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The Grower's Gap: Hedging the Agricultural Risks That Crop Insurance and Futures Markets Omit

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Agricultural businesses have more ways to manage risk than most industries, yet some costly risks still aren’t covered

Agriculture invented modern hedging. Grain futures have traded on the Chicago Board of Trade, now part of CME Group, since the 1800s. Today a farm, ranch or vineyard can lock in prices with futures and forward contracts, insure its crop or herd through federal programs that the government largely subsidizes, buy private insurance, and fall back on disaster aid from Congress in the most extreme cases. Federal crop insurance alone covered a record 561 million acres in 2025, with about $159 billion of crops insured.[1] [2]

That system works best for the crops it was built around. Corn, soybeans, wheat and cotton make up about 70% of the crop value that federal insurance protects, and they are the crops with deep futures markets.[3] Fruits, vegetables and nuts make up more than a fifth of US crop sales,[4] yet apart from orange juice none of them have a futures market. More than 80% of the acreage of crops such as strawberries and lettuce has no federal crop insurance or NAP coverage, mostly because federal policies for these crops are limited.[5] [6] Even where coverage exists, it is only partial. It leaves out some of the risks that hurt agricultural businesses the most, often pays on a measure that doesn't match the business's actual loss, and can take months or even years before the business receives the money.

Event contracts are a newer product. They trade on exchanges regulated by the Commodity Futures Trading Commission (CFTC), the federal agency that oversees futures markets, and most pay $1 per contract if a specific event happens and nothing if it doesn't. An agricultural business can use them to protect against events that its existing hedging products don't cover, or cover poorly, such as a spring frost, a heat wave or a government decision on cattle imports. Businesses in other industries have already started to hedge this way, from a metals distributor protecting against swings in the price of tungsten to a Los Angeles bar group protecting the revenue it would lose if the Dodgers’ playoff run ended early.[7] [8]

For agricultural businesses, the case for event contracts rests on three findings. First, today's protection leaves real losses unpaid. A Napa grower insured at 75% that lost 15% to 20% of its crop in the 2022 heat wave, as some wineries did, would have collected nothing, because the loss fell inside its deductible. Second, help often arrives late: federal aid for Georgia's 2023 peach freeze opened for applications 28 months after the freeze. Third, event contracts can now fill these gaps, with protection sized to the loss and settled on a nearby weather station, a published price or a policy decision. The sections below look at where today's products fall short, the four sectors where the gaps cost the most (vineyards and wineries, tree fruit and nuts, fresh produce, and cattle), and how to build a hedge sized to the loss.

How agricultural businesses manage risk today

Futures and options. A futures contract locks in the price of a commodity for a future date. A corn grower that sells futures before harvest locks in its selling price. An option works more like insurance on price: the grower pays an upfront fee, called a premium, for the right to sell at a set price, so it is protected if prices fall but still gains if they rise. Both protect price, not quantity, so they pay nothing if a frost or drought shrinks the harvest. They also track a national price that can differ from what a business receives in its own region. In a U.S. Department of Agriculture's (USDA) survey, only about 2% of US farms traded futures or options directly, rising to about one in six among farms with sales of $1 million or more.[9]

Forward and marketing contracts. Most farmers lock in prices through contracts with the businesses that buy from them, such as grain elevators, meatpackers, processors, wineries and supermarket chains. A forward contract works like a futures contract, but it is a private deal with one buyer rather than a trade on an exchange, so it can be set at the local price for the farmer's own crop. Like futures, it fixes the price but not the size of the harvest. If the harvest comes up short, the farmer may owe the buyer for the crop it can't deliver.

Federal crop insurance. Crop insurance covers more than 120 crops, but coverage for each crop is offered only in the counties where the USDA has set rates for it.[10] [11] A grower chooses a coverage level, usually between 50% and 85% of its average yield over the past 4 to 10 years, and the policy pays when the harvest falls below that level because of weather, fire, pests, disease or other natural causes. Revenue policies value that yield at a price set before planting, so they also pay if the price falls between planting and harvest.[3] The government pays a large share of the premium: 60% to 80% at the 75% coverage level.[12] Two add-ons, the Supplemental Coverage Option (SCO) and the Enhanced Coverage Option (ECO), cover part of the deductible, the part of a loss the basic policy leaves to the grower. They pay only when the whole county's yield or revenue falls, so a farm can lose money and still collect nothing. They are offered mainly for row crops such as corn, soybeans and wheat, and in 2025 ECO was also extended to almonds, apples, blueberries, grapes and walnuts.[12] [13] [14] For farms whose crops lack their own policy, Whole-Farm Revenue Protection (WFRP) insures the farm's total revenue up to $17 million. It requires five years of farm tax returns and a revenue review after the year end, which helps explain why few farms use it: about 2,000 policies nationwide in 2025.[15] [16]

Federal livestock insurance. Livestock Risk Protection (LRP) pays if national cattle prices fall below a floor the producer chooses. The number of cattle it insured rose from 71,000 in 2017 to 7.5 million by July 2025.[17] Pasture, Rangeland and Forage (PRF) insurance, which covered 316 million acres in 2025, protects ranchers against drought, which shrinks the grass their cattle feed on.[18] It pays when rainfall in the grid squares where the pasture sits, each roughly 17 by 13 miles, falls below a level the rancher chooses.[19] Because it pays on measured rainfall rather than an assessed loss, it works much like an event contract, and its wide use shows ranchers already accept this kind of protection. It covers drought, though, not heat, one of the costliest risks for cattle.

The backup program for uninsured crops. USDA's Noninsured Crop Disaster Assistance Program (NAP) covers a single crop that has no federal policy of its own, while WFRP insures a whole farm's revenue. NAP costs a small fee and pays only when more than half of a normal crop is lost, at 55% of the average price.[20] Payments are capped at $125,000 a year, or $300,000 with extra coverage.[21]

Private and parametric insurance. Private insurers sell policies that pay for specific causes of loss, such as hail, based on assessed damages. Parametric insurance pays a set amount when a measured trigger is reached, such as a daily temperature, without having to assess the actual loss. Firms such as Arbol and Descartes write parametric frost, heat and rainfall cover for farms, but each policy is custom-built and sized for large buyers, with published examples running from hundreds of thousands to over a million dollars of cover.[22] [23] Federal crop insurance has

adopted the idea too: since 2025, grape growers in California, and since 2026 in Idaho, Oregon and Washington, can add a smoke add-on that pays part of the deductible when satellite maps show enough heavy-smoke days over the county.[24] [25]

Disaster aid. When insurance falls short, the government often steps in. Two permanent USDA programs pay ranchers for grazing lost to drought and for animals that die in extreme weather.[26] [27] Beyond these, Congress passes one-off aid: it did so in six of the eight fiscal years from 2018 to 2025, almost $40 billion in total.[21] From 2015 to 2024, one-off payments, mostly trade and pandemic aid plus disaster aid, made up 45% of federal support to crop farmers, more than crop insurance's 35%.[28] But a business can't buy disaster aid in advance, and it arrives on Washington's schedule rather than the business's.

The table below compares event contracts with the three products an agricultural business is most likely to weigh them against: futures, crop insurance and parametric insurance.

	Futures	Federal crop insurance	Parametric insurance	Event contracts
What it pays on	A national price benchmark	The farm's own yield or revenue, compared with its history	A measured trigger, such as temperature or rainfall	A specific event the buyer chooses
What it covers	Price only	A smaller harvest from natural causes such as weather, fire, pests and disease, plus a fall in price for revenue policies	Weather events named in the policy	Weather, prices, policy decisions, supply shocks and other measurable events
Minimum size	Set by the exchange (e.g. one corn contract is 5,000 bushels)	A whole crop on a farm	Usually hundreds of thousands of dollars of cover	Any size on listed contracts (each pays $1); custom contracts trade in size as block trades
Cost to the business	A cash deposit (margin), with gains and losses settled daily	A premium, largely subsidized by the government	A premium	The contract price, paid up front
When it pays	Daily, as prices move	After the loss is assessed, usually after harvest	Days to weeks after the trigger	Days after the event is confirmed
Can it be sold before it ends?	Yes	No	No	Yes

Where today's products fall short

These products work well for the risks they were designed for. Across agriculture, five gaps remain.

Insurance leaves the first part of every loss uncovered. Most individual crop policies cover at most 85% of a normal crop, so without an add-on the grower absorbs the first part of any loss.[3] A grower insured at 75% absorbs any loss up to a quarter of its expected harvest, and many bad years fall within that first quarter. During the Labor Day heat wave in 2022, temperatures in Napa passed 100°F for nearly a week, and some wineries reported yields 15% to 20%

below normal.[29] A grower insured at 75% would have collected nothing. Each bad year can also lower the average yield the next policy is based on, so repeated losses shrink future coverage.[30] SCO and ECO can cover part of the loss for some crops, but only when the whole county's yield or revenue falls.[13]

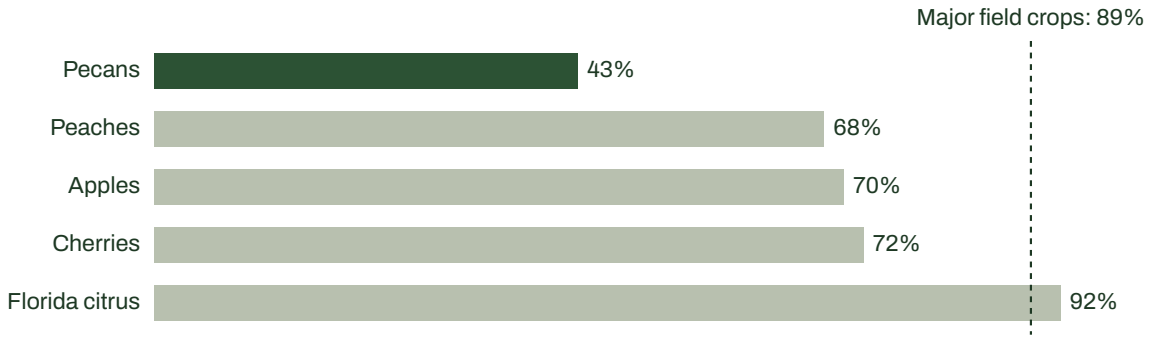
Many losses aren't covered at all. Crop insurance pays for a smaller harvest caused by weather, fire, pests, disease or other natural causes. It doesn't pay when a grower can't sell the crop.[31] In 2025 about 820,000 tons of California wine grapes, roughly a quarter of the crop, were left unpicked because falling wine sales left wineries with no use for them.[32] [33] Many other uncovered losses come from specific events: a border closed to cattle imports, a new tariff, a change in farmworker wage rules, or a price spike in a market a business buys from. Livestock programs also pay for animals that die in a heat wave, but not for the weight surviving cattle lose. Because cattle are sold by the pound, that lost weight is lost revenue.[27] [34]

The measure often doesn't match the loss. Every product pays on some measure: a national price, a yield history, a rainfall grid. The gap between what that measure shows and what the business actually loses is called basis risk. For a corn farmer, a smaller harvest across the country usually means a higher price, which softens the blow. Specialty growers rarely benefit from this offset. When two freezes did an estimated $675 million of damage to Florida's citrus groves in early 2026, orange juice prices actually fell about 20% instead of rising.[35] Since Florida currently grows about 13 million boxes of oranges a year, down from 244 million at its late-1990s peak, juice prices follow Brazil's much larger harvest. About half of Florida's crop had also been picked before the freeze, and growers turned much of the frozen fruit into juice.[36] [37] Ranchers face the same problem with pasture insurance. One study found that in 26% to 43% of the years when a ranch grew less grass than average, the rainfall index pointed to an average or better year, so the policy would likely have paid little or nothing.[38]

Coverage is thin outside the major crops. About 89% of the acreage of the major field crops is insured.[10] Among tree crops the share varies widely, from 92% for Florida citrus down to 43% for pecans.[39] Tree crops are harder to insure. Their yields swing widely from year to year (pecan trees bear heavy and light crops in alternate years), so the average yield a policy is built on is a poor guide to a normal crop. That makes premiums higher, and many policies are offered only in certain states and counties.[40] [41] California's strawberries were worth $3.5 billion in 2024, yet in 2025 the federal strawberry policy covered only about $145 million of strawberries across California and Florida combined.[16] [42] And NAP's payment cap covers little of the loss for a produce company with tens of millions of dollars in sales.

Insurance coverage varies widely across tree crops

Insured acres as a share of total acres, 2023 (major field crops, 2024)



Source: USDA Risk Management Agency, 2024 Specialty Crops Report; USDA Economic Research Service.

Money arrives late. Insurance pays once a loss has been assessed, usually after harvest, and disaster aid takes much longer. In March 2023 a late freeze took up to 98% of Georgia's peach crop.[43] About two-thirds of US peach acreage is insured, so many growers collected on their policies, but only for the part of the loss beyond their deductible.[39] Federal aid for the rest opened for applications in July 2025, 28 months after the freeze.[44] Georgia's $531 million block grant for Hurricane Helene, which struck in September 2024, opened in March 2026.[45] In between, businesses have to pay their workers and bills on their own.

How event contracts fill the gaps

Event contracts come in two shapes. A yes or no contract pays $1 if the event happens and nothing if it doesn't, so its price reflects the market's view of the odds: a contract that costs 20 cents implies roughly a 20% chance of the event. A scalar contract pays a share of $1 that grows the further a number, such as a price, moves. Yes or no contracts can also be combined by buying them at several thresholds, each one a layer of protection. Each layer pays at its own level, so the total payout grows in steps as conditions worsen: for example, one contract that pays if the temperature falls below 28°F and another that pays below 25°F.

Several CFTC-regulated exchanges list event contracts, including Kalshi and Polymarket US, the two largest by trading volume in the US. A business can buy contracts that are already listed, or have a custom contract created when none fit. Kalshi says a contract built on terms it has already certified can be listed within days; new terms take longer, because they must first be filed with the CFTC.[46] Large trades can be negotiated privately as a block trade with a market maker, a firm that stands ready to take the other side of a trade, so a business can hedge millions of dollars without waiting for the public market to fill its order. Block trades are open to businesses that qualify as eligible contract participants (ECPs), generally those with more than $10 million in total assets, or more than $1 million in net worth if they are hedging their business risk. Smaller hedges can trade directly on the exchange's public order book.

Businesses outside agriculture are already hedging this way. A metals distributor in Ohio hedged the price of tungsten, a metal with no US futures market yet (CME plans to launch one in early 2027), through a contract Kalshi listed for the trade, with Susquehanna as the market maker on the other side.[7] [47] In another instance, an insurer on the hook for a football coach's $3 million championship bonus offset that risk through trades on Kalshi.[48]

A business hedges by buying enough contracts to cover the loss it would suffer if the event happened. A vineyard that would lose about $200,000 in a hard frost during bud break, when the buds open in spring, would buy 200,000 contracts that pay if the nearest weather station records that frost. At 15 cents each, the protection costs $30,000. If the frost comes, the vineyard receives $200,000 within days. If it doesn't, the vineyard has spent $30,000, as it would on any insurance it didn't end up needing. Those mechanics answer the five gaps in turn.

Insurance leaves the first part of every loss uncovered. An event contract has no deductible: when the event happens, it pays out in full, with nothing held back, so a grower can buy protection sized to the share of the loss its insurance leaves uncovered.

Many losses aren't covered at all. A contract can be written on almost any event that can be measured and confirmed: a published price, a USDA decision, a tariff, the number of days exceeding a set temperature in a specific location. That includes losses insurance doesn’t cover, such as a collapse in demand, a price spike in something a business buys, a border closure or a new tariff.

The measure often doesn't match the loss. A contract can be written on the measure that best tracks a business's loss: for a vineyard, a specific weather station, time window and threshold; for a ranch, a measure of pasture conditions rather than just rainfall, such as the county’s weekly drought rating, which reflects soil moisture and

plant health. No contract matches a loss perfectly, and the section on building a hedge explains how to measure the risk that remains. There is also a side benefit: because the payout follows the measured event rather than an adjuster's assessment of the loss, a grower who runs frost fans all night and saves half the crop still collects in full.

Coverage is thin outside the major crops. Event contracts aren't limited to certain crops or counties. There is no underwriter reviewing the farm and no list of eligible crops, so a strawberry or lettuce grower can buy protection the same way a vineyard can.

Money arrives late. Contracts settle (pay out) when the event is confirmed, usually within days, not after an adjuster has assessed the loss. Payment doesn't depend on whoever sold the contract: the exchange's clearinghouse, the central party that guarantees payment, stands behind every contract, and today it collects the full $1 for each contract when the trade is made.

Event contracts work alongside futures and insurance rather than replacing them. Insurance remains the cheapest protection against a large loss of a farm's own crop, and futures remain the deepest market for the price of corn, soybeans or cattle. What event contracts add is cover for the part of a loss inside the insurance deductible, so protection can come close to the full loss, and for specific events neither covers, such as a tariff or a policy decision. Crop insurance rules bar a second federal policy on the same crop but allow private coverage alongside it, which is how many growers already buy private insurance on top of their federal policy.[49] An exchange-traded hedge can sit alongside a federal policy in the same way.

Four sectors where the gaps cost the most

The gaps above apply across agriculture, but they cost the most in sectors with three traits: more limited insurance coverage, prices that vary by region and buyer, and large losses from events the business can't control, such as a border closing or a new tariff. Four sectors stand out. The table below summarizes them, and the sections that follow look at each in turn.

Sector	Main protection today	Biggest gaps	Event contracts that fit
Vineyards and wineries	Federal grape insurance, frost fans, some private cover	Heat losses below the deductible; smoke losses below the policy's payout threshold; no federal insurance for a winery when its growers' harvest falls short; tariffs and trade disputes	Heat days and spring frost; county smoke days; district grape prices; trade decisions
Tree fruit and nuts	Crop-specific federal policies, frost fans, disaster aid	Frost losses inside the deductible; hurricane damage to the trees themselves; aid that arrives years later; export tariffs	Frost, tied to bud development; chill hours; a storm's wind speed near the orchard, or its path passing close by; tariffs
Fresh produce	Limited federal cover, NAP, fixed-price sales contracts	The cost of replacing product to fill contracts in a shortage; import duties; labor rules	USDA's reported produce prices; duty and wage decisions
Cattle	Futures, LRP, PRF, livestock disaster programs	Border decisions; drought losses the rainfall index misses; slower weight gain in heat	Border reopening decisions; county drought ratings; heat-stress index readings

Vineyards and wineries

Wine grape prices vary enormously by region and variety. In 2025 California crushed 2.76 million tons of grapes, and wineries paid an average of $978 a ton for the grapes they bought. But while Napa Cabernet Sauvignon averaged $8,645 a ton, grapes from the southern Central Valley averaged only $334.[50] At Napa's average prices across all varieties, an acre of vines brought in about $22,500, so a smaller harvest on even a few acres is a large loss.[51] The industry is also in a downturn, which leaves less room to absorb losses. Growers pulled out nearly 40,000 acres of vines between October 2024 and August 2025 as wine sales fell and grape prices dropped.[33] [52] Trade disputes add to the risk. US wine exports to Canada fell 78% in 2025 after most provinces pulled American alcohol from store shelves in response to US tariffs, and although it was agreed in August 2026 to restore them as part of a trade deal, eight of the ten provinces had still not done so.[53] [54]

Most growers rely on federal grape insurance, which 74% of California's wine grape acreage carried in 2024.[55] Lost grapes are normally valued at a set price for each district and variety. However, a grower with a winery contract can choose, when it buys the policy, to have them valued at its contract price instead, so a claim reflects what the fruit was actually worth.[56] For frost, growers install fans that pull warmer air down from above the vines, at a cost that can easily exceed $25,000 for about 10 acres, and the fans only work when that warmer air is there.[57] Frost damage can also differ sharply from one growing area to the next. In Washington's January 2024 freeze, most Red Mountain sites lost 10% to 20% of their buds, while some Walla Walla sites, about 55 miles away, lost nearly all of them, which is why a cold-weather hedge should settle on a weather station close to the vines.[58]

The gaps are heat, smoke and the winery's own supply. As noted above, heat losses often fall inside the deductible, so the basic policy doesn't pay out, and ECO, offered for grapes since 2025, pays only when the whole county's yield falls. Smoke can be far worse: the 2020 wildfires cut the amount of Napa Cabernet that wineries bought and crushed into wine by 43% as wineries turned away smoke-exposed fruit, and the industry put total damage at up to $3.7 billion.[59] [60] The basic grape policy pays for smoke damage only when the grapes lose more than three-quarters of their value, and only with a lab test taken before harvest.[61] [62] The smoke add-on described earlier, offered only in California, Idaho, Oregon and Washington, pays only part of the deductible, and only when the county has enough heavy-smoke days. So if a winery pays 40% less for smoke-exposed fruit, the basic policy pays nothing and the add-on covers part of the loss at most. Wineries face a different problem. A winery that buys grapes from independent growers can't insure those grapes, because the growers' policies pay the growers. If frost or heat shrinks its growers' harvest, the winery has to buy grapes elsewhere at higher prices or make less wine.

Event contracts fit each of these. A grower can buy protection that pays if a nearby station records a run of very hot days in late summer, or if spring frost reaches set temperatures during bud break. A contract on the number of heavy-smoke days in the county, using the same satellite data as the federal smoke add-on, can be sized to the discount a winery would actually apply. A winery can buy the same frost or heat contracts for its growers' region and use the payout to buy replacement fruit, and a winery that sells into Canada could buy contracts that pay if the provinces haven't restored US wine by a set date. A grower without a long-term winery contract sells at whatever price wineries offer at harvest, and that price fell sharply in 2025 as wine sales slowed. It could buy protection that pays if the average price for its district and variety in California's annual grape crush report falls below a set level. The section on building a hedge works through a Napa heat hedge in detail.

Tree fruit and nuts

For orchards, a single night can decide the year. In March 2017, a hard freeze after an unusually warm February destroyed about 90% of South Carolina's peaches,[63] and Georgia's 2023 freeze did similar damage.[43] Michigan's tart cherry harvest fell 92% in 2012, the worst year since records began in 1925, after March temperatures in the 80s woke the trees weeks early and 19 straight nights of frost followed. In April 2025, cold cut northwest Michigan's crop

from a typical 180 million pounds to just 30 million.[64] [65] [66] Hurricanes add a longer-lasting risk. Helene destroyed about 75% of the pecan crop across a third of Georgia's pecan acreage in 2024. Given that new pecan trees take five to seven years to bear nuts, one storm can cost an orchard most of a decade's income.[67] [68]

Protection varies widely across tree crops. Most have their own federal policy, and pecans have a revenue policy covering 50% to 85% of a grower's average revenue per acre.[41] Crop insurance generally covers the crop, not the tree, so the years of lost income after a hurricane fall to disaster aid. Orchards use the same frost fans as vineyards, and the fans raise temperatures only 2°F to 3°F on calm, clear nights.[69] The only futures contract for the sector is orange juice.

The most useful event contract here is a frost contract tied to the stage of the buds. Frost tables compiled by Michigan State University show that peach buds at first bloom lose about 10% at 26°F and about 90% at 21°F.[70] Buying layers of event contracts at several temperatures makes the payout rise as the cold deepens, the way the damage does. Peach growers can also hedge a warm winter. Peaches need roughly 800 hours below 45°F, known as chill hours, for the highest yields, and a contract on chill hours would pay if a winter falls short.[63] The contract has to state exactly how chill hours are counted, because different counting methods can give very different totals for the same winter.[71]

Kalshi already lists contracts on where a hurricane comes ashore.[72] Helene came ashore in Florida's Big Bend and did its pecan damage inland in Georgia, so a pecan grower needs a custom contract on wind speed measured at an inland station, or on a storm's path passing within a set distance of its orchards. Exporters face a separate risk that a contract can hedge directly: China's tariffs on US apples, pears and sweet cherries reached 160% in April 2025, then fell to 35% in November 2025.[73] [74] In late September 2026 the two countries agreed further cuts that include cherries.[74] An exporter could buy contracts that pay if the tariff is still above a set rate on a given date, making up for the profit it would lose on sales to China.

Fresh produce

US farms sold $28.2 billion of vegetables, melons and potatoes in 2022, 41% of it from California and 13% from Monterey County alone.[75] Yet for all that value, there are no futures for lettuce, tomatoes, peppers or any other fresh vegetable. Onion futures have been banned by federal law since 1958, after two traders cornered the Chicago onion market in 1955 and prices collapsed.[76] Fresh produce is among the least insured farm sectors: federal insurance reaches only a small share of the crop. The risk that insurance can't reach at all comes from how produce is sold.

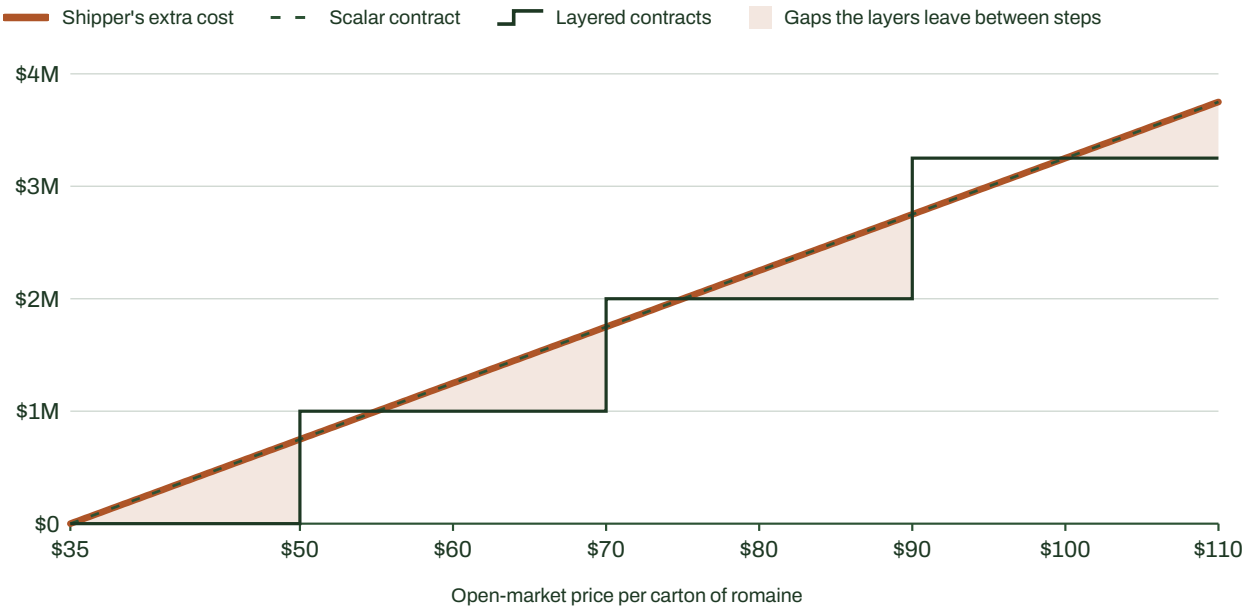
Most produce is sold by grower-shippers, companies that farm their own land and also contract with or buy from other growers so they can supply supermarkets and restaurant chains year-round as the harvest moves between regions. Much of their business runs on fixed-price contracts agreed weeks or months ahead; one industry estimate puts about 80% of Salinas Valley iceberg lettuce on contract.[77] A fixed price protects a shipper when the market falls, because its buyers still pay the agreed price. It hurts when the shipper's own harvest comes up short, because the shipper still owes the cartons and has to buy them from other growers at whatever the market charges. In the fall of 2022 a virus spread by insects cut lettuce yields in parts of the Salinas Valley, and some fields produced about 10% of a normal crop. Romaine and iceberg traded at $100 a carton or more on the open market, while an estimated 75% to 80% of shipments went out at contract prices around $35.[78] A shipper that had promised a supermarket lettuce at $35 a carton, but whose own fields produced little, had to buy lettuce from other growers at $100 to fill the order. It lost $65 on every carton. Crop insurance, where it exists, pays for the shipper's lost harvest, not for the cost of replacing it.

USDA publishes shipping-point prices, the prices buyers pay for produce at the place it is packed and shipped. A contract that pays when the reported price rises above a set level would hedge this risk directly. Because it pays on USDA's reported average, it can pay less than the highest prices a shipper actually pays in a shortage. Take a shipper

with 100,000 cartons of romaine promised for November at $35. If its fields yield half, it must buy 50,000 cartons on the open market. At $70 a carton that costs $1.75 million more than its customers pay, and at $100 it costs $3.25 million. There are two ways to structure the hedge. The first is a scalar hedge: the shipper buys enough scalar contracts to receive $50,000 for every dollar the USDA weekly price rises above $35. With 50,000 cartons to replace, that matches its extra cost dollar for dollar, as long as the shortfall stays at 50,000 cartons. The second uses layers of event contracts: one pays $1 million if the price tops $50, another pays $1 million above $70 and a third pays $1.25 million above $90. Layers leave gaps between the price triggers: at $69 a carton the shipper's extra cost is $1.7 million, but the layers would pay only $1 million. When the number of cartons to replace stays the same as the price rises, as in the chart below, the extra cost rises in a straight line, which is exactly how a scalar contract is structured to pay.

With a fixed shortfall, a scalar contract matches the loss

A shipper buys 50,000 replacement cartons to fill orders it sold at $35 a carton

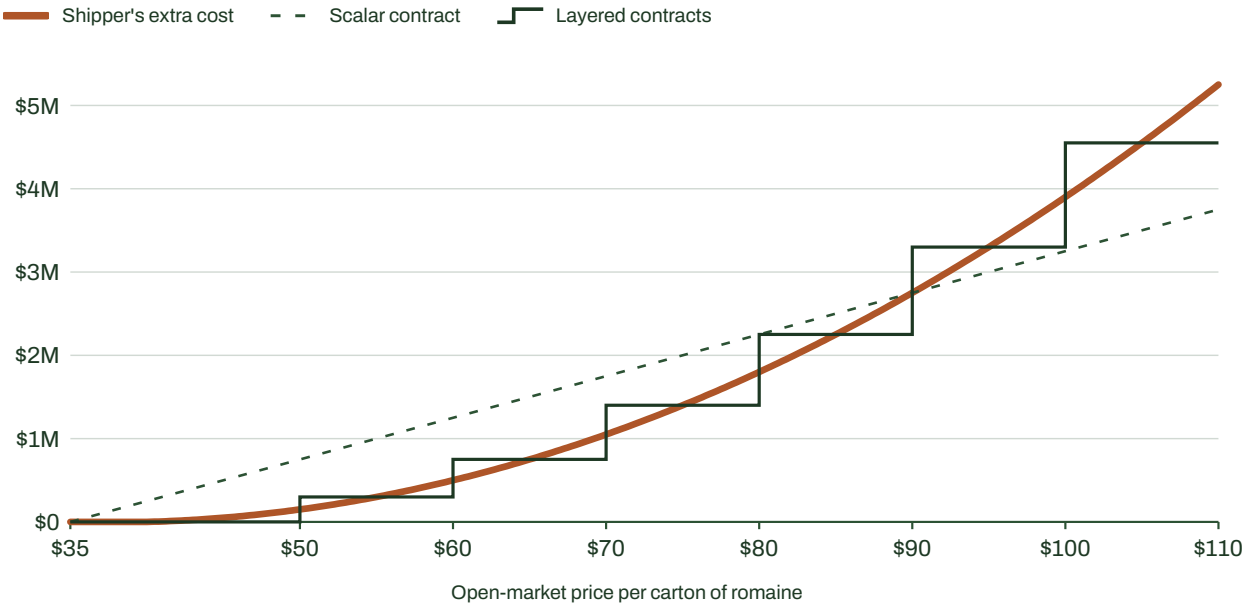


Illustrative example based on the scenario described. Scalar pays $50,000 per $1 above $35. Layers pay $1M above $50, $1M more above $70, $1.25M more above $90.

Layers make more sense when the number of cartons to replace grows as prices rise. That is common, because the same event usually drives both. When a virus or bad weather hits a whole growing region, it pushes up prices and shrinks the shipper's own harvest at the same time, so the worse the damage, the higher the price and the more cartons the shipper has to buy. Suppose the shipper is 30,000 cartons short when the price reaches $70 but 60,000 short at $100. Its extra cost then curves upward, from about $1.05 million at $70 to $3.9 million at $100. The scalar contract above would pay too much below about $90 and too little above it. Layers can instead be sized to grow with the loss: six layers, one every $10 from $50 to $100, starting at $300,000 and rising to $1.25 million, stay close to the curve all the way up, as the chart below shows. Layers have another advantage: a business can buy only the layers it needs. A business that can absorb a moderate price rise can buy just the top layers, which cost less because they are less likely to pay out.

When the shortfall grows with price, layers can follow the curve

The shipper is 30,000 cartons short at $70 and 60,000 short at $100



Illustrative example based on the scenario described. Six layers, one every $10 from $50 to $100, growing from $0.3M to $1.25M. Scalar pays $50,000 per $1 above $35.

Policy is the other major risk. Since July 2025 Mexican tomatoes have faced a 17.09% antidumping duty, a tariff on imports judged to be sold below fair value, and Mexico supplies about two-thirds of US tomatoes.[79] Labor rules change too. In October 2025 the Labor Department cut the minimum wage for H-2A guest farmworkers, lowering California's rate from $19.97 an hour to $16.45 or $18.71 depending on the job. In August 2026 a federal court ordered the department to rewrite the rule, and a grower paying the lower rate could owe back pay for the period from September 2, 2026 once new rates are issued.[80] [81] [82] Each of these is a dated government decision a contract can settle on.

Cattle

The cattle sector has more protection than the other three, including a national futures market, but it belongs on this list because of the third trait: its biggest shocks of the past two years came from government decisions, above all the closing of the Mexican border to cattle imports. Futures and LRP can protect against the price swings that followed, however no product pays on the decision itself. Producers can use CME futures and options, LRP and PRF, and federal programs cover drought feed costs and animal deaths. Despite that, few producers use these products: in one survey, 6% of cattle producers had ever used futures and 12.5% had used LRP, with most saying that they were unfamiliar with how these products work.[83] Size is another barrier: one feeder cattle futures contract covers 50,000 pounds of cattle, about 60 to 80 head, which is more than many smaller operations sell at one time.[83] [84]

The biggest event of the past two years was the border. In November 2024 USDA stopped imports of Mexican feeder cattle (young cattle sold to feedlots to be fattened) because of New World screwworm, a parasite whose larvae feed on living flesh. About 1.2 million head had crossed that year,[85] a large supply to lose with the US herd already the smallest since 1951.[86] The border reopened from February to May 2025, then closed again, and by July 2025, feeder prices ran nearly $100 per hundredweight (100 pounds of live weight) above where they would otherwise have

been.[87] [88] Headlines then moved prices the other way. In October 2025, after the President talked about lowering beef prices and reports of a possible meeting with Mexico on reopening the border, the benchmark feeder cattle price fell about 11% in 12 days, cutting more than $330 off the value of each 800-pound steer.[87]

Heat adds a loss no product fully covers. A June 2022 heat wave killed at least 2,000 cattle in Kansas.[89] Losses start well before heat becomes deadly, however. Cattle being fattened begin to suffer heat stress, which cuts feed intake and weight gain, once a heat-stress index that combines temperature and humidity passes about 72.[34]

The border is a natural market for event contracts because it has businesses on both sides. A ranch that sells young cattle loses if the border reopens and prices fall. A feedlot that buys them loses if reopening stalls or ports close again. USDA has been reopening ports in stages since August 2026: Douglas, Santa Teresa and Columbus have reopened, and Nogales, Arizona, is scheduled for November 30 if conditions allow. Screwworm has also reached the US, with more than 70 cases in Texas, New Mexico and Arizona since June 2026, so ports could close again.[90] [91] A feedlot planning to buy 10,000 head of 800-pound feeders over the winter, 80,000 hundredweight in all, might estimate that Nogales staying closed through the winter would add another $10 per hundredweight to its costs, or $800,000. Contracts that pay $800,000 if Nogales hasn't reopened by the end of February cover that, and a ranch with the opposite exposure can take the other side. Even when the border was open from February to May 2025, imports ran 43% below normal, so a reopening may not end the shortage, and the feedlot should size its hedge to the extra cost of the border staying closed.[87] Contracts on county drought ratings and on temperatures exceeding a certain threshold can cover the pasture and weight-gain losses described above. For ordinary price changes over months, futures and LRP remain the better fit, and event contracts can sit alongside them.

How to build a hedge sized to the loss

The sector examples show where contracts help. How much a contract helps depends on how it is built, and getting that right takes six steps.

Start with the part of the risk nothing else covers. On large losses, subsidized crop insurance is cheaper than any contract, so the first step is to find what it leaves uncovered. Mapping each risk against the business's existing protection usually looks like this:

Part of the risk	Best protection
A large loss of the farm's own crop	Federal crop insurance
The deductible, where SCO or ECO is offered for the crop	SCO or ECO, or an event contract where the farm's loss may not match the county's
The deductible, where no add-on is offered	An event contract on the event behind the loss, such as frost or heat at a nearby weather station
A loss no policy covers, such as a border decision, a tariff, or a price spike in a crop with no futures market	An event contract on that event
A change in the price of a crop or livestock with a futures market, such as corn or cattle	Futures, options or forward contracts, and LRP for cattle

Choose a measure that tracks the loss. The contract should pay on the measure that moves most closely with the business's losses. For a policy risk, that is the specific decision and date, such as a port reopening by January 31. For a price risk, it is the price the business actually pays or receives, such as USDA's shipping-point price for romaine.

For weather, it is a station closest to the farm, because conditions can differ sharply over short distances. Federal agencies run about 950 automated weather stations, most of them at airports, and hundreds more at smaller airports are run by states or the airports themselves. Many sit near growing regions: Napa County Airport, Penn Yan in the Finger Lakes, Fredericksburg in the Texas Hill Country, Perry in Georgia's peach country, Traverse City in Michigan's cherry country and Wenatchee in Washington's apple country.[92] [93] A custom contract can be written on a nearby station, provided its records are official, published promptly and reliable. Whatever the measure, it should come from an independent source that can't be tampered with, such as a government weather station or a USDA report.

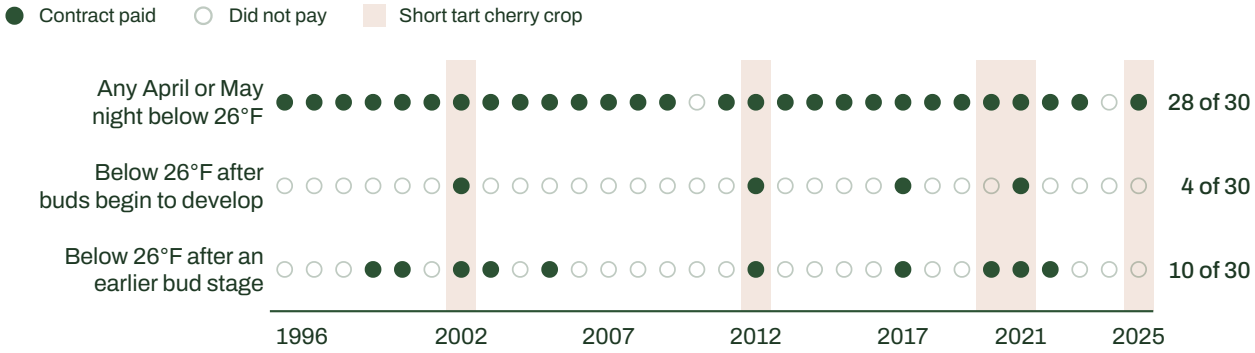
Design the trigger around the crop, and test it against history. The trigger is the condition that makes the contract pay, and small changes to it, such as the temperature or the number of days, can change how often it pays. A Napa grower worried about a repeat of 2022 might choose a contract that pays after five days of 105°F or hotter in late summer. At the long-running weather station in the city of Napa, that contract would never have paid in 30 years, including 2022. Five days of 100°F or more happened in 7 of the 30 years, including 2022. Two of those seven years, 2017 and 2022, brought real heat damage; in 2020 smoke did most of the harm.[59] [94] [95]

Frost works the same way. A tart cherry grower near Traverse City, Michigan, might choose a contract that pays if the airport records a night below 26°F in April or May. It would have paid in 28 of 30 springs, mostly for cold that did little harm, because buds that haven't begun to develop can survive much colder nights. Counting only cold nights after the buds begin to develop cuts the payouts to 4 springs: three bad years (the 2002 and 2012 freezes[64] [96] and the poor 2021 crop[97]) and one normal year, 2017.[95] [97] But it misses two bad years, 2020 and 2025, when orchards were damaged by earlier cold.[66] [97] Starting the count at an earlier bud stage catches 2020 too, but the contract then pays in 10 of 30 springs, six of them normal years, so it costs more. Neither version catches 2025, when the hard freezes came before the buds had developed. That is why a grower would pair a frost contract with insurance rather than rely on one trigger alone.

Trigger	Years it would have paid, 1996 to 2025	Did it pay when it mattered?
Napa: 5 or more days at 105°F or hotter, August 15 to September 30	0 of 30	No. It missed both damaging heat years, 2017 and 2022.
Napa: 5 or more days at 100°F or hotter, August 15 to September 30	7 of 30	Yes. It caught both damaging heat years, 2017 and 2022, but also paid in five other years.
Traverse City: below 26°F, any day in April or May	28 of 30	It paid almost every year, good or bad.
Traverse City: below 26°F, only after buds begin to develop	4 of 30	It caught 2002, 2012 and 2021, missed 2020 and 2025, and paid once in a normal year.
Traverse City: below 26°F, after an earlier bud stage	10 of 30	It also caught 2020, but paid in six normal years.

A frost trigger tied to bud development pays far less often

Years each frost contract would have paid at Traverse City airport, Michigan, 1996 to 2025



Source: Hedgestead analysis of NOAA weather records; crop data from USDA NASS and Michigan State University.

Size it to the loss. The number of contracts should match the dollars at risk. Take a 50-acre Cabernet vineyard at Napa's 2025 averages (about 3.4 tons an acre across all varieties, at $8,645 a ton for Cabernet), with a crop worth about $1.47 million.[50] [51] If a heat wave like 2022's cut its yield by about 18%, it would lose about $260,000, and with 75% coverage and no add-on, insurance would pay nothing.[29] To cover that loss, it would buy contracts paying about $260,000 in total, or $370,000 to cover the full deductible, the most it could lose before insurance pays. Where the damage grows with the severity of the event, as it does with frost, buying layers at several thresholds makes the payout rise with the loss. Where the loss rises in a straight line with price, a scalar contract could match it instead. Kalshi's rules allow scalar contracts, though most contracts listed today are yes or no binary contracts.[98]

Know what it costs, and decide whether it's worth it. A contract's price roughly reflects the chance of the event, and for weather, past records are a good starting point for that chance. The 100°F contract paid in 7 of 30 years, about a 23% historical frequency. History is only a guide, especially as global temperatures get hotter, so the true probability may be higher, but 23 cents per dollar of protection is a useful starting point when judging a quote. The actual price will also reflect the market maker's spread (the markup it builds into its price) and its own view of the risk. At around 23 cents, covering $260,000 would cost about $60,000 a year, roughly 4% of the crop's value. The case for hedging rests on what the payout protects: cash within days of the event rather than months later, the business's loan covenants (the conditions a lender sets, such as minimum cash levels), and a loss the business could not absorb on its own. A rarer event costs less per dollar of protection. The frost contract that counts only cold nights after the buds begin to develop paid in 4 of 30 springs, about a 13% historical frequency. For a Traverse City grower with a $1.5 million tart cherry crop insured at 75%, covering the $375,000 deductible against a damaging frost suggests starting from about 13 cents per dollar, or roughly $50,000 a year, when comparing quotes.

Understand the risk that remains. Like any hedge, a contract will occasionally miss a bad year or pay in a good one, and testing shows how often. On a still, clear night cold air sinks into low ground, so one block of a vineyard can be several degrees colder than another, and colder or warmer than the station the contract settles on.[99] For fruit in bloom, the gap between losing 10% of the buds and losing 90% is only 3°F to 5°F.[70] A business should also check with its accountant how the position will be treated. Under US accounting rules, event contracts are carried at their current market value, so changes in that value can show up in the business's earnings each quarter. Hedge accounting, if the hedge qualifies, lets those gains and losses be reported at the same time as the loss they protect against.[100]

What will help this market grow

Agricultural businesses can hedge this way today, through listed contracts, or through custom contracts traded as block trades with a market maker. Four developments will make it cheaper and easier as more businesses take part.

More contracts on farm-region data. Exchanges already list weather contracts for major cities and create custom contracts on request. Standard listings on rural weather stations, county drought ratings and USDA's price and production reports would let more businesses buy protection directly on the exchange, in any size, alongside the block trades available today.

More firms taking the other side of farm risk. Trading firms such as Susquehanna and Galaxy already price and take on custom event-contract risk.[101] [102] Farm risk also suits specialists that hold many unrelated risks, such as reinsurers (companies that insure insurers) and weather underwriters, because a freeze in Georgia has nothing to do with a hurricane in Florida or a tariff on cattle. Some farm risks also have businesses on both sides, as the border does for ranches and feedlots and the tomato duty does for Florida growers and importers. When both sides trade the same contract, the market maker can pass much of the risk from one party to the other instead of holding it itself, so it needs less capital and can quote better prices to both.

Lower collateral. Today the full $1 payout is posted in cash when the trade is made, so every contract is fully funded. In September 2026 Kalshi's clearinghouse asked the CFTC to approve margin for some event contracts, sized to how far the price could move in a day, the way futures margin works. The request is awaiting approval.[103] That would let agricultural businesses hedge with less cash tied up.

Recognition by lenders. Lenders already count crop insurance when they lend, and often have claim payments sent straight to them.[104] A hedge also protects a business's ability to repay, and it pays within days of a loss rather than months later, so as lenders become more familiar with event contracts, they may start to factor them into lending decisions, as they do crop insurance.

Where Hedgestead fits

Every gap above calls for the same six steps: find the risk that insurance and futures leave uncovered, choose a measure that tracks the loss, design the trigger and test it (where records exist), size the contract to the loss, decide whether the cost is worth it and understand the risk that remains. A grower, rancher or winery shouldn't have to become a derivatives specialist to do this. That is the work Hedgestead is being built to do.

We would like to hear from agricultural businesses, and from the parties who work with them, about which risks matter most to them. Get in touch at info@hedgestead.com.

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