially, a much higher deviation level was seen for the year 2019 and 2020.

Fig: 1: Forecast of Rainfall against Actual Rainfall



Source: CEIC, Bank of Baroda Economics Research

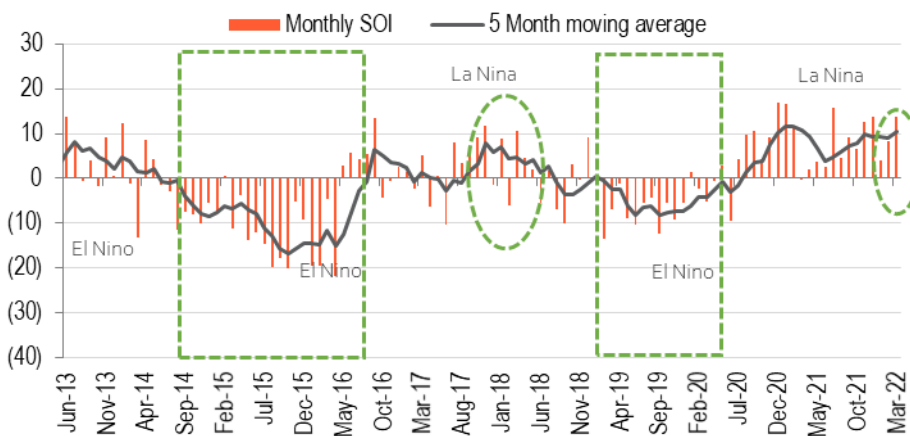
Fig 2: Divergence between prediction and Actual Rainfall



Source: CEIC, Bank of Baroda Economics Research

As per IMD, La-Nina conditions are prevailing over the equatorial region and is expected to continue during the monsoon season for this year. La-Nina is the cool phase of the recurring climate pattern across the pacific. EL-Nino is the warm phase. The southern oscillation index (SOI) signals the development, along with intensity of both these phases. Continuous negative values of SOI lower than (-) 7 implies EL-Nino, while continuous positive value of SOI greater than 7 signal the likelihood of La-Nina. El Nino- impacts the monsoon negatively and La-Nina has a positive impact on the monsoon.

Fig 3: Conditions of La Nina prevalent



Source: CEIC, Bank of Baroda Economics Research

- Is good monsoon a necessary or sufficient condition for good crop:** It is believed that monsoon has a direct bearing on India's agriculture growth. To understand the same, agriculture and allied sectors had moderated marginally by 20bps in FY18 as against FY17 when the monsoon was below normal. Following this, agriculture growth dwindled to as low as 2.2% in FY19 from 6.6% in FY18 which was the period of below normal monsoon. Foodgrains production was also lower. During FY20 and FY21, there was above normal monsoon rains and higher foodgrains production. This was followed by a period of normal

rainfall in FY22, with agriculture growth expected around 3.3% and production levels lower than last year.

Fig 4: Impact of Monsoon on Agriculture growth

Years	Real Agriculture GVA (%)	Actual Rainfall	Foodgrains prodn (Kharif)
FY17	6.8	Normal	Higher
FY18	6.6	Below Normal	Lower
FY19	2.1	Below Normal	Lower
FY20	5.5	Above Normal	Higher
FY21	3.3	Above Normal	Higher
FY22	3.3	Normal	lower

Source: CEIC, Bank of Baroda Economics Research

3. **Production of kharif crops:** In terms of agriculture growth, production of Kharif crops is dependent on monsoon for sowing area. Furthermore, temporal and spatial distribution of rainfall is key in term of which crops will be sown. Heavy rainfall also adversely impacts crop productivity of pulses and soybean. Production of rice (Kharif) has improved in 2021-22 crop year and is also higher than the 5-year average. However, the same cannot be said about other crops.

Table 1: Production of selected Kharif crops over the years

Growth (%)	2017	2018	2019	2020	2021*
Rice (Kharif)	0.9	5.0	0.2	2.1	4.1
Tur	(11.9)	(22.6)	17.2	10.0	(7.4)
Urad (kharif)	26.1	(14.2)	(43.6)	20.3	22.5
Moong (Kharif)	(12.8)	24.5	2.8	9.8	-
Maize (Kharif)	6.3	(3.5)	0.1	10.3	4.8
Soyabean	(16.9)	21.4	(15.4)	14.9	4.0
Groundnut	25.6	(29.1)	55.7	2.0	(2.3)
Cotton	0.7	(14.5)	28.6	(1.9)	(3.4)
Sugarcane	24.1	6.7	(8.6)	7.8	2.1

Note: 2021 is based on 2nd advance estimates. Source: CEIC, Bank of Baroda Economics Research

4. **Onset, Advance and Withdrawal of monsoon:** It has been noticed that monsoon does play pivotal role in terms of production. However uniform distribution of the same is important, besides timely arrival, progress through the monsoon period and final withdrawal. As in the past, untimely withdrawal and prolonged monsoon has wreaked havoc on crop production. Despite having normal rainfall in the last two seasons, La-Nina conditions resulted in uneven distribution of rainfall and also led to more than normal rainfall along with cooler than normal winters. Usually the onset of South-West monsoon begins around 3rd June and progress of the rainfall is also contingent on Indian Ocean Dipole. The IOD is a climatic condition formed through the temperature difference between two different sides of Indian Ocean. This can sometime even stall the progress of rainfall.
5. **MSP/ Inflation:** Going ahead, apart from rainfall, MSP prices ensures to provide remunerative prices to farmers. This will be awaited as this will incentivize the growers and will translate

into higher income. Further, the food basket carries the weight of 45.7% in CPI, hence rainfall plays an integral role in terms of inflation print. Moreover, with the ongoing geopolitical tensions and supply chain disruption there is likelihood of acceleration in overall prices led by entrenched price pressure. It remains to be seen how this will impact the Kharif crops.

Concluding remarks

The prediction of a normal monsoon is a necessary condition for the fructification of a good kharif harvest though not a sufficient one. With over 60% of the land under cultivation dependent on the monsoon, the arrival, spread and progress will drive the cropping pattern and prospects. Ultimately the withdrawal will be important as any delay here can destroy crops as this is also the harvest time.

In 6 of the last 10 years the monsoon came in lower than what was predicted by the IMD/Skymet in terms of % of LPA. Also two successive normal monsoons does not necessarily lead to higher growth rate in agricultural production (as per GVA). Lastly, state of monsoon and production prospects of various crops varies due to other factors including distribution of rainfall, and hence even in normal monsoon years there would be decline in output for some of them.

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