

Source: Australian BOM

## EL Nino Probability in FY24

- **IMD** forecasts 45% to 50% probability
- **NOAA** forecasts 55% to 60% probability
- **Australian BOM** with its El Nino Watch criteria suggest 50% probability

## El Nino, a threat to Indian agri sector

India is an agrarian country with the agriculture sector accounting for ~58% of the population and ~14% of the GDP. Events such as El Nino and La Nina adversely impact the agriculture scenario, and are direct threats to the country's economy. In this report, we highlight the possibility of an El Nino event in FY24 and its possible impact on agriculture and related companies.

- Historically, El Nino events have resulted in below normal monsoon or even drought in India. Agencies across the globe are suggesting a possible (45-60% probability) occurrence of El Nino in the later part of CY23.
- In the past, this has led to a stressed Indian agriculture scenario in the form of lower crop production (mainly affecting kharif crops) and surge in crop prices, thereby adversely impacting farm profitability.
- Further, due to lower farm profitability, consumer companies with higher rural salience also witness muted growth during these events.
- Since agrochemical and fertilizer companies have a strong correlation with monsoon, they reporting muted/lower revenue growth during such events. A possible occurrence of El Nino this year could lead to history getting repeated.

## History of low rainfall and drought...

- El Nino is a temperature anomaly and is scientifically known as the El Niño-Southern Oscillation cycle (ENSO). It is the warm phase of the ENSO, where the water temperature in the Pacific Ocean near the equator becomes abnormally warm. The warm water in the Pacific Ocean interacts with the atmosphere, causing various weather events, ranging from drought to floods.
- In India, El Nino is associated with drought or weak monsoons. Statistics from the year FY01 to FY20 showed that there have been seven instances of El Nino, of which, four instances witnessed drought, i.e., in FY03/FY05/FY10/FY15-16, where the countrywide deficiency was 19%/14%/22%/12-14%, respectively. These years witnessed moderate to very strong El Nino.
- The El Nino event was very strong in FY15 and FY16 and lasted for two years, resulting in lower reservoir levels and prolonged moisture stress, adversely impacting the Kharif and Rabi sowing in India. Rainfall during the period was lower by 12% and 14%, respectively. In an exceptional scenario, in FY98 (period of very strong El Nino), the Indian monsoon witnessed marginally better rainfall, 2% higher than long-period average.
- IMD's forecast indicates a 45-50% chance of an El Nino emerging in FY24 from Jul'23 to Sep'23, coinciding with the monsoon season; however, a clearer picture on the occurrence of the event will be confirmed in April'23.
- The National Oceanic and Atmospheric Administration (NOAA), situated in the US, also forecasted a high possibility of 55-60% (highest among all predictions) of El Nino re-emerging in Jun-Dec'23. El Nino occurred in just three of the six years in which NOAA predicted in February, with other years remaining normal.
- The Australian Bureau of Meteorology (BOM) has indicated that the criteria for El Nino Watch have been met (Refer Exhibit 5) and the historical data suggests 50% chance of El Nino occurrence if the forecast has reached watch category.

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- Analyzing the data in Exhibit 1 and 2, we can witness an increasing gap along with increasing intensity of very strong El Nino events. Very strong El Nino events were witnessed in FY73/FY83/FY98/FY15-16, which occurred in a gap of 10/15/18 years, respectively. Going by this data, the recent very-strong El Nino event occurred in FY15-16, which indicates that another very strong event is not expected this year or anytime soon.

#### **...resulting in low crop production and surge in crop prices**

- The growth of kharif crops might be adversely impacted if El Nino materializes. In the event of a severe El Nino, the crops most likely to be impacted include paddy (a water guzzler), groundnuts, and pulses. Also, cotton and sugarcane production might suffer.
- During the previous El Nino events, statistics indicate that the Kharif crop production gets majorly impacted. In FY16/FY10/FY05/FY02, the production witnessed a decline of 3%/10%/8%/16% YoY, respectively. The impact on Rabi was not as severe as kharif; however, the impact was still visible in some of the years. In FY15/FY10/FY03, production declined 8%/3%/7% YoY.
- In terms of specific crops, rice production declined in FY10/FY05/FY03 by 10%/6%/23% YoY; wheat production declined in FY15/FY05/FY03 by 10%/5%/10% YoY; pulses were the worst impacted as they declined 5%/11%/12%/17% YoY in FY16/FY15/FY05/FY03, respectively. The impact on cotton/sugarcane was moderate with production decline in two/one out of five El Nino-caused drought events in India.
- The lower production in turn caused supply constraints, thereby inflating the crop prices post El Nino events. In the recent event of El Nino, prices of crops such as paddy/wheat/bajra/ cotton/sugar surged 45%/18%/17%/15%/19% YoY in FY16.
- So overall, El Nino stresses farm profitability in terms of lower sowing, production and inflated crop prices.

#### **Impact of El Nino on domestic agrochemical and fertilizer companies**

- Agro-chemical and fertilizer companies too are not spared by the El Nino event. The lower sowing and production of crops adversely impacts the demand for agrochemicals and fertilizers, thereby, adversely impacting their sales and margins.
- We analysed the domestic business of agrochemicals companies such as UPL, Coromandal International (CRIN), PI Industries (PI), Rallis India, Godrej Agrovet (GoAgro), Insecticide India, Bayer and Dhanuka Agritech.
- The strong revenue growth (in the range of 12-26% YoY) of the agrochemical companies prior to FY16 came to an end due to a two-year El Nino event in FY15 and FY16. The aggregate revenue growth of the agrochemical company basket turned negative in FY16 (down 7% YoY), followed by a muted growth of 6%/3% in FY17/FY18. (Refer Exhibit 11)
- However, the major impact was seen in the fertilizer companies, where the volumes were hampered during the event. We evaluated the revenue of CRIN's fertilizer business and Chambal Fertilizers (CHMB). The revenue for both the companies were muted in FY16 (i.e., +2%/-6%, respectively) with a further drop in FY17 at -13%/-16%, respectively. (Refer Exhibit 10)

### Impact of El Nino on consumer companies with high rural salience

- The El Nino events causing drought also have their negative impact on rural consumption story due to below normal monsoon and lower farm profitability.
- We have analyzed companies with higher rural salience such as DABUR, Britannia (BRIT), Colgate-Palmolive (CLGT), Emami (HMN), HUL (HUVR), and Tata Consumer (TATACONS). As the numbers suggest, these companies reported muted revenue growth (2% YoY) during the last El Nino event, i.e., FY16. (Refer Exhibit 11)
- Further, the management commentary across these companies have also supported the analysis of lower monsoon resulting in distressed rural demand scenario. Consumer companies with high rural dependency would experience a negative impact on their revenue and profitability.

### Companies take on El Nino

- Managements of agrochemical and fertilizer companies have commented on their preparedness and strategy to tackle the event.
- **Dhanuka Agritech:** MK Dhanuka (MD), in his recent media interview, mentioned that he does not see any major impact of El Nino on the Indian agriculture sector, on the back of the government's increasing focus on building strong irrigation facility and good water levels in the dam to support the agriculture activities. He also mentioned that the company will focus on green patches (with good rainfall) to achieve the double-digit growth target in FY24 that the company has guided earlier.
- **GoAgro:** We interacted with Mr. Balram Yadav (MD) and he indicated that they are also tracking the event closely and the event can be confirmed only toward the end of March. However, the company, over the last few years, has increased the share of Rabi products in its portfolio to 40% from 30% earlier, which will reduce the impact of El Nino.

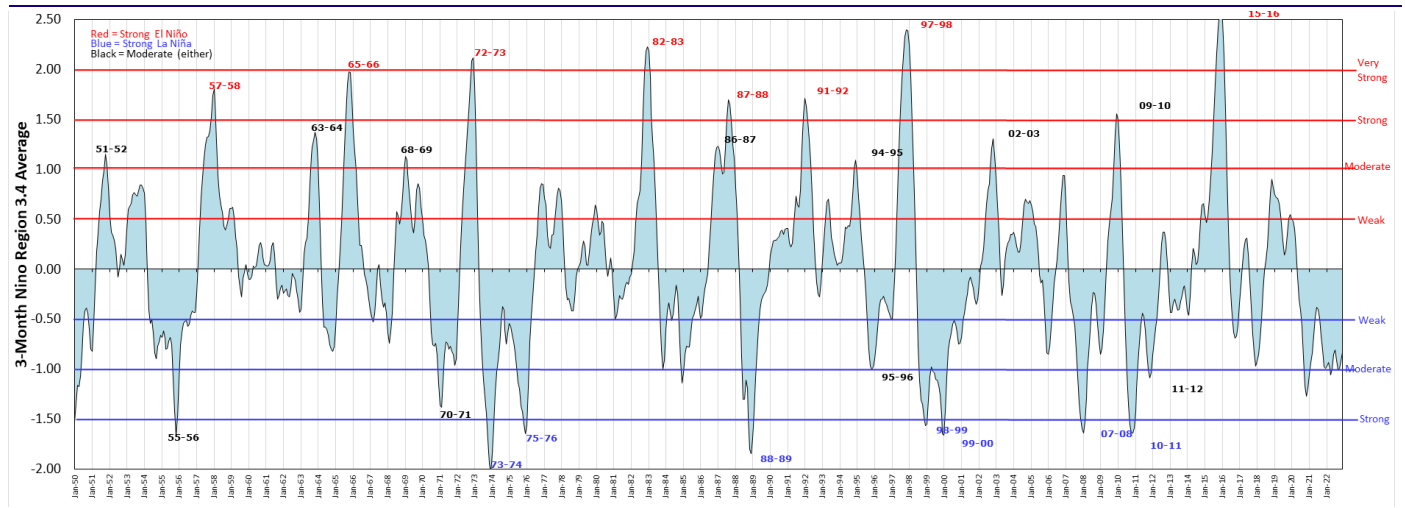
### View

- If the El Nino event in FY24 materializes into drought, it can adversely impact the Indian agriculture sector. The probabilities by the agencies and their forecasting accuracies based on historic trend suggest a possible occurrence of the event in FY24.
- The Indian agrochemical and fertilizer companies may get negatively impacted, due to lower sowing and production of crops impacting the demand. Also, FY22 and 9MFY23 were a muted period for these companies with lower gross margins and volume. So, the adverse impact of El Nino can lead to correction in the prices of this company. We believe this will be an opportunity to look into fundamentally strong companies.
- PI/CRIN are our top picks in the agrochemical/fertilizer space and any negative impact on the performance of the company can be a good opportunity to build positions in both the companies.
- In the Fertilizer space, we have a BUY rating on CRIN. In the Agrochemicals space, we have a BUY rating on PI and GOAGRO and a Neutral rating on UPLL.

**Exhibit 1: El Niño and La Niña event years and intensity since 1951-52**

| El Niño - 26 |              |            |                 | La Niña - 25 |              |            |
|--------------|--------------|------------|-----------------|--------------|--------------|------------|
| Weak - 11    | Moderate - 7 | Strong - 4 | Very Strong - 4 | Weak - 11    | Moderate - 6 | Strong - 7 |
| 1952-53      | 1951-52      | 1957-58    | 1972-73         | 1954-55      | 1955-56      | 1973-74    |
| 1953-54      | 1963-64      | 1965-66    | 1982-83         | 1964-65      | 1970-71      | 1975-76    |
| 1958-59      | 1968-69      | 1987-88    | 1997-98         | 1971-72      | 1995-96      | 1988-89    |
| 1969-70      | 1986-87      | 1991-92    | 2015-16         | 1974-75      | 2011-12      | 1998-99    |
| 1976-77      | 1994-95      |            |                 | 1983-84      | 2020-21      | 1999-00    |
| 1977-78      | 2002-03      |            |                 | 1984-85      | 2021-22      | 2007-08    |
| 1979-80      | 2009-10      |            |                 | 2000-01      |              | 2010-11    |
| 2004-05      |              |            |                 | 2005-06      |              |            |
| 2006-07      |              |            |                 | 2008-09      |              |            |
| 2014-15      |              |            |                 | 2016-17      |              |            |
| 2018-19      |              |            |                 | 2017-18      |              |            |
|              |              |            |                 | 2022-23      |              |            |

Source: GGWeather, MOFSL

**Exhibit 2: Oceanic Niño Index historic trend**

Note: The ONI has become the de-facto standard that NOAA use for classifying El Niño and La Niña events in the eastern tropical Pacific.

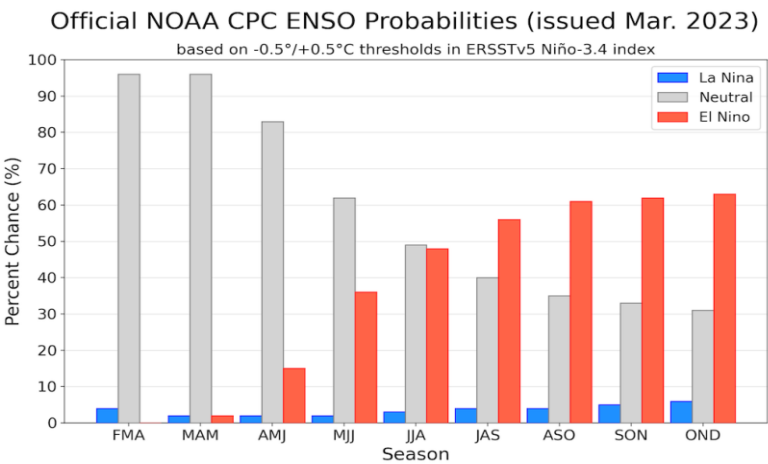
Source: NOAA, MOFSL

**Exhibit 3: Droughts and Flood during El Niño and La Niña Events**

| El Niño years | Event   | La Niña years | Event  | Neutral years |
|---------------|---------|---------------|--------|---------------|
| 1969-70       |         | 1970-71       | Floods | 1966-67       |
| 1972-73       | Drought | 1971-72       | Floods | 1967-68       |
| 1977-78       |         | 1973-74       |        | 1968-69       |
| 1982-83       | Drought | 1974-75       |        | 1976-77       |
| 1987-88       | Drought | 1975-76       | Floods | 1978-79       |
| 1991-92       |         | 1988-89       | Floods | 1979-80       |
| 1992-93       | Drought | 1996-97       |        | 1980-81       |
| 1993-94       |         | 1998-99       |        | 1981-82       |
| 1994-95       |         | 1999-2000     | Floods | 1983-84       |
| 1997-98       |         | 2000-01       |        | 1984-85       |
| 2002-03       | Drought | 2007-08       | Floods | 1985-86       |
| 2004-05       | Drought | 2008-09       | Floods | 1986-87       |
| 2006-07       |         | 2010-12       |        | 1989-90       |
| 2009-10       | Drought | 2016-17       |        | 1990-91       |
| 2014-16       | Drought | 2017-18       |        | 1995-96       |
| 2018-19       |         | 2020-21       |        | 2001-02       |
|               |         | 2021-23       |        | 2003-04       |
|               |         |               |        | 2005-06       |

Source: Research Paper by R. Bhatla (Institute of Science, Banaras Hindu University)

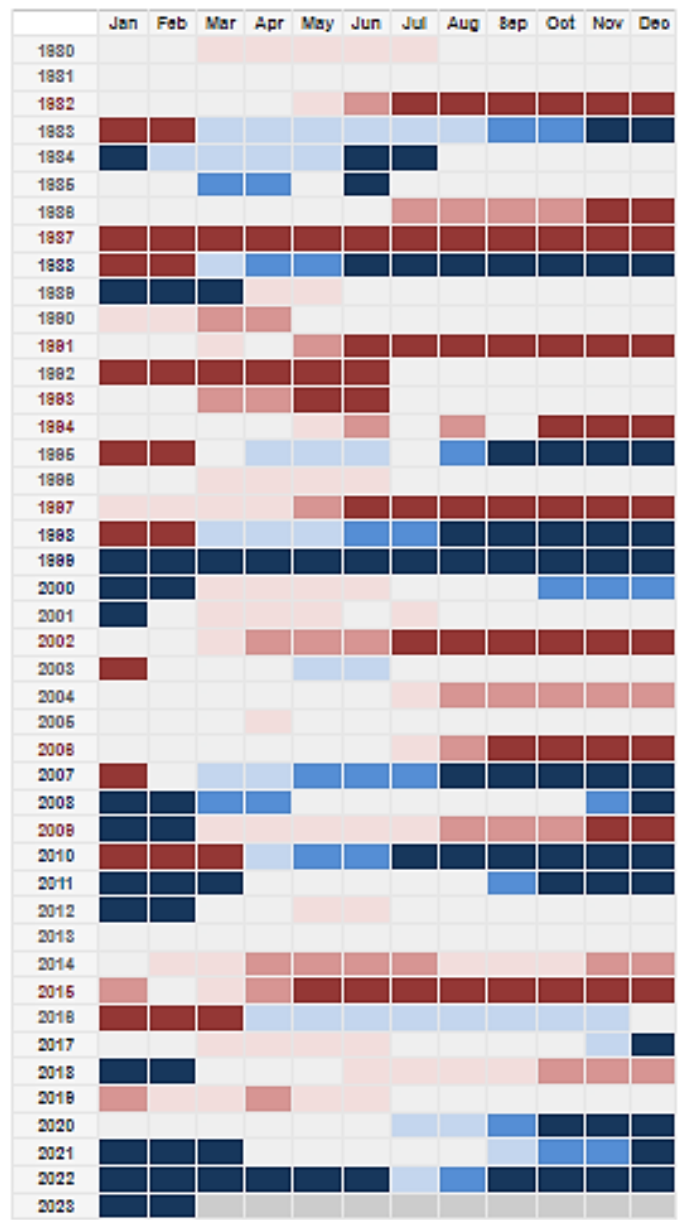
Exhibit 4: Official NOAA CPC ENSO Probabilities (issued in Mar'23)



Source: NOAA, MOFSL

Exhibit 5: Australian BOM Monthly ENSO Forecast value

Legends



|  |               |
|--|---------------|
|  | El Niño WATCH |
|  | El Niño ALERT |
|  | EL NIÑO       |
|  | INACTIVE      |
|  | La Niña WATCH |
|  | La Niña ALERT |
|  | LA NIÑA       |

Verification of the ENSO Forecast system found that for El Niño and La Niña events:

- 1. About 50% of the time a WATCH was reached, an ENSO event subsequently occurred; and
- 2. About 70% of the time an ALERT was reached, an ENSO event subsequently occurred.

Source: Australian BOM

**Exhibit 6: Kharif crops production were majorly impacted during El Nino drought years**

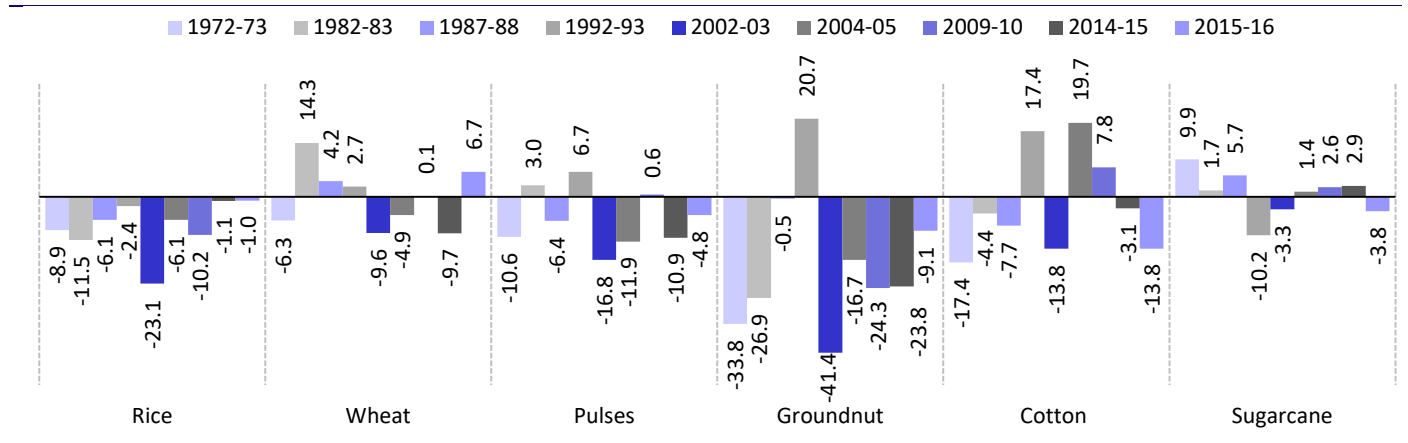
| Year    | Kharif |            |       |                    | Rabi  |            |       |                    | Total  |            |       |                    |
|---------|--------|------------|-------|--------------------|-------|------------|-------|--------------------|--------|------------|-------|--------------------|
|         | Area   | Production | Yield | YoY Δ production % | Area  | Production | Yield | YoY Δ production % | Area   | Production | Yield | YoY Δ production % |
| 1971-72 | 79.22  | 62.99      | 795   | -5                 | 43.4  | 42.18      | 972   | 3                  | 122.62 | 105.17     | 858   | -2                 |
| 1982-83 | 79.08  | 69.90      | 884   | -7                 | 46.02 | 59.62      | 1296  | 9                  | 125.1  | 129.52     | 1035  | 0                  |
| 1986-87 | 81.46  | 80.20      | 985   | -5                 | 45.74 | 63.22      | 1382  | -2                 | 127.2  | 143.42     | 1128  | -4                 |
| 1991-92 | 78.02  | 91.59      | 1,174 | -5                 | 43.85 | 76.79      | 1751  | 7                  | 121.87 | 168.38     | 1382  | 0                  |
| 2002-03 | 68.56  | 87.22      | 1,272 | -16                | 45.3  | 87.55      | 1933  | -7                 | 113.86 | 174.77     | 1535  | -11                |
| 2004-05 | 72.26  | 103.31     | 1,430 | -8                 | 47.82 | 95.05      | 2004  | 0                  | 120.08 | 198.36     | 1652  | -4                 |
| 2009-10 | 69.51  | 104.00     | 1,496 | -10                | 51.83 | 114.11     | 2202  | -3                 | 121.34 | 218.11     | 1798  | -6                 |
| 2014-15 | 68.77  | 128.06     | 1862  | 0                  | 55.53 | 123.96     | 2232  | -8                 | 124.3  | 252.02     | 2028  | -4                 |
| 2015-16 | 69.2   | 125.09     | 1808  | -3                 | 54.01 | 126.45     | 2341  | 5                  | 123.22 | 251.54     | 2041  | 1                  |

Source: Agricoop, MOFSL

**Exhibit 7: Productions of key crops during El Nino drought years**

| Drought years | Rice       |         |  | Wheat      |         |  | Pulses     |         |  | Groundnut  |         |  | Cotton     |         |  | Sugarcane  |         |  |
|---------------|------------|---------|--|------------|---------|--|------------|---------|--|------------|---------|--|------------|---------|--|------------|---------|--|
| Year          | Production | YoY Δ % |  | Production | YoY Δ % |  | Production | YoY Δ % |  | Production | YoY Δ % |  | Production | YoY Δ % |  | Production | YoY Δ % |  |
| 1972-73       | 39.24      | -9      |  | 24.74      | -6      |  | 9.91       | -11     |  | 4.09       | -34     |  | 5.74       | -17     |  | 124.87     | 10      |  |
| 1982-83       | 47.12      | -12     |  | 42.79      | 14      |  | 11.86      | 3       |  | 5.28       | -27     |  | 7.53       | -4      |  | 189.51     | 2       |  |
| 1987-88       | 56.86      | -6      |  | 46.17      | 4       |  | 10.96      | -6      |  | 5.85       | -1      |  | 6.38       | -8      |  | 196.74     | 6       |  |
| 1992-93       | 72.86      | -2      |  | 57.21      | 3       |  | 12.82      | 7       |  | 8.56       | 21      |  | 11.4       | 17      |  | 228.03     | -10     |  |
| 2002-03       | 71.82      | -23     |  | 65.76      | -10     |  | 11.13      | -17     |  | 4.12       | -41     |  | 8.62       | -14     |  | 287.38     | -3      |  |
| 2004-05       | 83.13      | -6      |  | 68.64      | -5      |  | 13.13      | -12     |  | 6.77       | -17     |  | 16.43      | 20      |  | 237.09     | 1       |  |
| 2009-10       | 89.09      | -10     |  | 80.8       | 0       |  | 14.66      | 1       |  | 5.43       | -24     |  | 24.02      | 8       |  | 292.3      | 3       |  |
| 2014-15       | 105.48     | -1      |  | 86.53      | -10     |  | 17.15      | -11     |  | 7.4        | -24     |  | 34.8       | -3      |  | 362.33     | 3       |  |
| 2015-16       | 104.41     | -1      |  | 92.29      | 7       |  | 16.32      | -5      |  | 6.73       | -9      |  | 30.01      | -14     |  | 348.45     | -4      |  |

Source: Agricoop, MOFSL

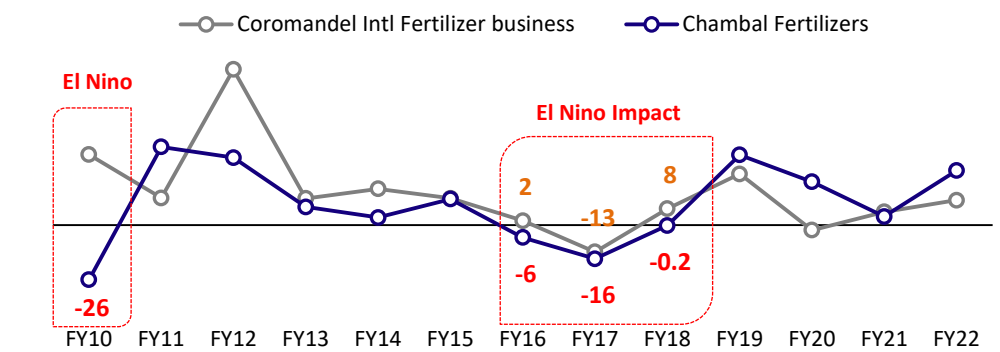
**Exhibit 8: Kharif crops and a few Rabi crops such as wheat witnessed a decline in production**

Source: Agricoop, MOFSL

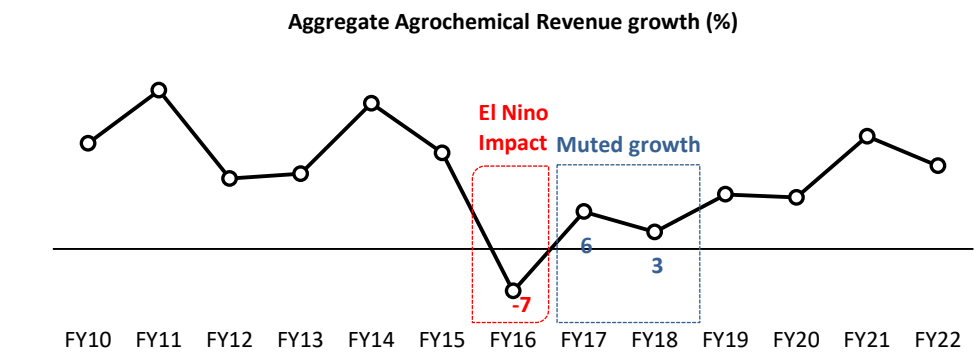
**Exhibit 9: Prices of key crops surged during and post El Nino Event**

| Year | Rice  | Δ YoY % | Wheat | Δ YoY % | Bajra | Δ YoY % | Maize | Δ YoY % | Cotton | Δ YoY % | Sugar | Δ YoY % |
|------|-------|---------|-------|---------|-------|---------|-------|---------|--------|---------|-------|---------|
| CY15 | 1,325 | NA      | 1,695 | 1       | 1,235 | 6       | 1,780 | 23      | 4,650  | 12      | 3,200 | 11      |
| CY16 | 1,925 | 45.3    | 2,000 | 18      | 1,445 | 17      | 1,610 | -10     | 5,350  | 15      | 3,800 | 19      |
| CY17 | 2,210 | 14.8    | 1,780 | -11     | 1,165 | -19     | 1,410 | -12     | 5,250  | -2      | 3,425 | -10     |
| CY18 | 2,310 | 4.5     | 2,090 | 17      | 1,645 | 41      | 1,905 | 35      | 5,400  | 3       | 3,140 | -8      |
| CY19 | 2,175 | -5.8    | 2,340 | 12      | 1,940 | 18      | 2,385 | 25      | 5,425  | 0       | 3,475 | 11      |
| CY20 | 1,965 | -9.7    | 1,845 | -21     | 1,375 | -29     | 1,545 | -35     | 5,625  | 4       | 3,320 | -4      |
| CY21 | 2,360 | 20.1    | 2,170 | 18      | 1,690 | 23      | 1,950 | 26      | 8,650  | 54      | 3,580 | 8       |
| CY22 | 2,850 | 20.8    | 2,910 | 34      | 2,140 | 27      | 2,420 | 24      | 8,300  | -4      | 3,540 | -1      |

Note: Prices are INR/Quintal; Source: Bloomberg, MOFSL

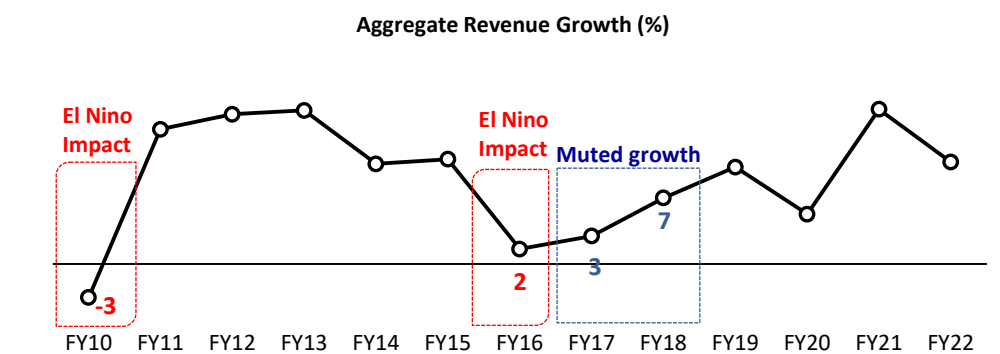
**Exhibit 10: Muted Revenue growth (%) for Indian Fertilizer companies post El Nino events**

Source: MOFSL

**Exhibit 11: Revenue growth (%) for Indian Agrochemical companies dropped post El Nino events**

Note: Aggregate includes India business of companies such as UPL, CRIN (CP), PI (CP), Rallis, GoAgro, Dhanuka, Bayer, and Insecticide India.

Source: MOFSL

**Exhibit 12: Revenue growth (%) for Consumer companies with high rural salience dropped due to an El Nino event**

Note: Aggregate includes companies such as DABUR, BRIT, CLGT, HMN, HUVR, TATACONS

Source: MOFSL

NOTES



| Explanation of Investment Rating |  |
|----------------------------------|--|
| Investment Rating                | Expected return (over 12-month)  |
| BUY                              | >=15%  |
| SELL                             | < - 10%  |
| NEUTRAL                          | < - 10 % to 15%  |
| UNDER REVIEW                     | Rating may undergo a change  |
| NOT RATED                        | We have forward looking estimates for the stock but we refrain from assigning recommendation |

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