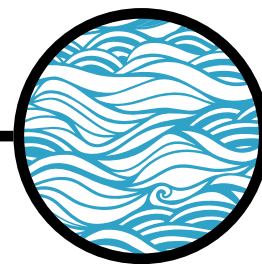


# La Niña



## anticipating the outcomes for agricultural investments

After a near-record El Niño, the likelihood of an impending La Niña – the flip-side of El Niño – is currently estimated at 55–60%. As every La Niña event may have different outcomes, which benefit some agricultural producers and harm others, a thorough understanding of this climate phenomenon is a key success factor not just for food security, but also for agricultural financing.

Climate and weather patterns are one of the most significant limiting factors of agricultural production<sup>1</sup>. Production intensity and yield strongly depend on favourable weather conditions and impact global food security as well as the employment situation of more than 1 billion people around the world.<sup>2</sup>

El Niño and La Niña, together called El Niño Southern Oscillation (ENSO), are considered the most important climate process besides the seasonal changes. ENSO refers to the irregular periodical variations in winds and sea surface temperatures in the equatorial Eastern Pacific Ocean.<sup>3</sup> The two extreme phases of this oscillation are known as El Niño and La Niña.

After one of the strongest El Niños in 2015/16 made 2015 the warmest year in global history, there is currently a 55–60% chance of a La Niña event occurring in autumn and winter 2016/17.<sup>4</sup>

### What is La Niña?

La Niña is a coupled ocean-atmospheric phenomenon that is the counterpart of El Niño as part of the broader ENSO climate pattern. During a period of La Niña, the sea surface temperature across the equatorial Eastern Central Pacific Ocean is about 3–5 °C lower than normal.

Unlike El Niño, which usually lasts no more than a year, a La Niña event may last between one and three years and occurs in a 2-to-7-year cycle. La Niña

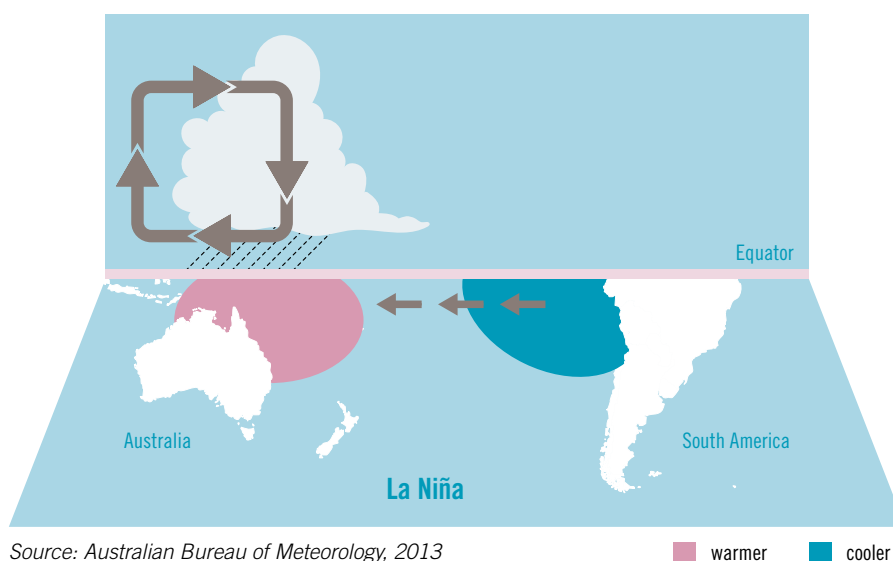
usually follows an El Niño event as its “little sister”, especially when the precedent was very strong. La Niña typically develops from April to June, peaks between December and April, and fades from May to July, although other patterns have been recorded.

In the early 20th century, Peruvian fishermen were the first to notice a correlation between temperature changes and anchovy stocks although variations in fish stock had been observed since the 17th century. During El Niño events the stock was usually very low, whereas the catch was higher than usual during La Niña

events. As this happened around Christmas, the phenomenon was named after baby Jesus (El Niño in Spanish) and the opposite event La Niña.

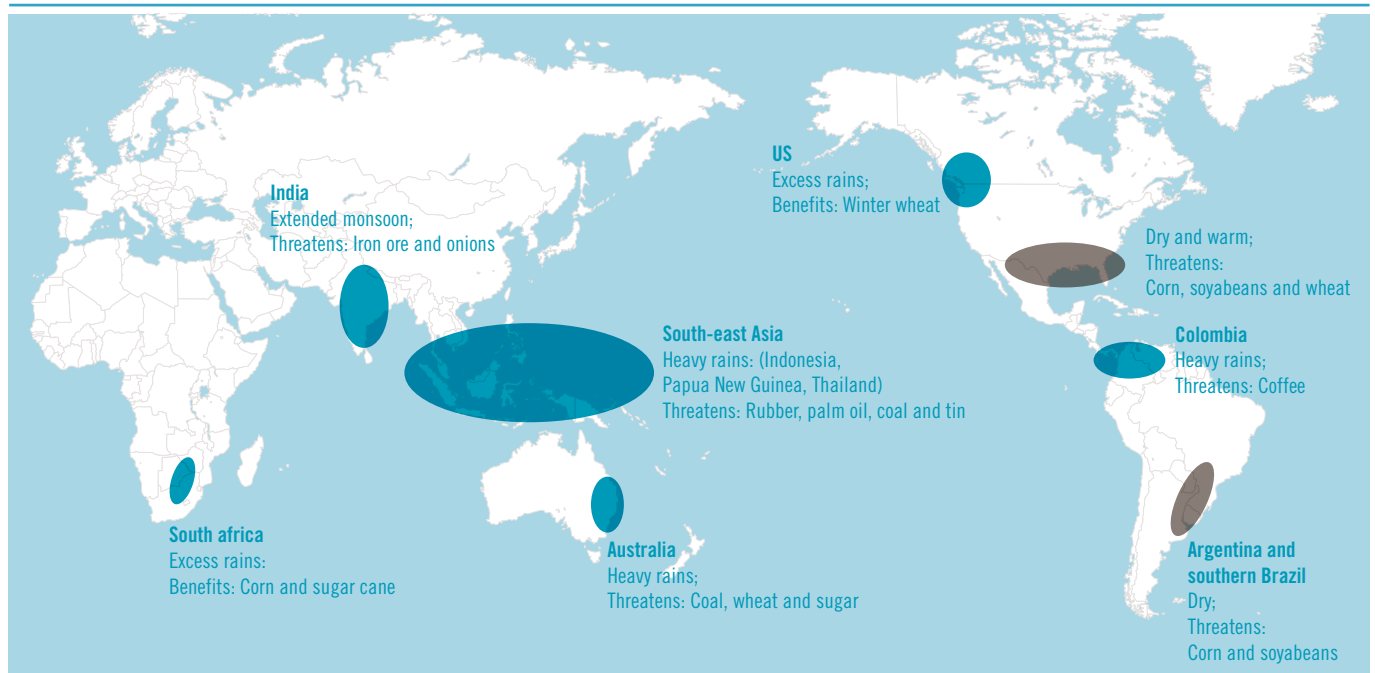
**„Climate and weather patterns impact agriculture productivity“**

Chart 1: The La Niña phenomenon



Source: Australian Bureau of Meteorology, 2013

Chart 2: La Niña's impact on agriculture by region



Source: Financial Times, January 2016

### What are the impacts of La Niña?

While the mechanisms that cause the oscillation remain the subject of scientific research, the impact of La Niña is documented and forecasts of potential impacts can be made. However, every event is different and the forecasts are based on significant recurring statistical patterns from past events.

**“La Niña is a risk, but also has benefits.”**

La Niña can cause droughts along the western coast of South America, southern California, Chile, southern Brazil and northern Argentina as well as in East Africa. It leads to increased rainfall in northern Brazil, Indonesia, Malaysia and northern Australia and brings stronger than average monsoons to India and

Bangladesh. Southern and western Africa also receive additional rainfall. In addition, La Niña is said to increase the probability of strong hurricanes in the Atlantic, threatening the US and Caribbean coastal regions, as well as cyclones in the western Pacific (see chart 2).

While some of these outcomes can be beneficial, the phenomenon is better known for the damages it causes: harvests can be destroyed, threatening food security in many regions. The last severe La Niña event, reported in 2010–2011, resulted in more than 100,000 deaths due to the East African drought as well as several billion dollars in crop and infrastructure damage. Economic damages in Colombia alone amounted to USD 7.8 billion – nearly 2% of the country’s GDP (Gross domestic product) at the time.<sup>5</sup>

During the 1998–1999 La Niña event, one of the strongest in decades, more than 66% of Bangladesh’s territory was flooded. Food shortages and waterborne diseases affected more than 30 million people and killed several thousand. Total damages of well over USD 2.5 billion caused GDP growth to slow to 3.3% from the previous 5.6%. With 4.5 million

tonnes of crop lost, Bangladesh became a large-scale importer of rice, which put the government’s budget under severe pressure.<sup>6</sup> During that same La Niña event, Hurricane Mitch, one of the strongest and deadliest hurricanes on record, killed more than 11,000 people in Honduras and Nicaragua and affected most of Central America, leading to USD 6.2 billion in total damages.

### La Niña and commodity prices

Every La Niña event may have different outcomes, and stock levels, previous harvests, supply and demand dynamics, political structures etc. are other important factors when analysing its impact on commodities.

According to Allan Brunner from the International Monetary Fund (IMF), El Niño generally leads to commodity price increases, whereas La Niña typically results in lower commodity prices. The 1982–83 El Niño had a dramatic effect on commodity prices, which rose by 30% as a result. By contrast, the 1970–71 and 1988–89 La Niña events appear to have lowered commodity prices by just 10%.<sup>7</sup>

While commodity markets certainly factor in La Niña once it starts disrupting harvests and transportation infrastructure, research has shown that financial and agriculture markets generally do not anticipate La Niña events although economically and statistically significant impact forecasts exist, hence potentially leading to market disruptions.

### responsAbility and La Niña

Given the damages it can cause, La Niña requires constant monitoring for agricultural investors. For [responsAbility Investments AG\\*](#), which invests in many different traditional and non-traditional commodities that are traded in smaller quantities, no projection can be made as to how the development will impact commodity prices for our clients in general.

As of 30 June 2016, responsAbility had a well-diversified portfolio with investments in 55 different commodities across 49 countries, most of which are of short-term duration (under one year). La Niña represents both a risk and an opportunity to our counterparties and

## **“responsAbility has a well-diversified portfolio.”**

could thus impact our portfolio and pipeline: For example, the 2017 cashew harvest could result in higher output for West African producers thanks to more rainfall and colder temperatures, whereas Mozambican output might be threatened by floods. Peruvian grape producers could profit from increased rainfall in coastal regions, whereas potential drought conditions in California might reduce output and drive global grape prices upwards.

To better understand the dynamics of this phenomenon, we have created a database that incorporates data from previous La Niña events to point out likely impacts on our portfolio. The assessments are based on each country's local climate and harvest dynamics and are continuously

updated as La Niña progresses. Agricultural investment officers can thus establish whether increased risks may arise in the following planting and harvest season to better assess the risks for new and existing investments. The close exchange with our clients combined with advice on potential mitigants such as irrigation or planting different crops are key success factors in our efforts to maintain a strong portfolio and promote growth.

In developing and emerging economies, agriculture is the largest contributor to GDP. According to the World Bank, the sector accounts for 26.7% of GDP in the least developed countries.<sup>8</sup> These countries rely on small farms with little available technology for food and cash crop production. *As a result, a thorough understanding of climate and weather is therefore not just a critical success factor for food security and national income, but also defines the success of agricultural financing. In the case of El Niño there was very limited impact on our portfolio.* Therefore, responsAbility closely monitors the occurrence of weather phenomena and adapts its investment strategy accordingly.

<sup>1</sup> *Climate Education for Agriculture, 2010* <http://climate.ncsu.edu/edu/ag/ClimateandWeather>

<sup>2</sup> *Momagri; 28 July 2016* [http://www.momagri.org/UK/agriculture-s-key-figures/With-close-to-40-%25-of-the-global-workforce-agriculture-is-the-world-s-largest-provider-of-jobs-\\_1066.html](http://www.momagri.org/UK/agriculture-s-key-figures/With-close-to-40-%25-of-the-global-workforce-agriculture-is-the-world-s-largest-provider-of-jobs-_1066.html)

<sup>3</sup> *Climate Prediction Center; 2016:* [http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/ensostuff/ensofaq.shtml#ENSO](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensofaq.shtml#ENSO)

<sup>4</sup> *International Research Institute for Climate and Society; 16 July 2016:* [http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso\\_tab=enso-cpc\\_update](http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-cpc_update)

<sup>5</sup> *Hoyos, Escobar, Restrepo, Arango & Ortiz, 2013:* [http://www.stri.si.edu/sites/publications/PDFs/STRI-W\\_Jaramillo\\_Hoyos\\_2013\\_LaNina\\_Effect\\_on\\_Colombia.pdf](http://www.stri.si.edu/sites/publications/PDFs/STRI-W_Jaramillo_Hoyos_2013_LaNina_Effect_on_Colombia.pdf)

<sup>6</sup> *Shekhar Shah, World Bank, 1999:* <http://siteresources.worldbank.org/INTPOVERTY/Resources/WDR/stiglitz/Shah.pdf>

<sup>7</sup> *IMF, 2002:* <https://www.imf.org/external/np/ins/english/pdf/CourVol4.pdf>

<sup>8</sup> *World Bank, 2014*

\* *responsAbility is not a direct investor and does not provide direct financing. However funds managed by responsAbility provide investors with more diversification and investing options to invest in the specified markets, countries, companies, institutions, instruments, or sectors.*

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