J.P. Morgan Perspectives

Food security is national security: A compounding storm



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See page 28 for analyst certification and important disclosures, including non-US analyst disclosures.

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Executive Summary

- **We update the structural factors driving food insecurity through "Five Ws": War, Weather, Warehousing, Water, and Waste.**
- **The latest State of Food Security and Nutrition in the World's global hunger estimates show gradual improvement in 2025, even as broader food security risks intensify.**
- **Disruptions in the Strait of Hormuz and the coming super El Niño are adding to fertilizer and food price pressures, with the potential to translate into weaker yields and lower food production capacity through 2027.**
- **Price pressures are expected to extend through 1H27, as crop and price effects are still building and agricultural impacts lag the oceanic peak by 6 to 12 months.**
- **EM bears the brunt: severe food insecurity (ex-China) rose by ~165mn people from 2020-2025 and will increase by a further 35-70mn by end-2028, according to the World Bank.**
- **Another oil spike above $100/bbl beyond mid-year could push ~45mn additional people into acute food insecurity, according to the World Food Programme.**
- **With El Niño now embedded in our global economists' baseline, global food inflation is set to rise from 2.8% in 1H26 to 5.0% in 1H27, adding 0.6%-pts to global headline inflation in 1H27 (0.3%-pts for the full year).**
- **China's food security strategy is reshaping supply chains, and China is evolving from being primarily a large commodity consumer to becoming a strategic price setter.**
- **China's long-term food strategy includes higher domestic output, gaining control of resource bases, stockpiling, reserve releases, import diversification and export controls to build larger food buffers.**
- **Iranian attacks on desalination plants compound existing threats to food security already elevated by water scarcity and chronic agricultural water mismanagement.**
- **As much as 40% of all food produced is lost or wasted, costing more than $1trn annually and driving 8-10% of total global greenhouse gas emissions.**
- **With Southeast Asia and Latin America most impacted by El Nino, our strategists see select opportunities in power generators and agribusiness as well as consumer names positioned to defend margins amid higher input costs.**

The Five Food Insecurity W's: War, Weather, Warehousing, Water, and Waste

Food security risks are rising even as headline hunger estimates improve. Successive shocks since COVID have compounded, eroding food production capacity and keeping food price pressures elevated into 2027. Food insecurity has become the new normal as wars (hot and cold), pandemics and climate change drive recurring food insecurity crises impacting ~2.1bn people alongside structurally higher food inflation and agricultural commodity prices (see *J.P. Morgan Perspectives: Food Insecurity: A New Normal*, Joyce Chang, et al., 20 Sep 2022). The Food and Agriculture Organization of the United Nations' State of Food Security and Nutrition in the World 2026 report indicates that global estimates of hunger confirm sustained, gradual improvement for 2025, with 7.8% of the global population facing hunger, down from 8.1% in 2024, but still above pre-pandemic 2019 levels. Meanwhile, disruptions around the Strait of Hormuz are rippling beyond energy markets. The global food system is facing a convergence of stresses related to energy and shipping disruptions, tighter fertilizer availability and inflation. This decade's crisis has unfolded in three mega-shocks: first, COVID-era supply chain and logistics breakdowns; second, the Russia–Ukraine war, which exposed the fragility of concentrated grain and fertilizer markets; and third, today's Iran conflict, amplifying risks through energy supply disruptions, fertilizer constraints, shipping vulnerabilities, and renewed inflation pressure. Disruption risks around the Strait of Hormuz, alongside drone strikes across the Arabian Peninsula and towards the Black Sea, have coincided with renewed Russian attacks on grain exports, raising the odds of simultaneous hits to energy, freight, water systems and food flows.

Extreme weather is compounding these geopolitical and logistical shocks. Super El Niño is now a central scenario, alongside heat waves already damaging European crops and an above-average typhoon season threatening Asian harvests and distribution networks. Because agricultural impacts typically peak six to twelve months after the oceanic El Niño peak, the full crop and price effects are still building. Meanwhile, volatile fertilizer costs and constrained availability are already tightening farmers' input decisions, raising the risk that today's shocks translate into weaker yields and reduced food production capacity in 2027.

This is not a short-lived shock; it has reduced the likelihood of near-term disinflation, and the food inflation cycle is likely to exert pressure through 1H27. Our global economics team notes that the impact of El Niño on global food inflation is modest on its own but it roughly doubles when combined with energy shocks (see *Super El Niño and oil: double whammy for food prices*, Nora Szentivanyi et al., 24 Jul). While emerging markets bear the greatest food security burden, the spillover is increasingly visible in advanced economies, with the latest Washington Post poll showing that two-thirds of Americans now find grocery prices unaffordable. Against this backdrop, our economists expect central banks, particularly in Latin America and Asia to remain hawkish, with inflationary pressures outweighing downside risks to growth.

In this *J.P. Morgan Perspectives* report, we provide an update on the global state of food security, highlighting recent research from our EM economics, agriculture commodities research, sustainable investing, and global equity research teams. We also build on the prior installments in the series: *J.P. Morgan Perspectives: Food Security: Rising weaponization and insecure supply*, Joyce Chang et al., 9 Sep 2024; *J.P. Morgan Perspectives: Food Security and Climate Change: The Makings of a Perfect Storm*, Joyce Chang et al., 10 Aug 2023; and *J.P. Morgan Perspectives: Food Insecurity: A New Normal*, Joyce Chang et al., 20 Sep 2022. This report also features

highlights from the latest reports from the World Food Security Outlook, the IMF, the World Bank, The State of Food Security and Nutrition in the World, the Food and Agriculture Organization of the United Nations, the Global Report on Food Crises, and the Food Security Information Network.

I. War and armed conflict remain the leading causes of food insecurity

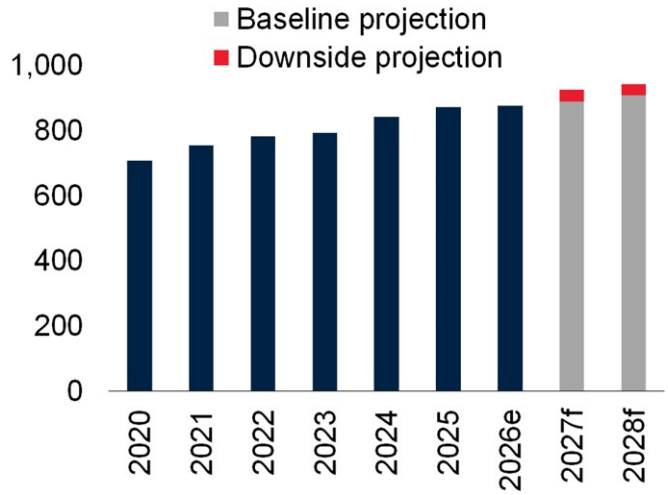
We have long argued that food insecurity is a national security issue. Conflict, extreme weather, supply side constraints (including warehousing), water stress and waste contribute to moderate or severe food insecurity for roughly 25% of the global population. Although conditions have improved since the pandemic, global levels of hunger and food insecurity remain far above 2015 levels, when the 2030 Agenda for Sustainable Development was adopted. Global hunger declined to 7.8% in 2025 from 8.6% in 2022, yet 2.1bn people, or 25.8% of the global population, still experienced moderate or severe food insecurity in 2025.

Before the Iran conflict, there was optimism that the food export restrictions that had surged at the onset of Russia's war on Ukraine in 2022 had eased. Food and agricultural trade increased fivefold between 2000 and 2024, and low- and middle-income countries became more integrated into global markets. The State of Food Security and Nutrition in the World 2026 estimates that around **645mn people** were affected by hunger in 2025, nearly **43mn** fewer than in 2022. The Iran conflict now risks reversing that progress as China's quest for food security has tightened domestic fertilizer export controls. China is also prioritizing self-reliance, stockpiling agricultural commodities and diversifying sources, particularly from South America.

The 2026 edition of the Global Report on Food Crises reports that nearly 23% of the analyzed population, roughly 266mn people, across 47 countries and territories, marginally above 2024, experienced high levels of acute food insecurity. The share facing high levels of acute food insecurity has nearly doubled since 2016 and has remained above 20% every year since 2020. Even before the Iran conflict, the number of people facing severe food insecurity in EMDEs, excluding China, rose by ~165mn between 2020 and 2025. The World Bank estimates a further increase of 35-70mn by end-2028 (Figure 1). There is a growing risk that an extended closure of the Strait of Hormuz could trigger a systemic agrifood shock. Another oil spike above $100/bbl beyond mid-year could push ~45mn additional people into acute food insecurity, according to the World Food Programme, raising the total from a baseline of 318mn to roughly 363mn. That would exceed the 349mn record set after Russia's invasion of Ukraine.

Figure 1: Number of people experiencing severe food insecurity

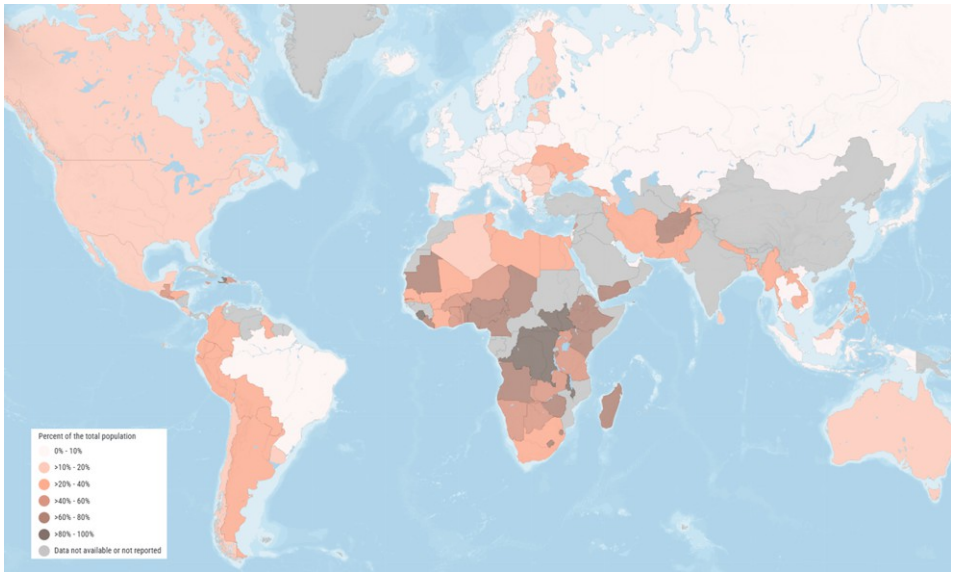
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Note: e = estimate; f = forecast. Population facing severe food insecurity (blue bars). Gray (gray plus red) bars show the World Food Security Outlook's April 2026 baseline (downside) projection for 152 EMDEs excluding China.
Source: World Bank; World Food Security Outlook (database).

Figure 2: Prevalence of moderate or severe food insecurity in the total population (2023-2025)

%, 3-year average



Source: Food and Agriculture Organization of the United Nations

With three wars raging alongside extreme weather events, acute food insecurity and global food inflation pressures are rising. Since the pandemic, agriculture has absorbed a succession of crises, including wars and climate-related disasters, which have underscored the close relationship between energy and agrifood systems. As of 2025, the share of the global population facing severe food insecurity stood at about 12%, or ~2%-pts above the pre-pandemic level in 2019 (World Food Security Outlook 2026). With the Strait of Hormuz still disrupted for commercial shipping, the key food security transmission channels are fertilizer and fuel.

2026's food security risk is fertilizer now and production capacity in 2027

The food security crisis of 2026 centers on fertilizer and eroded production capacity in 2027. In past J.P. Morgan Perspectives, we have highlighted the weaponization of food supply chains (see *J.P. Morgan Perspectives: Food Security: Rising weaponization and insecure supply*, Joyce Chang et al., 9 Sep 2024). In an article in Small Wars Journal, Bruce Randolph Tizes points out that the global fertilizer supply chain resembles the 1970s oil market: supply is concentrated in adversarially-positioned suppliers, with no reserve mechanism, no bypass infrastructure, and no institutional architecture for managing supply shocks. While the Strategic Petroleum Reserve holds months of petroleum buffer, no strategic fertilizer reserve exists in any G7 country. The result is a global market that is one closed strait and one export directive away from crisis. Roughly 15mn tonnes of urea exports in a 58mn-tonne export market are affected by the closure, driving price swings and uncertainty (see *Nitrogen Update: China Urea Exports Remain at Low Levels in June*, Jeffrey J. Zekauskas, 20 Jul). It has also tightened natural gas supply, a key input for nitrogen fertilizer. Diesel prices jumped immediately after the war began and remain sharply elevated in August, about 63% above the February average in Asia and nearly 55% and 60% higher in the US and Europe, respectively. In EM countries, irrigation pumps, transport networks, and farm machinery still rely on diesel, so volatility in fuel markets can translate rapidly into higher production costs. These increases are expected to pressure farmer margins and could curtail supply in coming seasons (see *Agricultural Commodities Tracker: Impacts and risks of the Middle East conflict*, Natasha Kaneva, 24 Apr). Roughly one-third of the world's seaborne fertilizer transited Hormuz, including more than 30% of global urea trade, 20% of ammonia and phosphate trade, and around 50% of global seaborne sulfur trade. The disruption of the Strait of Hormuz has caused sharp spikes and increased volatility in fertilizer prices, including urea and ammonia, as well as fuel prices.

Compounding the disruption, China introduced fertilizer export bans that have largely remained in place. NDRC suspended phosphate fertilizer exports in December 2025, running through August 2026. After the onset of the Iran conflict in mid-March, China widened the export ban to include nitrogen-potassium blends (NPKs) and additional phosphates. China announced that it would suspend sulfuric acid exports from May 1 to protect domestic fertilizer supply and removing a key source of swing supply. Most sulfur is a byproduct, with production, including acid, mainly in China (23%) and the Middle East (24%) (see *The sulfuric acid squeeze: Hormuz & China export ban*, Tingting Ge, 7 May). As of late July, China expanded restrictions on DAP, MAP and certain NPKs through at least August, with Reuters reporting that 50-80% of export volumes are restricted[1]. However, it is noteworthy that Russia, despite Western sanctions, anticipated reaching 45mn metric tons of fertilizer exports in 2025 via third-country routes including Turkey, Brazil, India.

Our US chemical equity research team, led by Jeffrey Zekauskas, expects a tough year for the phosphate operations. The team notes that global phosphate market (DAP/MAP/TSP/NPS) shipments are likely to trend at or below 65mn tons in 2026 compared to 77mn tons in 2025. The global shipment forecast reflects reduced phosphate shipments from the Middle East due to the closure of the Strait of Hormuz, raw material shortages for sulfur, and economic decisions by farmers in the US and Brazil lowering demand. Their 2026 phosphate shipment estimate is 5.8mn tons (see *Nutrien and Mosaic: In the Maize*, Jeffrey J. Zekauskas, 8 Aug).

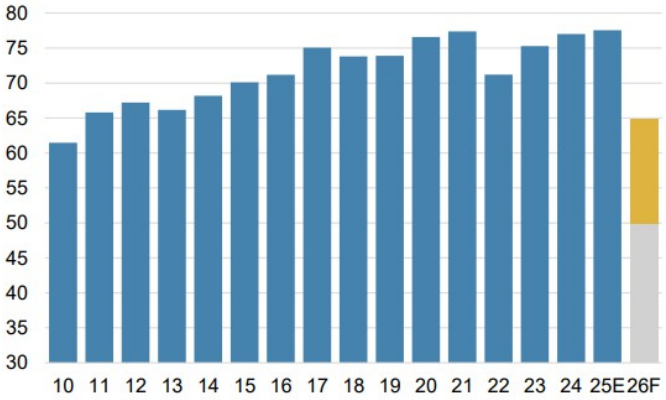
Nitrogen, phosphate and potash are the core fertilizer nutrients. Potassium and key NPKs are also key inputs**.** Our US chemical equity research team forecasts global

1. China extends phosphate export curbs through August 2026 as Russia holds fertilizer quotas, Fertilizer Daily, 29 Jul 2026

average potash prices to be ~$20/mt higher y/y in 2026. The domestic potash NOLA barge price (GCFPPONO Index) is at $340/st fob in August, up from $310/st fob at the beginning of the year. In Brazil, potash prices (GCFPPGBZ Index) were $395/mt in August, up from $365/mt at the beginning of the year. In Southeast Asia, potash prices (GCFPPTSM Index) were at $400/mt in August, up sequentially from $370/mt at the beginning of the year. The China 2026 contract price is $348/mt cfr. In India, BPC settled a new standard grade MOP contract with Indian fertilizer importer IPL at $383/mt cfr, up from the previous 2025 contract price of $349/mt cfr. China and India represent 19-20mn tons and 3.5-4.0mn tons of potash demand, respectively, in a 75mn ton market. They have lowered their forecast for nitrogen prices by about $56/t on a 9.3m ton base from their previous forecast.

Figure 3: Global phosphate shipments (DAP/MAP/TSP/NPS)

(million tons)



Source: Argus, IFA, CRU, and Mosaic company reports.

About 3mn tons of P205 exports, or the equivalent of 6mn tons of DAP, are affected by the closure of the Strait of Hormuz.

Figure 4: Global DAP/MAP Exports

Export Region	2023 000 mt	2024 000 mt	2025 000 mt	Main Destinations
Morocco	4,226	4,772	4,984	India, Brazil, Australia
China	3,667	3,278	2,661	India, Bangladesh, Brazil
Saudi Arabia	**2,398**	**2,527**	**2,947**	**India, U.S., Brazil**
Russia	2,296	2,123	2,301	Brazil, Mexico, India
U.S.	1,199	1,059	846	Canada, Colombia, Australia
Jordan	307	359	365	U.S., India, Iraq
Egypt	188	265	290	U.S., India, Turkey
Tunisia	320	244	268	U.S., Italy, Turkey
Australia	156	166	198	India, U.S., Pakistan
Mexico	135	182	193	U.S., Canada, Dom. Republic
Other	794	867	1,079	
Global Exports (P205)	**15,686**	**15,842**	**16,132**	
% of shipments through SOH	**15%**	**16%**	**18%**	

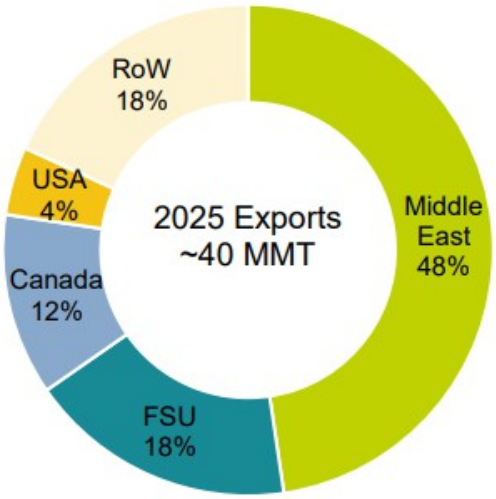
Note: Morocco does not ship through SOH, but some of its sulfur imports come from the Persian region affected by the closure of SOH.
Source: Nutrien Fact Book (CRU), J.P. Morgan estimates.

Nearly half of global sulfur exports in a 40mn ton export market originate from the Middle East. Phosphoric acid demand for fertilizers represents more than half of global sulfur demand. Sulfuric acid sits at the base of fertilizers and is foundational to phosphate fertilizers, hydrometallurgical copper and some nickel production methods, and high-purity electronics manufacturing. Its demand has also rebalanced to high-value industrial chains: SX-EW copper, nickel and UHP Semis The market was already tight pre-conflict. China and the Middle East account for ~47% of global output, a

concentration that magnifies downstream risk for sulfuric acid-dependent supply chains (see

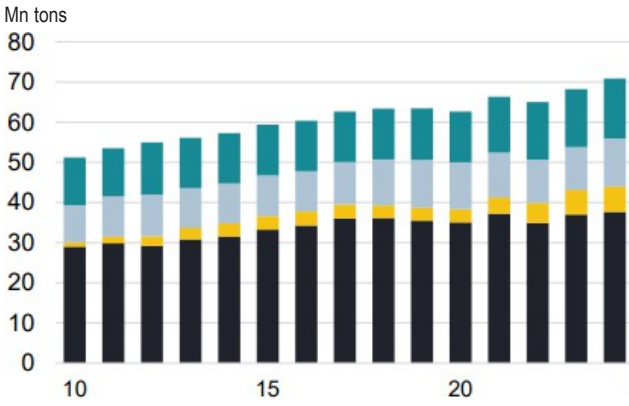
Nutrien and Mosaic: In the Maize, Jeffrey J. Zekauskas, 8 Aug).

Figure 5: Global sulfur exports



Source: CRU and Mosaic company presentation.

Figure 6: Global sulfur demand by end-market

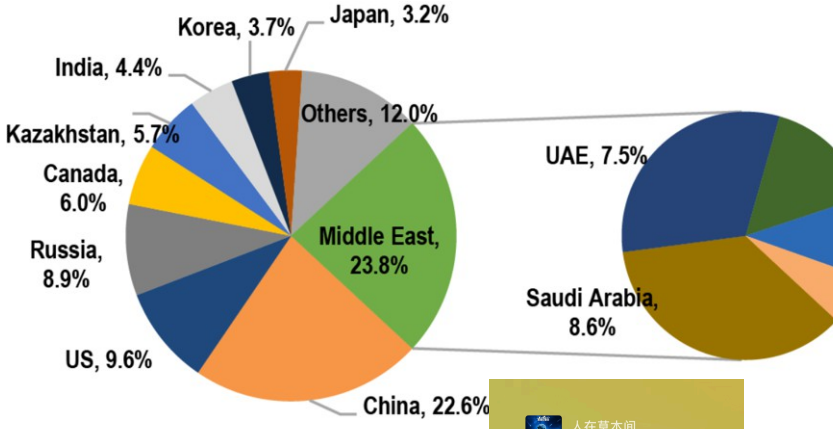


Source: CRU and Mosaic company presentation.

Sulfur supply is structurally constrained because it is overwhelmingly a b
Roughly 98% of global output is recovered through desulfurization in petrole
refining, natural gas processing, and coal-to-chemicals operations. Global sul
production in 2025 is estimated at ~84 Mt and is heavily concentrated in Chir
Middle East (Figure 7), leaving the market highly sensitive to disruptions or p
shifts in either. Together, China and the Middle East account for ~47% of glob
a concentration that magnifies downstream risk for sulfuric acid–dependent su
chains.

Figure 7: Global sulfur (all forms) production

% of global



Source: USGS, J.P. Morgan

Fertilizer price volatility remains a risk for **pecially**
and the US for the 2027 season. Our US Hig **edit analy**
Rosenthal, notes that while urea has retreated **-war leve**
is duration rather than peak. The US granular **increase**

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$427/st exiting July from $353/st at the end of June and compares to ~$392/st at the beginning of the year. Modeling by NDSU and Illinois economists finds that under a central "contested transit" scenario, urea stays above $700/short ton through November, pushing the exposure into the autumn 2026 purchasing window for the 2027 crop. USDA's Prospective Plantings report already showed US corn and wheat acreage, both nitrogen-intensive, down about 3%-pts each year-over-year, with soybeans up 4%-pts. Nitrogen fertilizer prices have retreated from peak levels following the onset of the Middle East conflict, with the US NOLA urea weekly spot price down 44% from its mid-April high (peak price of ~$710/st observed on April 17th). The US Cornbelt ammonia weekly spot price increased to ~$743/st exiting July (-24% v. peak price of ~$975/st observed April through early June) and compares to ~$705/st at the beginning of the year (see *High Grade Chemicals: Mid-Year Outlook Updates and Ratings Changes*, Aaron Rosenthal, 29 Jun). Countries are also resorting to food and feed export restrictions, including Chinese fertilizer curbs and India's sugar export ban, contributing further to price volatility. This is the pattern that turned the 2007-08 and 2022 shocks into price crises.

Ukraine's agricultural sector has been a major target of Russia's attacks since February 2022. Russian attacks on Ukraine's Black Sea port of Chornomorsk on July 10-12 resulted in the loss of around one-third of its seaborne grain export capacity as four of 13 large export terminals stopped buying. Kernel Holding, Ukraine's largest grain exporter, suspended all operations at its Chornomorsk terminals. Major shipping lines such as Maersk and Hapag-Lloyd also halted their services to Chornomorsk in the 2025/26 marketing year ending 30 June. Ukraine exported 41.1mn tonnes of grains, while oilseed exports are down 12% year-over-year. Markets have reacted, and Chicago wheat touched a two-year high of $7.11¼/bu, on track for a gain of more than 20% for the month.

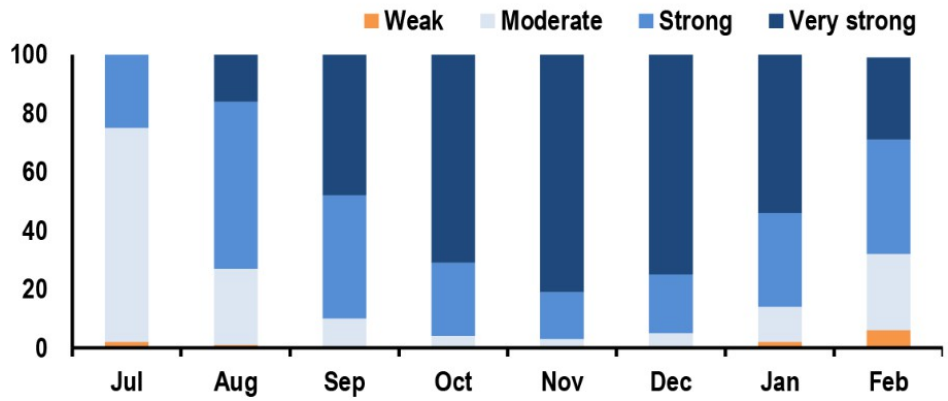
The World Food Programme estimates that 1.4mn people in Gaza, or two-thirds of the population, are facing acute food insecurity. While this is an improvement from the famine that was formally declared in August 2025, the outlook is fragile as livelihoods have collapsed, response capacity is exhausted, and the accessible area has shrunk by more than 50% since October 2023. The Integrated Food Security Phase Classification (IPC) scale used to measure hunger levels reported that more than 1.2mn people, or 59% of the population, faced crisis or worse (IPC Phase 3+), including 212,000 in Emergency (Phase 4), between mid-April and 30 June 2026. Conditions are projected to worsen from July to December, with more than 1.4mn people, or 67%, expected to be in Phase 3+. All five governorates are classified as being in crisis.

II. Weather: Super El Niño, extreme heat, typhoons, and food inflation

El Niño has rapidly shifted from a tail risk to a central scenario for 2H26 and early 2027. The latest oceanic and atmospheric indicators point to a rapidly strengthening El Niño, with an 81% probability that the current episode will develop into a very strong, or "super," El Niño by the end of 2026 and a 97% chance that conditions will persist into spring 2027. This would place the event among the strongest observed in recent decades, increasing the risk of weather-related disruptions to global food production and supply chains (see *Super El Niño and oil: double whammy for food prices*, Nora Szentivanyi et al., 24 Jul).

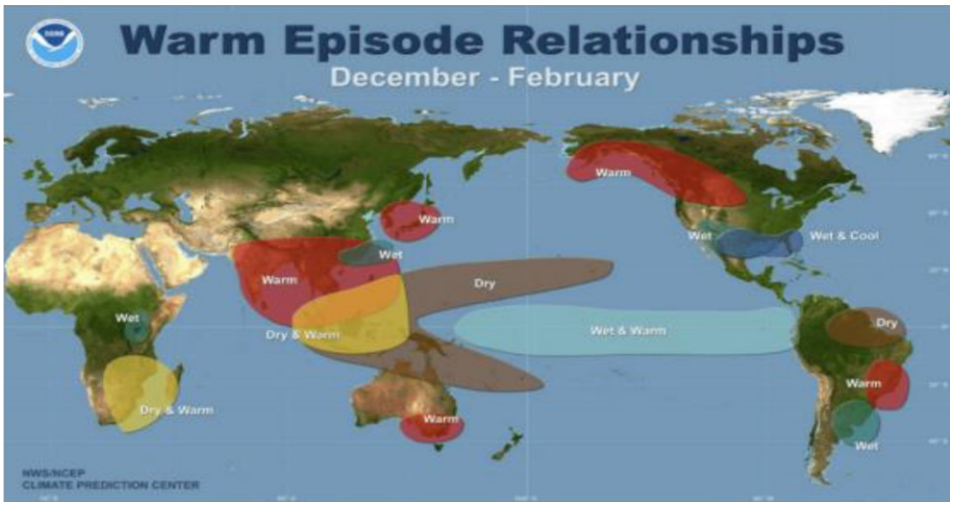
Figure 8: ENSO strength probabilities

% chance, as of Jul 2026



Source: J.P. Morgan Global Economics, NOAA

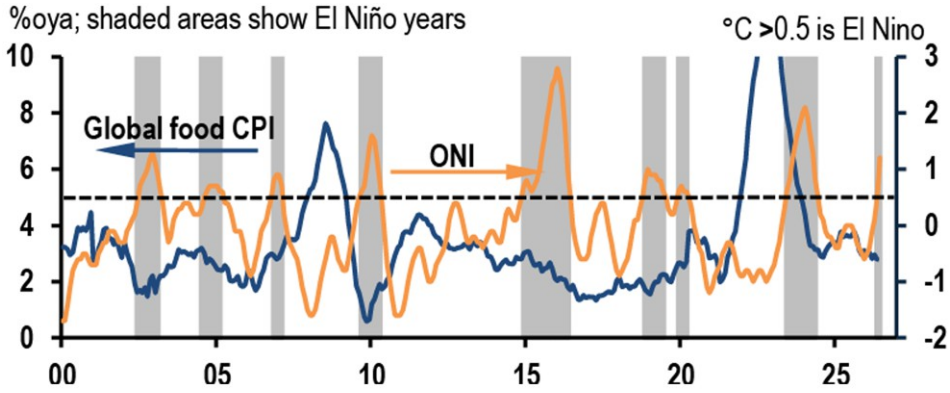
Figure 9: El Niño typically brings dry conditions, droughts and heatwaves to SE and S Asia, while escalating rainfall in China and Japan



Source: NOAA, Climate Prediction Center.

This year's ongoing energy price shock is likely to amplify food price pressures, likely doubling the impact on global food CPI to ~1.5%-pts. Our global economics team finds that stronger El Niño episodes generate disproportionately larger inflation outcomes as disruptions across agriculture, energy, and logistics reinforce one another. Their analysis suggests that a super El Niño has historically raised global food inflation by a relatively modest 0.7%-pts at its peak, which tends to occur around six months after the onset of the shock. But each El Niño is different and, importantly, the current episode is not occurring in isolation. With food inflation projected to reach 5%ar in 1H27, this would add 0.6%-pts ar to global headline inflation, slowing next year's expected inflation decline by 0.3%-pts for the full year.

Figure 10: Global food inflation and El Nino



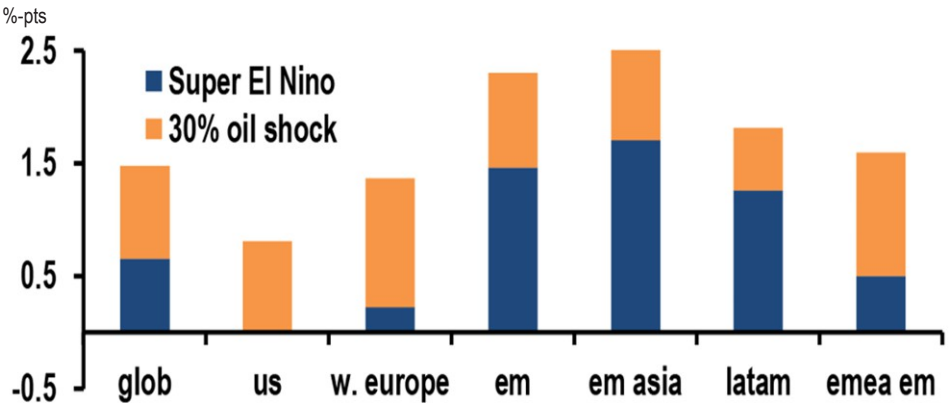
Source: NOAA, national sources, J.P. Morgan

Exposure is concentrated in South and Southeast Asia, including rice, sugar, and coffee; West Africa, including cocoa; and parts of East and Southern Africa. FAO's latest Crop Prospects report already cites El Niño conditions alongside high input prices as constraints on East and West African production. The risk is regional rather than systemic, and analysis of past events suggests El Niño is not uniformly inflationary across commodities.

EM bears the brunt of El Niño. The largest food inflation responses are concentrated in EM Asia and Latin America, where weather-sensitive agriculture plays a larger role in economic activity and food carries a higher weight in consumption baskets. India, Colombia, Indonesia, Brazil, Taiwan, and Korea emerge as among the most sensitive economies.

Energy matters more for DM, Europe. More advanced economies exhibit substantially smaller responses to El Niño or estimates that are statistically indistinguishable from zero. However, the impact of higher energy prices on food prices is sizeable in both the US and Europe (Figure 11). In Europe, historical El Niño episodes have not been consistently associated with higher food inflation. Instead, localized droughts, floods and heatwaves show a much stronger relationship with food prices, while imported commodities such as coffee, cocoa, tea and sugar represent the main channel through which global climate shocks affect food inflation.

Figure 11: Peak food CPI impact of a "super" El Niño & 30% oil shock



Source: National sources, J.P. Morgan.

Higher food inflation could increase the number of people facing hunger by as much as 17mn by 2030. The State of Food Security and Nutrition projects that

depending on the length of the impact of the crisis on food inflation, which is driven by higher energy and fertilizer prices, ~**510 to 520mn people** may still be facing hunger in 2030 (compared to the lower projection of 503mn before the Iran conflict)[2].

The latest Washington Post-Ipsos poll found that 66% of Americans now consider groceries unaffordable, compared to 45% polled in February before the Iran conflict. Only one-third of respondents describe grocery prices as affordable, compared with 54% earlier this year. For households earning less than $50,000 annually, 82% find grocery prices unaffordable, compared to 70% of households earnings $50k-$100k, with even the majority of households (56%) earning more than $100k annually indicating that grocery prices are unaffordable.

Amongst major agricultural commodities, sugar is particularly exposed to El Niño because its key supply regions—India, Thailand, and Brazil—can face weather-related disruptions simultaneously, albeit through different channels. Together, these three countries account for roughly 65% of global sugar exports**.** El Niño typically brings drought to Southeast Asia, India, and parts of Brazil, reducing yields for water intensive crops such as rice, palm oil, corn, soybeans. In Argentina, El Niño can support yields through increased rainfall, but excessive rain can also cause localized flooding and delay harvests (see *LatAm Agribusiness: 3tentos (OW) & SLC Agricola (N): El Niño overhang persists; asymmetric setup favors TTEN*, Lucas Ferreira, 20 Jun). Corn, wheat and soy are also potentially affected, but the outcomes are more mixed. El Niño can reduce yields through droughts in Asia/Australia and excessive rain in parts of Latin America, while some US regions may benefit from cooler and wetter late-summer conditions (see *Agricultural Commodities Tracker: Potential El Niño impact on agricultural markets*, Natasha Kaneva, 15 Jul). Past El Niño episodes have been followed by median price increases of 8–12% one year after the event, with palm oil (+8.3%) and rubber (+27%) recording the largest gains. Rice and wheat also see price increases, but the impact is more muted (see *ASEAN Consumer: El Niño: Don't trade the weather; watch the margins*, Jeanette Yutan, 9 Jul).

III. Warehousing: China is reshaping ag commodity pricing

China's strategy to ensure its long-term security of strategic commodities includes building larger food and energy buffers, gaining control of resource bases, diversifying suppliers, and stockpiling to reduce exposure to geopolitical and logistics disruptions (see *China Thematic Research: Decoding The Next Five Years – Innovation, Resilience, and Economic Rebalancing*, Haoshun Liu, et al., 13 May). While energy security features as a core pillar of the 15th Five-Year Plan, food security is an equally important core pillar that receives less attention. China is the world's largest agricultural importer but also suffers from a shortage of arable land and increasing water scarcity. Elements of its food strategy mirror its approach to advanced manufacturing, reducing reliance on imports through substitution while building competitiveness in selected exports. China has made steady progress toward higher grain self-sufficiency. By contrast, dependence on soybean and feed-related import dependence remains difficult to reduce, despite ongoing substitution efforts. China's restrictions on fertilizer and sulfuric acid exports have been compared to its approach to rare earth minerals, using export controls to protect domestic supply while raising input costs for overseas buyers, including US farmers. Self-sufficiency in agricultural products such as grain, cotton, cooking oil, sugar, meat, and milk has long been a priority, shaped by China's historical experience with famine. With larger reserves and more active policy management, China's commodity purchasing is likely to be driven not only by

2. UN report: Global hunger levels ease for third consecutive year as regional disparities persist, Food and Agriculture Organization of the United Nations, 21 Jul 2026

consumption needs, but also by stock replenishment, supply-security considerations and price opportunities. The implication is that China is evolving from being primarily a large commodity consumer to become a strategic price setter through stockpiling, reserve releases, import diversification and export controls.

There are three pillars to China's food security priorities. First, the Food Security Law, approved in late December 2023, published in January, and effective Jun 1, 2024, calls for security in staple goods and self-sufficiency in grains, and includes targets related to China's production capacity, farmland restoration, and scaled agriculture. The second pillar is the annual No. 1 Document, released in February 2026, which acknowledges shifts in the Chinese diet by addressing the entire food basket across farming, forestry, livestock, and fisheries and by reducing grain consumption as meat and edible oil consumption increase. The third pillar is the 15th Five-Year Plan (2026–2030), announced in March 2026. It marks a shift to security- and technology-driven infrastructure modernization to increase grain production capacity to 725mn tonnes by 2030 and reach a 98% pass rate on agricultural-product safety inspections, compared with the previous floor of 650mn tonnes. By 2030, the 15th Five-Year Plan outlines goals to build or renovate more than 100 national-level strategic fertilizer depots and ~1,000 county-level distribution centers in major grain-producing counties. The plan also calls for increases in corn and soybean capacity.

China first became a net food importer in 2004, and in 2021 it surpassed the US to become the world's largest food importer. According to China Power estimates, China imported $215bn worth of food in 2023 and it relies on foreign suppliers, namely Brazil and the US, for over 80% of its soybeans. However, it is important to note that while China is heavily dependent on soybean imports, its use as human food is actually low, and most of it is used as animal feed. China's goal has been to maintain very high self-sufficiency in staple grains (rice and wheat). This is what Chinese government refers to as "absolute grain security" – a concept first brought up by President Xi in 2013. This has been largely achieved.

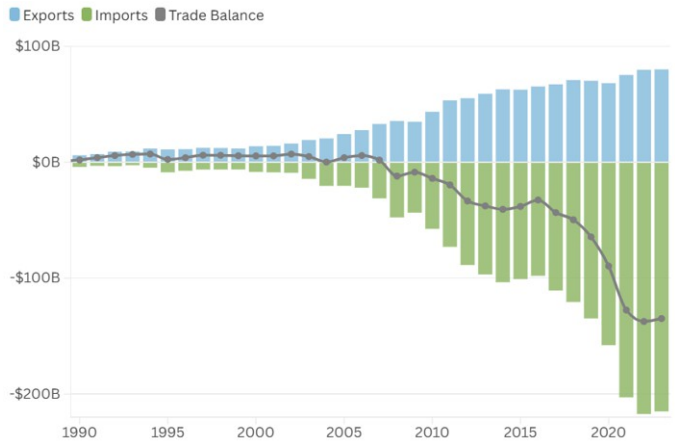
Figure 12: China major crops

Food product	Consumption, mn ton	Production	Import dependence	Human food	Animal feed	Industrial processing	Import market
Rice	200	209	~0%	~77%	8-9%	~9%	
Wheat	144	140	<5%	~70%	15-18%	~10%	
Soybean	120	21	80-85%	~10%	85-90%	~2%	Brazil, US, Argentina
Corn	280	300	<5%	~5%	63-65%	25-28%	

Source: NBS, MOA, China Customs, and J.P. Morgan estimates

Figure 13: China's food trade balance

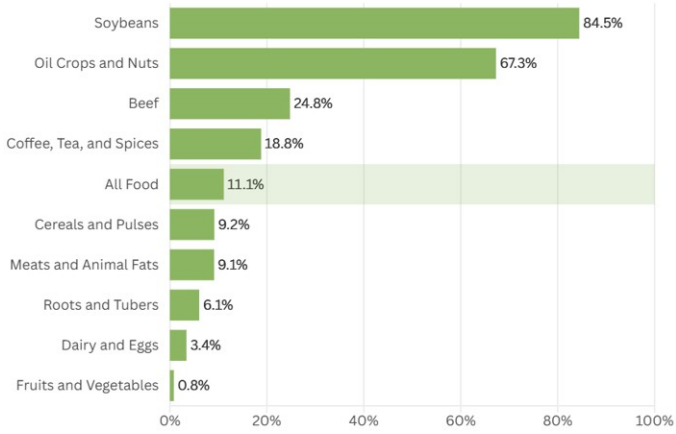
$bn



Source: CSIS China Power Project; UN FAOSTAT; UN Comtrade

Figure 14: China's food import dependence (2023)

Import quantity as a % of domestic demand

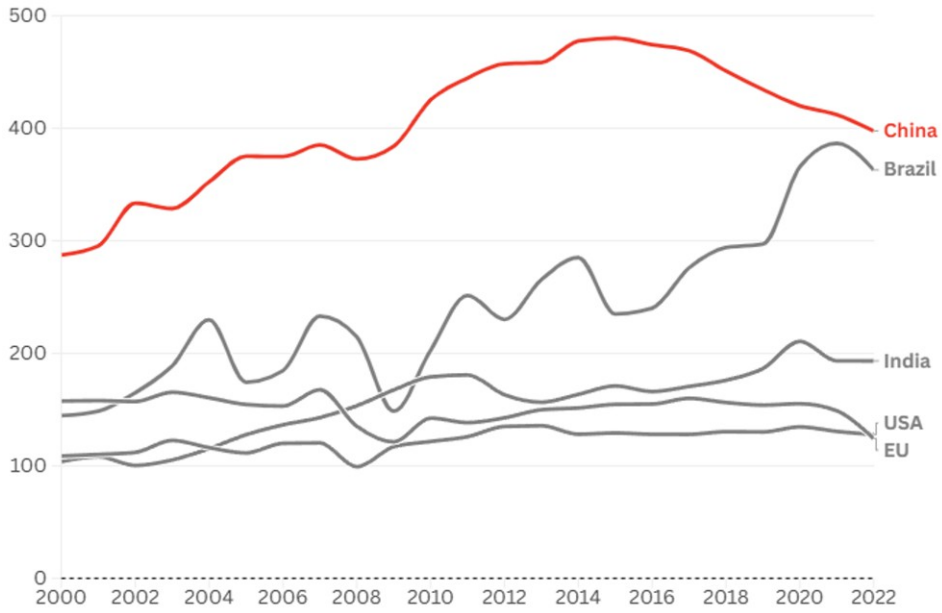


Source: CSIS China Power Project; UN FAOSTAT

Given its outsized role in agricultural commodity markets, China's restrictions on fertilizer exports to protect its domestic market have exacerbated global food insecurity. China accounts for approximately 25% of global fertilizer production. Its urea capacity was projected to reach 75mn tons by 2025 against domestic consumption of ~65.5mn tons. China remains one of the world's top consumers of fertilizer, with its usage rate at over three times that of the US and the EU. The export restrictions on fertilizer introduced in March included nitrogen-phosphorus-potassium (NPK) blends for the first time before Beijing eased its urea export ban at the end of May 2026. Overall, the ban is estimated to have removed up to 75% of prior year fertilizer exports, removing 40mmt from the market and contributing to a 40% increase in urea prices. China officially announced on April 10, 2026, that it will comprehensively restrict exports of sulfuric acid from May 1, with only a very small number of special categories, such as electronic-grade sulfuric acid, exempted for export.

Figure 15: Fertilizer use in selected countries

Kg per hectare of arable land



Source: CSIS China Power Project; World Bank

Our US chemicals team highlights that lower phosphate production and exports from China could lead to tighter supply-demand dynamics. China has been exporting less phosphate, reflecting export restrictions in favor of supporting domestic demand and prices. Phosphate exports totaled 5.8 mn tons in 2025, down (19%) y/y. Higher ammonia prices likely contributed to DAP shipments being curtailed. In 2026, exports could fall to 3mn tons or below (see *Nutrien and Mosaic: In the Maize*, Jeffrey J. Zekauskas, 8 Aug).

Figure 16: China DAP/MAP/TSP Exports

Thousand tons

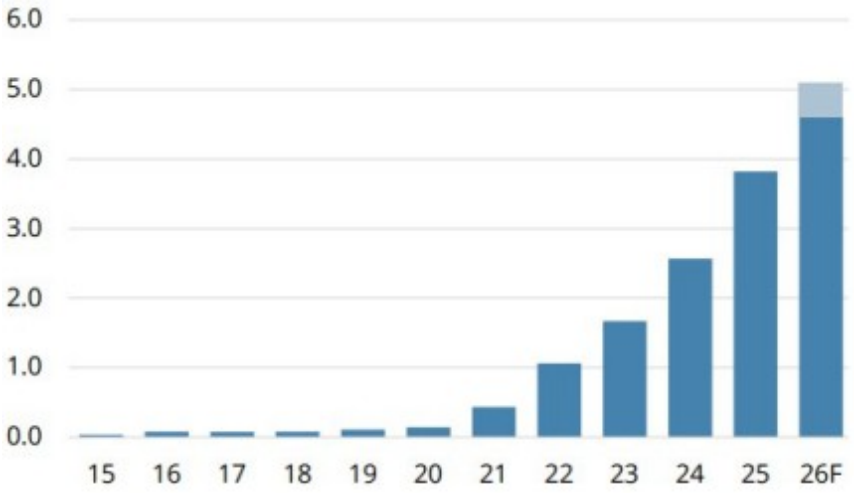
	2019	2020	2021	2022	2023	2024	2025	2026 YTD	% Δ
Jan	627	353	390	360	550	202	112	88	(21.8%)
Feb	450	228	553	167	292	81	118	90	(23.8%)
Mar	678	1,008	799	560	500	95	17	69	299.7%
Apr	969	701	905	493	552	664	89	101	13.1%
May	1,082	616	1,458	438	866	800	89	70	(21.3%)
Jun	890	894	1,622	538	998	878	731	61	(91.7%)
Jul	1,431	1,014	1,777	541	788	816	1,412		
Aug	806	1,228	1,338	766	819	943	1,007		
Sep	972	817	1,006	755	488	823	594		
Oct	645	891	1,048	803	625	624	630		
Nov	990	788	250	438	864	884	773		
Dec	532	722	63	441	532	375	265		
Total	**10,071**	**9,261**	**11,209**	**6,300**	**7,873**	**7,184**	**5,837**	**478**	**YTD**
% change	**(8.8%)**	**(8.0%)**	**21.0%**	**(43.8%)**	**25.0%**	**(8.7%)**	**(18.7%)**	**(58.7%)**	**YTD**

Source: Bloomberg Finance L.P., China National Chemical Information Center (CNCIC), Fertilizer Consultants, and J.P. Morgan estimates

China has also redirected some phosphate tons to lithium iron phosphate (LFP) battery production for power storage. China's LFP production increased from 2.6mn tons in 2024 to 3.8mn tons in 2025. LFP production could approach 5mn tons in 2026. The finished fertilizer equivalent (DAP) to LFP is about 1:1.

Figure 17: China LFP Production

(million tons)



Source: Baichuan (LFP battery producer) and Mosaic company presentation.

Urea exports from China could dip to 3-4mn tons in 2026, or below. China's urea exports totaled 4.9mn tons in 2025, or multiples of the unusually low level of 0.26mn tons in 2024.

Figure 18: China urea exports

thousand metric tons

	2020	2021	2022	2023	2024	2025	2026 YTD	% Δ
January	366.1	291.8	85.1	240.8	12.6	2.6	307.9	NM
February	148.8	142.8	152.0	165.4	7.5	1.4	111.5	NM
March	271.3	367.4	65.6	119.7	4.2	2.3	58.7	NM
April	111.7	539.2	149.7	75.8	5.2	2.3	15.0	567.0%
May	599.8	601.0	85.6	182.8	34.6	2.4	3.3	34.2%
June	222.6	482.4	186.1	223.9	74.2	66.2	7.1	(89.2%)
July	181.2	243.0	150.7	323.4	79.4	567.2		
August	200.5	261.3	351.2	314.0	25.5	796.5		
September	827.9	1,091.5	347.4	1,184.4	9.3	1,371.2		
October	1,092.0	739.8	350.9	561.6	3.5	1,201.3		
November	846.0	499.8	372.6	515.5	2.2	601.8		
December	582.0	35.4	534.3	343.6	2.3	278.3		
Total	**5,450.1**	**5,295.3**	**2,831.3**	**4,251.0**	**260.6**	**4,893.5**	**503.5**	**YTD**
% change	**10.2%**	**(2.8%)**	**(46.5%)**	**50.1%**	**(93.9%)**	**NM**	**551.9%**	**YTD**

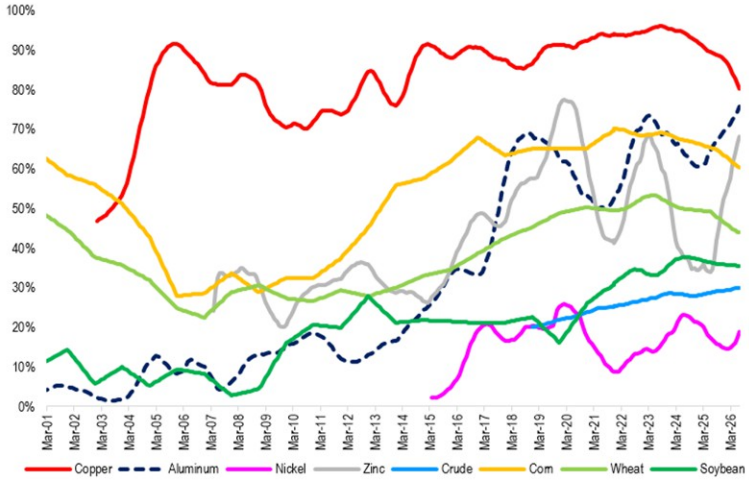
Source: Bloomberg Finance L.P., China National Chemical Information Center (CNCIC), Fertilizer Consultants, and J.P. Morgan estimates.

State intervention has contributed to excessive competition and signs of "involution." In 2025, grain output ran ahead of plan. The 2025 harvest reached a record 715Mt. Meat and poultry output crossed 100Mt for the first time, while corn set a record near 301Mt. China's standard warehouse capacity passed 700Mt by end-2023, up 36 % from 2014 and roughly equal to a full year's national output, and state procurement reached 415Mt in 2025. USDA's Beijing post reports that state silos are effectively full, with industry sources indicating no need to import grain for at least two years, and policy shifting from building reserves toward releasing them. No national corn reserve purchase program was launched in autumn 2025, and aged rice auctions for feed use restarted in late May 2026, the first since 2023. The Chinese Communist Party (CCP) has claimed that China has enough wheat and rice reserves to feed its population for up to two years.

A CSIS report estimates that China's budget for food stockpiles is twenty times larger than the sum dedicated to food stockpiling by all OECD countries. Our commodity strategy team estimates that, inclusive of exchange, visible commercial inventories, and strategic stockpiles, China holds an estimated 60% of corn, 44% of wheat, 35% of soybean, 30% of crude oil, 68% of zinc, 76% of global visible aluminum and 80% of global visible copper.

Figure 19: China commodities inventories as % of global inventories by commodity

Percent of global inventories

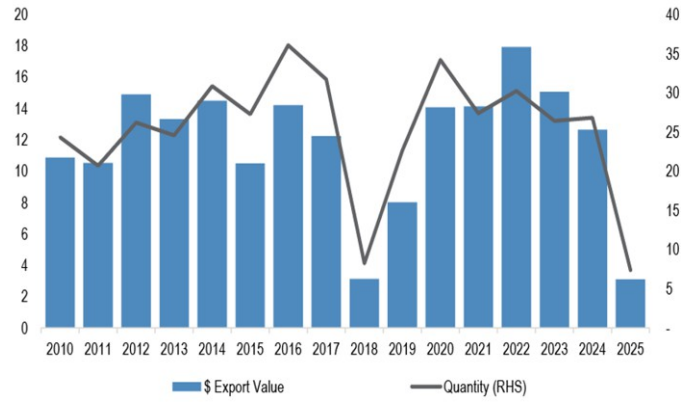


Source: Bloomberg Finance L.P., S&P Global Platts, IEA, EIA, USDA, various exchanges, J.P. Morgan Commodities Research

China has diversified its sources of food imports, notably decreasing the reliance on the US for soybeans. Although China's soybean imports from the world increased in June 2026, imports specifically from the US fell below last year's level. As part of the US-China summit held on May 15-16 in Beijing, China has agreed to purchase US agricultural products of at least $17bn per year in addition to the already agreed upon purchase commitments (announced November 1, 2025) of 25mn tonnes of soybean purchases per year in 2026-28. However, actual purchases in the current season remain well below this target, with Brazil continuing to be the primary supplier. As of the ongoing 2025/26 season, China's soybean imports have been dominated by Brazilian-origin beans. By April 2026, US-origin soybean imports to China were only 7mn tonnes (13% of total), while imports from Brazil reached 31mn tonnes (60% of total). Argentina supplied 9mn tonnes (17% of total) during the same period. This reflects a strong preference for Brazilian soybeans, with US volumes significantly lower due to ample Brazilian supply and competitive pricing (see *Agricultural Commodities Tracker: Thoughts on $17bn US-China agriculture trade deal*, Natasha Kaneva, 9 Jun).

Figure 20: US soybean exports to China

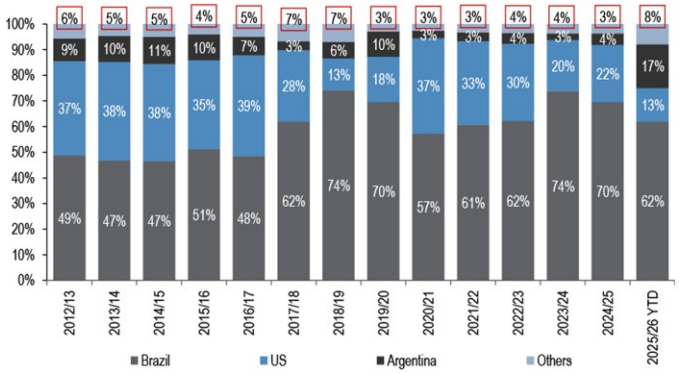
LHS: $bn; RHS: mn tonnes



Source: USDA, J.P. Morgan Commodities Research

Figure 21: China's soybean import origins by %

%



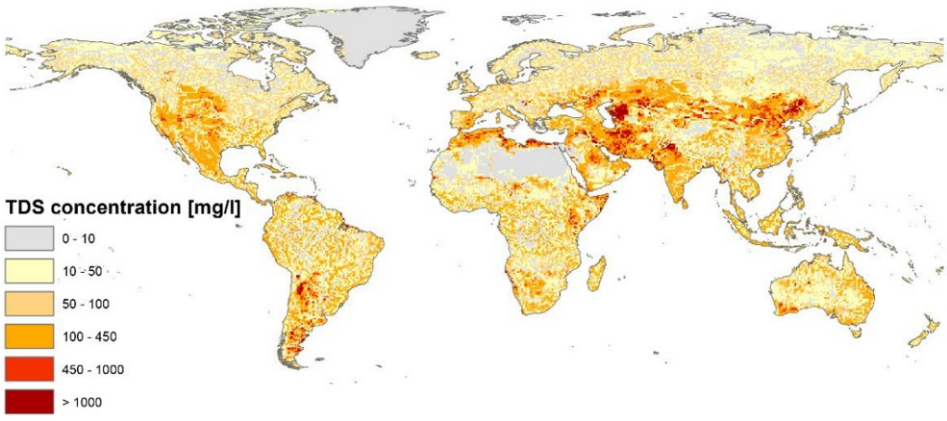
Oct/Sep international soybean MY; 2026 data until April
Source: China Customs, J.P. Morgan Commodities Research

IV. Water: Iranian attacks, scarcity and mismanagement

Iranian attacks on desalination plants in the Gulf Cooperation Council (GCC) highlight the region's acute vulnerability to a water crisis. A number of countries in the Middle East are among the top countries suffering from water stress, including Bahrain, Kuwait, Lebanon, Oman and Qatar. The GCC countries rely heavily on desalination for drinking water and collectively produce around 40% of the world's desalinated water supply. Desalinated water accounts for 99% of drinking water for Qatar, 90% for Kuwait and Bahrain, 86% percent for Oman, 80% for Israel, 70% for Saudi Arabia, and 42% for the UAE. Against this backdrop, Iranian missile and drone attacks have increasingly targeted regional water infrastructure, including strikes on desalination plants that convert seawater into drinkable water. In July, Iranian missile and drone strikes hit a power and desalination plant in Kuwait and desalination facilities in Bahrain were deliberately targeted in March as a retaliatory act by Iran after it accused the US of attacking a desalination plant in Iran. More broadly, global spatial patterns of simulated salinity, measured as total dissolved solids (TDS) in in-stream concentrations, show hotspots in the Middle East, as well as north-eastern China, India, parts of South America, Africa, Mexico, the US and the Mediterranean (Figure 22).

Figure 22: Global surface water salinity hotspots

average simulated in-stream TDS concentrations [4]



Note: Regions with water availability less than 1 m^3s^{-1} are masked (white). Details are provided in the supplementary information of van Vliet et al. (2020).
Source:

areas, while one in four cities experiences water insecurity[3]. Water stress is de

the **The World Resources Institute**

in areas where the water supply is highly stressed, h

Securing sufficient water resources for agriculture in an efficient manner is key for

advancing food security. Accounting for

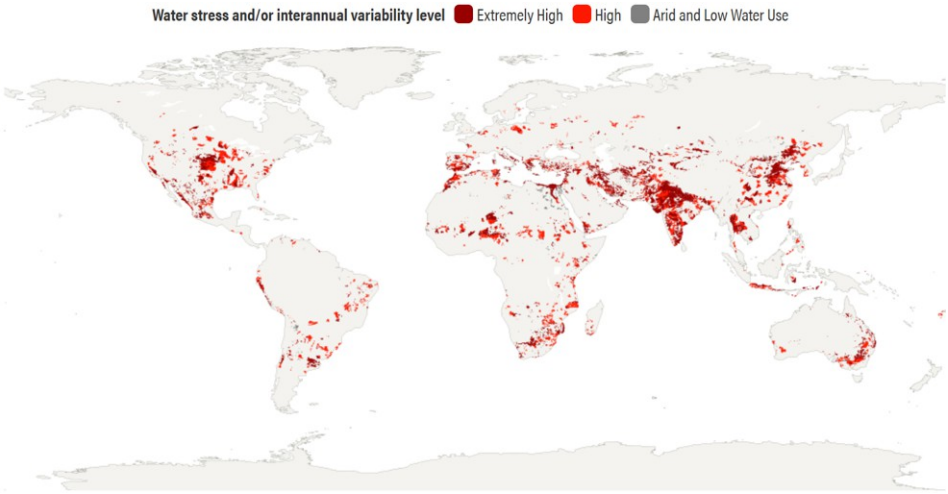
World Resources Institute as the ratio of

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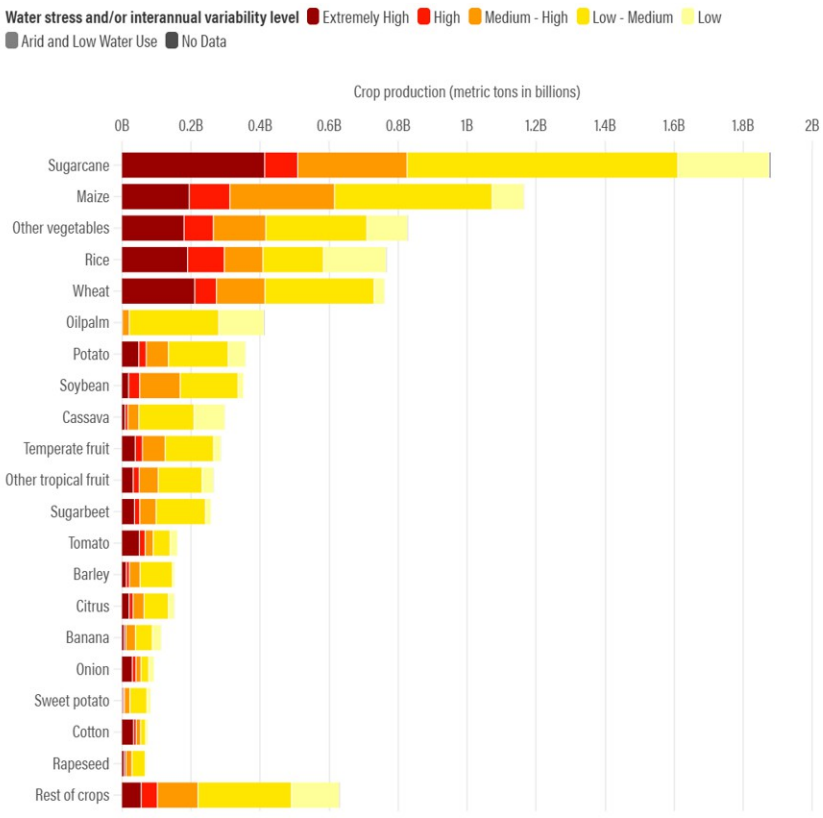
25 Countries, Housing One-quarter of the Population,

Figure 23: Global crop areas at high risk of water stress and/or variability



Source: Aqueduct Food 2024, World Resources Institute

Figure 24: Crops exposed to water stress and/or interannual variability



Source: Aqueduct Food 2024, World Resources Institute

The World Bank estimates that about 10bn people will need to be fed by 2050, yet current water and agrifood systems, including agricultural water management (AWM) practices, can sustainably feed only 3.4bn people. In April, the World Bank introduced Water Forward to improve water security for 1bn people by 2030. It introduces a new framework for agricultural water management that links water availability with food production and trade. The World Bank's Nourish and Flourish report highlights the impact of expanding irrigation where water is available. Irrigated agriculture accounts for 20% of total cultivated land, but 40% of crop production

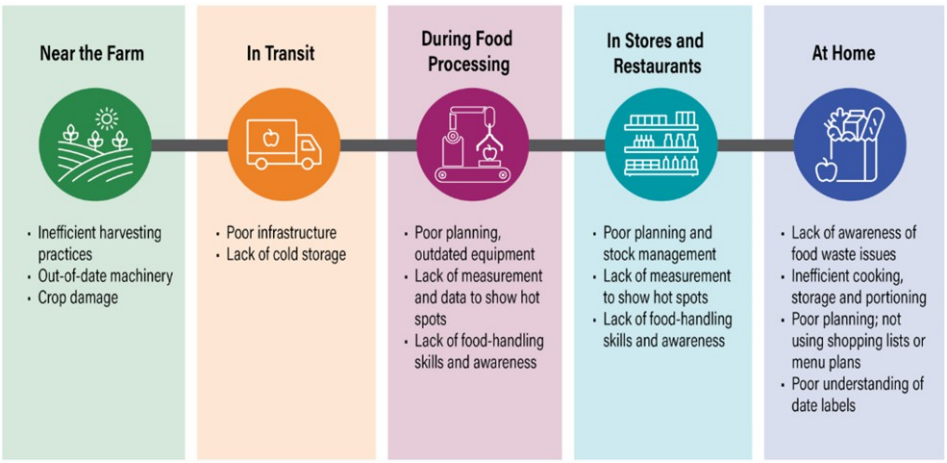
worldwide is harvested from irrigated land, as crop yields are higher and the same area can be cultivated more than once a year under favorable climate and water conditions. The World Bank estimates that expanding irrigation and modernizing existing systems require an additional $24-70bn per year through 2050. Governments already spend roughly $490bn annually on agricultural support, most of it on subsidies. They estimate that redirecting these resources toward transforming how countries manage agricultural water through sustainable irrigation expansion could create at least 245mn jobs, before accounting for the multiplier effect across storage, processing, transport, and markets.

V. Waste: Resource inefficiency and broken supply and production chains

Food waste occurs in every facet of the food life cycle with estimates that around one-third of the world's food production is lost or wasted annually at a cost of $1trn [5]. The UN's Sustainable Development Goals include a call to halve food waste and reduce food losses by 2030. About 40% of all food produced globally by weight is wasted between farm and fork. The World Resources Institute estimates that food loss and waste accounts for 8% to 10% of total global greenhouse gas emission. Wasted food consumes a land area larger than China and uses 45trn gallons of water annually.

There is a great need to adopt and advance technologies that use less water, land, and fertilizer to ensure a sustainable agricultural supply chain. Figure 25 and Figure 26 illustrate the food life cycle, the points of inefficiency, and the scale of food waste.

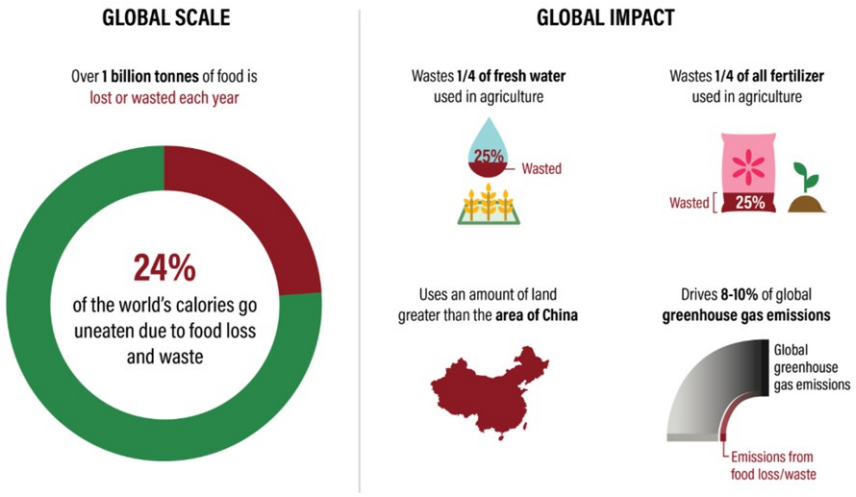
Figure 25: Main drivers of food loss and waste throughout the supply chain



Source: World Resources Institute

5. Unlocking Africa's $1 trillion food economy: The role of global aid and sustainable technology, World Economic Forum, 24 April 2024

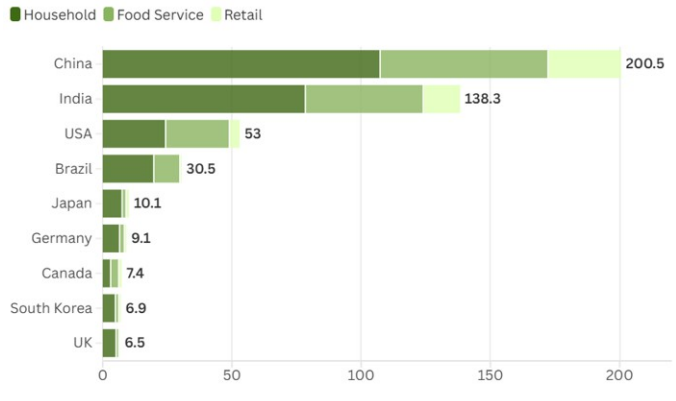
Figure 26: The scale and impact of food loss and waste



Source: World Resources Institute

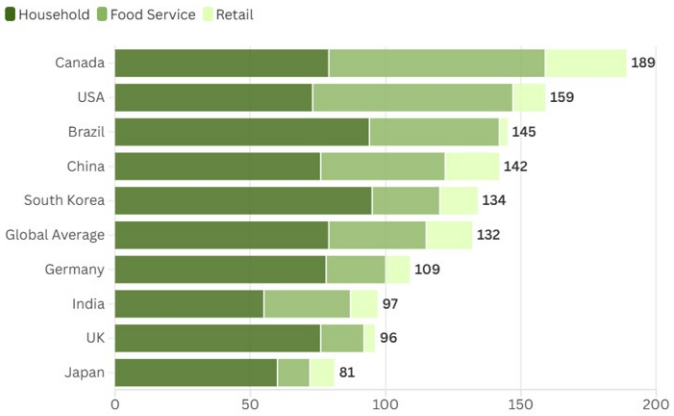
According to the UN Environment Programme's Food Waste Index Report 2024, approximately 1.05bn tonnes of food waste were generated globally in 2022 across households, food service, and retail sectors. China was the largest contributor in aggregate terms, generating more than 200mn tonnes of food waste in 2022, reflecting its large population. On a per capita basis, however, food waste levels were broadly comparable with those of other major economies, with China generating approximately 142kg per person, compared with 159kg in the United States. Household food waste alone was estimated at roughly 76kg per person in China versus 73kg in the United States. The Chinese government has initiated multiple campaigns to reduce food waste, such as the Clean Plate campaign in 2013 and 2020. In 2021, China enacted the Anti-Food Waste Law to institutionalize monitoring and punishment mechanisms, particularly for the food service and retail sectors.

Figure 27: Estimated annual food waste (2022) by *billion kg*



Source: CSIS China Power Project; UN Environment Programme

Figure 28: Estimated annual food waste (2022) by *per capita*



Source: CSIS China Power Project; UN Environment Programme

If current trends persist, this waste will double by 2050. The World Resources Institute estimates that reducing consumer food waste by even 20%-25% by 2030 could save the world an estimated $120–$300bn per year. Eliminating avoidable food waste would save the average family in the UK more than £700 ($870) each year, while in the United States, the average American would save $728, or nearly $3,000 for a family of four.

VI. Market implications: Positioning for El Nino – Top trade ideas from Latin America and Southeast Asia

We provide top trade recommendations from EM Asia and Latin America to position for El Nino, as these regions are most impacted since weather-sensitive agriculture plays a larger role in economic activity and food carries a higher weight in consumption baskets. El Nino is mostly negative for agriculture, consumer staples, and industrials, but positive for power generators and some agribusinesses.

In **Latin America**, El Niño is expected to negatively impact: 1) food retailers due to substitution effects driven by food inflation, and 2) financial institutions with exposure to agribusiness loans and insurance.

For **Utilities and Agribusiness**, the impact is mixed and depends on assets' locations. In Utilities, El Niño is likely to drive: 1) high temperatures in the Northeast region, boosting volumes for power distributors and 2) high rainfall in the South region, which could pressure regional power prices. In **Agribusiness**, the downside is most acute in names where on-farm productivity and field execution are the profit engine, because yield swings, delays, and higher costs tend to flow directly into margins. The upside is generally more selective: tighter supply can lift commodity prices, but the winners depend on cost position, product mix, and the hedge book (see *Sustainable Investing 2026 mid-year Outlook: Catching our breath*, Virginia et al., 23 Jun).

Key recommendations from our Latam team include: 1) Long: EQTL, with 50% of NAV coming from NE power distributors, 2) Short: EGIE, given high concentration of its generation portfolio in the South region. A deeper analysis is available in El Niño - How to Position: Stock ideas.

Figure 29: How to position for El Niño

Name	Ticker	Sector	Market Cap ($bn)	Analyst	Reco	Upside
Equatorial	EQTL3 BZ	Electric Utilities	9.2	Arthur Pereira, CFA	OW	37.0
AXIA	AXIA3 BZ	Electric Utilities	29.8	Arthur Pereira, CFA	OW	30.0
Engie Brasil	EGIE3 BZ	Renewable Electricity	7.8	Arthur Pereira, CFA	UW	8.0

Source: J.P. Morgan Research. As of 11 Aug 2026.

Figure 30: El Niño ideas, explained

Name	Ticker	Explanation
Equatorial	EQTL3	El Nino could boosT power consumption in Brazil's Northeast, posing risk to EQTL's distributors in the region (50% of NAV). Moreover, EQTL's renewable platform (10% NAV) could also benefit from higher wind output at higher spot prices.
AXIA	AXIA3	El Nino could support higher power prices due to lack of rainfall in Brazil's N/NE, in which AXIA has 60% of its generation capacity. Morever, expected warmer temperatures in Brazil's Southeast could support higher average prices for the system and AXIA is the most levered name to power prices.
Engie Brasil	EGIE3	We recommend a short position on EGIE as we expect El Nino to negatively impact power prices in Brazil's South region, translating into lower realized prices for 38% of EGIE's generation portfolio.

Source: J.P. Morgan Research

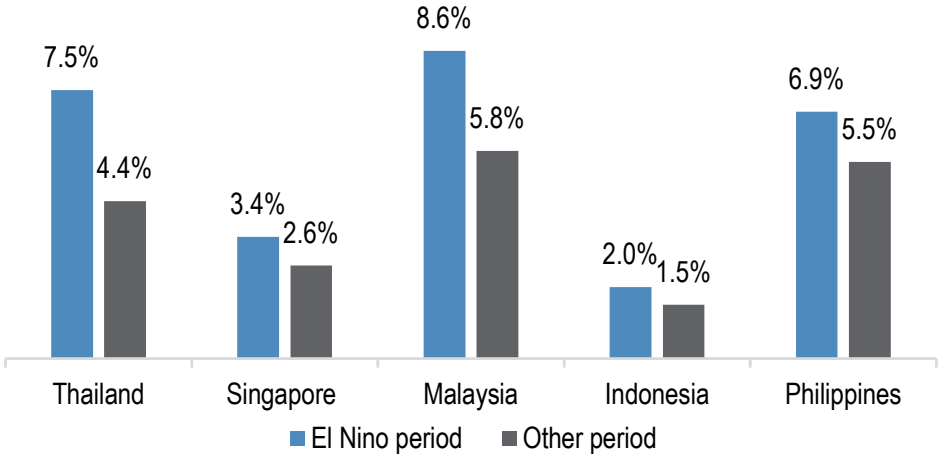
As a strong El Niño phenomenon is confirmed, our LatAm Food & Beverages and Agribusiness team is tracking on a monthly basis the progress of rainfall forecasts, yield forecasts and actual rainfall in key producing areas of the Americas and India (as a read-through for the sugar market). While it's still early stages of El Niño and early in the LatAm planting season, at this point the central read is that weather conditions across the monitored footprint remain broadly "orderly," with no signal yet that would force an immediate rethink of the fundamental setup for the names they

cover - Remain Neutral on SLC and Sao Martinho, and Underweight on Adecoagro (see *LatAm Agribusiness: El Niño Tracker: July Rainfall Broadly in Line for SLC, SMTO and Adeco*, Lucas Ferreira, 6 Aug).

Notably, Southeast Asia is among the regions most exposed to El Niño-related heat, where higher temperatures can quickly translate into an incremental cooling load. Historically, electricity consumption growth in El Niño years has tended to be stronger than in other periods, implying that peak-load stress could intensify further as the El Niño dynamic plays out (see *El Niño: Sunbaked summer: Transition trades for top temperatures*, Hannah L Lee, 4 Jun).

Figure 31: Electricity consumption growth in ASEAN is stronger in El Niño years

Electricity consumption growth (kWh, % yoy)



Source: CEIC Data, J.P. Morgan.

Warmer-than-normal temperatures this year are already testing system peaks. Power demand in India reached record-breaking levels for four days in a row in May this year, culminating in 270.82GW of all-time high peak power demand on 21 May as temperatures hovered around 45°C in many regions. The El Niño set-up this year suggests a firm summer power-demand backdrop. As such, our APAC power utilities analysts highlight **APAC electricity generators** in the table below, which tend to outperform in summer. For a more comprehensive list of investment ideas for a hotter planet, including distributed-generation (DG) solar plus energy storage systems (ESS) and coal producers, who are experiencing a tailwind from El Nino-linked higher temperatures, see *El Niño: Sunbaked summer: Transition trades for top temperatures*, Hannah L Lee, 4 Jun).

Figure 32: Valuation comparison of APAC Power Utilities sector

	Ticker	JPM analyst	JPM rating	Share price (LC)	Mkt Cap (USDm)	Daily liquidity (USDm)	PE (x)		P/BV (x)		ROE (%)		EV/EBITDA (x)	
							2026E	2027E	2026E	2027E	2026E	2027E	2026E	2027E
Power developers and grid														
NTPC	NTPC IN	Atul Tiwari	OW	338.5	34,422	47.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Power Grid	PWGR IN	Atul Tiwari	OW	268.0	26,139	35.0	15.8	14.9	2.5	2.3	16.5	16.1	10.3	10.3
Manila Electric	MER PM	Jelline Gaza	N	483.4	8,909	4.1	10.4	10.3	2.8	2.6	28.5	26.1	9.8	7.8
Tenaga Nasional	TNB MK	Samuel Tan	OW	14.3	20,428	20.4	17.1	16.2	1.6	1.5	8.9	9.2	7.5	7.1
YTL Corp	YTL MK		NC	2.2	6,171	10.5	16.7	n.a.	1.6	1.5	9.2	9.2	8.9	8.1
Sembcorp Industries	SCI SP	Terence Khi	N	5.7	7,871	30.5	12.3	8.6	1.7	1.5	17.8	19.0	9.7	7.2
Huaneng Power	902 HK	Stephen Tsui	UW	5.8	14,878	32.4	6.9	7.3	1.0	0.9	7.5	6.8	10.4	10.2
China Resources Power	836 HK	Stephen Tsui	N	18.5	12,213	46.9	7.0	7.2	0.8	0.8	12.3	11.2	7.5	7.5
Huadian Power	1071 HK		NC	4.1	7,725	5.4	7.6	7.1	0.6	0.6	8.6	8.5	11.4	11.0

Source: Bloomberg Finance L.P. and J.P. Morgan. Bloomberg consensus estimates for Not Covered (NC) stocks, J.P. Morgan estimates for all others. Prices as of 11 August 2026.

Our ASEAN strategy team has reviewed El Niño episodes from 1994 to 2025 and sees generally no causal relationship between the weather pattern and the share price performance of ASEAN consumer stocks. However, they find that second-order effects from El Nino are transmitted through higher input costs and inflation pass-through. They recommend ASEAN companies with pricing and demand resilience that are best positioned to defend margins and capture demand in volatile conditions. They avoid names with concentrated commodity exposure and weak pricing power, as the lagging margin impact of weather-driven cost pressures is not yet discounted. Their OW recommendations include: Indonesia – MAPA, INDF; Thailand – CPALL, MRDIYT; Malaysia – FFB, 99SMART; and the Philippines – CNPF (see *ASEAN Consumer: El Niño: Don't trade the weather; watch the margins*, Jeanette Yutan, 9 Jul).

Appendix

J.P. Morgan Research

Strategic Research

J.P. Morgan Perspectives: Food Security: Rising weaponization and insecure supply, Joyce Chang et al., 9 Sep 2024

J.P. Morgan Perspectives: Food Security and Climate Change: The Makings of a Perfect Storm, Joyce Chang et al., 10 Aug 2023

J.P. Morgan Perspectives: Food Insecurity: A New Normal, Joyce Chang et al., 20 Sep 2022

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Economic Research

Super El Niño and oil: double whammy for food prices, Nora Szentivanyi et al., 24 Jul 2026

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