

2022 Year in Review

By NCIS Staff

Introduction

The recurring nature of adverse weather events that underpin the need for a safety net for U.S. agriculture were evident in 2022. While some areas celebrated record yields and crop production totals, other areas were devastated by adverse weather and natural disasters. For those affected areas, crop insurance once again provided the foundation of support that was needed to begin the recovery process.

In this annual review we present the highlights of 2022, covering events that had an impact on agriculture and the crop insurance industry. The review begins with a discussion of

the year's weather and how it influenced crop production, followed by an overview of commodity market developments. Commodity prices and a summary of the Federal crop insurance program's performance are then discussed. The review concludes with coverage of some of the major developments in the Risk Management Agency (RMA) policies and programs and a summary of the Crop-Hail business in the United States and Canada. As farmers continue to struggle with uncertain market conditions and increasingly volatile weather, the information provided here helps illustrate the benefits of Federal crop insurance and its importance to U.S. agriculture.

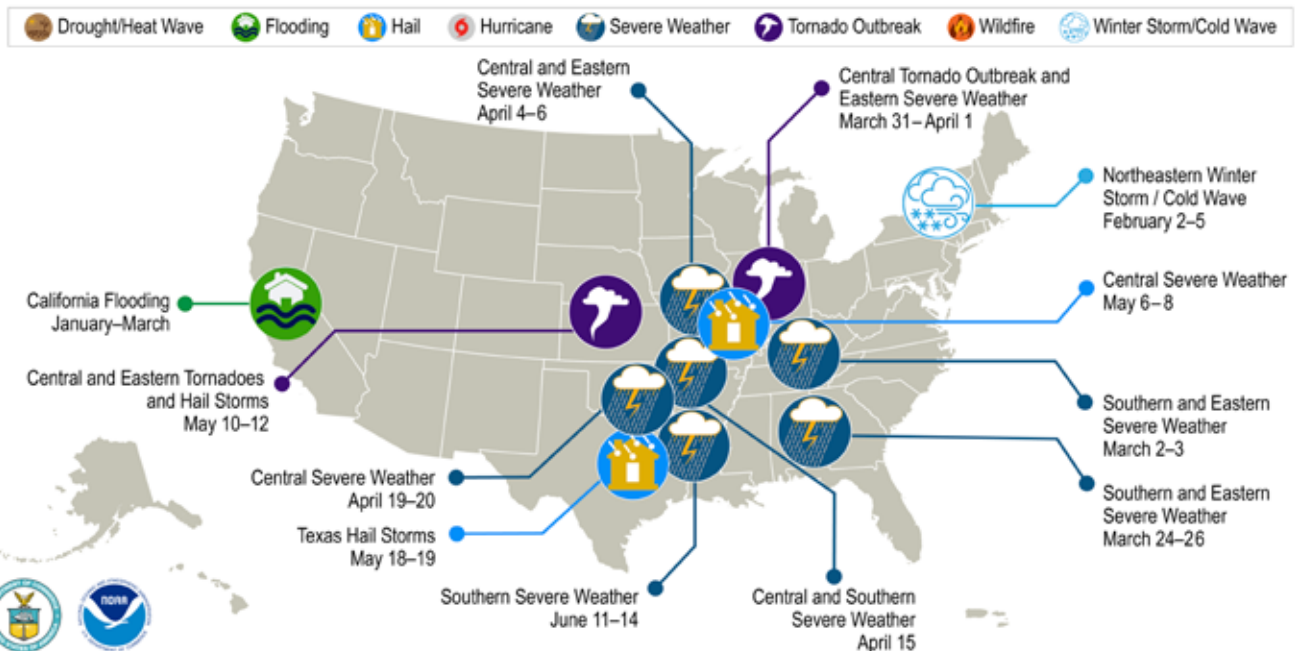
U.S. Weather and Production of Major Crops

The U.S. agricultural economy had a banner year with 2022 net cash farm income forecast to reach a record high \$195.3 billion. However, while the agricultural economy broke records overall, weather and climate events resulted in difficult conditions for many farmers in affected areas. In addition, producers were faced with many challenges that were unrelated to natural causes such as the war in Ukraine, increasing

Figure 1

Major Weather Events in 2022

U.S. 2023 Billion-Dollar Weather and Climate Disasters



This map denotes the approximate location for each of the 12 separate billion-dollar weather and climate disasters that impacted the United States through June 2023.

Source: <https://www.ncei.noaa.gov/access/billions/>

interest rates, and a return of inflationary pressures to name a few. Over the course of the year the National Oceanic and Atmospheric Administration reported 18 weather and climate disasters each with damages exceeding \$1 billion; the third-costliest disaster year event in history behind 2017 and 2005 (Figure 1). The major disasters in 2022 resulted in \$22 billion in crop and rangeland losses; \$20.4 billion from drought and wildfires while the remaining \$1.08 billion were attributed to hurricane, hail, flooding, and severe weather. Fortunately, some \$11 billion of those losses were covered by preexisting risk management programs (AFBF, 3/3/23)¹.

2022 serves as another real-world example of how farmers continued investment in crop insurance provides them a safety net that serves as the foundation of support to help in their recovery from such uncertain troublesome events. In addition, the regional variation in adverse weather events and local impacts of extreme events in 2022 highlighted the importance of risk management plans that address individual operations relative to their specific locational needs. This section provides a review of how weather developed throughout the year and the general impacts it had on farming operations across the United States season by season.

Winter 2022

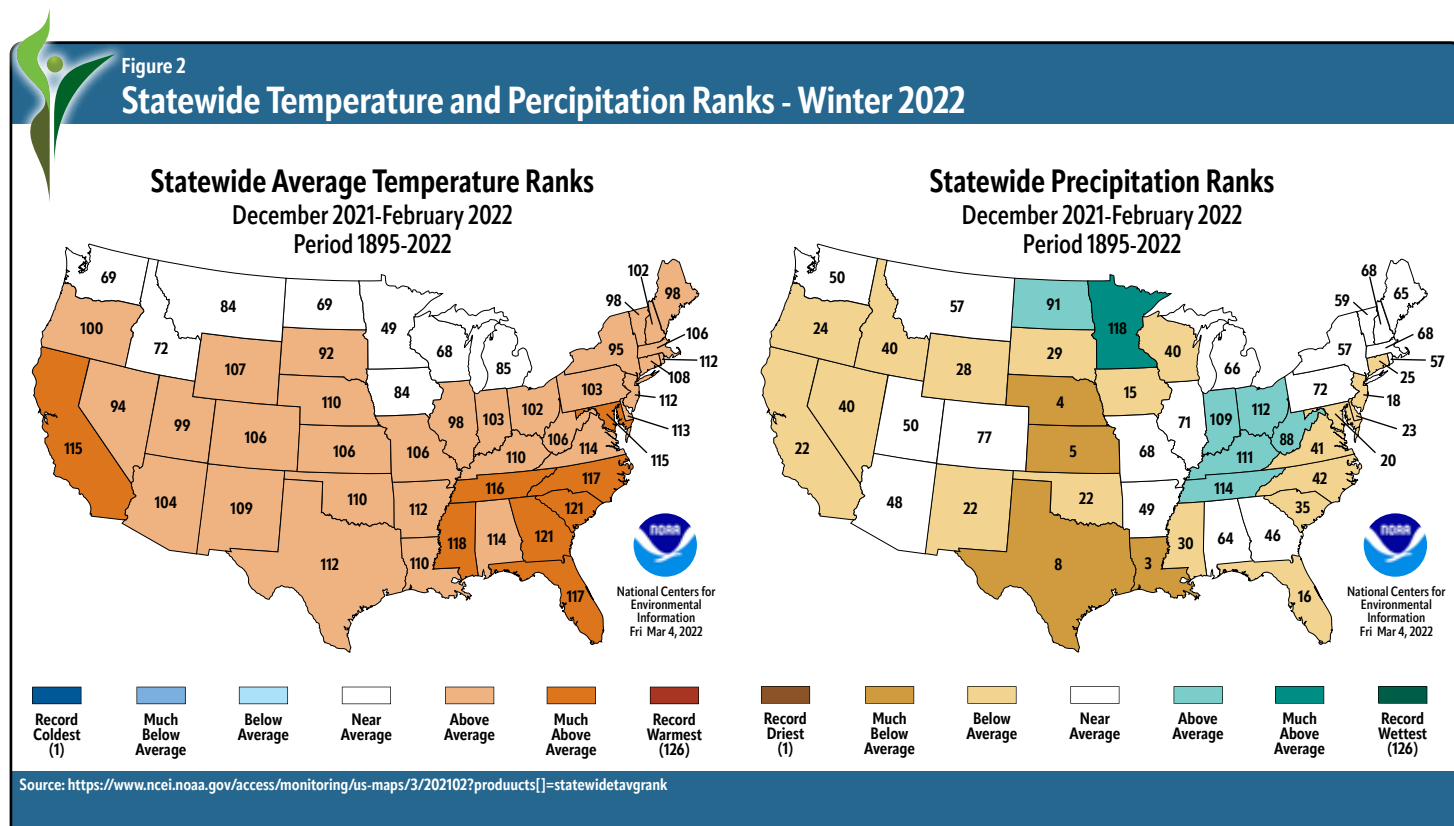
Overall, the winter of 2022 will go down as a warm one, with no states recording average temperatures below average for the season (Figure 2). By the end of the winter, most of the country recorded above, or much above, average temperatures. The south, east of the Mississippi (apart from Alabama), the mid-south Atlantic states and California all had winter temperatures much above average. Across most of the rest of the country temperatures were close to average. In all, only eight of the northern states, seven bordering Canada, and Iowa recorded less than above average temperatures. In addition to being a warm winter it was also a dry one. Only one state, Minnesota, recorded precipitation much above average for the season. Over the same period, above average precipitation was recorded in six states (North Dakota, Indiana, Ohio, Kentucky, West Virginia, and Tennessee). In contrast, Texas, Louisiana, Kansas, and Nebraska registered close to a record dry period at much below average. For the rest of the country, winter precipitation was near average to below average.

Across the country, the Winter of 2022 was characterized by extreme drought in some regions along with ample to excessive precipitation in others. There were also notable extreme weather events. Early heavy precipitation, along

with flooding in the northern areas of the West, did not provide enough relief to result in an overall change in the drought conditions gripping the Western region. The *Drought Monitor* depicted moderate to exceptional drought in the 11-Western state region at just below 95 percent in early December and remaining at 88 to 90 percent each week through March 1. The severity of drought conditions was highlighted by the driest January-February period for California and Nevada over the period 1895-2022.

While the West was under extreme drought conditions, excess dryness also extended east into the High Plains. Low topsoil moisture, rated 75 to 80 percent very short to short, extended through Kansas, Oklahoma, and Texas. The drought conditions stressed the winter wheat crop in the area and put additional pressure on rangeland, pastures, and oats in Texas. The drier-than-normal winter conditions extended to parts of the South from the Mississippi Delta, west along the Gulf Coast, and into the southern Atlantic region.

In line with the regional variations observed in the winter of 2022, some areas in the Tennessee Valley, eastern Corn Belt, and lower Great Lakes regions experienced ample to excessive periods of precipitation. In addition, frequent blizzards plagued parts of the north-central areas of the Red River Valley and upper Great Lakes,



¹ <http://www.fb.org/market-intel/new-estimates-reveal-major-2022-weather-disasters-caused-over-21-billion-in-crop-losses>

United States and proceeded sluggishly in the Midwest, amid frequent storms and periods of cold weather. By May 8, only 22 percent of the Nation's intended corn acreage had been seeded. Although planting conditions eventually improved across the heart of the Midwest, with an additional 64 percent of the national corn acreage planted during the three weeks ending May 29, major delays persisted in Minnesota and North Dakota. Those planting delays extended to other Northern crops, including spring wheat (73 percent planted, nationally, by May 29) and sugar beets (75 percent, a record-slow pace for that date). Among 21st century years, only 2011 featured a slower spring wheat planting pace by May 29.

The cool spring conditions that dominated the Northwest allowed rangeland and pastures to begin recovering from long-term drought but slowing the development of winter wheat and spring-sown crops. In addition, mountains in the Northwest retained considerable high-elevation snowpack, setting the stage for record-setting flooding along the Yellowstone River when heavy rain and warmer conditions arrived in mid-June. Elsewhere, less extreme conditions covered the eastern United States, although warmer than normal spring weather prevailed. In addition, pockets of dryness expanded during spring, mainly from Georgia to the Carolinas and in coastal New England.

Summer 2022

In the summer, drought coverage continued to decline, decreasing slightly from 49.30 to 45.53 percent, between May 31 and August 30. Decreasing drought was evident in several areas, including the four corners states and the Northwest, contrasted with worsening conditions in parts of the mid-South, western Corn Belt, central and southern Plains, and the Northeast.

In addition, summer brought periods of excessive heat that worsened the effects of drought in portions of the West, South, and Northeast. Summer temperatures averaged at least 2 to 4°F above normal in many locations west of the Mississippi River, as well as scattered Northeastern communities. Among the Nation's major agricultural regions, only the eastern Corn Belt escaped from extreme heat (Figure 4). Some of the most extreme temperatures were observed across the far west and the central and southern Plains, with profound heat and drought related impacts observed on crops such as cotton and sorghum.

Rangeland and pastures, in portions of the western and central United States and the Northeast, also suffered amid hot, dry conditions. By August 28, nearly one-half (46 percent) of the nation's rangeland and pastures were rated in very poor to poor condition, unchanged from the end of May. Very poor to poor ratings reached a summer peak of 52 percent on August 14, before

late-summer rainfall provided limited drought relief across the south-central United States.

Hot dry conditions contributed to the two largest wildfires in modern New Mexico history—the Calf Canyon/Hermits Peak Fire and the Black Fire had charred 341,735 and 325,136 acres, respectively. An early Southwestern monsoon helped to extinguish those fires, starting in the second half of June, allowing the focus for wildfire activity to shift into the Pacific Coast States and the northern Rockies. Smoky conditions and late-summer degradations in air quality were common across California, the Great Basin, and the Northwest, with dozens of wildfires actively burning.

Midwestern crops, including corn and soybeans, experienced variable growing conditions. Crop concerns were greatest west of the Mississippi River, where hotter and drier than normal conditions reduced yield potential. Meanwhile, a quick-hitting summer drought in the Northeast led to adverse conditions such as reduced soil moisture, poor crop and pasture conditions, and low streamflow. In other areas, early-summer heat in the South adversely affected corn and other early-planted crops gave way to somewhat cooler, wetter weather in July and August. As a result, many Southern crops fared well, as evidenced by more than two-thirds of the rice (70 percent) and peanuts (69 percent) rated in good

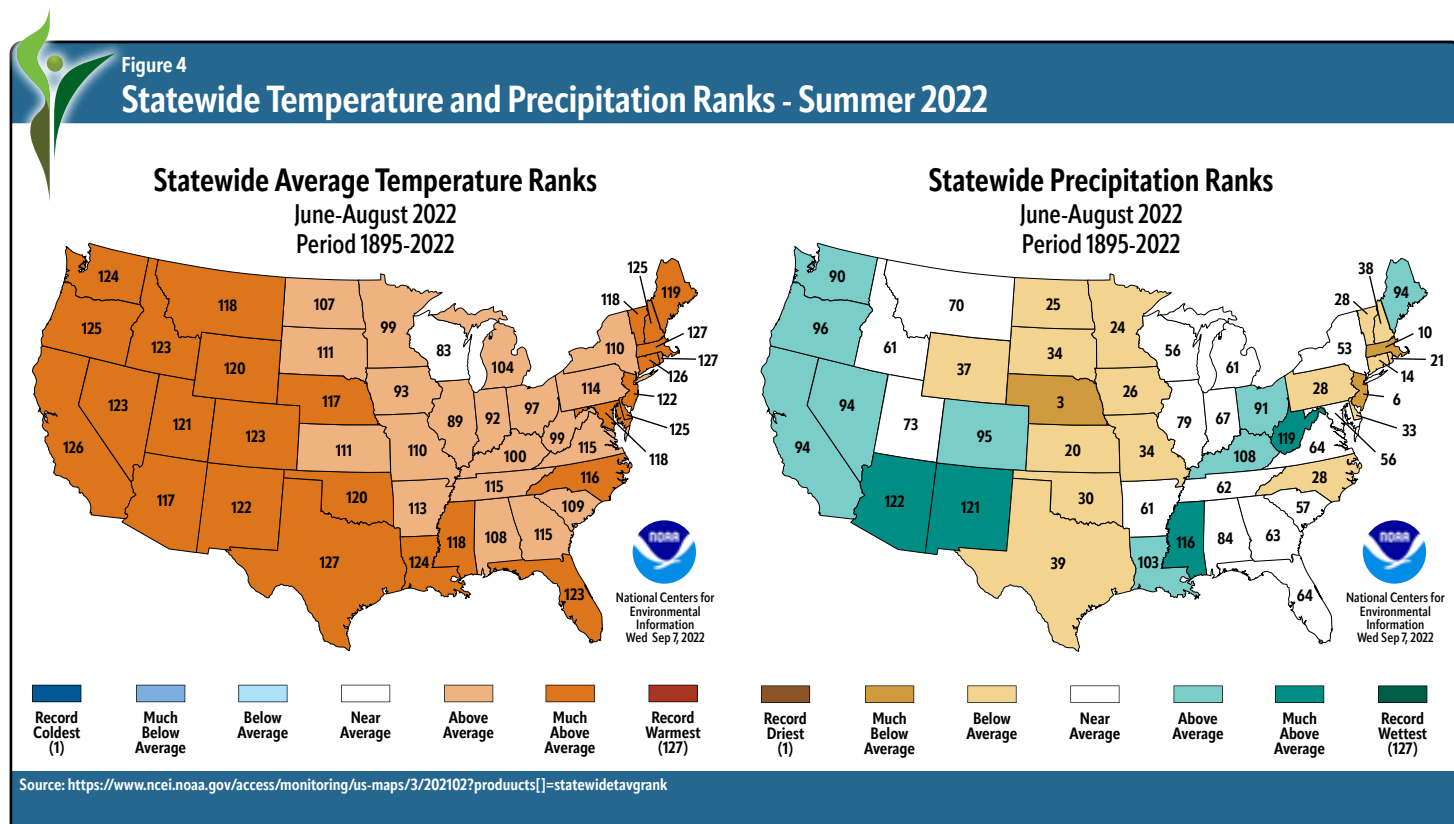
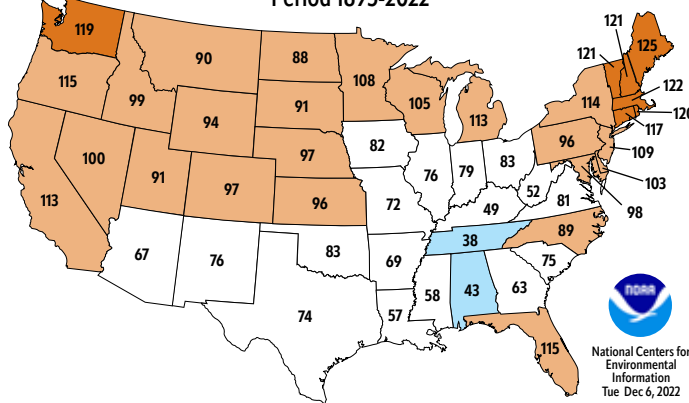




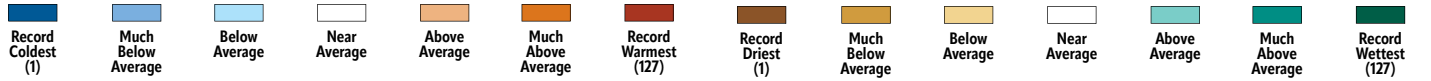
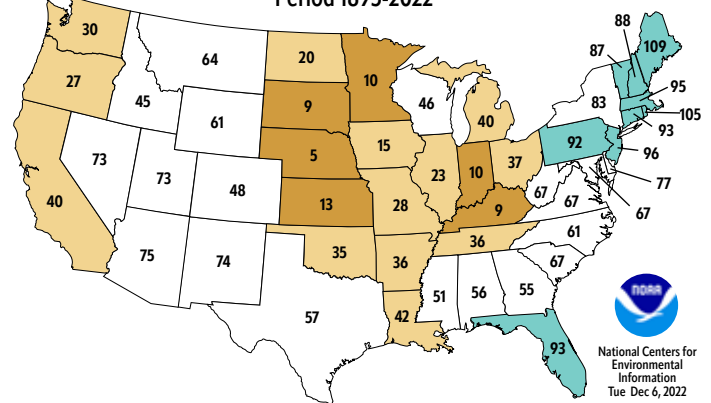
Figure 5

Statewide Temperature and Precipitation Ranks - Fall 2022

Statewide Average Temperature Ranks September-November 2022 Period 1895-2022



Statewide Precipitation Ranks September-November 2022 Period 1895-2022



Source: [https://www.ncei.noaa.gov/access/monitoring/us-maps/3/202102?products\[\]=statewidetavgrank](https://www.ncei.noaa.gov/access/monitoring/us-maps/3/202102?products[]=statewidetavgrank)

to excellent condition by the end of August.

Unlike the previous year, the Atlantic Basin weather was quiet during the summer months, with just three named storms. Only two tropical storms had any impact in the United States, Alex in early June and Colin in early July. Alex was responsible for substantial rains in early-June in parts of Florida. Colin was a short-lived storm over South Carolina that had minimal impact in the affected area.

Fall 2022

The season began as an historic Western heat wave continued while extended periods of warm, mostly dry weather provided favorable conditions for spring-sown crops in key agricultural regions, including the Midwest, Plains, and South. Early season warmth was most notable from the Pacific Coast to the Plains, with September temperatures averaging around 2 to 4°F above normal. The drier than normal weather reduced topsoil moisture in those same regions, leading to concerns as planting for the 2023 winter wheat crop began. By the end of September, most of the country experienced the driest September since 1956. A trend that continued as the September to October period was the driest recorded since 1987.

However, not all areas experienced these dry conditions during that period. The relatively quiet summer weather period in the Atlantic Basin

and Gulf States ended with hurricane Ian, making landfall near Fort Myers, Florida, in mid-afternoon, September 28 as a high-end Category 4 storm with 150 miles per hour winds. The storm pummeled Florida with historically high winds, flooding rain, and a massive storm surge. Ian tied for the fifth-strongest storm ever to strike the continental United States. Damage from the storm ran across Florida northeastward from the Fort Myers to Naples corridor. In addition to severe damage from the storm surge and high winds in southwestern Florida, record-setting freshwater flooding quickly developed across inland sections of the state.

By the end of the Atlantic hurricane season on November 30, 14 named storms and eight hurricanes were recorded. The last major storm, hurricane Nicole, a Category 1 storm with winds near 75 miles per hour, made landfall close to Vero Beach, Florida. Nicole battered Florida with tropical-force winds (gusts of 39 mph or higher). Only the western panhandle area escaped the storms wrath. Nicole continued across the eastern United States producing large amounts of rain that resulted in runoff in the upper Ohio Valley that helped boost the critically low water levels in the Mississippi River below Cairo, Illinois.

By the end of the season, wetter weather in several areas reduced widespread precipitation deficits, although drought remained a significant issue across the states. According to the

U.S. *Drought Monitor*, drought coverage across the continental United States decreased 5.3 percentage points, from 62.8 to 57.5 percent, during the four-week period ending November 29. In more detail, coverage of moderate to exceptional drought (DI to O4) plus abnormal dryness (DO) decreased to 79.8 percent by late November, down from a *Drought Monitor*-era record high of 85.3 percent on November 1. Drought coverage in the continental United States decreased from a peak of 62.95 percent on October 25 to 57.51 percent by November 29, according to the *Drought Monitor*. The gains in drought relief made during the second half of the season decreased overall drought coverage and intensity in many areas but masked worsening conditions across the central Plains (Figure 5).

The Fall, which began with a severe heat wave in the Western states, was followed by another impressive warm spell in early November. Throughout the fall, temperatures were highly variable, fluctuating from record lows to record highs. Freezes in October, reaching deep into the South, reduced grass growth, which lowered pasture conditions. Additional cold weather in November, peaking around mid-month, limited winter wheat establishment. Taken as a whole, autumn temperatures were somewhat too much above normal across the North and slightly below normal in parts of the Southeast.

[The information sources for this section were:



Table 1
Crop Yields and Production

Crop	2021 Yield	2022 Yield	2021 Production	2022 Production	% CHANGE IN Production
	Bu./Harv. Ac.	Bu./Harv. Ac.	Mill. Bu.	Mill. Bu.	
Corn	177.0	173.3	15,074	13,730	-9%
Barley	60.3	71.7	120	174	45%
Grain Sorghum	69.0	41.1	448	188	-58%
Soybeans	51.7	49.5	4,465	4,276	-4.2%
All Wheat	44.3	46.5	1,646	1,650	0.2%
Winter Wheat	50.2	47.0	1,278	1,104	-13.6%
Other Spring Wheat	32.6	46.2	331	482	46%
Durum	24.7	40.5	38	64	68%
	Lbs./Harv. Ac.	Lbs./Harv. Ac.	1,000 Bales	1,000 Bales	
Upland Cotton	819	947	17,520	14,680	-16%
	Lbs./Harv. Ac.	Lbs./Harv. Ac.	1,000 Cwt.	1,000 Cwt.	
Rice	7,709	7,383	191,600	160,400	-16.3%

Source: NASS Crop Production Annual Summary, January 2022; USDA, WASDE-634-17, March 2023.

National Agricultural Statistics Service, ISSN: 1057-7823, *Crop Production 2022 Summary, January 2022*; <https://downloads.usda.library.cornell.edu/usda-esmis/files/k3569432s/w3764081j/5712n018r/crop22.pdf> and *Weekly Weather and Crop Bulletins, USDA, WAOB*; <https://usda.library.cornell.edu/concern/publications/cj82k728n>

U.S. Crop Production Summary

While most events that influenced the agricultural economy in 2022 seemed outside the element of production agriculture, such as the war in Ukraine, the return of inflation, and higher interest rates, fundamental commodity supply and demand balances remain its foundation. Once again, turbulent weather events in 2022 take a toll, from tropical storms to hurricanes to tornados to wildfires in the West, that were exacerbated by widespread dry conditions. In 2022, persistent dry conditions were attributed to most of the pronounced fluctuations in the production among crops. For example, drought conditions plagued crops such as grain sorghum, rice, winter wheat and cotton (Table 1).

Coarse Grains and Soybeans

Corn production in 2022 declined by nine percent from the previous year due to a combination of a reduction of yields of approximately two percent, falling to 173.3 bushels per acre, albeit from a record high yield in 2021. The lower yield, combined with a reduction of planted and harvested acres, five percent and seven percent

respectively, resulted in the falloff in production. Delayed planting and drought across the western Corn Belt and Great Plains contributed to reduced yields and increases in unharvested acres. Grain sorghum production declined dramatically, which was attributable to severe drought pressure on the crop in Kansas, where yields fell by 50 percent, and reduced plantings in Texas. Overall grain sorghum production declined by 58 percent in 2022, with planted acres down 13 percent and yields down by 30 percent from 2021. Soybeans continue to be a mainstay among the major crops with planted acres virtually the same in 2022 from the previous year, up less than one percent. A fall off in average yields, down 2.2 bushels from 2021, approximately four percent, resulted in a decline of the same percentage in the 2022 crop. Similar to corn, the very hot and dry finish in parts of the western and southwestern Plains had a detrimental impact on yield.

Wheat

In 2022 all wheat production remained virtually unchanged, up by less than one percent. But in the case of wheat, it is important to examine the variation among the different classes of wheat that are grown in different areas within different seasonal windows. A difficult growing season for winter wheat offset the robust gains in durum production and other spring wheat to hold down the all wheat production number for the year.

Winter wheat problems were predicted as early as March before the crop emerged from dormancy mainly across Kansas, Oklahoma, and Texas. A lack of soil moisture in this major hard red winter wheat growing area resulted in a falloff

in yields and reduced total winter wheat production for 2022. Hard red winter wheat accounts for 75 percent of total U.S. wheat production and it was down almost 14 percent from the previous year. Among the winter wheats, only soft white winter wheat, grown in the Pacific Northwest, registered an increase in production from 2021, a result of a return of much needed moisture and normal to below normal temperatures during the growing season.

In contrast, both spring wheat and durum experienced a rebound in production from the previous year. All spring wheat classes experienced an increase in production from 2021 helping to offset the fall in winter wheat production. Durum wheat production rebounded from a poor crop last year, resulting from dry conditions in the major growing states of Montana and North Dakota. Better growing conditions this season produced a 2022 crop that was more than double in size from 2021.

Upland Cotton

It was a bad year for Upland cotton as production was down 16 percent from 2021 at almost 14.7 million 480-pound bales. The decline in production occurred despite overall yield for Upland cotton in the United States being reported at 947 pounds per acre, up 128 pounds from 2021. In addition, Upland cotton planted area, reported at 13.6 million acres, was up 22 percent from the previous year. The decline in production resulted primarily from a decline in harvested area, pegged at 7.26 million acres, down 28 percent from the previous year. Extremely dry conditions in Texas, which accounted for 58 percent of planted acres in 2022, contributed the most to the decline in production with a record low number of harvested acres, down 63 percent from the previous year.

Rice

All rice production in 2022 totaled 160.4 million cwt, down 16.3 percent from the 2021 total. The planted area for all types in 2022 was estimated at 2.22 million acres, down 12 percent from 2021. Area harvested, at 2.17 million acres, was down 13 percent from the previous crop year. The average yield for all U.S. rice was estimated at 7,383 pounds per acre, down 326 pounds from the 2021 average yield of 7,709 pounds per acre. The decline in overall production was due to a fall in production across all types with long-grain production declining by 12.8 percent. Arkansas,

the largest rice producer, declined by 11.5 percent and Missouri declined 24.1 percent, the second largest decline. All other long grain producing states registered relatively smaller declines in both percentage and volume terms.

Medium grain rice production declines were dominated by a falloff in California production of over 41 percent accounting for virtually all the loss in production for the year. Missouri and Arkansas recorded small losses while Texas and Louisiana each experienced offsetting modest gains. Short grain rice production declined as well due primarily to the decline in California production. This was the second consecutive year of a sharp decline in California rice production due to acreage declines resulting from a severe and prolonged drought, low reservoir levels, and water restrictions. California grows almost exclusively medium and short-grain rice, typically accounting for around 75 percent of U.S. medium and short-grain acreage.

Dry Beans and Lentils

Despite a late start in planting due to cold and wet weather, dry edible bean production was estimated at 25.8 million cwt for 2022, up 14 percent from the previous year. Planted area was estimated at 1.25 million acres, down 10 percent from 2021. The harvested area was estimated at 1.22 million acres, down eight percent from the previous year. The average yield for dry edible beans for the 2022 season was 2,113 pounds per acre, up 411 pounds from 2021. Despite cold and wet weather to begin the season, both Minnesota and North Dakota experienced ideal growing conditions resulting in an increase in production from the previous period. North Dakota, the largest producer registered a major rebound in production, up almost 63 percent from 2021. Topping a bountiful year, Michigan, the second largest producing state, experienced a very good growing season and increased production 3.46 percent from 2021. Minnesota, the third largest producing state, recorded an increase in production of over seven percent from the previous year. Together the production totaled 20.3 million cwts., 78 percent of the total production of dry edible beans grown in the United States.

Production of lentils bounced back from a dismal previous year with production estimated at 5.49 million cwt, up 61 percent from 2021. The increased production was despite a decline in planted area, at 660,000 acres, down seven percent from last year. Better growing conditions in the season help offset the decline in planted acres.

The better conditions resulted in harvested area, at 602,000 acres, up over six percent from last year, combined with an increase in average yield, at 912 pounds per acre, up 309 pounds from last year, or over 51 percent.

Hay

Overall production of dry hay for 2022 was reported at 112.8 million tons, down six percent from the 2021 total. The total area harvested was estimated at 49.5 million acres, down two percent from 2021. The average yield, at 2.28 tons per acre, was down 0.09 ton from 2021.

In most years there is a wide range of growing conditions across the United States and 2022 was no exception. The Southern Plains and western Midwest suffered from severe drought conditions that resulted in lower hay production in those regions. In the West some growers had limited or no access to irrigation water that reduced production potential. In areas east of the Mississippi River, and the dairy regions of the Midwest, production was less affected as dry and wet conditions were experienced throughout the growing season. Hay production is accounted for in two broad categories, alfalfa and alfalfa mixtures and all other hay. The variety of growing conditions across states in 2022 resulted in significant differences in production among the two categories.

For alfalfa and alfalfa hay mixtures, production in 2022 was estimated at 48.0 million tons, down three percent from the 2021 total. The harvested area, at 14.9 million acres, was two percent below 2021. Average yield was estimated at 3.22 tons per acre, down only 0.01 ton from 2021. Overall, the reduction in 2022 alfalfa and alfalfa hay mixtures production was small because of substantially increased production in North Dakota, South Dakota, Oregon, Utah, Montana, and Idaho.

For all other hay production, the overall decline was more pronounced. Production of all other hay in 2022 totaled 64.8 million tons, down nine percent from 2021, the largest annual decline since 2011. The harvested area was reported at 34.6 million acres, down two percent from 2021. The average yield for all other hay was down six percent from the previous year at 1.87 tons per acre. The decline in production was attributable primarily to most Southern Plains and Southeast states having double-digit hay production declines. Most affected was hay production in Texas, the largest hay-producing state, where production fell to 6.15 million tons, a 40 percent

decline compared to 2021. The reduced production was linked to declining cattle inventories, expensive inputs, and competition from higher priced crops. This likely contributed to a 25 percent decline in acreage in Texas, which combined with poor precipitation, led to a 19 percent reduction in yields. Production also declined by 20 percent, 16 percent, 13 percent, and 10 percent, in Kentucky, Arkansas, Mississippi, and Tennessee, respectively.

Fresh Produce and Vegetables

During 2022, a variety of circumstances came together to limit supplies. Inclement weather ranging from below-normal temperatures in southwestern production regions early in the year, to hurricanes and associated heavy rains on both coasts in the fall. In the United States, the utilized production for the 26 vegetable and melon crops reported by NASS totaled 655 million cwt, down two percent from 2021². Area harvested in 2022 was 2.14 million acres, down five percent from 2021. The top three vegetables, in terms of area harvested, were sweet corn, tomatoes, and snap beans. In terms of total production, the three largest crops were tomatoes, onions, and sweet corn, which combined accounted for 53 percent of all vegetables.

As adverse weather events impacted the supply side, the value of utilized production for 2022 vegetable crops was \$16.5 billion, up 27 percent from the previous year. Tomatoes, onions, and romaine lettuce claimed the highest values, accounting for 30 percent of the utilized value of production when combined. A brief review of major crops and major states production and growing conditions in 2022 follows.

Production of sweet corn in 2022 totaled 57.2 million cwt, up slightly from 2021. The planted area was estimated at 355,100 acres, down three percent from the previous year. Area harvested, at 340,400 acres, was down three percent from 2021. The value of the crop totaled \$809 million, 22 percent more than the previous year. Utilized production totaled 56.9 million cwt, of which 13.0 million cwt was for the fresh market and 2.20 million tons were for processing.

Minnesota, Washington, and Wisconsin are the largest providers of sweet corn, producing almost 70 percent of U.S. sweet corn. In 2022, Minnesota ranked first for sweet corn production with 27 percent of the nation's production. Corn yield reports and quality were better than

² Utilized production is the amount of a crop sold for fresh market, sold for processing, the quantities used at home to make processed items, or held on storage. Vegetables 2022 Summary (February 2023) USDA, National Agricultural Statistics Service.



expected, despite adverse planting conditions and an early summer drought during harvest season. Timely rain in the southern portion of the state yielded an exceptional crop, whereas yields were affected by less rain in northern Minnesota. As a result, Minnesota sweet corn production in 2022 was recorded at with a total production of 15.4 million cwt, up seven percent from 2021. Washington experienced a cold, wet growing season in the spring. The damp weather and excessive water early in the season reduced spring pollination activity, hindering growth and crop development. However, the summer heat and warmer weather helped to improve and restore damaged crops before harvest. In 2022, Washington accounted for 26 percent of U.S. sweet corn production, up 14 percent from the previous year. Wisconsin ranked third for sweet corn production with 18 percent of the nation's production, with a modest increase in acreage offsetting lower yield to increase production by about seven percent from 2021.

California and Florida account for 100 percent of U.S. tomato production reported in the USDA NASS annual production report. However, tomato production in Florida is predominately aimed at the fresh vegetable market, while California produces tomatoes for both processing and fresh markets. Overall tomato production in 2022 totaled 225 million cwt, down two percent from 2021. The planted area was estimated at 271,000 acres, down one percent from the previous year. Area harvested, estimated at 263,800 acres, was down two percent from 2021. The value of the crop totaled \$1.78 billion, 18 percent more than the previous season. Utilized production totaled 223 million cwt, of which 13.1 million cwt was for the fresh market, with Florida accounting for over 55 percent of the utilized production. In 2022, the utilized production of tomatoes for processing totaled 10.5 million tons with California re-

ported to account for 100 percent of the total.

Adverse weather conditions affected production in both states in 2022. In California, most of the growing regions were under extreme and exceptional drought throughout the 2022 season. Due to the lack of rainwater being available to leach the salt below the root zone, salt levels in the soil become elevated when using ground water wells for irrigation. This process can negatively impact the yield. Additionally, this year's crop was impacted by the Beet Curly Top Virus and a new strain of spotted wilt. Temperature swings also played a role in a lower yield for 2022. Florida experienced some frost in early 2022 and some abnormally dry to moderately dry conditions for the season. Still the crop received enough precipitation for adequate growth and development. However, some growers had to replant fields after fall planting due to flooding from hurricanes Ian and Nicole.

Snap beans production in 2022 totaled 14.3 million cwt, down five percent from 2021. Planted area was estimated at 164,600 acres, down seven percent from the previous year. Area harvested, at 158,200 acres, was also down seven percent from 2021. The value of the crop totaled \$325 million, 24 percent above the previous season. Utilized production totaled 14.2 million cwt, of which 2.21 million cwt was for the fresh market and 601,673 tons for processing. In 2022, about 77 percent of snap bean production in the United States was in three states, Wisconsin (51 percent) New York (14 percent), and Michigan (12 percent).

In Wisconsin, the largest snap beans producing state, the dry spring conditions, and early frost experienced by some farmers had minimal impact on the 2022 crop, as the state's yield was the highest on record. In Florida, during the winter and spring months, portions of the state were moderately dry and cool, but as the summer arrived, rainfall increased over most of the state. Although conditions were dry during the early

part of the year, there was still enough precipitation to provide enough moisture for the crop's growth and development. In New York, planting of the crop lagged the previous year early on; however, toward the end of the planting season, progress surpassed 2021. In Michigan, production of snap beans was up almost eight percent in 2022 as increased yields combined with a modest increase in planted acres.

Onion production in 2022 totaled 64.4 million cwt, down five percent from 2021. Planted area was estimated at 129,800 acres, down six percent from the previous year. Area harvested, at 127,200 acres, was down six percent from 2021. The value of the crop totaled \$1.63 billion, 31 percent more than the previous year. Utilized production totaled 63.7 million cwt, of which 43.1 million cwt was for the fresh market and 1.03 million tons were for processing. United States onion production is concentrated in three states, California, Oregon, and Washington, accounting for almost 71 percent of total onion production in 2022. Adverse weather conditions in California and Oregon were largely responsible for production shortfalls. In Washington, despite early season weather challenges and no increase in planted acres, there were increased yields that resulted in a 17 percent larger crop than the previous year.

In California, the largest onion producing state, growers planted fewer acres than last year due to extended drought conditions and limited availability of irrigation water. The crop was harvested later in the season and some acres were freeze damaged and affected by *Fusarium* basal rot, but this was less widespread than last year. In Washington, harvest conditions were less than ideal in 2022, but growers harvested a decent crop, and onions moved to storage. Temperatures improved in September, and warm, dry weather was ideal for fieldwork and made for good harvest conditions with good quality yields.

United States romaine lettuce production is reported for two states: California accounting for 72 percent of the total and Arizona producing 28 percent of the total. Production in 2022 totaled 25.5 million cwt, down seven percent from the 2021 total. The planted area was estimated at 88,400 acres, down seven percent from the previous year. Area harvested, at 88,100 acres, was down six percent from 2021. The value of the crop totaled \$1.54 billion, 45 percent more than the previous season. Utilized production totaled 25.4 million cwt, all of which was for the fresh market. The decline in total production in 2022 was attributable to a reduction in planted acres, down almost seven percent from 2021, in California and a decline in yields in Arizona of 1.6 percent from the previous year. In California, the crop experienced some weather and crop disease-related issues during the season that affected production. Some farmers reported large yield losses due to the Impatiens Necrotic Spot Virus (INSV). In Arizona and California, the desert region experienced several days of freezing temperatures in December, causing epidermal blisters and peel, an issue that romaine lettuce is more susceptible to than other varieties of lettuce.

Citrus

United States citrus fruit production is reported for four states: California, Florida, Arizona, and Texas. Citrus production for 2022 declined for the third straight year with a utilized production total of 5.61 million tons, down 19 percent from the 2020-21 season. California accounted for 62 percent of total United States citrus production, Florida totaled 36 percent, and Texas and Arizona produced the remaining two percent.

In California, issues related to drought, irrigation water availability and costs were challenging issues for producers. Utilized citrus production in California was down 16 percent from the 2020-21 season. California's all orange production, at 40.4 million boxes, was 18 percent lower than the previous season. Grapefruit production was down two percent from the 2020-21 season and tangerine and mandarin production was down 40 percent.

In Florida, growers faced difficult conditions

resulting from multiple negative weather events resulting in loss of trees and fruit attributable to hurricane and tropical storm force winds along with freezing temperatures and standing water. Florida's orange production, at 41.1 million boxes, was down 22 percent from the previous season. Grapefruit utilization in Florida, at 3.33 million boxes, was down 19 percent from last season's utilization. Florida's total citrus utilization was down 22 percent from the previous season. Utilized production of citrus in Texas continued to suffer from persistent drought and reductions in available water supply. In addition, the lingering negative effects of Winter Storm Uri resulted in below freezing temperatures for several days. Citrus production in Texas was down 46 percent from the 2020-21 season. Orange production was down 81 percent from the previous season and grapefruit production was down 29 percent. The only citrus category that had an increase in production across the growing regions was Arizona's lemons, which increased by 27 percent from the previous year.

The value of the 2022 United States citrus crop was down 13 percent from last season, to 2.91 billion (packing house door equivalent). Orange value of production decreased nine percent from last season and grapefruit value is down 27

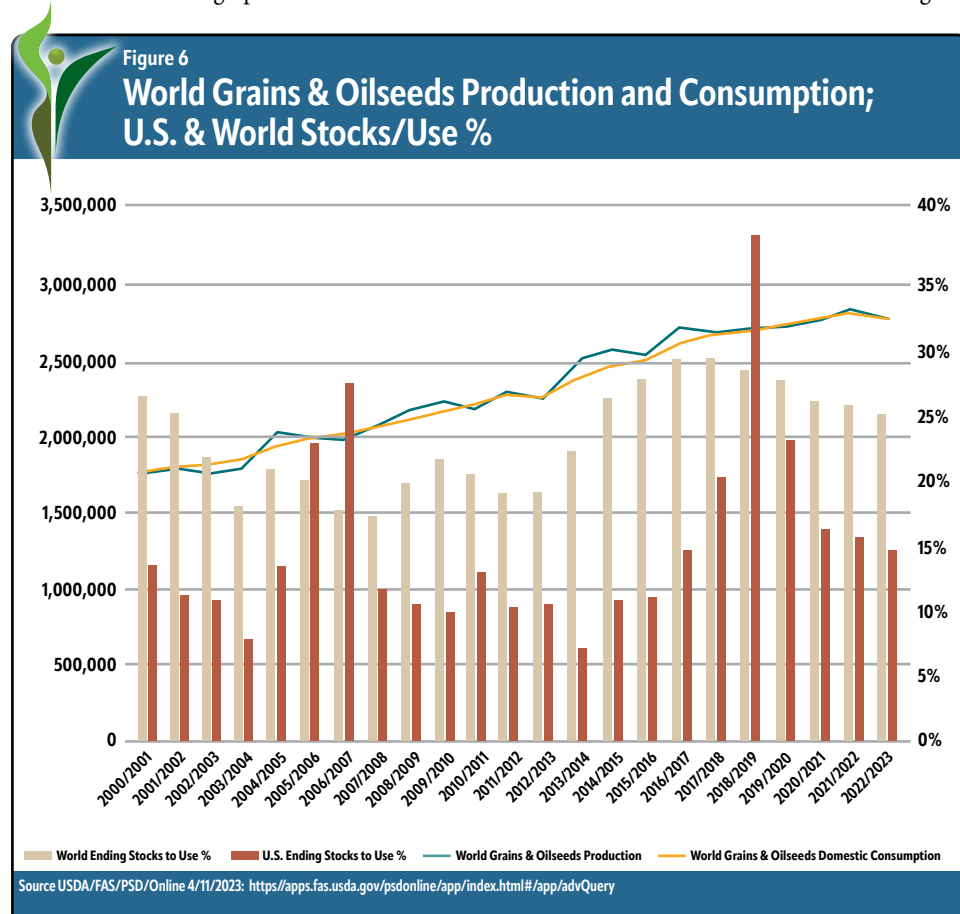
percent. Tangerine and mandarin value of production is down 18 percent from last season and lemon value of production was down 13 percent from last season.

[Information sources for this section include USDA NASS 2022 Production Summaries: Crop Production Summary, January 2022; Vegetables 2022 Summary, February 2023; Citrus Fruits 2022 Summary, September 2022; and various issues of: USDA, ERS, Vegetable and Pulses Outlook and USDA, ERS, Fruit and Tree Nuts Outlook.]

Commodity Market Developments

Global grains and oilseeds production remained in a relatively balanced position in 2022. World production declined by 1.5 percent while consumption remained virtually unchanged, increasing by less than one percent from the previous year.³ The modest global deficit in production resulted in a slight decline in the world ending stocks-to-use ratio, albeit only by 0.7 of one percent (Figure 6).

A comparison between the United States and the rest of world reveals different patterns that contributed to the combined draw down in glob-



³ Global oilseeds include Copra, Cottonseed, Palm kernel, Peanut, Rapeseed, Soybeans and Sunflower seeds. Global grains include barley, corn, millet, mixed grains, oats, rye, sorghum and wheat. U.S. grains exclude millet and mixed grains. Wheat and corn comprise around 87 percent of global grains, while soybeans account for almost 60 percent of global oilseeds. Accordingly, additional detail is provided for these three crops.

al ending stocks-to-use. For example, in the United States, 2022 domestic oilseed ending stocks experienced a decline in production of 18.1 percent, and an increase in domestic consumption resulted in a return to declining stocks, following a slight decline in 2021. U.S. domestic grains ending stocks also declined by 8.2 percent from a slight increase in 2021. A decline in United States grains ending stocks in 2022 was attributable to the combined effect of a decrease in production with a falloff in domestic consumption. The fall in both U.S. oilseeds and grains stocks resulted in a continued reduction in the combined total ending stocks-to-use ratio of 0.9 percent, slightly above the global figure.

Worldwide, a reduction in foreign grain production in 2022, down 2.6 percent, combined with a modest decline in total use of 0.9 percent, resulted in a decline in foreign ending stocks-to-use of 0.6 percent from the previous year. Global oilseed consumption increased by 2.4 percent from the previous year while global production increased 2.6 percent. Overall ending stocks-to-use for global oilseeds increased in 2022 by 1.3 percent as increased production offset the increase in consumption but not enough to draw down beginning stocks from the previous year. Combined, the decline in the greater volume of global grains offset the increase in global oilseeds resulting in the decrease in the combined global grains and oilseeds ending stocks.

Wheat

Global wheat production in 2022 represented 35.5 percent of total world grain production, increasing by 1.9 percent from the previous year. The overall gain in world wheat production reflects a variety of experiences in 2022 wheat production among the major producing countries. For example, 2022 wheat production in the United States was almost the same as the previous year, increasing by less than one percent. Whereas in the European Union, 2022 wheat production declined by almost three percent. Overall global wheat production was bolstered by increased production among major exporting countries with Australia production increasing by eight percent from 2021 while Russian production increased more than 22 percent. These gains offset substantial losses in production by major exporters, such as Argentina, down just over 43 percent, and the troubling conditions in the Ukraine that contributed to a fall off over 36 percent in 2022 wheat production.

Among the major wheat importers, production was up slightly, 1.4 percent from the previous year. Leading the way among importing countries was Brazil, where wheat production was up over 35 percent in 2022. In addition, Nigeria experienced a 22 percent increase in production, albeit from a small base. Less fortunate were the North African nations (Algeria, Egypt, Libya, Morocco, and Tunisia), where the 2022 wheat production was off by almost 14 percent from 2021. Among selected other countries, Kazakhstan and the United Kingdom had increased wheat in 2022 of 39 percent and 11 percent respectively. Wheat production in India declined by more than five percent from the previous year.

The leader among those countries with a substantial boost in wheat production in 2022 was Canada. In 2022 Canada returned to above average production levels at 34.7 million metric tons of production, a 55 percent increase attributable to a break in the drought conditions that plagued Canadian producers in 2021. In 2022, Canadian wheat yields increased by 38 percent while the harvested area was up over nine percent. More favorable weather conditions in Brazil's wheat production area contributed to higher yields on continued area expansion leading to record production of 10.4 million metric tons.

Russia and Kazakhstan both experienced substantial increases in wheat production in 2022. In Russia there were favorable growing conditions during the winter and summer, mild temperatures during the winter, a cooler-than-normal spring with adequate moisture, and no substantial heat stress throughout the summer. Russian wheat production reached 92 million metric tons, the largest crop in 13 years, resulting from the highest yields recorded on the largest area over that period. The same results were experienced in Kazakhstan as record yields on an increased area produced the largest crop, 16.4 million metric tons, since 2011. Favorable weather conditions and adequate precipitation in grain producing regions fueled the increased production.

Areas where wheat production declined significantly in 2022 resulted from very different circumstances. In Argentina, a significant drop in production throughout the planting season was due to a very dry winter followed by late frosts. Accordingly, 2022 wheat production in Argentina fell to 12.55 million metric tons, the lowest level since 2015. The decline in production was attributable to a decrease in yields, 2.28 metric tons per hectare, the lowest in the period 2010 to

2022, and a decline in planted area of just under one million hectares from the previous year.

In the Ukraine, the cause for the decline in wheat production is attributable to the full-scale invasion launched by Russia in February 2022 that wreaked havoc throughout the Ukrainian economy, with agriculture bearing a direct impact. The fighting led to a breakdown of farming operations. Production volumes for all major grains dropped in 2022/23 due to military activities. The decrease in Ukraine wheat production was substantial; the area harvest was down 28 percent from 2021, yields declined by 12 percent, and 2022 wheat production declined by 36 percent. At the time of this writing the forecast is for a continued decline in 2023/24 production and beyond, if the current conflict is not resolved.

Overall global consumption of wheat is a combination of domestic feed consumption that measures the volume of crop used locally for animal feed and the part of the crop used for food, seed, and industrial (FSI) uses. In 2022, the volume of global consumption of wheat was virtually unchanged from the previous year, up only 0.5 percent. The composition of global use reflected a less than one percent decline in animal feed globally while FSI use increased a bit less at 0.18 percent.

Many low and middle income developing countries where wheat is a food staple but have production potential, import much of their wheat. Most of these countries have limited abilities to expand wheat production, which increases global demand for wheat imports. The largest growth markets for wheat imports include Africa—both North (Egypt, Algeria, and Morocco) and sub-Saharan (Ethiopia, Kenya, Nigeria, South Africa, and Sudan)—the Middle East (Iran, Jordan, Lebanon, Saudi Arabia, and Syria), and Southeast Asia (Indonesia, the Philippines, and Vietnam). Combined with rising populations in various parts of the world and improving economic growth, it is expected to lead to sustained increases in the demand for both milling-quality and feed wheat.

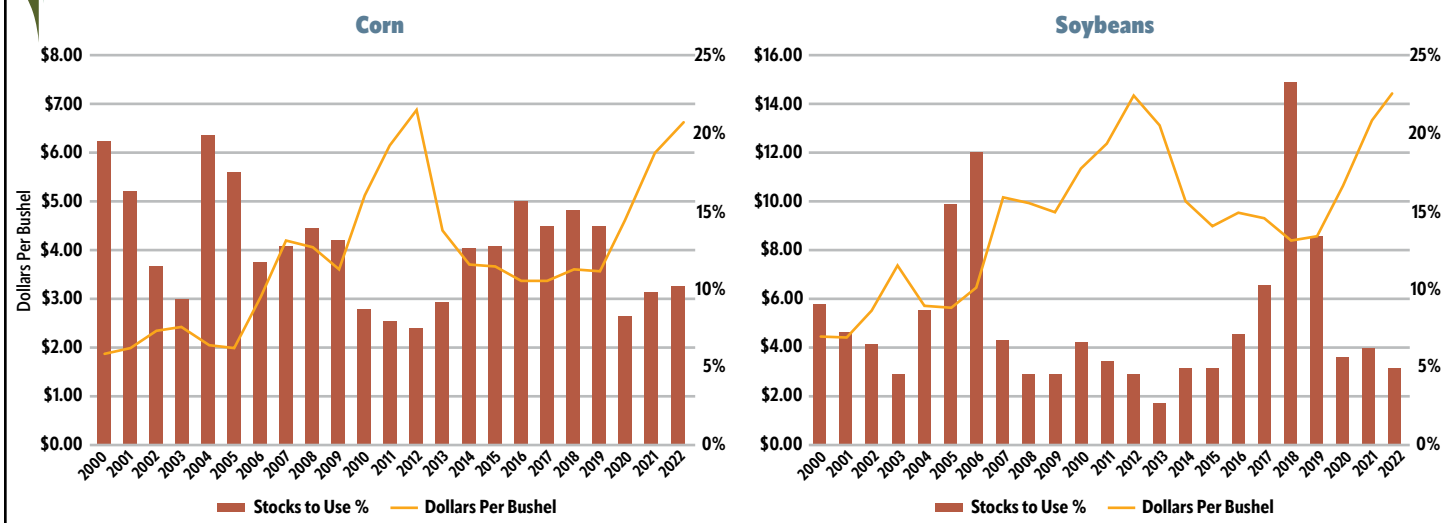
Corn

Global corn production in 2022 represented just under 80 percent of total world coarse grain output. World corn production declined for the second year in a row, falling by six percent from the previous year. Corn production fell from 1,217 million metric tons in 2021 to 1,147 mil-



Figure 7

U.S. Prices and Ending Stocks as a % of Total Use, 2000-2022



Source: World Agricultural Supply and Demand Estimates, April 2023
<https://www.usda.gov/oce/commodity/wasde/wasde0321.pdf>

lion metric tons in 2022. The primary cause for the decline in corn production in 2022 can be traced to a decline in yields in major producing areas. The European Union experienced one of its worst growing seasons for corn with yields falling 22 percent from the previous year and 21 percent below their five-year average. Combined with a slight decline in the area devoted to corn production, EU corn production fell by 25 percent in 2022⁴. In addition the persistent drought in Argentina caused corn production to fall 25 percent from 2021, with yields declining to 5.5 metric tons per acre, 26 percent below their five-year average.

The war in Ukraine continued to exacerbate the global corn supply situation as production fell by 36 percent in 2022. However, in the case of the Ukraine, yields remained at their five year average of 6.8 metric tons per acre, but much of their farmland used for corn production was a casualty of war, with 2022 area contained to only 80 percent of its five-year average.

In the United States, corn production for the 2022 marketing year declined by almost nine percent from 2021, falling to 13.7 billion bushels. This was linked to a decline in area harvested, 79.2 million acres, down seven percent from 2021. There was also a decrease in yields, down to an estimated at 173.3 bushels per acre, 3.4 bushels below the 2021 record high yield of 176.7 bushels per acre.

The fall in production comes at a time when total use of corn in the United States has also diminished, primarily due to a decline in exports, down over 25 percent from 2021 marketing year. Currency fluctuations, increased competition from South America and domestic policy decisions by China all contributed to the declining outlook for exports. The fall in exports is primarily linked to the three top markets, Mexico, Japan, and China having reduced corn imports from the United States in the 2022 marketing year. In percentage terms, shipments to Japan are expected to be off by 55 percent this marketing year, down 132 million bushels; shipments to China have fallen 40 percent, down 121 million bushels; and, shipments to Mexico have declined 15 percent, down 56 million bushels. Combined with a falloff in feed and use in ethanol production, total U.S. corn use declined by eight percent from the previous year.

With total use declining slightly more than total supply (production plus beginning stocks), ending stocks of corn are projected to fall slightly from the previous year (Figure 7). Supported by continuing tight global supplies and the uncertainty in geopolitical events, the U.S. corn price is expected to average \$6.60 per bushel in 2022, up from 10 percent from the previous year.

Soybeans

Global soybean production in 2022 increased

by three percent, increasing from 359.7 million metric tons in 2021 to 369.6 million metric tons in 2022. The increase in production is attributed primarily to Brazil, which accounts for 42 percent of the global total, where production increased by 18 percent from 2021 to 154 million metric tons. In addition, a rebound in soybean production in Paraguay, a major exporter accounting for three percent of global production, increased available supplies as more normal moisture conditions boosted production back to the ten million metric ton level, more than double the previous year's drought plagued output of just over four million metric tons.

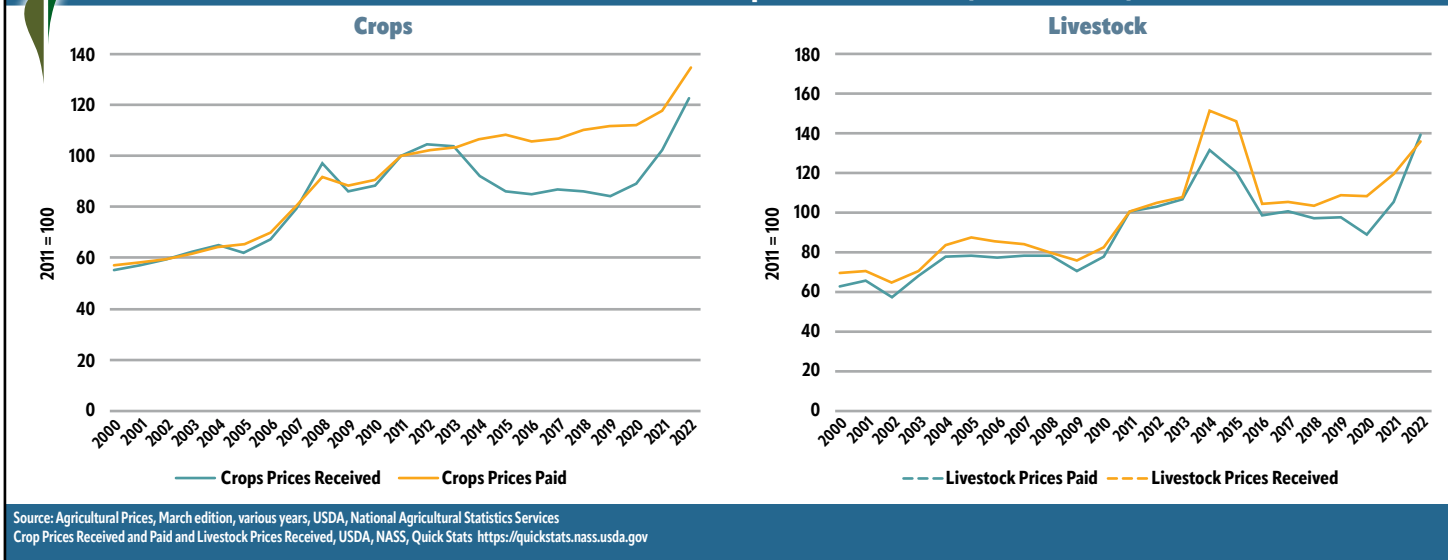
The bumper crop in Brazil and a return to more normal production in Paraguay helped to offset a fall in Argentina production of 38 percent from the previous year, due to a severe drought conditions. In a more normal year, Argentina accounts for approximately 12 percent of global soybean production. In addition, U.S. soybean production, which accounts for about 32 percent of world production, was down by four percent from the previous year as drought reduced yields.

Also of note, 2022 was the first time China had production of soybeans greater than 20 million metric tons. The April World Agricultural Supply and Demand Estimate (WASDE) reports soybean production in China to be 20.3 million metric tons in 2022, up 24 percent from the previous year attributable to an increase in planted area of 22 percent. This increase in soybean production is in line with China's desire to lessen its dependence on imports of soy-

⁴ <https://ipad.fas.usda.gov/countrysummary/default.aspx?id=E4&crop=Corn>



Figure 8
Index of Farm Prices Paid and Received for Crops and Animals (2000-2022)



beans from Brazil and the United States.

Global soybean domestic consumption increased by less than one percent in 2022 reported in the April WASDE at 366 million metric tons, up from 363 million metric tons in 2021. Worldwide soybean crush was almost unchanged compared to 2021 (reported as 315 million metric tons in 2022) up less than one half of one percent. The modest increase in total use was linked to a six percent increase in food use, increasing by 1.4 million metric tons from 2021. Total food use, 23 million metric tons, accounts for about six percent of global soybean domestic consumption.

World exports of soybeans increased by nine percent in 2022, up almost 14 million metric tons from the previous year. The increase in export activity was captured by Brazil whose 2022 exports are expected to be up over 17 percent from the previous year reaching almost ninety-three million metric tons. The other major gain in exports came from Paraguay, where a return to more normal

production allowed for exports to increase to pre-drought levels, expected to reach 6.4 million metric tons in 2022. The export gains by Brazil and Paraguay were offset by a decline in exports from the United States, down by six percent in 2022, dampening the growth in overall global soybean trade.

Overall global trade increased by five percent from the previous year, with total imports up six million metric tons from 2021. Among the major importers, China is expected to increase imports by almost 4.5 million metric tons in 2022, up five percent from 2021. Increased imports by countries in Southeast Asia and Mexico are expected to contribute to the remainder of the increase in 2022, up 1.5 million metric tons, 18 percent, and 0.44 million metric tons, seven percent, respectively from the previous year.

In the United States, the decline in production with a slight uptick in total domestic use, resulted in another year of declining ending stocks-to-total use. At the end of the marketing year the stocks-to-use ratio is expected to fall to just five percent from almost six percent at the end of 2021 (Figure 7). Combined with strong global demand and an uncertain global supply, support for higher marketing year average prices continues. As of this writing, the market year average price for U.S. soybeans is expected to be \$14.30 per bushel, up seven percent from 2021. The outlook for next season will likely be determined by the soybean crop in South America and continued market activity by China and the other major import markets. Currently futures markets are signaling a dampening of price expectations for 2024. However, given the recent global geopolitical environment the appearance of another black

swan market disruption event cannot be ruled out.

Prices Paid and Received

Strong commodity market prices continued into 2022 and remained a cause for optimism in the outlook for the overall farm economy; however, at the same time input prices remained at high levels and dampened the longer-term outlook. Rapidly increasing prices paid by farmers and ranchers over the past few years offset the gains from improved prices received for crops and livestock. A continuing challenge facing U.S. farmers is illustrated in the overall index of prices paid for inputs and prices received for crops and livestock (Figure 8). In the case of crops, while commodity prices move up and down, input prices trend steadily upward or, at best, fail to decline as rapidly as crop prices. For livestock producers, feed and related input costs vary with the price of crops like corn, soybeans, and other feed ingredients. But while they have fallen from the high levels in 2013, a renewed upward trend began in 2019 and expectations for weaker commodity prices in the coming year may improve the near-term outlook for the livestock market. While livestock related prices have persistently failed to keep pace with input prices since 2016, declining cattle numbers limiting supply has begun to move related prices to more favorable levels.

Overall crop prices continued their upward trend as reflected in the increase in the prices received index, up 18 percent in 2022 from the previous year. As mentioned above, increases continued in crop production input costs are illustrated by the 14.2 percent increase in the overall index in



2022 from the value in 2021. Accordingly, the gap between the two began to narrow slightly from the previous year. Except for cotton, most major commodity prices were up in 2022 contributing to the increase in prices received index. For example, USDA/NASS average monthly all wheat price was up 18 percent in 2022 from the previous year. To put the prices received change in perspective, December all wheat in 2022 price of \$8.98 was up from December 2021 price of \$8.59. Similar upward moves were evident for corn, up 11.7 percent and soybeans, up 7.5 percent from 2021. At the same time, prices paid for inputs were at higher levels as well, for example in March of 2022 the fertilizer index was up 66 percent from March of 2021, with higher prices for potash and phosphate and mixed fertilizer more than offset lower prices for nitrogen. As for fuels, the March 2022 index was up 58 percent from March 2021, for inputs like diesel, gasoline, and Liquefied Petroleum gas.

The livestock situation improved in 2022 as illustrated by the increase in prices received index exceeding that of the index of prices paid for raising livestock for the second year in a row. The annual index of prices received for livestock increased to 150.4 by December 2022, up by over 25 percent from 2021. While the index of prices paid stood at 137.8 up only a bit over 10 percent from 2021 for the same period.

While encouraging for the sector, all categories did not share equally as increases in poultry and egg prices exceeded those in the meat animal and dairy category. For example, the index for dairy closed 14 percent above December 2021 with all milk price of \$24.70 per cwt, \$3.00, above the previous year. At the same time, the poultry and egg index was up 58 percent from a year earlier, with egg prices \$3.61 per dozen higher than 2021, over four times greater while broiler prices declined modestly, 2.4 cents, or three percent, lower than the previous year. Meanwhile the meat animal index increased by 12 percent from a year earlier with beef cattle prices at \$154 per cwt \$17 higher than in 2021. Hog prices of \$62.50 per cwt were \$6.00 per cwt above 2021 December prices.

The index of prices paid for livestock-related production increased with annual increases for inputs such as feed gains, up 24 percent from the previous year, hay and forages up 21 percent, complete feeds up 15 percent, and feed concentrates up seven percent on the year. In addition, the price of all animals increased as well, with feeder cattle, up 14 percent, feeder

Table 2
Insured Acres by Major Crop¹

Crop	2020	2021	2022	CHANGE 2021/22	% CHANGE 2021/22
Wheat	36,194	36,649	36,571	-78	-0.2%
Corn	84,372	83,062	81,487	-1,574	-1.9%
Sorghum	4,482	5,939	4,986	-954	-16.1%
Soybeans	75,688	78,890	80,092	1,202	1.5%
Upland Cotton	11,756	10,765	13,151	2,386	22.2%
Pasture, Range & Forage	160,000	202,000	248,000	46,000	22.8%
Total (Above Crops)	372,491	417,305	464,288	46,982	11.3%
Total (All Crops)	399,405	445,799	494,768	48,968	11.0%
NASS Planted Acres (Field Crops)	310,114	317,119	312,111	-5,008	-1.6%

¹ Data as of July 16, 2023. In (000) acres.
Source: RMA Summary of Business, NASS Quick Stats

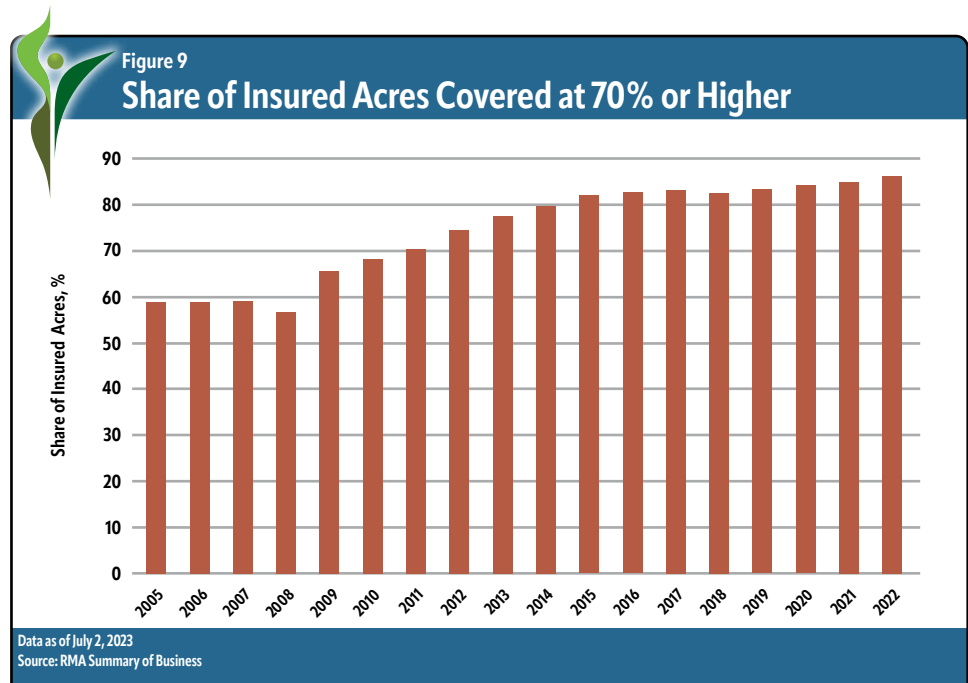
pigs and milk cow replacements up 14 percent, six percent, and 17 percent respectively.

The margins between costs and returns are likely to remain thin overall and the challenges of uncertain market conditions moving forward will likely continue for U.S. farmers and ranchers. Given the reality of sticky input prices any downward fluctuations in agricultural commodity prices in the coming year will likely exacerbate the potential risks for producers.

[The information sources for this section were: USDA, Quick Stats <https://quickstats.nass.usda.gov>; USDA, OCE, WASDE, <https://usda.gov/oce/commodity/wasde> and USDA, FAS, Market and Trade Data, PSD Online, <https://apps.fas.usda.gov/psdonline/app/index.html#/app/home>. USDA, NASS, Ag Prices January 2023 and various past issues, <https://usda.library.cornell.edu/concern/publications/c821gj76b>]

Federal Crop Insurance Experience

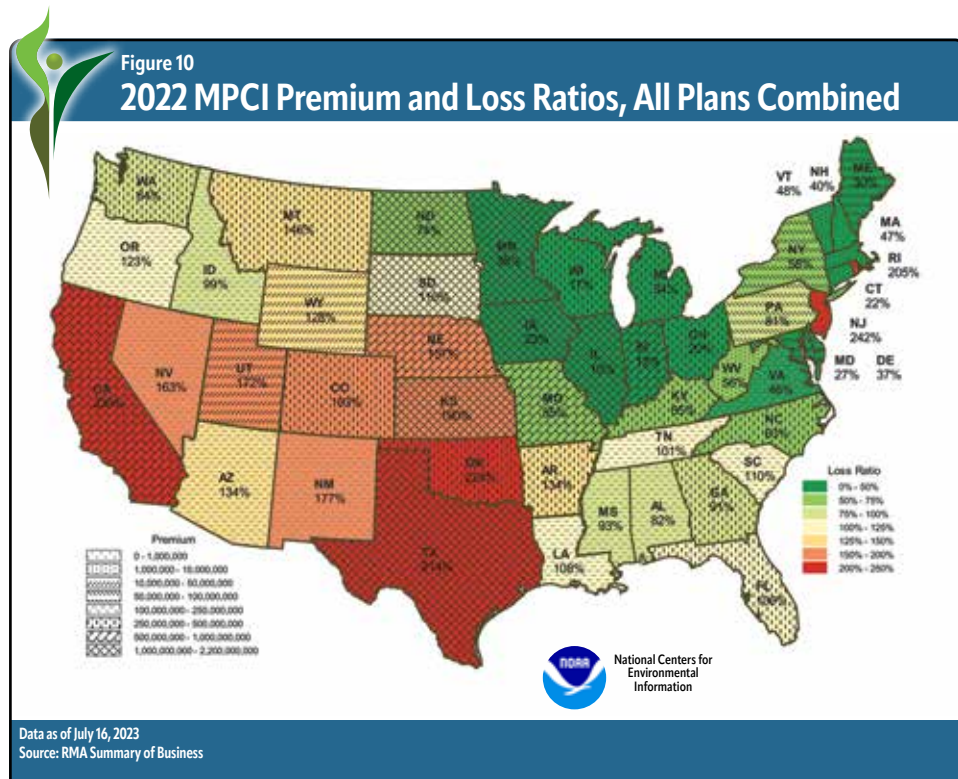
In 2022, total insured acreage increased by 11.0 percent (Table 2). Pasture, Rangeland and Forage (PRF) continued to expand, increasing by 46 million acres in 2022, a 22.8 percent increase over 2021. Insured acreage declined for Sorghum, Corn, and Wheat, down 16.1%, 1.9 percent, and 0.2 percent respectively. Offsetting these decreases were the increased insured acreage of Cotton and Soybeans, up 22.2 percent and 1.5 percent respectively. In addition to the overall increase in total acres insured and acreage shifts among the major crops, average coverage levels for the U.S. also increased, as illustrated in Figure 9. Nearly 86 percent of U.S. insured acres are protected at coverage levels exceeding 70 percent.



FCI underwriting performance is provided in Table 3. Indemnities for 2022 were approximately \$19 billion compared to \$9.6 billion in 2021. The gross loss ratio (indemnity divided by premium) was 104 percent for 2022, up from the 70 percent loss ratio in 2021 and considerably nearly equal to the 105 percent loss ratio experienced in 2019. Table 4 provides a breakdown of premiums and indemnities ranked by both state and crop for 2022. In terms of premium volume, Texas, North Dakota, Iowa, Illinois, and Kansas were again the top-ranking states for 2022. With respect to indemnities, Texas, Kansas and Nebraska were the top three ranking states respectively. The ranking of top crops by premium volume remained unchanged in 2022 compared to 2021. Corn, wheat, and soybean indemnities were ranked number one, two and three at \$4.9 billion, \$3.9 billion, and \$2.5 billion in 2022.

The U.S. loss ratio map in Figure 10 reveals a remarkable dichotomy in underwriting results between regions in 2022, while several of the major corn and soybean states experienced exceptionally favorable loss ratios, the Southwest, West, and Northwest had quite unfavorable results, and the remaining regions tended to be about average. Specifically, the states of Minnesota, Iowa, Wisconsin, Illinois, Indiana, Michigan, and Ohio all experienced loss ratios under 50 percent for the FCI program. South Dakota, Nebraska, and Kansas were the exceptions with loss ratios of 110 percent, 157 percent, and 190 percent, respectively.

Contrast the experience of the Midwest with that of the Southwest, Northwest, and West regions. Oklahoma, Texas, and California, along with Rhode Island and New Jersey, all sustained loss ratios in excess of 200 percent. The primary cause of loss in these states was drought, except for California where it was irrigation failure.



Oregon, Nevada, Arizona, New Mexico, Utah, Montana, Wyoming, Colorado, Arkansas, Louisiana, Florida, Tennessee, and South Carolina all experienced loss ratios between 100 percent and 200 percent, primarily due to drought or excess moisture.

Revenue Products

The projected base prices used to establish the value of a crop and the insured liability under the Revenue Protection and Yield Protection forms of insurance policies are shown in Table 5 for crop years 2016 through 2023. Projected base prices are the average of futures prices during the discovery month, i.e., the month preceding the sales closing date for a policy.

After increasing in 2021, projected base prices

increased again in 2022 for Winter Wheat, Corn, and Rice, but declined for Spring Wheat, Soybeans, and Cotton.

Commodity prices were up significantly across the board for all commodities in 2022, including over 40 percent increases for both spring and winter wheat, a 29 percent increase for corn, a 28 percent increase for cotton, a 21 percent increase for soybeans, and a 14 percent increase for rice.

Implied volatility factors (IV) are derived from futures market information and serve as the measure of risk for expected harvest prices. RMA annually calculates the implied volatility factor for a crop by averaging the implied volatility of in-the-money options for a designated futures contract over the final five trading days of the discovery period for that crop (generally

Table 3
Federal Crop Insurance Program Performance, Gross Basis¹

Crop Year	Policies with Premium	Units with Premium	Liability	Premium	Farmer-Paid Premium	Indemnity	Gross Underwriting Gain	Insured Acres	Loss Ratio
	Thousands	Thousands							
2013	1,224	2,584	123,811	11,808	4,511	12,085	-227	296	1.02
2014	1,207	2,539	109,904	10,073	3,858	9,136	938	295	0.91
2015	1,205	2,547	102,539	9,769	3,679	6,316	3,452	296	0.65
2016	1,160	2,442	100,623	9,329	3,462	3,913	5,416	290	0.42
2017	1,125	2,370	106,064	10,071	3,716	5,435	4,637	312	0.54
2018	1,108	2,330	110,166	9,896	3,630	7,324	2,573	335	0.74
2019	1,106	2,355	109,857	10,126	3,757	10,607	-481	379	1.05
2020	1,112	2,433	113,909	10,061	3,744	8,695	1,366	398	0.86
2021	1,167	2,633	136,668	13,718	5,110	9,597	4,122	444	0.70
2022	1,193	2,720	173,542	18,390	6,760	19,133	-742	494	1.04

¹ Data as of July 16, 2023
Source: RMA Summary of Business



Table 4

Top 10 Premiums and Indemities Ranked by State and Crop for 2022

Rank	RANK BY STATE				RANK BY CROP			
	Premium		Indemnity		Premium		Indemnity	
	State	MIL.\$	State	MIL.\$	Crop	MIL.\$	Crop	MIL.\$
1	Texas	2,166.5	Texas	4,634.0	Corn	6,469.6	Corn	4,897.3
2	North Dakota	1,546.8	Kansas	2,221.5	Soybeans	3,981.0	Wheat	3,861.4
3	Iowa	1,364.0	Nebraska	1,526.6	Cotton	2,029.3	Soybeans	2,546.5
4	Illinois	1,245.7	California	1,502.7	Wheat	1,670.4	PRF	1,782.0
5	Kansas	1,171.6	South Dakota	1,257.3	PRF	1,067.4	Cotton	1,433.2
6	South Dakota	1,146.1	North Dakota	1,147.4	Grain Sorghum	315.3	Rice	655.2
7	Minnesota	1,078.0	Oklahoma	756.1	Annual Forage	291.0	Annual Forage	631.8
8	Nebraska	971.2	Colorado	503.4	Rice	193.7	Dry Peas	606.3
9	Indiana	672.8	Montana	482.4	Whole Farm	178.0	Dry Beans	374.1
10	Missouri	646.3	Minnesota	372.1	Apples	133.0	Grain Sorghum	134.8
Top 10 Sub-Total		12,009.0		14,403.5	16,328.6			16,922.7
All Other		6,381.4		4,729.3	2,061.8			2,210.2
U.S. Total		18,390.4		19,132.8	18,390.4			19,132.8
Top 10 Share of U.S.		65%		75%	89%			88%

Source: RMA Summary of Business as of July 16, 2023



Table 5

Major Revenue Policy Base Prices¹

	2016	2017	2018	2019	2020	2021	2022	2023	% CHANGE	
									2021/22	2022/23
Wheat, Winter (\$/bu) (KS)	5.20	4.59	4.87	5.74	4.35	4.90	7.08	8.79	44.5	24.2
Wheat, Spring (\$/bu) (ND)	5.13	5.65	6.31	5.77	5.56	6.53	9.19	8.87	40.7	-3.5
Corn (\$/bu) (IL)	3.86	3.96	3.96	4.00	3.88	4.58	5.90	5.91	28.8	0.2
Soybeans (\$/bu) (IL)	8.85	10.19	10.16	9.54	9.17	11.87	14.33	13.76	20.7	-4.0
Upland Cotton (\$/bu) (MS)	0.62	0.73	0.75	0.74	0.70	0.80	1.02	0.84	27.5	-17.6
Rice (\$/cwt)	11.90	10.40	11.90	10.80	12.10	12.70	14.50	16.90	14.2	16.6

¹ Revenue Protection for 2016-23 as of July 2, 2023.
Source: RMA Actuarial Information Browser

the last five trading days before the sales closing date). For example, implied volatilities over the final five trading days in February for the December futures contract are used to determine the IV factor in the major corn producing states. RMA uses the IV factor to simulate the risk of

an expected change in harvest price for the crop, which is then utilized to establish the price risk component of the premium rate for the specific crop. A higher IV indicates a greater likelihood for larger price movements while a lower IV implies a more stable market with futures prices ex-

pected to move within a smaller range. All things being equal, higher IV factors result in higher premiums, while lower IV factors result in lower premiums.

Historical IV values for selected major crops during the period 2015-2022 are shown in Table 6.



Table 6

Volatility Factors

	Historical Price Volatility ¹	Volatility Factor ²									
		1968-2022	2016	2017	2018	2019	2020	2021	2022	2023	% CHANGE
											2021/22
Wheat, Winter (\$/bu)	0.19	0.22	0.18	0.16	0.19	0.17	0.16	0.21	0.31	31.3	47.6
Wheat, Spring (\$/bu)	0.22	0.15	0.13	0.13	0.14	0.14	0.18	0.23	0.18	27.8	-21.7
Corn (\$/bu)	0.20	0.17	0.19	0.15	0.15	0.15	0.23	0.23	0.18	0.0	-21.7
Soybeans (\$/bu)	0.18	0.12	0.16	0.14	0.12	0.12	0.19	0.19	0.13	0.0	-31.6
Upland Cotton (\$/bu)	0.23	0.14	0.15	0.14	0.14	0.13	0.20	0.22	0.22	10.0	0.0
Rice (\$/cwt)	0.22	0.15	0.17	0.12	0.11	0.13	0.15	0.10	0.11	-33.3	10.0

¹ Historical volatility values are obtained by fitting log-normal distribution to the time series of the ratio of the harvest price to the base price from 1968 to 2022. For each year in that time period, the harvest and base prices are calculated by using relevant futures prices in that year. Source: Barchart.com

² Revenue Protection as of July 2, 2023.
Source: Various RMA Manager's Bulletins

The IV factors observed for 2022 exhibited mixed behavior, with spring and winter wheat both up roughly 30 percent, followed by cotton up 10 percent, while corn, and soybeans remained unchanged and rice decreased roughly 30 percent. The combination of higher base prices across the board and increased IV factors for wheat and cotton, resulting in significant premium increases for 2022.

Figure 11 shows the change between the base prices established at the outset of 2022 in relation to the harvest prices established close to the end of the growing season. The harvest prices provided in Figure 10 are the average daily prices in the harvest month for the same futures contract used to establish the base price earlier in the year. Harvest prices are an essential element of the calculation process as they are used to determine the farmer's actual revenue, which in turn is used to establish the amount of indemnity provided by Revenue Protection (RP) policies.

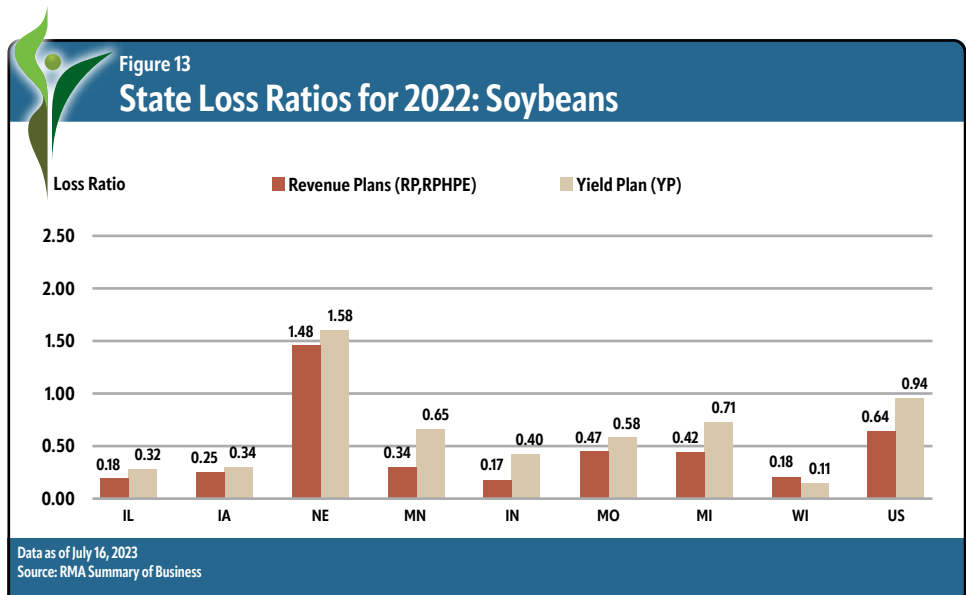
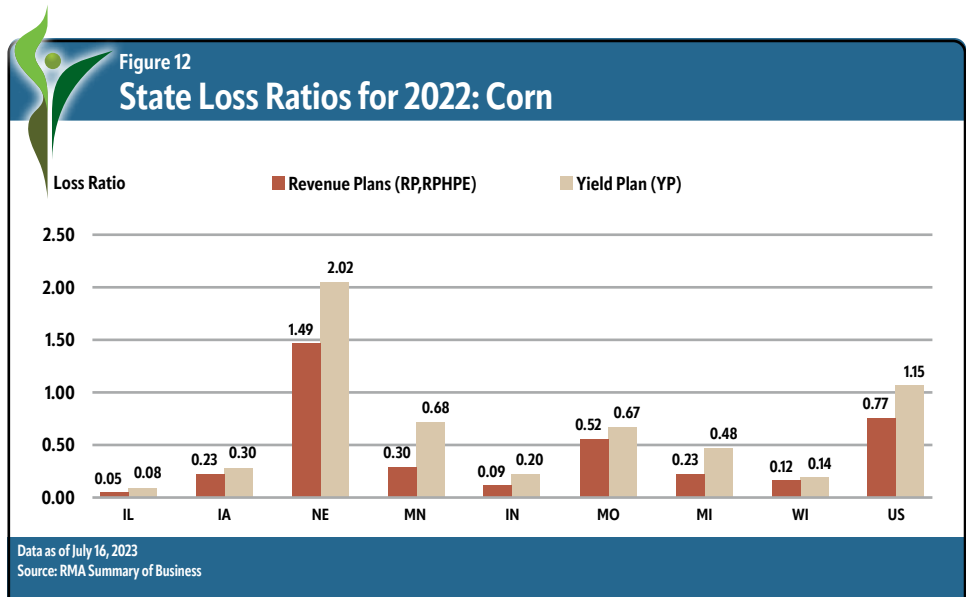
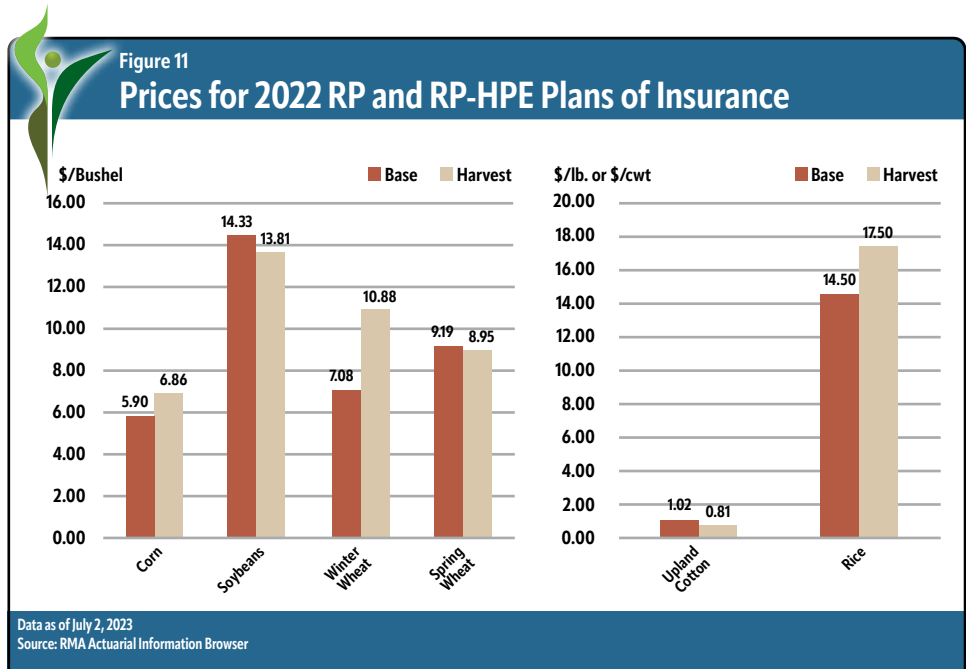
Harvest prices for corn, winter wheat, and rice all increased compared to their base prices for 2022. Corn increased from \$5.90 to \$6.86 per bushel, winter wheat from \$7.08 per bushel to \$10.88, and rice from \$14.50 to \$17.50 per hundredweight. In contrast, spring wheat fell from \$9.19 to \$8.95 per bushel, soybeans declined from \$14.33 to \$13.81 per bushel, and cotton dropped from \$1.02 to \$0.81 per pound. The largest increase in base price to harvest price observed was for winter wheat, which increased from \$7.08 per bushel to \$10.88 per bushel, an increase of 54 percent.

Figure 12 presents corn loss ratios by state for the yield plan of insurance (YP) and revenue plans of insurance (RP and RP-Harvest Price Exclusion combined) for Illinois, Iowa, Nebraska, Minnesota, Indiana, Missouri, Michigan, and Wisconsin. YP plans experienced higher loss ratios than the revenue plans in all states except Wisconsin, mostly the result of experience for the RP plans reflecting higher yields offsetting changes in price for the crop year.

For 2022, the corn RP plans within the Corn Belt states experienced an overall loss ratio of 42 percent, despite Nebraska's poor results at just under 150 percent.

Figure 13 shows that, at the national level, the loss ratio for soybean RP plans was lower than corn. Nebraska was the only state to experience a loss ratio in excess of 100 percent for soybeans in 2022.

[Information sources for this section includes



USDA, Foreign Agricultural Service, P, S & D database; Office of the Chief Economist; World Agricultural Supply and Demand Estimates Report (WASDE), various issues; NASS Quick Stats; RMA Manager's Bulletins, Price Discovery Application, and Actuarial Information Browser.]

Program and Policy Developments

Emergence From the COVID-19 Environment

A spike in COVID cases late in 2021 and into early 2022 was a reminder that the pandemic continued to impact the lives of Americans. The Federal crop insurance program continued to provide additional relief for servicing America's farmers well into the first half of the 2022 calendar year reaffirming the high-quality service expected by America's farmers and ranchers. However, as spring began to arrive and many of America's farmers headed to the field with the prospects of a new crop and renewed hope for a bountiful harvest, so also did the effects of the pandemic begin to slowly reside. This led to a sense of returning to a more normal lifestyle. As the year continued, many thought they could see "business as usual" coming over the horizon. And yet through all the COVID challenges over the prior two years, the Federal crop insurance program continued to remain vibrant, viable, and a proven effective safety net for supporting a strong agricultural system and economy to keep Americans food secure.

The COVID-19 flexibilities issued by RMA in 2020, continued through all of 2021 and were again, for the most part, continued into 2022.

These included extending time to file production reports and complete perennial crop inspections, creating efficiencies in handling written agreements between RMA and approved insurance providers (AIPs), allowing greater flexibility to execute business transactions by utilizing digital signatures and waiving the witness signature requirement for approval of assignment of indemnities and other relief measures. The COVID-19 bulletins issued by RMA expired on June 30, 2022, but many of the program flexibilities and efficiencies proved so effective to address the pandemic that they were eventually moved into routine operating procedures and continue today.

New Ideas and New Challenges

After the first year with a new Administration, RMA and USDA began to provide new priorities and program direction aimed to enhance participation and address climate change. The crop insurance program continued its growth both in the crop and livestock areas, with industry and RMA leadership addressing the usual day-to-day issues and challenges. With creative solutions and flexibilities, the program effectively provided over \$194 billion of crop and livestock liability to America's farmers and ranchers.

To start the year the crop insurance program recognized climate-smart practices when the FCIC Board approved a new concept, and RMA released in January for the 2022 crop year the new Post-Application Coverage Endorsement. This endorsement provides coverage for producers in certain states and counties who choose to "split-apply" nitrogen, a practice where farmers apply nitrogen on two or more occasions rather than all at one time. The coverage provides a payment for the projected yield of the farmer when they are unable to apply the

post-application of nitrogen to corn stages V3-V10 due to field conditions created by weather. This climate-smart practice helps reduce nitrogen run-off and the potential amount of nitrogen used which can help lower costs. The release of the new endorsement was somewhat delayed, and training and education were playing catch up resulting in only 61 endorsements being purchased. Subsequently, the Board approved expansion for the 2023 crop year and additional sales and participation are anticipated.

RMA announced early in the spring that it would continue the Pandemic Cover Crop Program (PCCP) to provide financial assistance to farmers impacted by the effects of the pandemic and market disruptions. The program supported cover crop conservation practices and demonstrated that crop insurance and voluntary conservation efforts work together for the benefit of all. For 2022, the PCCP provided premium support to eligible farmers who insured their spring crop and planted a qualifying cover crop by June 15. A new revision also included cover crops planted after June 15 and cultivated over the summer for a fall planted crop. In addition, Whole Farm Revenue Protection was made eligible for the PCCP benefit, and states that maintained their own cover crop program were also allowed a supplemental dollar for dollar Federal match for their eligible farmers in addition to any base PCCP eligibility. The premium support was \$5 per acre and AIPs continue to administer the program by adjusting the farmer's billing statement to reflect a discount in the premium owed by an amount calculated by RMA. The second year of this new pilot program saw approximately 11.7 million acres of qualifying cover crops planted as certified to the Farm Service Agency. This was a reduction of about 2.3 million acres certified in the 2021 crop year. While several factors can impact the actual acres eligible for premium assistance, there was more than \$48 million in premium reductions for insured farmers, about a 19 percent reduction from 2021. In addition, the States of Iowa, Illinois, and Indiana contributed another \$1.7 million in premium discounts that were also matched by the Federal contribution.

By mid-summer, with war raging in Ukraine and food supply issues becoming increasingly prominent, RMA began an effort to review the practice and areas where doubling cropping could be liberalized to increase more acreage of wheat, grain sorghum, and soybeans. RMA met with 70 grower groups in 28 states to evaluate counties that could be permanently expanded to



allow for soybeans and grain sorghum to follow winter wheat. They also discussed creating flexibilities for obtaining written agreements making them easier for producers in areas with less history of double cropping to get. The result was widespread expansion and streamlining of insuring double crop acreage in 681 soybean counties and for grain sorghum in 870 counties. Also new for 2022 was RMA efforts to add a relay cropping practice, available through written agreement, that provides for soybeans to be relay cropped into an established small grain crop. This emerging practice allows a second crop (relay crop) to be planted into an established crop where both crops are planted in a manner that allows separate agronomic maintenance and harvest of the crops.

Continued Drought in the West, Excess Moisture, and Freeze Events

Regional weather events occurring in 2022 were typical of most years with areas seeing both too dry and too wet conditions, but the year also saw severe freeze and other more area specific loss events. These weather events brought their own challenges and hardships but again reaffirmed that crop insurance successfully provided the risk management tools farmers and bankers rely upon to continue for another year. A record 494 million acres and \$173 billion in crop liability was insured by farmers and ranchers with the risk of loss also being shared by AIPs and taxpayers, demonstrating again one of the most successful public-private partnerships in stabilizing agriculture and the food supply of Americans. The livestock sector also continued its growth through use of improved and expanded risk management products with an additional \$21 billion in liability protected by the program.

Continually Improving and Expanding Program Coverage

RMA, private sector developers, and the industry continued to expand the availability of coverage for new crops, areas, and production and marketing risks. And the continual task of maintaining and improving the 136 various crop and livestock programs takes a concerted, collaborative effort from RMA, the AIPs, and NCIS. Their efforts mean that today's program accounts for over 604 crop-livestock and related differing types and varieties insured through 36 different plans of insurance. That translates into more than 170,000 different county crop program actuarial offers. This comes with daily challenges in main-



taining and keeping current on prices, premium rates, underwriting rules, special provisions, and key agronomic planting dates among the many other factors in establishing the multitude of insurance offers for which farmers can choose to cover their risks. Yet equal, if not more efforts are continuously being made by RMA, AIPs, grower groups and associations, and other stakeholders to improve existing policies and coverage. As operating margins grower tighter there is continued demand for new crop policies and types of coverage to address all areas of production and marketing agriculture, along with an even greater emphasis for covering small, under-served, and specialty crop farmers. This collaborative effort between the industry and RMA is a constant search for effective and efficient risk management tools and products to further both new crop development and improvement of existing crop programs. While past renditions of this writing would annually try to count the number of policy changes made each year, that simply is no lon-

ger a manageable task for a program covering numerous row crops, trees, vines, bushes, vegetables, specialty crops, various seeds, livestock, aquaculture, and the list goes on and on!

During 2022 the NCIS Underwriting and Operations (U&O) and Training & Education (T&E) Committees sponsored a special webinar, with RMA, to implement a new Unit Division by Grid Option in the States of Georgia, Maine, and Texas. This new program addressed land that is not surveyed under the U.S. Public Land Survey System used for establishing optional units by section in many parts of the United States. However, in several areas including these states, the U.S. survey system is not always applicable, making optional unit determinations cumbersome and inconsistent for farmers. The new grid system will be used for annual crops to establish optional units like those in other parts of the country providing farmers a more equitable and effective strategy for establishing their unit structure to be consistent with the risks they face.

The U & O Committee and RMA also began to engage in almost monthly meetings to discuss implementation of a same year production reporting initiative aimed at better tying production history to the crop year and unit upon which it was produced. This will enhance the accuracy of yield information captured on individual level crop insurance policies to be used for determining yields applicable to area yield plans of crop insurance, annual yields used by USDA in other farm programs, and to strengthen actuarial parameters within the program. This effort also led to discussions for the integration of APH regulations into the Common Crop Insurance Policy Basic Provisions effective for the 2024 crop year. APH regulations have not been updated in some time, and in doing so RMA believes that, by incorporating the regulations into the Basic Provisions, farmers will be more familiar with the requirements and procedures used to establish insured yields and guarantees.

RMA updated, revised, or issued new policies for numerous individual crop programs, some of which included pecan trees, hemp, machine harvested pickling cucumbers, fresh market beans, camelina, hybrid vegetable and specialty seed, and flue cured tobacco. Development efforts occurred for Production Revenue History for fresh market tomatoes, fresh market sweet corn, and fresh market peppers. In addition, improvements were made to area or index-based programs like Rainfall Index, adding certified organic and transitional organic hay practices and clarifying several other provisions. The HIP-WI plan clarified its relationship with other area-based endorsements and late in the year tropical storm coverage was added to the program for the 2023 crop year. 2022 also saw changes to the Common Crop Insurance Policy and Area Risk Protection Insurance Basic Provisions applicable to the June 30 and later contract change dates. These changes added a new marketing certification to allow producers to self-identify if they do not have disinterested third party records, allows the use of their own supporting production records, minimizing the need for AIPs to do preharvest appraisals, listing a 30-day appeal deadline for good farming practice determinations, and revising, improving, and moving the definitions of direct marketing and vertically integrated into the Basic Provisions, along with other individual policy changes. These changes impacted at least 20 fall 2023 crop policies with more to come. RMA also amended the Small Grains Crop Provisions

to expand revenue coverage to oats and rye, revised the sugar beet policy to incorporate stage guarantees and the Stage Removal Option, and expanded contract-based features for issuing price elections and quality adjustment on burley, dark air, fire cured, and Maryland types of tobacco like those previously implemented for flue-cured tobacco. Again, this required NCIS and the AIPs to move quickly in training the delivery system workforce so farmers could be fully aware of their enhanced coverage options and program requirements.

Later in 2022, RMA introduced the new Transitional and Organic Grower Assistance program for the 2023 crop year as part of USDA's Organic Transition Initiative. This initiative is part of a bundle of programs that will build more and better markets for American producers and consumers and improve the resilience of the food supply chain. This new program provides premium assistance to producers who insure their crops. Producers who have crops in transition to certified organic can receive assistance of 10 percentage points of premium subsidy, and for certified organic grain and feed crops producers can receive \$5 premium assistance per insured acre. WFRP policies with crops in transition or certified organic crops can also receive assistance of 10 percentage points of premium subsidy, and, if those producers with a WFRP policy also have individual crop policies, they will receive the applicable premium benefit assistance on those policies as well.

The Federal Crop Insurance Corporation Board of Directors (Board) stayed busy addressing the numerous efforts of RMA and private developers at improving, modifying, and expanding various products within the crop insurance program. The Board acted upon nearly 50 different submissions ranging from confidential submissions for new concept proposals or revised policies or products, to evaluating and approving fully developed and complete private sector and RMA product submissions that either modified, clarified, or expanded existing or previously approved products, along with establishing user fees for proven products in the marketplace. All livestock policies saw improvements aimed at increasing head limits for Livestock Risk Protection, expanding Livestock Gross Margin coverage availability for cattle, dairy, and swine to all 50 states, revising premium offset language in both policies, allowing the purchase of both LGM and LRP as long as coverage is not for the same end

month or the same livestock, and making numerous other policy provision changes. Dairy Revenue Protection flexibility was added to continue coverage when producers experience a disaster at their dairy operation, and made several clarifications around the termination date, restrictions around sales when adverse market conditions occur during the sales period, and other policy clarifications. Livestock premium earning policies jumped from 7,000 in 2021 to over 10,000 in 2022, and liability increased from \$14.2 billion in 2021 to \$21.1 billion in 2022. The livestock program continues to grow and increase in popularity with livestock producers, becoming a key risk management tool and garnering greater attention from all stakeholders.

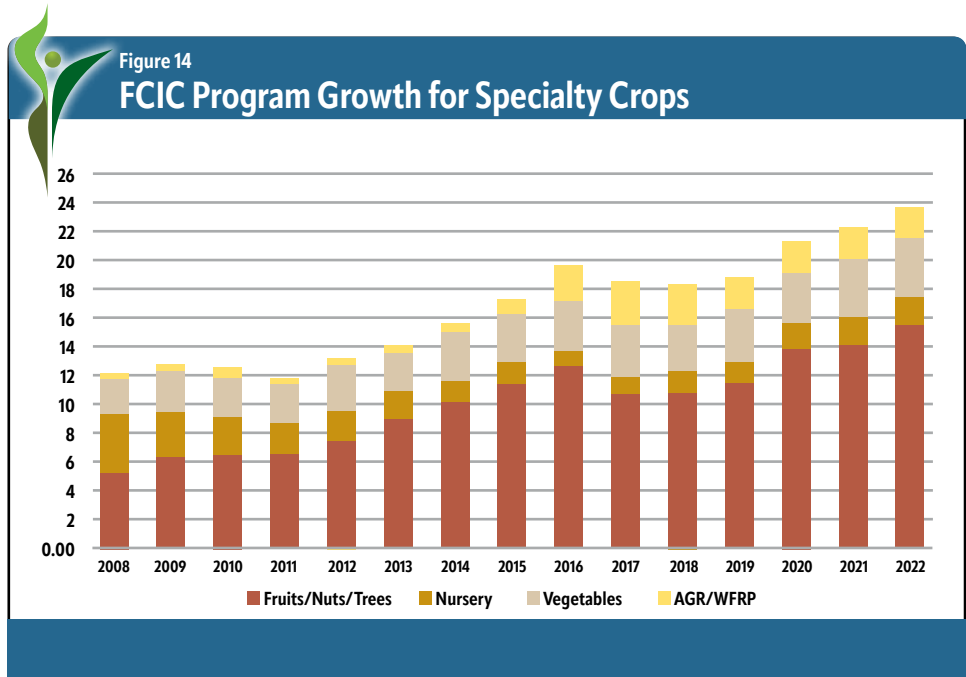
The Board addressed improvements to several programs including modifying policies for the ARH cherry, caneberry, hybrid vegetable seed, and popcorn revenue programs, converting the silage sorghum pilot program to permanent, expanded crops for the Production and Revenue History program, approved a new pomegranate program in California, and considered the potential for a new shellfish program, among many other actions aimed at enhancing coverage for America's farmers and ranchers.

The Whole Farm Revenue Protection (WFRP) plan of insurance and Micro Farm policy continued to see more modifications after RMA received input from stakeholders on needed improvements. This included increasing the maximum insurable revenue from \$8.5 million to \$17 million, allowing additional producers to participate in the program. Also, paperwork for the program was reduced by replacing the expense reporting procedures with a reduction in expected revenue for commodities that cannot be planted due to insurable causes and adjusting yield reporting requirements at sales closing dates to streamline record keeping. Specifically for the Micro Farm program the Board increased the maximum approved revenue from \$100,000 to \$350,000 allowing for greater participation by more local food producers. In 2022, the WFRP policy accounted for roughly \$2.0 billion of liability, dropping a notch to the seventh largest plan of insurance in the crop insurance portfolio. RMA initiated a series of "Road Shows" during 2022 helping educate and inform growers, especially small, under-served, and specialty crop growers on the program's merits and recent changes highlighting this strategic risk management

tool with the objective of increasing awareness and greater participation. This targeted effort is another example of the crop insurance program seeking to provide valuable protection to farmers and growers of crops, products, and farm-size often different from traditional major crop programs.

RMA continued its annual efforts of evaluating areas for expanding existing crop programs, including expansion of 12 existing programs—apples, peaches, grapes, blueberries, pecans, cotton, popcorn, dry beans, and others—into a total of 15 states and 52 counties to provide wider availability of coverage. In addition, there was expansion of the PACE endorsement to select counties in 11 states, and the High-Risk Alternate Coverage Endorsement for cotton in several states and counties.

RMA sent an updated 2022 Specialty Crop Report to Congress that highlighted progress on research and development activities related to expanded coverage for specialty crops that included the Micro Farm policy, adding crops for production and revenue history, and policy improvements for almonds, blueberries, cane berries, dry beans, grapes, pistachios, Florida avocado and citrus APH crops, hybrid vegetable seed, pecan trees, WFRP improvements, and the nursery select program. This encompassing report highlighted achievements and accomplishments in addressing 2018 Farm Bill requirements, new and ongoing research, studies, and initiatives aimed at expansion efforts, and overall specialty crop program improvements. In 2022, the amount of insurance for specialty crops reached almost \$24 billion (Figure 14) reflecting grower's increased use of crop insurance in response to the overall program enhancements. The report outlines future efforts for program expansion and improvements noting potential policy changes and nationwide stakeholder discussions with apple growers and interested parties, development of a potential aquaculture program—specifically shellfish—researching the feasibility of a program for controlled environment agriculture such as greenhouses and highlighting the transition and organic assistance program. The report also highlights the collaborative efforts of both the industry and RMA through the establishment of the Perennial and Specialty Crop Workgroup which focuses on improving specialty crop insurance policies and coverage. And lastly the report highlights an exhaustive list of outreach efforts as the program works with growers and



their representatives to find new and effective risk management tools to address new crops and under-served areas.

Finally, one of RMA Administrator Marcia Bunger's key initiatives during 2022 was entering into new risk management education cooperative agreements to help reach communities that historically have lacked access to training and resources. Together with the University of Arkansas at Pine Bluff, and the Building Resiliency initiative with Alcorn State, Annie's Project, the Intertribal Ag Council, and Rural Coalition, these various cooperative agreements will look to serve all regions of the country, traditional as well as specialty, organic, and livestock producers. Audiences will include Native farmers, African American producers, Hispanic growers, Veterans, Women, and Alaskan farmers, and others to develop training and educa-

tional tools to help farmers learn how to effectively manage long-term risks and challenges.

U.S. Crop-Hail Experience

Crop-Hail insurance policies insure direct damage from hail as the primary cause of loss. In addition to hail damage, many policy forms carry endorsements for additional perils such as wind, fire, vandalism, and theft.

Crop-Hail premium held steady at roughly \$1.0 billion through 2020 and then rose by 15.6 percent in 2021 and a further 18.5 percent in 2022 to its current \$1.383 billion. Crop-Hail provided \$46.2 billion in private insurance protection to U.S. farmers in 2022, and losses paid out were \$1.142 billion (Table 7).

Crop Year	Liability Mil. \$	Premium Mil. \$	Losses Mil. \$	Loss Ratio
2013	39,773	953.2	646.2	0.68
2014	39,652	991.7	1,209.9	1.22
2015	36,805	979.7	740.3	0.76
2016	36,178	983.3	880.1	0.90
2017	35,775	958.8	882.0	0.92
2018	36,084	987.3	937.4	0.95
2019	35,359	1,019.6	996.5	0.98
2020	35,802	1,010.0	1,154.4	1.14
2021	40,309	1,167.3	924.2	0.79
2022	46,169	1,383.1	1,142.0	0.83

Data as of June 29, 2023
Source: Adjusted Verified Totals, US only, for NCIS member companies combined with the data from non-members.

The industry loss ratio, defined as paid losses divided by premium written, was 0.83 in 2022, up from 0.79 in 2021, but down from 2020's 1.14.

There were eleven storm days that exceeded \$20 million of loss in 2022. The most significant storm occurred on June 7 causing \$203 million in Crop-Hail losses with \$191.3 million of that occurring in Nebraska alone. Four storms in June caused more than \$336 million in damage across 23 different states. Five storm days in July caused more than \$185 million in damage. In total, the losses from the top 10 storm days in 2022 amounted to \$541 million, up significantly from \$393 million in 2021, and on par with 2020's \$570 million. Five states took the brunt (93%) of the damage caused on the ten largest storm dates, with Nebraska absorbing \$399.3 million of loss, South Dakota \$30.2 million, Iowa \$29.7 million, Minnesota \$23.4, and North Dakota \$22.0 million.

Crop-Hail loss ratios by state are shown in Figure 15. Colors identify states with similar loss ratios, while shading is used to identify states with similar premium volume. Crop-Hail insurance was purchased in 42 states in 2022. Of these, eight states had loss ratios greater than 1.00 and are shown in shades from yellow to red on the map. Arizona had the highest loss ratio at 1.83, followed closely by Montana with 1.59.

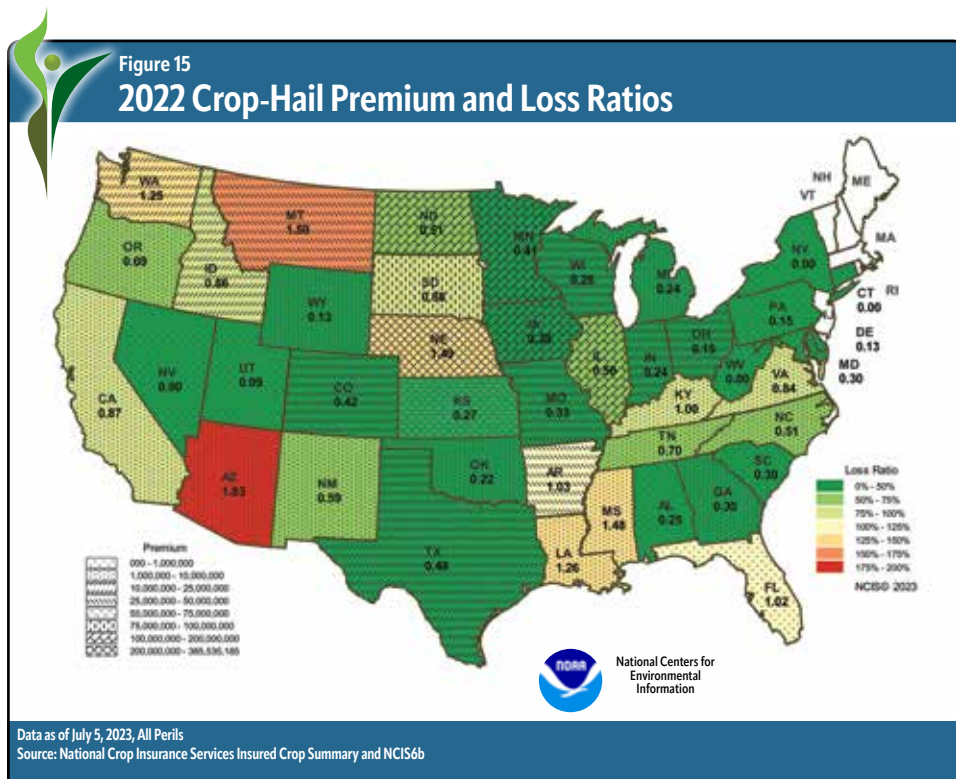
The top five states by premium volume—Nebraska, Iowa, Minnesota, Illinois, and North Dakota—experienced loss ratios of 1.49, 0.38, 0.41, 0.56, and 0.51, respectively. Overall, 23 of the 42 states with premium had loss ratios of 0.50 or less, shown in dark green on the map. Six states, shown in medium green, had loss ratios between 0.50 and 0.75, and five states, shown in light green, had loss ratios falling between 0.75 and 1.00.

[Information sources for this section include: NCIS' Insured Crop Summary and claim files.]

Canadian Crop-Hail Experience

This section of the report was prepared by the Canadian Crop-Hail Association. It can be found on their website: www.CropInsuranceInCanada.org.

The crop hail industry set yet another record with nearly \$10 billion in crop hail coverage, a 20 percent increase over last year (Table 8). Producers who waited to purchase hail coverage late in 2022 likely had a problem finding it due



Data as of July 5, 2023, All Perils
Source: National Crop Insurance Services Insured Crop Summary and NCIS6b

to the unanticipated demand. With continued strong crop pricing, combined with increasing input costs, rising fuel costs and record inflation, producers increased record crop hail coverages to ensure adequate coverage was placed on their crops.

Claim activity was at or slightly below the five-year average. Producer premiums totaled \$265 million, which was slightly above the five-year average. This resulted in an industry loss ratio of 71 percent, down from last year but still a significant impact on participating companies.

Prairie farmers faced mixed conditions at the beginning of the season

Alberta seeding and conditions were at or near normal despite the south being persistently dry through the winter. Timely rains helped progress crops.

Saskatchewan had an early start in the south and west portions of the province with drought like conditions still a concern along the west corridor. The dry conditions provided some impact on crop production. The east side of the province battled a cool damp spring hampering and delaying early seeding progress. A dry fall season helped to ensure that all crops were harvested. Overall crop reports indicate an average to above average production year for most producers.

After a record dry 2021, Manitoba had a very wet start to the 2022 growing season. Saturated soils delayed seeding by up to four weeks in parts of the province. A warm and moderate summer allowed most crops to catch up to near normal development. Harvest rain caused some delays and extending harvest beyond the average.

Storm frequency was below average in 2022. The number of days producing active weather was below average for most provinces. With the record coverage, the cost per claim quickly built like the clouds that cause the hail. What appears to have been an average season for storms and claims endured record high claim payments.

Manitoba's average claim was 20 percent higher than the 5-year average. Saskatchewan's average claim was 45 percent higher and Alberta was 41 percent higher.

2022 received fewer than average storm days throughout the summer, but the cost per claim made up for the decrease in storm days. June was the only month that provided more storm day activity than the average across most of the prairies. With June more active than normal, the year overall ended up with about 20 percent less active days from the five-year average.

The hardest hit was Alberta with an industry loss ratio of 98 percent compared to 2021's 97 percent. Saskatchewan followed with a 68 percent loss ratio, compared to 133 percent in 2021. Manitoba reported a 43 percent loss ratio compared to 21 percent in 2021.



Table 8

Canadian Crop-Hail Results, All Perils

Crop Year	Premium Mil. \$	Losses Mil. \$	Number of Claims Mil. \$	Loss Ratio ¹
2013	344	172	13,321	0.50
2014	316	249	13,372	0.79
2015	274	167	13,222	0.61
2016	302	269	20,325	0.89
2017	286	97	8,633	0.34
2018	270	171	11,709	0.63
2019	264	247	16,367	0.94
2020	301	193	12,137	0.64
2021	310	323	12,092	1.04
2022	379	275	12,433	0.73

¹ Loss ratios do not reflect loss adjustment costs
Data as of December 12, 2022
Source: Canadian Hail Association

The Canadian prairie storm season runs June through October. This year July, August, and September saw reduced storm activity. Though claim day activity for the year saw a decrease, the five-year average for claim frequency, or number of claims to policy, saw an increase of 28 percent —meaning more claims were filed with limited storms.

Alberta crop hail results continue to be clouded with storm activity

Alberta's storm activity resulted in heavier-than-average loss expense for the industry. The claim-to-policy ratio was 18 percent above the five-year average. Average cost per claim saw an increase of more than 41 percent of the five-year average. More than \$94 million was paid out to Alberta producers in hail claims.

Total sums insured saw 14 percent increase from 2021, with average rates charged reporting a slight increase likely due to industry results.

Saskatchewan records average hail loss year

2022 was a below average loss year for Saskatchewan based on cost of losses to sums insured. However, the loss results show a different story with an average paid loss ratio of 68 percent. The claim to policy ratio was 36 percent higher than average, and average claim paid 45 percent higher than average, resulting in \$143 million being paid to producers.

Total sums insured saw a 26 percent increase year-over-year, likely due to the increase crop prices and cost related to inputs.

The industry average rate charged appears to have reached its lowest historic point last year. A small increase was realized in the 2022 year.

Manitoba records positive results despite the late start to the season

Seeding was later than normal due a very wet spring. Saturated soils delayed seeding by up to 4 weeks in areas. A warm moderate summer followed in July, allowing crops to nearly catch up to normal development. A later harvest with a few rain delays led to an extended harvest.

Manitoba's hail season saw below average hail activity. Like the other provinces however average cost per claim was higher than the five-year average. The combination of lighter activity and increased cost per claim provided a higher-than-average loss ratio at 43 percent, resulting in \$31 million being paid to producers.

Manitoba's most expensive storm occurred in the southwest corner on Aug. 23.

Total sums insured saw an increase of over 25 percent from 2021 with average rates mostly remaining flat.

Conclusion

In conclusion, the program and its future continue to be poised as the number one risk management program looked to by America's farmers and ranchers in time of need, and a risk management program envied around the world. As the farm sector began to focus on the 2023 Farm Bill, numerous Congressional hearings, both in DC and the field, contained the familiar refrain that crop insurance was the number one priority among farmers and ranchers and that it be retained, fully funded, and continually improved where needed.

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