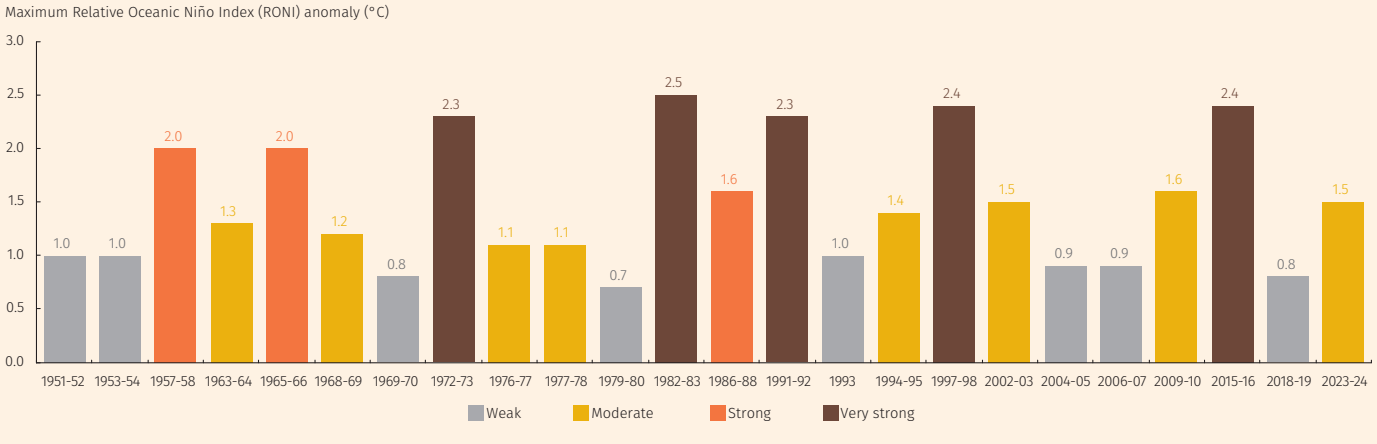
Box 1
El Niño Phenomenon

The *El Niño*-Southern Oscillation (ENSO) phenomenon is an oceanic and atmospheric phenomenon that occurs in the central and eastern tropical Pacific Ocean. Its warm phase (known as *El Niño*) corresponds to persistent and anomalous warming of surface waters off the coasts of Peru and Ecuador, while its cold phase (*La Niña*) is characterized by cooling of these same waters. Although ENSO has global effects, in the case of Colombia, its effect is a significant reduction in rainfall and an increase in air temperature, particularly in the Caribbean, Andean, and Pacific regions.

For several decades, the international meteorological community has used the Oceanic Niño Index (ONI) as a reference for identifying the occurrence and intensity of the phenomenon. This index, calculated by the U.S. National Oceanic and Atmospheric Administration (NOAA), measures the deviation of sea surface temperature in the Niño 3-4 region of the central Pacific from a rolling thirty-year climatological average. An *El Niño* episode is considered to occur when this index persistently exceeds the +0.5°C threshold for at least five consecutive rolling three-month periods, and the intensity of the event is classified into four categories: weak (+0.5 to +0.9 °C), moderate (+1.0 to +1.4 °C), strong (+1.5 to +1.9 °C), and very strong or extreme (+2.0 °C or higher).

At the beginning of 2026, in response to the structural warming of the ocean, NOAA replaced the ONI with the Relative Oceanic Niño Index (RONI). In a context in which the Earth's temperature has exceeded, on average over the last three years, the critical threshold of 1.5°C established in the 2016 Paris Agreement, the reference climatological average of the ONI had been steadily increasing, making it difficult to distinguish the cyclical signal inherent to ENSO from the trend component associated with global warming. The RONI corrects this bias by subtracting from the anomaly in the Niño 3-4 region the average warming observed in the rest of the tropical belt, thereby allowing for more precise identification of the onset, duration, and intensity of each episode. This methodological change—discussed in detail in Box 2 of the April 2026[1] *Monetary Policy Report*—is the standard currently used by the technical staff of *Banco de la República* in its monitoring and forecasting exercises, and is the one used in this box.

Graph B1.1
Intensity of *El Niño* Episodes, 1950–2024



Source: National Oceanic and Atmospheric Administration (NOAA) – Climate Prediction Center (RONI); calculations by *Banco de la República*.

1 See: https://repositorio.banrep.gov.co/server/api/core/bitstreams/9d957fd9-5082-420b-8dcb-72ffb3526d4e/content

A review of the available oceanographic records since 1950 shows that the *El Niño* phenomenon (like *La Niña*) does not follow regular patterns of onset, occurrence, duration, or intensity. Between 1950 and 2024, according to the RONI, twenty-four *El Niño* episodes have been recorded: eight of weak intensity, eight moderate, and eight strong to very strong, five of which have been classified as very strong. In the second half of the twentieth century, warm events predominated over cold ones, a situation that has been reversed so far this century. The duration of each *El Niño* episode ranges from five to eighteen months, with an overall average of close to ten months. The evidence also shows an increasing relationship between intensity and duration: very strong episodes have lasted, on average, close to fourteen months, while weak ones last around eight months.

Five episodes stand out for their magnitude and macroeconomic impact on the Colombian economy. The 1982-1983 episode was associated with severe adverse effects on the agricultural sector and upward pressures on food prices. The 1991-1992 episode led to the most severe electricity rationing in the country's recent history, in a context of high dependence on hydropower and low diversification of the energy mix. The 1997-1998 episode (one of the most intense of the twentieth century) generated significant shocks to food inflation. More recently, the 2014-2016 and 2023-2024 episodes contributed significantly to the upward pressures observed on food and regulated prices during those periods and evidenced the persistence of transmission channels, despite improvements in energy infrastructure and institutional response capacity (Table B1.1).

Table B1.1
Major Strong or Very Strong El Niño Episodes

Episode	Intensity	Max. ONI (°C)	Max. RONI (°C)	Macroeconomic Impacts in Colombia
1982-1983	Very strong	2.2	2.5	Severe dampening on agriculture; upward pressures on food prices.
1991-1992	Strong	1.7	2.3	National electricity rationing (1992 power blackout).
1997-1998	Very strong	2.4	2.4	Significant shocks to food price inflation and the balance of payments.
2009-2010	Moderate	1.6	1.6	Pressures on food prices; limited sectoral effects.
2014-2016	Very strong	2.8	2.4	Significant contribution to the acceleration of inflation in 2015–2016.
2023-2024	Strong	2.1	1.5	Increases in energy rates and perishable prices; effects on expectations.

Note: The intensity classification is based on the ONI. For some episodes, particularly the more recent ones, the RONI may fall into a different category because of the adjustment for mean tropical ocean warming.
Source: NOAA – Climate Prediction Center (ONI and RONI) and IDEAM; calculations by *Banco de la República.*

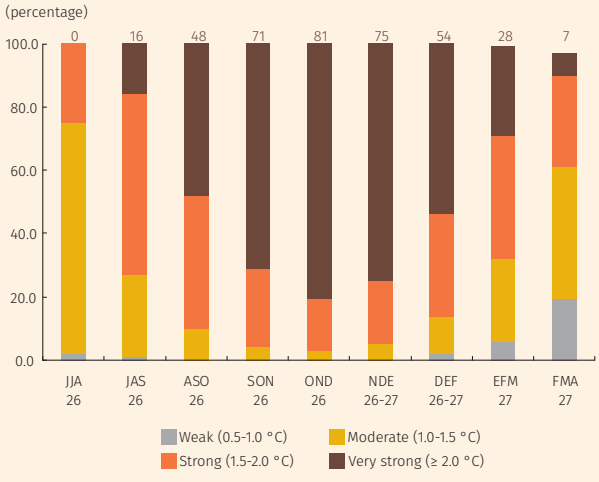
For Colombia, the evidence in the literature suggests that the main transmission channel of *El Niño* to the economy are through food, energy, and agricultural activity. The magnitude of the impact depends on the intensity and duration of the phenomenon, and on producers' response.

First, reduced rainfall and higher temperatures affect agricultural production. Second, lower water availability reduces inflows into reservoirs in the electricity system and puts upward pressure on electricity and gas rates, with a direct impact on the regulated-price basket. Third, higher food prices are passed through to food away from home and, through this channel, to services inflation. Finally, direct shocks to food and regulated prices generate second-round effects on inflation expectations and on the other CPI baskets.

The quantification of these effects has been studied by the technical staff of *Banco de la República*. The available empirical evidence suggests that an *El Niño* phenomenon could cause annual headline inflation to deviate by several dozen basis points (bp) above its

baseline[2] path, with more pronounced impacts during strong and very strong episodes and limited effects during weak[3] ones. These estimates are subject to a high degree of uncertainty, as the final effects may be affected by the presence of other simultaneous shocks during climatic episodes (transportation cost shocks, greater depreciation, etc.) and by the response of economic agents to the shock.

Graph B1.2
Probability of El Niño Phenomenon Intensity by Quarter



Note: figure above each bar: probability of very strong intensity.
Source: NOAA – Climate Prediction Center, Official El Niño Southern Oscillation (ENSO) Strength Probabilities (RONI), July 2026 update.

According to the information available as of the date of this *Report*, the main international climate monitoring centers agree that *El Niño*-like conditions are already present both in the equatorial Pacific Ocean and in the atmosphere, and that the phenomenon has been strengthening. According to the most recent update from NOAA's Climate Prediction Center, released in early July 2026, the probability that the episode will persist into early 2027 rose to 97%, while the probability that it will reach very strong intensity increased significantly for the remainder of the year: this probability rose from 63% in June to 81% for the October-December 2026 period and remains elevated (around 71% and 75%) for the September-November 2026 and November 2026-January 2027 periods, respectively. If it materializes, the episode would be among the largest *El Niño* events recorded since 1950. Projections from the International Research Institute for Climate and Society (IRI) and the World Meteorological Organization point in the same direction (Graph B1.2).

At the national level, the Institute of Hydrology, Meteorology and Environmental Studies (Ideam) confirmed the presence of *El Niño* conditions and is consistent with the international assessment of a high probability that the phenomenon will reach very strong intensity, with the period of greatest intensity concentrated between the last quarter of 2026 and early 2027. The regions most exposed would be the Pacific, Andean, and Caribbean regions, with risks associated with wildfires, water stress, declining river flows —which are already beginning to be reflected in record temperatures in several regions of the country— and disruptions to food production and electricity generation.

Consequently, given the higher probability of a high-intensity episode for the remainder of 2026 and early 2027, the *El Niño* phenomenon is emerging as one of the main factors shaping the macroeconomic outlook over the medium term.

References

Abril-Salcedo, D. S.; Melo-Velandia, L. F.; Parra-Amado, D. (2016). "Impacts of Climate Phenomena on the Price of Food in Colombia," *Ensayos sobre Política Económica*, vol. 34, no. 80, pp. 146-158, *Banco de la República*.

Abril-Salcedo, D. S.; Melo-Velandia, L. F.; Parra-Amado, D. (2020). "Nonlinear Relationship between the Weather Phenomenon El Niño and Colombian Food Prices," *Australian Journal of Agricultural and Resource Economics*, vol. 64, no. 4, pp. 1059-1086.

Bejarano-Salcedo, V.; Caicedo-García, E.; Lizarazo-Bonilla, N. F.; Julio-Román, J. M.; Cárdenas-Cárdenas, J. A. (2020). "The Stylized Facts

2 For more information on estimates of the impact of previous *El Niño* episodes on inflation in Colombia, see: Abril-Salcedo *et al.* (2016); Abril-Salcedo *et al.* (2020); Bejarano-Salcedo *et al.* (2020).

3 In general terms, the literature has found that a weak *El Niño* climate shock does not affect consumer food prices and, consequently, headline inflation.

of the Relationship between El Niño, La Niña and Inflation in Colombia," *Borradores de Economía* (Working Papers on Economics), no. 1105, *Banco de la República*.

Bermúdez-Céspedes, J. P.; Melo-Velandia, L. F.; Parra-Amado, D. (2025). "Do Natural Disasters and the Announcement of ENSO Events Have an Impact on Market-Based Measures of Inflation Expectations?," *Borradores de Economía* (Working Papers on Economics), no. 1315, *Banco de la República*.

Caicedo-García, E.; Bonilla-Pérez, J. D. (2023). "Box 2: Characterization of El Niño Phenomenon in Colombia," *Monetary Policy Report*, October, *Banco de la República*.

Caicedo-García, E.; Vallejo-Peña, J. C. (2026). "Box 2: The New RONI: An Improved Indicator for Characterizing Climate Anomalies" *Monetary Policy Report*, April, *Banco de la República*.

Programming and Inflation Department (2018). "Box 2: The Recent Drop in Food Prices," *Inflation Report*, March, *Banco de la República*.

Programming and Inflation Department (2020). "Box 2: Food Prices drove inflation in 2019," *Monetary Policy Report*, January, *Banco de la República*.

Institute of Hydrology, Meteorology and Environmental Studies (2026). Communications and monitoring bulletins on the El Niño phenomenon, Bogotá.

Ministry of Agriculture and Rural Development (2012). *Plan for Mitigation the Effects of the El Niño Phenomenon on the Agriculture, Aquaculture, and Fisheries Sector* (second edition), Bogotá: MinAgricultura.

NOAA, Climate Prediction Center (2026). "ENSO Diagnostic Discussion: El Niño Advisory" and "Official ENSO Strength Probabilities" (RONI). June and July updates.

Romero-Chamorro, J. V.; Naranjo-Saldarriaga, S. (2022). "Weather Shocks and Inflation Expectations in Semi-Structural Models," *Borradores de Economía* (Working Papers on Economics), no. 1218, *Banco de la República*.

Romero-Chamorro, J. V.; Naranjo-Saldarriaga, S.; Muñoz-Martínez, J. A. (2025). "Adverse Weather-Induced Inflation: Some Implications for Monetary Policy in a Small Open Economy," *Borradores de Economía* (Working Papers on Economics), no. 1319, *Banco de la República*.