Risk Management Agency

Climate Adaptation Plan

June 2022

About RMA

The United States Department of Agriculture's (USDA) Risk Management Agency (RMA) serves America's agricultural producers through effective, market-based risk management tools to strengthen the economic stability of agricultural producers and rural communities. RMA is committed to increasing the availability and effectiveness of Federal crop insurance as a risk management tool. RMA manages the Federal Crop Insurance Corporation (FCIC) to provide innovative crop insurance products to America's farmers and ranchers. Approved Insurance Providers (AIP) sell and service Federal crop insurance policies in every state and in Puerto Rico through a public-private partnership with RMA. RMA reinsures the AIPs who share the risks associated with catastrophic losses due to major weather events.

RMA's vision is to secure the future of agriculture by providing world class risk management tools to rural America.

History

As climate impacts the nation's weather, there will be greater needs for agricultural risk management. Over the last 80 years, the Federal government's involvement has evolved into one of the largest programs within the USDA to serve these needs.

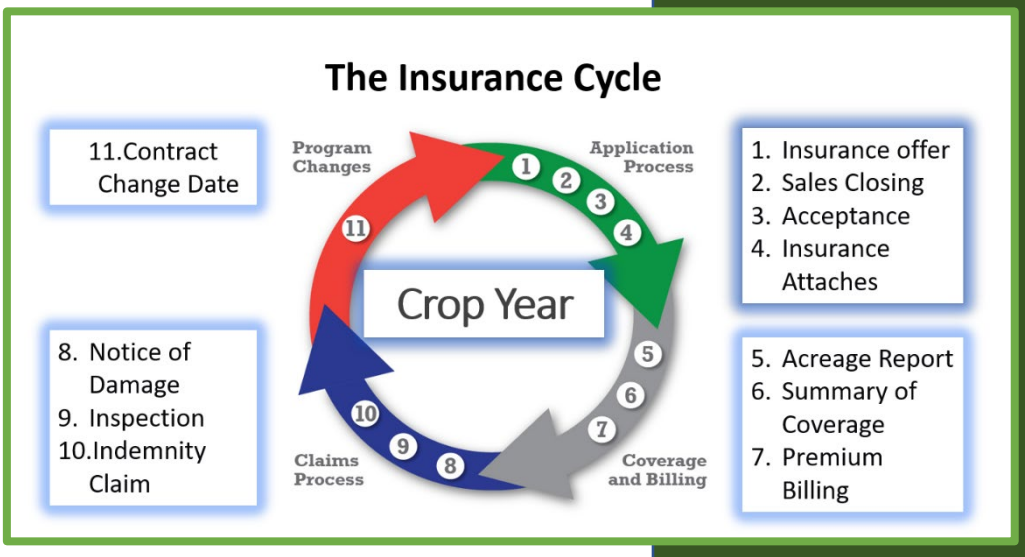
Non-government backed crop insurance has developed in several forms over the years. However, a consistent problem arose where large disaster events like droughts caused extreme losses to occur across the risk pool, thus private insurers were unable to carry the capital to weather such events. Congress first authorized Federal crop insurance in the 1930s along with other initiatives to help agriculture recover from the combined effects of the Great Depression and the Dust Bowl. The FCIC was created in 1938 by the Federal Crop Insurance Act (FCIA or Act) to carry out the program. Initially, the program was started as an experiment, and crop insurance activities were mostly limited to major crops in the main producing areas. Crop insurance remained an experiment until passage of the Federal Crop Insurance Act of 1980. The 1980 Act expanded the crop insurance program to many more crops and regions of the country. It encouraged expansion to replace the free disaster coverage offered under Farm Bills of the 1960s and 1970s. To encourage participation in the expanded crop insurance program, the 1980 Act authorized a subsidy to offset premium costs, which has been expanded over the last four decades. RMA was created in 1996 to administer FCIC programs and other non-insurance-related risk management and education programs that help support U.S. agriculture.

By 1998, more than two-thirds of U.S. field crops were insured under the program and reaching nearly 90% of those crops insured today. In 2000, Congress enacted legislation that expanded the role of the private sector

allowing entities to participate in conducting research and development of new insurance products and features. With the expansion of the contracting and partnering authority, RMA can offer contracts or create partnerships for research and development of new and innovative insurance products. Private entities may also submit unsolicited proposals for insurance products to the FCIC Board of Directors (Board) for approval. If approved by the Board, these unsolicited insurance products could receive reimbursement for research, development, and operating costs, in addition to any approved premium subsidies and reinsurance. This provides an avenue for the private sector to introduce innovative crop insurance products targeting grower needs and has been critical to expanding insurance offerings to new crops, growing practices, and risks faced in modern agriculture.

Crop Insurance 101

A crop insurance contract is a commitment between insured farmers and their insurance providers. Under the contract, the insured farmer agrees to insure all the eligible acreage of a crop planted in a particular county. This choice is made county by county and crop by crop. The insurance provider agrees to indemnify the insured farmer against losses (such as lower than expected yield or price, a low-quality crop, or the inability to plant a crop) that occur during the crop year. Losses generally must be due to unavoidable natural perils beyond the farmer's control. Availability varies by crop and location and there are many different types of insurance, each with its own unique features, requirements, inclusions, and exclusions. Producers work with a licensed crop insurance agent to find the right coverage for them. Most policies follow an annual cycle from sales/renewal to an acreage report to a claim/production report to contract changes for the next year (pictured).



Climate Adaptation Introduction

While weather events are becoming more common and more severe, it translates to aggregate production changes in unpredictable ways. however, that is exactly what insurance is for, cover those that were unlucky to be hit by adverse weather, while those that have a good year pay into the system with their premium dollars. As long as the risk pool includes both groups consistently, the insurance program will stay viable.

Technology is also playing a major role in mitigating production losses due to climate change. Modern genetics, changing growing regions, precision agriculture, farm information management systems, and university extension research all have been highly successful in maintaining production and profitability in the face of volatile weather. Farmers, long lauded for their ability to innovate and adapt, have continued that success. It is critical to understand that, over time, overall production risk has gone down. Although that overall risk may have declined, some individual regions or crops have not. The asymmetric impacts of climate change should not be discounted and are critical to program adaptation. It is also unclear on the sustainability of the overall trend in the face of potential exponential or tipping-point style climate effects. Using current and well-researched science[1] is critical in that endeavor.

Risks associated with climate changes depend on the rate and severity of the changes and the ability of producers to adapt to changes.

- Fourth National Climate Assessment

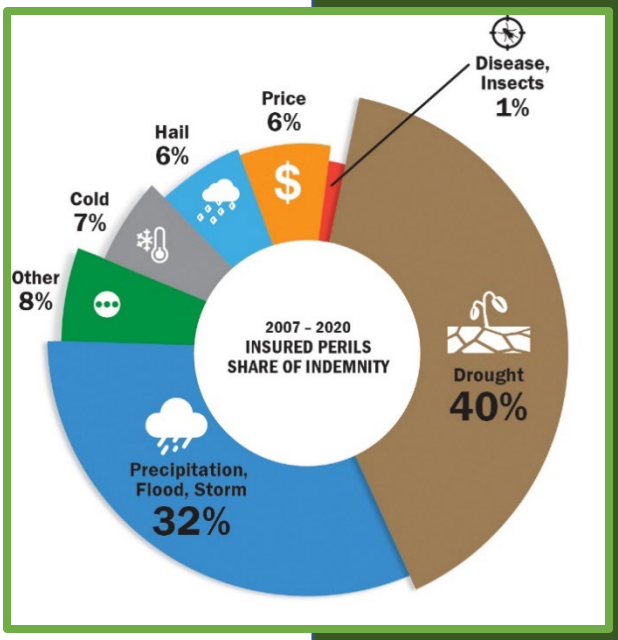
RMA's fundamental strategy in adapting to climate change is to adapt the program along with the innovation of America's farmers and ranchers. Predicting how successful future technology will be in adapting to climate change, or the full extent in production risk increases due to such changes are difficult to quantify. Therefore, ensuring the program is built to naturally adapt to any outcome is the most likely way to succeed in the face of uncertainty.

[1] Unless otherwise stated, climate models come from the Fourth National Climate Assessment (FNCA), Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.) (2018)

Climate Impacts and Vulnerabilities

A large and growing literature has documented the likely impacts of climate change and warming temperatures on agricultural crops. Warmer temperatures are often associated with large, negative effects on crop yields at regional and global scales through both direct (e.g., heat stress) and indirect (e.g., soil moisture deficit) mechanisms. In general, this literature provides evidence that climate change has strong negative impacts on expected mean yields.

At the regional level, climate impacts are likely to cause production shocks to be correlated. At the producer level, the choice of input depends on the expectation of future revenue. When crop yields become more variable producers may use fewer inputs. Both effects will increase the probability of crop shortfalls and increase premium rates. This will increase the producer share of insurance costs and governmental subsidy.



Source: USDA RMA

Drought

Drought is the most common cause of loss (see graph, right) for the current Federal crop insurance program, accounting for nearly half of all indemnities. Moreover, most of the largest program 'loss' years are related to major U.S. drought events. 2012, which saw a widespread drought across the country remains the largest aggregate program payout to date. This effect impacts insurance the most since drought impacts large geographic footprints, where other perils are confined to smaller areas or mitigated by other factors (e.g., higher elevation land may lessen flooding risks).

The literature strongly suggests that climate change is expected to reduce mean yields and increase yield variability (risk). A decrease in mean yields holding yield variance constant implies greater likelihood of a yield shortfall and therefore indemnity payments. The increased yield risk will increase premium rates and the costs to producers and the government. However, producer adaptation will mitigate some of these risks. For example, one low-cost adaptation to climate change induced yield risk and loss is to lengthen the growing season. On average, across eight states, research has demonstrated[2] moving the planting date back by

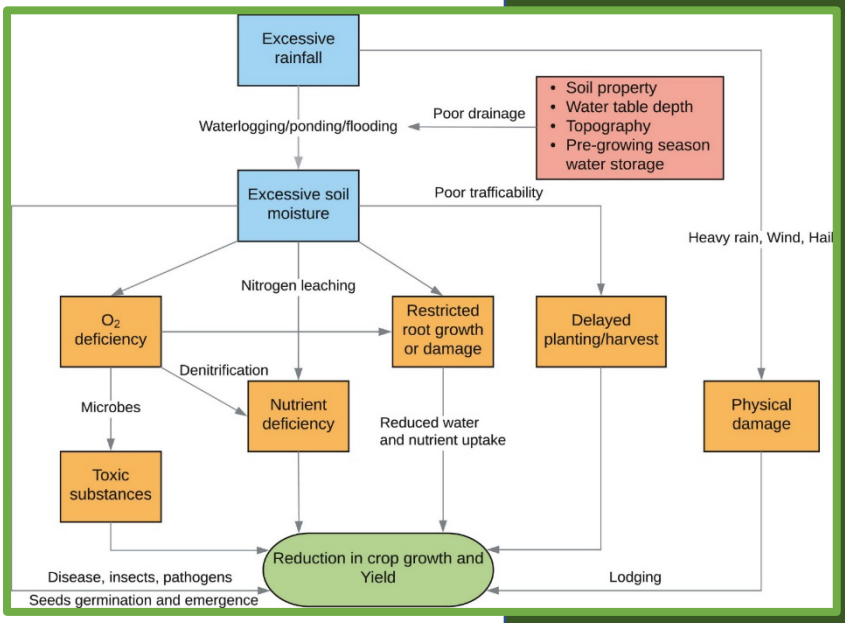
[2] Ortiz-Bobea (2013)

approximately two-weeks would reduce about half of the impact on expected yields. These types of adaptations may require insurance rules to evolve with them to prevent other unintended consequences.

Flooding and Excess Moisture

Crop insurance losses to flooding and excess moisture are the second most common cause of loss. The 1993 flood is still one of the largest loss events in program history relative to program size at the time. In 2019, widespread flooding across the Heartland prevented over 20 million acres of crops from being planted, triggering program losses and an additional public policy response of supplemental disaster payments on top of crop insurance.

The effects of excessive rainfall on crop yields are demonstrated by Rosenzweig et al. (2002), shown in the accompanying figure. Excess rainfall can directly damage crops due to flooding and physical damage or indirectly through anoxic conditions, increased risk of plant disease and insect infestation, or delayed planting or harvesting due to inability to operate machinery.



Source: Rosenzweig et al. (2002)

According to Rosenzweig (2002) the climate change caused increase in precipitation probability of crop damaging events (see figure, right). They expect that the probability of events causing damage comparable to, or greater than, the 1993 U.S. Midwest floods will double by 2030 and quadruple by 2090. Shirzaei (2021) found in the Midwest an increasing trend in both frequency and magnitude of floods and associated crop losses.

Tropical Cyclones

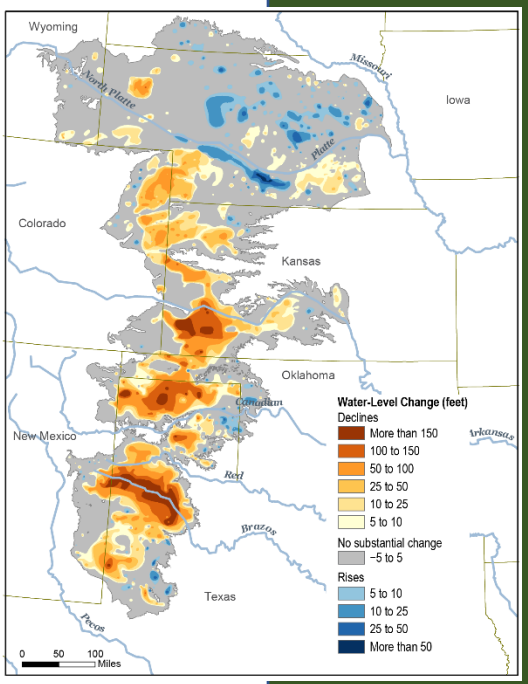
Tropical cyclones, the catch-all term for hurricanes, tropical storms, and tropical depressions, pose some risk to agricultural production. However, they do present several unique aspects that complicate their impacts. First, they often produce significant rain, but depending on the speed of the storm, the rainfall amount can often be a positive along the storm tract. Localized flooding is likely to produce some crop losses, but most areas in

which tropical cyclones are common are highly adapted to major rainfall. Second, windspeed is often the more troublesome risk. Most crops are susceptible to high winds, whether by collapsing, losing buds or fruit, or losing limbs. However, RMA research suggests most tropical depressions and even tropical storms do not produce high enough sustained winds to cause widespread damage. Thus, RMA's focus in recent years has been on hurricanes, especially through the introduction of a new insurance option, Hurricane Insurance Protection – Wind Index (HIP-WI).

HIP-WI is a product the covers a portion of an underlying crop insurance policy deductible when the policyholder's county, or adjacent county, is hit by a hurricane. The product is both simple, and fast paying, leading to high sales volume among eligible producers. Although the product itself is a major achievement for RMA, more relevantly for this discussion, it shows producers have major risk management needs for hurricane risk.

Water

"Water systems face considerable risk even without anticipated future climate change," according to the FNCA. Growing population and declining infrastructure already threaten water security. Add in disruption due to changes in climate and its clear water availability could cause concern. Moreover, it is likely public policy will prioritize water availability to human populations over agriculture, especially water-hungry luxury crops such as some tree nuts, in both allocation and infrastructure funding.



Source: Adapted from McGuire 2017

According to NASS[3], about a quarter of U.S. farmland (55.9 million acres in 2018) is irrigated. Additionally, this is disproportionally true for California, which represents about 15% of irrigated acreage, but nearly 30% of all agricultural water applied. Another example of a significant area of concern is the Ogallala Aquifer (pictured, right) which supplies water for about a quarter of irrigated acreage in the Great Plains. Aquifers refill from the natural water cycle, thus changes in rainfall could have dramatic effects on the

3 https://www.nass.usda.gov/Publications/Highlights/2019/2017Census_Irrigation_and_WaterManagement.pdf

ability to use that water. Ogallala has already seen significant decline in total storage since the mid-20th century[4].

RMA data indicate that irrigated acreage generally tends to yield between 20% and 60% more than non-irrigated acreage depending on crop and location, thus loss of water supply could cause major production declines in the future. Many crops are exclusively grown under irrigated practices such as rice, many citrus crops, and many of the tree nuts, which could mean a direct loss of acreage in such circumstances.

Public policy around water quality could also affect agricultural production systems as regulations could limit the methods and use of fertilizer and other chemicals. Even if not directly tied to climate change, it seems plausible that carbon intensive practices could presumably be targeted, and producers will need to adapt. It is unclear on what the possible production effects such changes could have but RMA should monitor and consider such potential risk factors.

Emerging Risks

Several other risks are worth monitoring, but currently are not major drivers of crop insurance losses and production risk.

In general, it is expected that warming will increase the distribution of warm season weeds to areas that have not experienced such weeds. Agronomic weeds increase competition with crops for light, nutrients, and water. The increase in weed pressure and decline in yields will increase premium rates and decrease producer revenue.

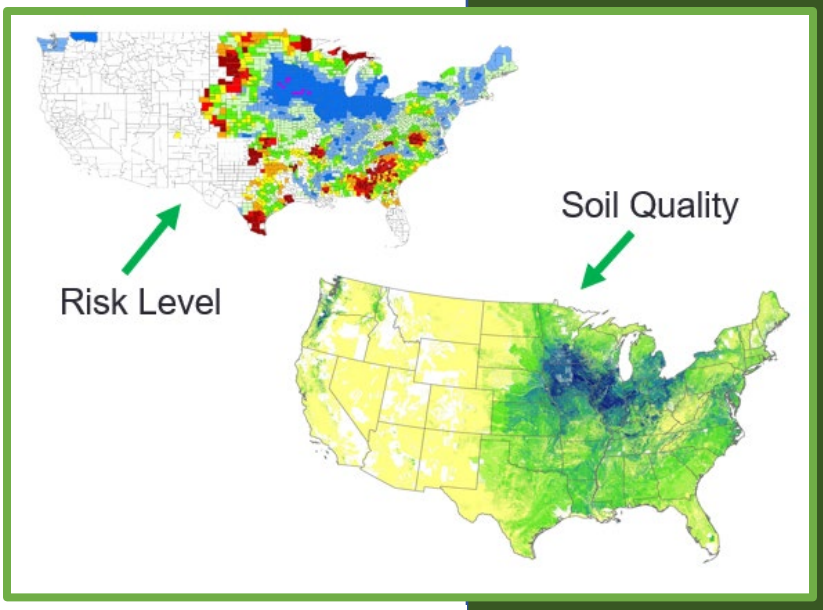
Increasing air temperature is also beneficial to insect pests. With more pests shifting northward, management costs are expected to increase due to more frequent application of pesticides. The decrease in expected net revenue will affect producers' choice in crops and insurance choices.

Plant diseases are likely to increase yield losses and quality degradations. Increased temperature, drought, changing rainfall patterns and intensity, and change in cropping practices are likely to increase pathogen growth and changes in the geographic growth of pathogens.

Additional to all three of these risks is the potential for mitigation to be increased use of chemical treatments. Although such chemicals may be effective at solving one issue, the increase of chemical usage could cause other unknown effects.

[4] McGuire, V.L. (2017)

Soil quality, a defining characteristic to successful farming (see graphic), is additionally at risk to erosion. The FNCA notes, "increasing soil erosion rates have the potential to not only reduce agricultural productivity but also accelerate climate change effects through the loss of large stocks of carbon and nutrients stored in soil.



Source: USDA RMA & NRCS

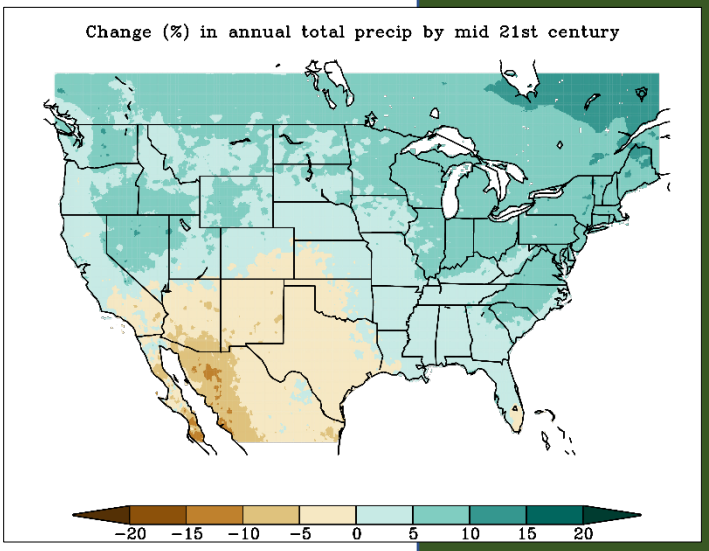
Warmer temperatures lead to reduced yields and reduced biomass increasing the likelihood of soil erosion. Increased CO_2 can enhance stomatal resistance, suppress transpiration, and lead to a moister soil, conducive to greater runoff-induced erosion[5&6]. Simulation[7] of climate change and management practice in the Midwest found that runoff increase by 10 to 310 percent and soil loss increased by 33 to 274 percent for 2040-2059 relative to 1990-1999.

These risks can be heightened by poor soil conservation. Although most USDA soil conservation is spearheaded by the Natural Resources Conservation Service (NRCS), RMA partnerships with NRCS programs are likely to increase over time. Past actions with conservation compliance (requirements for highly erodible land and wetland conversions to receive certain Federal benefits including crop insurance premium subsidies) are part of a larger mitigation strategy, as are promotion of conservation tillage, cover crops, and grassed waterways. Regardless of, or in absence of, that mitigation, productivity losses are still ever present and may be one of the more general effects encountered due to climate change. Unlike droughts, floods, and hurricanes, soil quality degradation would have persistent and long-term effects. RMA will need to consider such a risk structure, as that is more difficult to insure in many ways than acute weather events.

[5] Schulze (2000)
[6] Pruski and Nearing (2002)
[7] O'Neil et al. (2005)

Asymmetric Impacts and Equity

The effects of climate change on crop production vary by region, some of which have already been felt by producers around the country. The maps on this page and the next highlight models showing how impacts are projected to vary across the country. Importantly, specialty crops are generally more sensitive to climatic stressors such as increasingly variable weather and require more comprehensive management compared to traditional row crops. Perennials such as grapevines and nut trees represent a major investment and, unlike annual field crops, cannot be abandoned or fallowed in the event of a severe drought, storm, or heat wave, in addition to commonly facing higher replacement and maintenance costs regardless. Further, many areas most at risk for major impacts from climate change are where specialty crops are the dominant agricultural activity. Much of the climate change impacts are increasing challenges for underserved producers in these regions. Such producers often lack access to specialized training or knowledge to explicitly address these challenges in their farm planning. Often, U.S. agriculture focuses on the vast acreage of grain crops across the Corn Belt, or the picturesque fields of cotton in bloom in the South. However, below is highlighted other critical agricultural regions that will be impacted by climate change and may, in fact, have a greater economic significance if not properly considered.



Source: Fourth National Climate Assessment - Higher Emissions simulated change for 2036–2065, compared to 1976–2005

West

The western region, stretching from Oregon to Idaho and Washington to California, is home to incredible crop diversity. The highest value commodity groups in the region include fruit, tree nuts, and berries ($17.9 B); and vegetables, melons, and potatoes ($7.2 B). California is the number one U.S. producer of specialty crops and accounts for more than half of specialty crop production nationwide, with a total of over 400 different crops recorded.

Drought

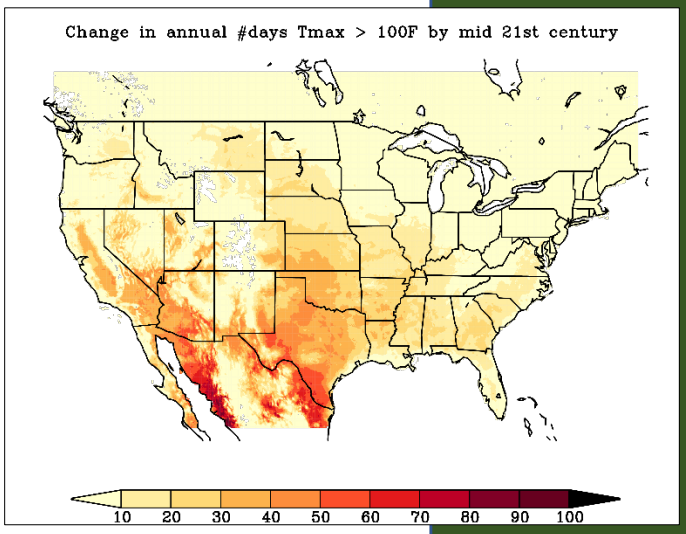
Southwestern agriculture is defined by water scarcity. More than 92% of the region's cropland is irrigated. The region produces many high-value perennial crops, including apples, blueberries, cherries, and wine grapes that rely heavily on irrigation from surface and groundwater sources

during the dry season. Water is a precious commodity across the west and is at risk of declining due to climate change. Drought affects the market value of fruits and vegetables because sales depend on good visual appearance. Perennial plants live for decades and are thus at a disadvantage in terms of adapting to climate change because of the time and costs required to re-plant and produce strong yields.

About 90 percent of crops harvested in California are grown on farms that are entirely irrigated, so a sustained decrease in the amount of water available for irrigation would force farmers to either reduce the acreage under cultivation or shift away from the most water-intensive crops.

Rising Temperatures

Climate change projections for the southwest suggest an increase in extreme heat. Hotter climate conditions may reach temperature thresholds for warm-season vegetable crops, thereby limiting growth and viability. More frequent heat waves accelerate crop ripening and maturity and reduce yields of tree fruit and wine grapes. These impacts are projected to continue and intensify, possibly displacing existing growers and affecting farming communities.



Source: Fourth National Climate Assessment - Higher Emissions simulated change for 2036–2065, compared to 1976–2005

Rising temperatures could transform California's agriculture. Fruit trees and grape vines need a certain number of chilling hours in the winter before they can flower. Projections show that chilling requirements for fruit and nut trees in California will not be met by the middle to the end of this century. In fact, the area capable of consistently producing grapes for the highest-quality wines is likely to shrink by more than 50 percent during the next 75 years. Likewise, extreme heat has led to damaged blueberries and apples in Washington. Warmer temperatures may also prevent stonefruit (such as peaches and cherries) from experiencing the chill-hours needed for proper flowering.

Wildfires

Increased heat, drought, and insect outbreaks, all caused by or linked to climate change, have increased wildfires in the Southwest. Fire models project more wildfire and increased risks to communities across extensive areas.

On average, 4 percent of the land in California has burned per decade since 1984. The combination of more fires and drier conditions may expand deserts and otherwise change parts of California's landscape. Wildfire smoke has damaged California grown grapes and affected the state's $40 billion wine industry.

Northeast

Drought and Rising Temperatures

The northeast region ranks high nationally for production of many high-value fruit, vegetable, and specialty crops, such as apples, grapes, fresh market sweet corn, snap beans, cabbage, mushrooms, and ornamental nursery plants. Increased drought frequency in the Northeast, together with warmer growing season temperatures will result in perennial specialty crops having reduced yield and quality. Midwinter warming can lead to early bloom of some perennial plants, resulting in frost damage when cold winter temperatures return. Yields will be negatively affected if the chilling requirement is not completely satisfied because flower emergence and viability will be low.

An added challenge is the high prevalence of direct marketing sales channels in the area. This increases the financial pressure on producers as weather events may trigger losses on many non-production related value-add activities that would normally be absorbed by other parts of the supply chain for most commodities elsewhere.

Southeast

Hurricanes

Hurricanes and tropical storms have become more intense during the past 20 years. Such events are important drivers of flooding events in the Southeast. The frequency and intensity of hurricanes is expected to increase under projected climate change scenarios, stressing agricultural crops, triggering replacement costs for downed trees, and decreasing yields.

This particularly impacts Florida, which is the second highest producing state of annual specialty crops, ranging from citrus groves and nurseries in Central and South Florida, to vegetables in various regions around the state. In 2019, Florida ranked first in the U.S. in the value of production for bell peppers for fresh market, grapefruit, oranges, fresh market tomatoes, and watermelons.

Drought and Rising Temperatures

Although the Southeast often receives excessive precipitation, drought conditions can develop rapidly across the region from lack of tropical cyclone activity and warm season rainfall variability. La Niña is associated

with negative precipitation anomalies and increased risk of drought across the region. Yields of citrus fruits could decrease with warmer temperatures in the southernmost part of Florida because of a lack of a sufficient dormant period.

Environmental Justice

Although not all encompassing, the above highlights how communities will be disproportionally impacted by the various climate changes that will occur over time. Producers in areas that face greater, or importantly, more rapid change are likely to face greater economic impacts that may lead to maladaptation. Communities that are dependent on monoculture agriculture are also at risk. Commonly, the Midwest corn and soybean growing areas are referred to in that context, but from citrus production in Florida to Native American communities in California that produce acorns for food, there are countless other examples. Further, tribal areas may be especially vulnerable to drought as most tribal agriculture is livestock/pasture based. Assessing insurance needs for specialty crops will be critical in promoting equity within the program.

Additionally, in the event of climatic shifts that impact the productivity or location of agriculture, the low-skilled and seasonal workers would be the first to lose their jobs. Employment would be affected by two different ways. First, increases in the frequency and the intensity of extreme weather events will yield risks and revenue losses that could lead to layoffs. Second, changing weather and precipitation patterns could require investments in adaptation measures, changing crops, and increase in inputs[8]. Climate change is also likely to have a disparate impact on beginning farms and those with little or no capital reserves. Ideally, crop insurance will be able to mitigate revenue impacts and allow producers time to invest in climate adaption measures.

Departmental Alignment

These vulnerabilities are consistent with the overarching threats USDA has identified in its Climate Adaption Plan. Each weather event directly correlates to the Department's first risk of "decreased agricultural productivity." Many of the same concerns and responses mentioned in the plan are repeated here in more detail. The USDA's third identified vulnerability, "disproportionate impacts on vulnerable communities," also aligns with RMA's concern with asymmetric impacts of climate. RMA's work with specialty crops will have the most relevance for crop insurance's contribution to climate adaption for those communities. Finally, "shocks

[8] Shonkoff et al. (2011)

due to extreme climate events," is relevant in that many insurance products are directly tied to providing support after such events. In a way, the crop insurance program exists for these impacts. So as those shocks become more frequent, crop insurance will become more relevant. Moreover, the same shocks could impact RMA's internal operations, thus the actions to promote continuity of operations become paramount to properly controlling that risk.

Action

Create products that promote Climate-Smart Ag

Action A - Implement Incentives to Encourage Cover Crop Planting

Cover crops have the potential to provide multiple benefits in a cropping system. They can prevent soil and wind erosion, improve soil's physical and biological properties, supply nutrients, suppress weeds, improve the availability of soil water, and break pest cycles along with various other benefits. Although those benefits extend well beyond climate adaptation, the soil conservation value is critical to maintaining strong productive capacity, and thus viable crop insurance products.

Beginning in 2017, RMA entered into an agreement with the State of Iowa to incentivize cover crops by applying up to $5 per acre of additional premium subsidy on a policyholder's insured crop that followed a cover crop. The program enrolled approximately 170,000 acres the first year and was a major success in promoting an agronomic practice with climate and environmental benefits. The funding is provided by the state, as is the enrollment process and eligibility information. The program was also adopted by the State of Illinois the next year, followed the year after by the State of Indiana for a targeted watershed. Building upon that, in response to the pandemic, RMA launched the Pandemic Cover Crop Program (PCCP) that was a nationwide implementation of the cover crop premium support based on reported acres to FSA.

These programs have achieved several key advantages. First, they have changed widespread perceptions that cover crops could cause insurance claims to be denied. By officially endorsing the practices, producers understand that cover crops can be a part of a producer's overall agronomic plan. Second, the direct financial support helps incentivize more producers to adopt cover crops and reap their benefit. With these already-issued program regulations and existing design, should resources again become available, RMA will prioritize this program so more producers could adopt cover crops and reap the climate benefits, while maintaining a strong linkage with Federal crop insurance and sound risk management practices.

Action B - Implement Incentives to Encourage Smart Water Use

As discussed earlier, water availability is already a major challenge in some regions, and those stresses are likely to continue as the climate changes. Being proactive and encouraging the use of water-saving practices could

lessen program risk due to lack of water availability. For example, systems like drip or subsurface irrigation reduces water usage considerably by targeting the irrigation more precisely and limiting (or eliminating) loss to evaporation. Water recycling systems lessen the need for water simply by not wasting water the producer already has available. Certain crops have water efficient practices, such as intermittent flood irrigation for rice. There are many other examples as well.

Like cover crops, should resources and data become available, RMA will prioritize such a program within existing authorities to help incentivize the practices and strengthen the link between such practices and crop insurance as a full-featured risk management strategy. Smart water usage also has the added effect of potentially reducing drought risks, thus the program could be used in conjunction with premium rate adjustments.

Action C - Implement Incentives to Encourage Other Climate Smart Practices

Of course, the first two proposed actions with cover crops and smart water use are the most well understood today. However, it stands to reason that new research, technology, or public policy outcome will provide other avenues to allow crop insurance to promote such a practice within the existing program. RMA will continue to explore other options to implement incentives for climate smart agriculture, especially where there is known risk reducing effects.

Reducing premium costs for these causes is advantageous because it does not conflict with legal requirements for the program to be actuarially sound. Rates will still reflect the proper risk; policyholders will simply have cheaper insurance if they choose to engage in the targeted practice. Another option is bonus payments for losses, which does have the advantage of being popular with producers because they would receive money (as opposed to smaller premium bills). That approach does have drawbacks. The first is simple accounting, as RMA would need to separate losses associated with base insurance and whatever program incentive is being designed. This administrative burden provides no value to taxpayers, the government, or the policyholder and creates budget uncertainty in the face of variable weather. Second, an additional loss payment would incur increased administrative costs, may have tax implications, and potentially

lead to debt issues should claims ever be revised. Last, permanent programs in this area could incentivize producers to incur greater losses and make insurance more expensive in the long run.

Another potential incentive is reducing paperwork. Policyholders typically like the least amount of paperwork required. Perhaps a future technology associated with a climate-smart practice is so automatic, that once a producer proves they engage in the technology, no other records are required. This is, of course, speculative; however, it is a common request from stakeholders and RMA should be willing to adapt if such a development occurs.

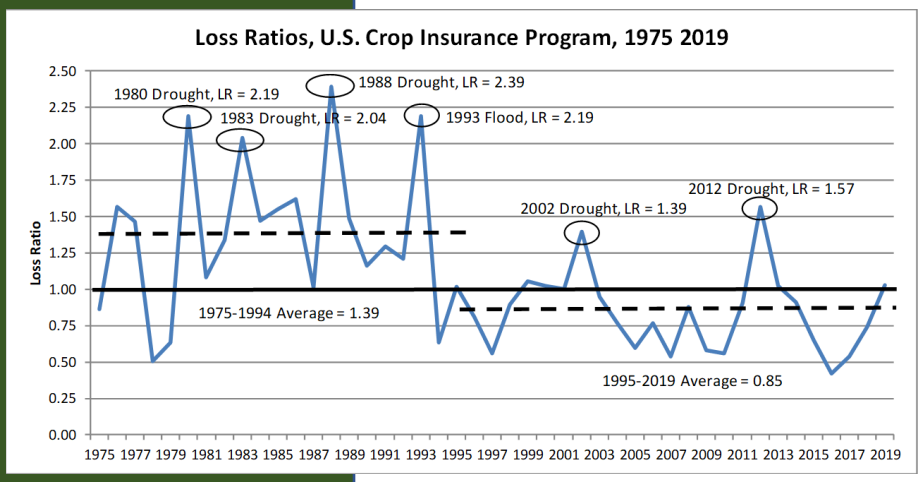
Another avenue for this support is the Agricultural Management Assistance (AMA) program, which helps agricultural producers manage financial risk through diversification, marketing, or natural resource conservation practices. AMA is available in 16 states where participation in crop insurance is historically low (primarily the Northeast). RMA has partnered with NRCS since 2017 to provide funding for financial assistance to producers who implement or improve select conservation practices such as watershed management or irrigation structures, soil erosion control, integrated pest management, and organic farming. RMA is currently apportioned $4M annually for this program.

This action has no immediate implementation plan, outside of the existing AMA support, and is rather a catch-all for unknown developments. However, given the power of additional insurance subsidy on behavior, it should be called out as a valuable public policy tool available to RMA and the USDA to promote climate-smart practices as they develop.

Evaluate and monitor climate risks and update program parameters

Action D – Continue Updating Program Premium Rates to Reflect Changes in Risk Due to Climate Change

RMA continuously reviews and revises its premium rating methodology. Changes include using a shorter historical timeframe to measure risk, and the introduction of a process that explicitly considers weather variables in calculating premium rates. This makes premium rates more responsive to any changes in agronomic risks, whether due to climate change or other factors. Actuarial reviews consist of evaluating and updating the factors used to calculate premium rates, generally based on historical experience. Several review categories exist: Actual Production History (APH), dollar



Source: RMA

plan, pilot program, and specialty plans of insurance. Full actuarial reviews for APH-based programs are generally conducted on a three-year cycle by RMA staff. These reviews have maintained the program in an actuarially sound manner effectively, as seen on the accompanying chart showing loss ratios (Indemnity / Premium) over time.

RMA uses well established methods and a past research study on rating methodology[9] to set premium rates, that is the percent of liability representing the expected loss plus a reasonable reserve. The study defined a weather index methodology and a methodology to adjust insurance experience prior to 1995 to, in a broad manner, account for changes in underwriting and policy improvements as well as the mix in business. The study based this adjustment on a comparison between the loss performance of the program in the pre- and post-1995 periods, accounting for differences in weather. Given the use of the weather index and pre-1995 adjustment, the study also recommended the adoption of a rolling 20-year timeframe for calculating the variable portion of the rate (the county unloaded rate). Despite shortening the time-period used to calculate the county unloaded rate, RMA maintains the entire history back to 1975 for calculating the catastrophic load or fixed portion of the rate. The indemnities, more than the 90th percentile loss cost ratio for each county, form the basis for the catastrophic load. In general, RMA pools the excess indemnities at the weather district level and assigns the resulting load to each county within the district as a fixed rate**.**

In addition to the weather district catastrophic load, the fixed rate is also comprised of the prevented planting load, replant load, and quality adjustment load. In general, RMA calculates prevented planting and replant loads as the average frequency of occurrence (prevented planting acreage or replant acreage divided by total insured acreage) multiplied by the payment rate established in the policy provisions. The quality adjustment load was introduced in 2001 following modifications to the quality adjustment procedures. Over time, this load is being phased out

[9] https://www.rma.usda.gov/en/Topics/Publications

given the proportion of years within the 20-year base rate period that reflect the adjusted procedures.

Critical in all this, the program will naturally update its measures of risk under current methods to address increases or decreases in risk for each crop insurance offer. RMA will also continue to periodically review its methodology for enhancements due to new technology, methods, or external drivers such as climate change.

Action E - Continue Updating Program Yields to Reflect Changes in Output Due to Climate Change

Like rates, program yields also undergo regular review to keep them relevant in the face of changing weather, climate, genetic, technology, and production practices. The reference yield (in combination with the producer's average yield and exponent) provides a means to classify production risk. As a producer's yield increases relative to the county, the premium rate charged decreases. Conversely, as a producer's yield decreases relative to the county, the premium rate charged increases. Generally regarded as the average yield, RMA previously updated reference yields based on transitional yields (T-yields) under the premise that this moved reference yields in a direction more consistent with the average yield of producers in the county. However, this process ignored the latency effect resulting from the full T-Yield reviews that occurred every 4 to 5 years at that time. Beginning with the 2011 crop year, RMA developed and implemented a more appropriate reference yield methodology for those commodities undergoing an actuarial review. In general, the methodology bases reference yields on the acre-weighted average of average yields reported by crop insurance participants for the most recently available crop year. In addition, RMA considers various levels of aggregation or statistical models in limited data scenarios. These reviews now occur on the same cycle as rates, that is, every 3 years, and use the most recent 10 years of yield data.

The exponent determines the amount of the rate increase or decrease warranted given the relationship between the producer's average yield and the reference yield. For determining exponents, RMA structures data hierarchically, pooling individual data within counties, then nests it within climate regions, then nests it within states. This leads to using explicit multilevel modeling methods to take advantage of the data structure. Such models are a compromise between no pooling (where the exponent is estimated separately for each geographic area) and total pooling (where a single, common exponent for all geographic areas is developed). Instead, RMA matches producer average yields and actual realized yields through

the available history to estimate the exponential relationship between the unit-level yield ratio and the loss cost ratio.

Again, these methods are regularly reviewed and conducted to naturally adapt to any agronomic change and keep crop insurance yields appropriate into the future.

Action F - Continue Updating Program Dates to Reflect Changes in Agronomic Practices to Climate Change

RMA regional offices review key dates, rates, and yield information for all crops at least once every 5 years. For example, to review planting dates, regional offices use climate data such as growing degree days available in a county, average frost and freeze dates, and key weather causes of loss by dates. They also work with university extension experts and other industry experts to make sure dates are adaptive to changing climates, new crop hybrids, and new farming practices down to the county level. In addition to the climate data and agronomic experts, they also use RMA and FSA data to identify when the crop was mostly planted, when yields start to increase or decrease, impacts to loss ratios by planting date, and causes of loss by planting date. Using this combined information gives the regional offices a well-rounded approach to see crop production, climate, and insurance performance all be considered on a consistent basis. Similar processes can be used to look at appropriate acreage reporting dates, which must be early enough to prevent moral hazards, but late enough to ensure all the crop is planted.

RMA will continue this approach, using the expertise of regional experts on staff to maintain appropriate dates in the face of temporal changes caused by climate change.

Action G - Continue Updating Program Map Areas to Reflect Changes in Risk Due to Climate Change

Most program offer data is at the county level geographically. However, crop insurance defines specific areas within counties when conditions suggest an area has significant variance in risk, yield, price, growing time, etc. from the rest of the county. The most common use of these are flood-prone areas around major waterways. These map areas, or sub-counties, need to be aggregated to ensure the risk pool is properly segregated to ensure a fair actuarial offer.

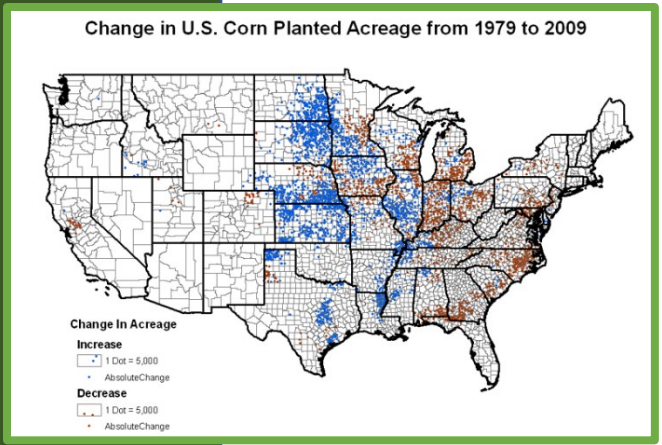
In 2022, regional offices will review all actuarial maps, including flood prone maps on a 5-year recurring cycle. Advancements in technology have

allowed regional offices to review these more quickly than was possible historically as there is a lot of new climate and insurance information available to them to be able to get a clearer picture of the different crop risks within a county in a faster amount of time. In the example of flood prone ground, regional offices identify where land is impacted by flood occurrences that create insurance experience that is different than the rest of the county. To do this, they use a combination of geospatial and insurance data, including satellite imagery, topographic maps, flood gauge data, and written agreement insurance experience to name a few. They compare the timing of these events to when they might commonly impact crop production and create an elevated risk that is not representative of the rest of the county. This allows higher risk ground to have different actuarial components that do not impact others in the rest of the county, creating a fairer insurance offer for all producers involved.

RMA will continue this approach, using the expertise of regional experts on staff to maintain appropriate map areas as climate change impacts different geographic regions in disproportionate ways. RMA will also incorporate new data, especially those indicators of climate change, where appropriate

Action H - Continue Updating Program Availability and Procedures to Reflect New Growing Areas and Agronomic Practices Due to Climate Change

Expanding and reducing the availability of insurance is also critical as climate change will change the viability for certain crops in certain areas. RMA uses its regional offices to approach this in a couple of ways. First is the use of written agreements, which are individually underwritten offers of insurance for producers that would not normally be available in the county they farm. RMA uses this demand to identify and target appropriate expansion based on insurance experience. Regional offices engage stakeholders at all levels including producers, AIPs, agents, universities, and other ag experts to identify these changes in growing areas and farming practices. In general, stakeholder engagement is central across RMA, but regional offices offer localized contacts and relationships that have proven valuable over time. The map shows a good example of how that data impacts different regions and can be used to support changing program



Source: USDA NASS

availability. When improvements are identified, they then work within RMA to make sure policy, procedure, and insurance offers are adaptable and available with these changing practices and growing areas while still maintaining sound insurance principles.

For example, this may include changes to farming practices and irrigation methods. For 2022, RMA's regional offices have implemented a regional review program of climate smart agricultural practices to determine whether these practices should be covered, or whether existing coverage should be modified or enhanced. This year's reviews include skip row cotton with extra wide skips, relay cropping, which is interplanted crops harvested separately, and cover crops. These reviews will also aid in RMA compliance efforts as up-to-date practice information will ensure resources are efficiently allocated to maintain program integrity.

Action I – Improve Production Reporting to Enhance Yield Data Quality for Research and Program Support

Currently, a producer files a production report at the beginning of the insurance year recording the previous year's crop production. This means the previous year's production data is organized and aggregated according to the optional unit structure of the current year and is used to establish an APH for the current year's policy. However, this also limits RMA's ability to match production to the actual location where it was produced since optional unit structure may differ year-to-year. RMA is planning on changing production reporting to be based on the optional unit structure in effect the year it was produced. This change would require production reports be tied to the location where it was produced as an "end" step to a crop insurance policy. By having this direct connection to the insured acreage, RMA could do more advanced analysis of the data.

This is critical to maintain quality data for the program to adapt to changes in yield at low levels. It enables specific targeting of analysis at the field level, whereas previously it was heavily limited to county aggregates. For example, it stands to reason that climate change may have disparate effects to low-lying areas (perhaps more prone to flooding) versus higher elevations (more susceptible to drought). By having data that can differentiate yield effects at that level is critical for programs and research to solve future policy needs. Not only should this help RMA programs, but Farm Service Agency (FSA) programs would also benefit from this. Currently, programs such as Agriculture Risk Coverage (ARC) and Price Loss Coverage (PLC) use county level data. However, future versions of ARC/PLC or other yet-to-be-created farm programs may find it valuable to better target sub-county areas. Advancements in precision agriculture should

also hasten the integration of this data into the program, which RMA policy should support.

This change would be implemented via updated regulations for the basic provisions of varying crop insurance policy documents. Further, IT implementation would be required. Both steps would seem straightforward.

Action J - Conduct Research on the Impact of Conservation Practices on Yield and Risk

RMA is assembling data for a joint Economic Research Service, NRCS, and RMA product to conduct internal research on yield and risk impacts from practices such as cover crops. RMA is also examining the effects of soil types and other environmental factors on the impact to yields. RMA is engaged with the University of Illinois via AGree and Meridian Institute to share detailed insurance data, in conjunction with FSA and NRCS conservation data, to analyze yield and risk impacts of conservation practices on prevented planting losses. These efforts have been aided advances by RMA's data science work to allow data to be better geolocated for analysis. This also requires setting up narrow research contracts and protecting confidential data.

For example, county level data shows a strong correlation between soil quality and risk for corn. However, more precise data is necessary to continue the research. This will be aided greatly by the proposed changes to production reporting. Moreover, finding additional outside partners to support these lines of inquiry are critical to have a full understanding of these effects. With these relationships more fully understood, insurance rates would be able to more adequately price changes in risk as a result in changes to these effects on soil.

Promote and expand products that support climate-smart ag

Action K – Support Climate Literacy Among Agents and AIPs

RMA should ensure the insurance industry maintains the foresight necessary to tackle a broad range of climate issues. This could take the form of strengthening business strategy for an insurance company, or an agent advising a client based changing weather patterns. For example, climate effects may make parts of an operation more susceptible to certain

flood risks than others. To properly prepare for this, a producer may want to maintain historical production records in a manner to separate out vulnerable areas. Although this may be more work in the near term, it could greatly expand risk management options to the producer in the future. Educating stakeholders to understand how climate may impact operations would lead to more efficient and better targeted risk management plans.

RMA and the industry have many standing committee meetings that are ideal to share this type of information. Additionally, there are large industry meetings with the AIPs to 'train the trainers' that then train agents and staff on the upcoming changes to policy and procedure. Any issues, improvements, and opportunities are often addressed very closely with the industry to make sure policy and procedure effectively address what is happening on the ground. RMA also regularly receives email questions on specific events and instances. RMA coordinates responses within its work units to make sure procedure addresses the situation and issues clarifications if needed.

RMA could work with the USDA Climate Hubs to develop climate literacy and training plans to better assist with these operational risks. The Climate Hubs 2020 5-year review explicitly targeted greater engagement in this area, with the goal, "… can develop additional resources to prepare a climate-smart workforce nationwide."[10] Although this was likely envisioned for the USDA workforce, translating it to RMA's insurance industry partners ought to be straightforward and worthwhile. In the past, the Southwest Climate Hub worked with RMA to understand how weather and causes of loss change over time and spatial areas. In 2017, RMA assisted in the collection and analysis of cause of loss data. From the analysis conducted, a dynamic online tool[11] called AgRisk Viewer, was developed allowing users to examine county-level RMA cause of loss data and trends. To further these types of projects, funding would need to be allocated and objectives more precisely defined. Curriculum would seem straightforward, and RMA could distribute and integrate many of the outputs within the industry via existing avenues.

Action L – Specialty Crop Outreach

RMA is investing up to $2 million in cooperative agreements in 2022 for risk management education and training programs that support historically underserved producers to help them better understand how to

[10] Steele, R., Zycherman, A., Wiener, S., Hernandez, C., Wilson, M., Johnson, R., & Steele, C. (2020).
[11] https://swclimatehub.info/rma/

manage risk in the face of volatile weather. These funds will be awarded to organizations, such as universities and nonprofits among others, to provide risk management training to historically underserved producers, specialty crop operations, and others. The outreach will emphasize managing risks in the face of volatile weather and climate smart solutions that improve the profitability and resilience of producers.

RMA's overarching goal is to ensure Federal crop insurance meets customer needs and is available to as many producers as possible. To meet this goal, producers need to know how to access Federal crop insurance and how it works. Therefore, outreach and education will continue to be an agency priority. By providing opportunities for risk management education, we aid in further strengthening the farm safety net for agricultural producers. Outreach conducted by RMA Regional Offices aligns with their role as RMA's eyes in the field, keeping in close contact with local producers and grower groups. This work is especially important given the asymmetric risks identified earlier.

Effective outreach is necessary to offer education and information that specialty crop producers need to effectively manage their risk and remain productive. Additionally, outreach is an opportunity to provide producers with the latest news and updates regarding crop insurance programs and climate smart initiatives, identify attributes of the program that are working well and the aspects that need to be changed to improve efficiency, effectiveness, and responsiveness to industry adaptations to climate change. Workshops are popular with farmers and have proven to be a catalyst for development of risk management skills in limited-resource communities. The training equips the agricultural community with tools beneficial to minority farming operations and illuminates for the industry and its partners the challenges faced by socially disadvantaged producers. RMA can also utilize other industry meetings, presentations, and information booths to maintain this outreach. RMA should continue to engage in these activities utilizing the RMA Specialty Crop Coordinator and the Specialty Crop Liaisons at each RMA Regional Office.

Action M - Promote Whole Farm Revenue Protection to Support Crop Diversification to Reduce Risk

Although difficult to predict what production crop systems may look like over the coming years, many speculate greater use of diversification seems

likely to occur. Research supports the idea that such practices may help mitigate impacts of climate change.

Crop diversification can improve resilience in a variety of ways: by engendering a greater ability to suppress pest outbreaks and dampen pathogen transmission, which may worsen under future climate scenarios, as well as by buffering crop production from the effects of greater climate variability and extreme events[12].

RMA can support these producers who choose to diversify by promoting the Whole Farm Revenue Protection (WFRP), Micro Farm, or other 'to-be-developed' products that specifically target small and/or diversified operations.

WFRP provides a risk management safety net for all commodities on the farm under one insurance policy. This insurance plan is currently tailored for any farm with up to $8.5 million in insured revenue, including farms with specialty or organic commodities (both crops and livestock), or those marketing to local, regional, farm-identity preserved, specialty, or direct markets. WFRP provides protection against the loss of insured revenue due to an unavoidable natural cause of loss which occurs during the insurance period and will also provide carryover loss coverage if you are insured the following year. Critically, WFRP provides additional premium subsidy when including multiple crops, thus is specifically tailored for diversified operations.

Micro Farm is a product based on WFRP which is limited to producers with less than $100,000 (or $125,000 for carryover insureds) in allowable revenue. These smaller, usually local, producers have a high prevalence of diversification in their operation, thus Micro Farm automatically provides the diversity discounts. The product also includes revenue from value-added products (e.g., an apple producer selling pies at a farmer's market), which is an important aspect of their business.

Of course, these two products currently exist, but many other new products could be developed that provide targeted support for diversified operations. Regardless, crop insurance support for producers that are adapting to climate change via diversification will need targeted insurance policy options to help them manage their production risk.

Action N - Support Private Submitters on Expansion of the Climate-Smart Products

[12] Lin, B (2011)

The FCIA allows private parties to develop and submit crop insurance products to the Board for consideration of approval. By submitting a concept proposal prior to full development, these private parties may request advanced funding to cover a portion of their expected research and development costs. If advanced funding is provided, the private party must deliver a fully developed crop insurance product by an agreed upon date.

Following the submission of a fully developed crop insurance product, RMA and independent expert reviewers evaluate these products and the findings are presented to the Board. Products approved by the Board for implementation are eligible for Federal reinsurance and premium subsidies. Submitters of the privately developed product are also eligible for reimbursement for research and development and up to four years of maintenance costs if the products are approved for implementation.

An example of this product was the introduction of the Post Application Coverage Endorsement (PACE) in 2022. The product, initially for non-irrigated corn in select midwestern counties, provides coverage for producers who split-apply nitrogen to their crop. If a weather event prevents the in-season application of the nitrogen, the policy pays an indemnity equal to the lost potential production that could have been achieved with a complete nitrogen treatment. The product was developed privately and went through the rigors of the above process, critical in refining it for a proper pilot and introduction to growers. Moreover, the process will continue to be available for further modifications, enhancements, and expansions if warranted.

This privately developed product submission process provides a means for those within the public that have an interest in climate-smart agriculture to introduce and develop crop insurance products. From grower organizations to university researchers, anyone who follows the process established in the FCIA can submit a privately developed product. These private submitters act as a resource extension for the Federal government. Having an expanded pool of resources helps ensure innovative and adaptive approaches to address climate change through crop insurance can be adopted timely and efficiently. RMA can and will continue to support this process for climate-smart products for producers who are using new and different agronomic practices to adapt to climate change.

Action O – Engage USDA Climate Hubs for Product Development

Given the breadth of expertise employed by the USDA Climate Hubs, RMA could utilize cutting edge research to better design or review new

products. For example, if new products make claims about new agronomic practices or crop varieties, RMA could request the Climate Hubs to assist in ground-truthing those claims. Moreover, during research and development phases, RMA could leverage the Climate Hubs for data, contacts, and ideas for innovation in the climate-smart space. Those types of activities will increasingly be valuable as climate change accelerates and has new impacts across the country. The regional design of the Climate Hubs ought to aid in the asymmetries previously discussed to ensure RMA considers the proper solutions and science. The Climate Hubs could also aid in RMA staff climate literacy unique to newly proposed products. Admittedly, this will be a challenge, as often RMA product development timelines may not fit into the current business models of the Climate Hubs. However, RMA should strive to find ways integrate the processes to ensure valuable feedback is not missed.

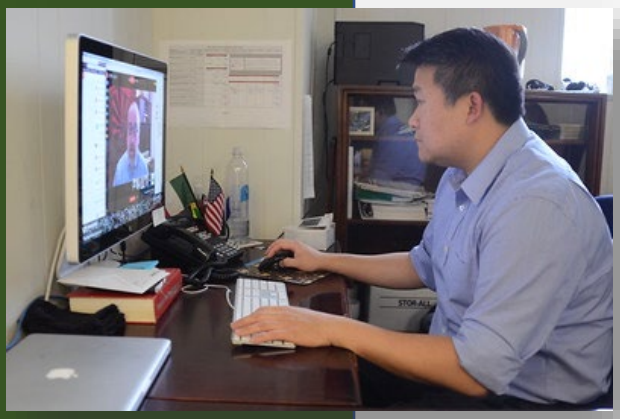
Maintain continuity of operations during weather-related disasters

Action P – Maintain a 100% Telework-Ready Workforce

In the past, RMA has utilized a "brick-and-mortar" based approach to disaster response where a team of subject matter experts would meet in a government facility in a conference room that had been quickly converted into an emergency operations center. Decisions regarding the actions that the organization would take to respond to the disaster/emergency would be made by personnel in the emergency operations center and then relayed out to the organization's personnel via the available communications technology, typically telephone or two-way radio. As communications technology advanced, changes were made to RMA's emergency response and recovery process.

Recently, the need to adapt and overcome the negative impacts of the COVID-19 pandemic have caused a significant change in how RMA is approaching performing the emergency response and recovery process. With meeting in-person at a government facility not being a viable option, RMA components that are responsible for conducting disaster response operations quickly transitioned to using the latest virtual technology to organize and coordinate the response to disaster/emergency situations such as extreme weather events or conditions. Working entirely virtually, the Agency is now able to perform the vital decision-making and information sharing activities effectively and efficiently that were necessary in support of the response to weather-related disasters such as

wildfires, drought, and hurricanes. Key to the overall success of disaster response and recovery efforts was the ability for leadership personnel and subject matter experts that were located at numerous home worksites throughout the country to communicate in real-time.



By successfully performing real-world disaster response and recovery responsibilities while operating entirely in a virtual environment, RMA was able to demonstrate that having a team of dedicated professionals that are capable of performing their duties in a 100% remote (i.e. virtual) work environment is not only a valuable component of the continuity of operations program, maximizing virtual capabilities is also how the federal government will be looking to streamline disaster response operations. Being able to leverage the flexibilities that are inherent in a remote approach to performing disaster response and recovery operations has rapidly become recognized as the way of the future when it comes to attaining, maintaining, and managing a state-of-the-art continuity of operations program. RMA is transitioning to a near 100% remote workforce. However, even if situations change and some employees are brought back to physical locations, the ability to ad hoc telework is vital to performing tasks under any situations. Therefore, RMA will continue to pursue technology, training, and infrastructure needed to maintain a full telework-ready workforce.

Action Q – Support Cloud-Based IT Processing

RMA's role in maintaining a functioning crop insurance system is increasingly an information technology (IT) endeavor. Therefore, maintaining IT functions in the face of natural disasters is critical. Logically, if those natural disasters become more commonplace, the need grows to prioritize system design that is resilient to such concerns and create protocols and contingencies for disaster recovery. RMA currently defines its recovery time and outcomes objectives via normal processes, which is a critical step in understanding computing needs.

Cloud-computing means systems are hosted at external sites in a distributed nature. That means services can be spread out to different servers in different geographical locations, essentially providing complete protection against local natural disasters. It also means for disaster recovery that data backups are not maintained by RMA directly on disks or

physical hard drives. This makes cloud better in that it both reduces the likelihood and severity of disaster events damaging IT processes. Combined with the cost-effective nature of the process, it is a win-win for the Agency to migrate to cloud-based processing.

RMA, partnering with the FPAC Business Center, is already in the process of putting some pilot applications, services, and data into cloud-based systems. The escrow mission essential function has been cloud based for nearly a decade and new services are being migrated over the next couple years. RMA will continue this process over the next several years to fully retire local server-based systems. Moreover, this will synergize with efforts already underway to modernize RMA's data mining tools within the Compliance mission which limits waste, fraud, and abuse to keep the program affordable to taxpayers and producers in the long run.

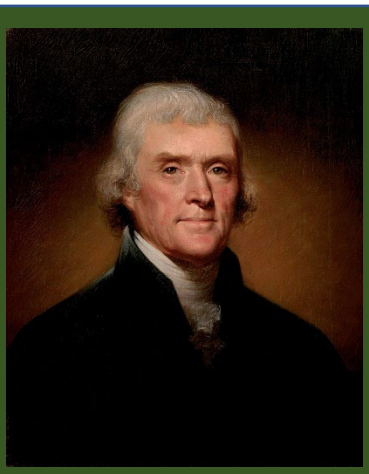
Action R - Maintain Network of Regional Offices to Respond to Unique, Geographic-Centric Issues

Too often, assumptions are made that insurance can largely be designed, maintained, and regulated centrally. However, as many of the ongoing actions previously covered, on-the-ground local expertise is critical to maintaining actuarial soundness in the program. Contextualizing data and events, staying ahead of changing farming methods and practices, and outreach and education are all tasks best done with local expertise. Combined with the ability to enable remote work, long-term, having staff to cover each region far exceeds any perceived efficiency gain of a centralized workforce. Moreover, when disasters do strike, responsiveness is critical. Regional offices allow RMA to have local experts engage with customers on an ongoing basis, who understand the unique challenges producers face. They assess the situation on the ground, collaborate on policy needs, clarify how the policy handles the situation, providing immediate response and actions to our customers where it occurs. Regional Compliance Offices ensure program integrity, and they too increase their effectiveness by understanding local risks and potential for waste, fraud, or abuse.

Resources, Measurement, and Sustaining Adaptation

The attached table specifies the core metric(s) to track each action, if applicable. Several are naturally dependent on each other, as most program maintenance actions all will get summarized into the ultimate test of crop insurance effectiveness, do producers buy it and is it actuarially sound? Several metrics will need to be developed from existing data (e.g., production reporting or cloud-based IT), while several others are already commonly reported (e.g., cover crop benefits and climate-smart insurance products). The table also outlines the area of RMA that will lead each action, a timeframe on how each is implemented/will be implemented, and other stakeholders that may require coordination or collaboration.

Internally, RMA's structure already supports these actions, leadership merely needs to maintain its commitment to each. All actions, even those engrained in current processes, will vary heavily based on emphasis placed on each by leadership. Given the long-term timeframe of this adaptation plan, it is likely there will be an ebb-and-flow to several actions, as funding for subsidy benefits, science of conservation practices, market forces, Agency budget constraints, and other factors impacts the value proposition of each. This need not be seen as a problem, but rather the natural adaptation of the plan itself.



Laws and institutions must go hand in hand with the progress of the human mind. As that becomes more developed, more enlightened, as new discoveries are made, new truths discovered and manners and opinions change, with the change of circumstances, institutions must advance also to keep pace with the times.

-Thomas Jefferson

Actions Overview

Climate Vulnerability	Action Title/Description	Type of Activity	Lead Office	Timeframe	Coordination	Progress Metrics	Accomplishments to Date
Soil	Incentives to Encourage Cover Crop Planting	Ongoing/ Proposed	DAPM	Annual Funding	FSA	Acres Covered	State programs, PCCP 21 & 22
Water	Incentives to Encourage Smart Water Use	Proposed	DAPM	Annual Funding	TBD	Acres Covered	-
Any	Incentives to Encourage Other Climate Smart Practices	Proposed	DAPM	Annual Funding	TBD, ARS	Acres Covered	-
All	Update Program Premium Rates	Ongoing	DAPM	3-Year Cycle	Internal	Participation Rate & Loss Ratio	Regular Maintenance
All	Update Program Yields	Ongoing	DAPM	3-Year Cycle	Internal	Participation Rate & Loss Ratio	Regular Maintenance
All	Update Program Dates	Ongoing	DAIS	Continual	Internal	Participation Rate & Loss Ratio	Regular Maintenance
Flooding	Update Program Maps	Ongoing	DAIS	5-Year Cycle	Internal	Participation Rate & Loss Ratio	Regular Maintenance, Now on Regular Cycle
All	Update Program Availability and Procedures	Ongoing	DAIS/DAPM	Continual	Internal	Participation Rate & Loss Ratio	Regular Maintenance
All	Improve Production Reporting	Planned	DAPM	2023 CY	Internal	Percent of Acreage	-
Any	Conduct Research on the Impact of Conservation	Ongoing	DAPM	1-3 Years	ERS, NRCS, Universities	-	Engagement with U of I, NRCS, ERS
All, especially Asymmetries	Support Climate Literacy Among Agents and AIPs	Proposed	DAIS	Continual	Climate Hubs	-	-
All, especially Asymmetries	Specialty Crop Outreach	Ongoing	DAPM	Continual	Internal	Participation Rate & Loss Ratio	Website, RO Liaisons, Board Submission Requirements

Water, Pests/Disease	Promote WFRP to Support Crop Diversification	Ongoing	DAPM	Continual	Internal	Participation Rate & Loss Ratio	Regular Maintenance
All, especially Flooding & Soil	Support Private Submitters on Expansion of the Climate-Smart Products	Ongoing	DAPM	Continual	Internal	Number of Climate-Smart Products	Regular Outreach
Any	Engage Climate Hubs for Product Development	Proposed	DAPM	1-2 Years	Climate Hubs	Number of Engagements	-
Flooding, Tropical Cyclones	Maintain a 100% Telework-Ready Workforce	Ongoing	OA	Continual	Internal	Percent of Employees	Accelerated due to Pandemic
Flooding, Tropical Cyclones	Support Cloud-Based IT Processing	Ongoing	OA	Continual	FBC	Percent of Systems	Investments Underway, Multiple Systems Migrated
All	Maintain Network of Regional Offices	Ongoing	DAIS/DAC	Continual	Internal	Number of ROs and RCOs	Current State