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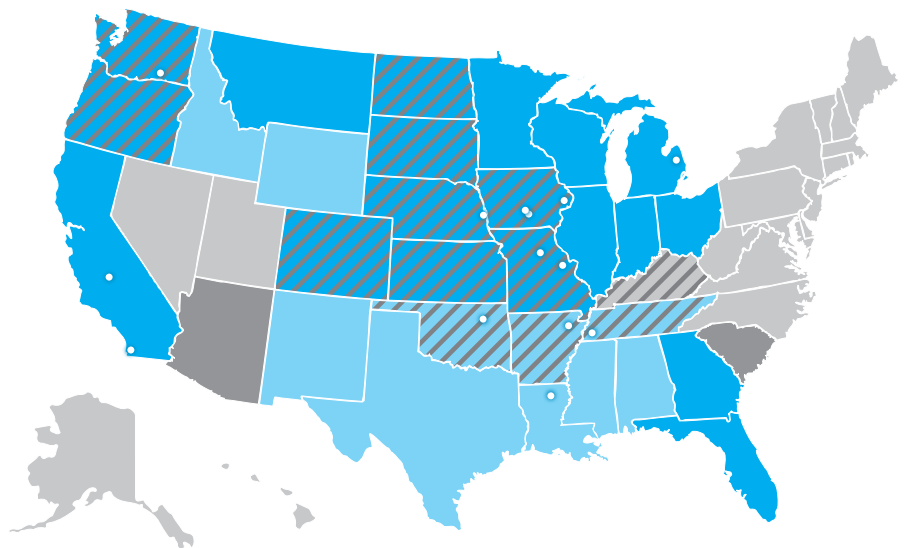
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We are pleased to present our fourth annual National Land Values report with expanded regional coverage including the Northern Plains and Southern Plains. Peoples Company is privileged to work across all the major agricultural regions in the United States appraising farmland, brokering farm assets, managing farms, and deploying capital for investors looking to invest in the asset class. Our boots-on-the-ground approach is invaluable as we put this report together, gaining insight from our regional offices and combining those insights with data to help landowners make informed decisions about their farmland assets.

Last year's report predicted a leveling out of farmland values after three years of unprecedented appreciation with the farmland asset class surpassing \$4 trillion in total value. With the rapid run-up in prices and interest rates, there was some sentiment that the land market might soften but not to the degree that other real estate sectors might experience due to thinly traded markets with less than 1% of farmland hitting the open market, and the low real estate leverage of only 14% on farmland nationwide.

The 2023 Land Values report highlights how persistent inflation, high commodity prices, and policy implementation of the Inflation Reduction Act will keep the land market strong heading into 2024. While the higher cost of capital certainly has impacted some buyers of farmland, this environment has solidified the investment thesis and resiliency of farmland including its positive correlation with inflation, low or negative correlation with publicly traded equities, and steady annual income in conjunction with reliable long-term appreciation. While fixed-income investments are capturing the attention of many investors, the current economic environment is what farmland is built for, and you can't ignore the historical performance of farmland.

While farmland values could soften to recalibrate with continued high-interest rates, prices may also remain strong and increase if inflation persists or reaccelerates. With a new farm bill in the works and the upcoming election, it's anyone's guess where interest rates and inflation will go in 2024 and beyond. The confidence in the view that farmland will continue to provide an effective hedge against inflation and maintain its key diversifying position in portfolios as an appreciating generational asset has never been stronger. We believe that 2024 will likely present buying opportunities for patient investors who opportunistically are able to act on a specific opportunity but overall, the land market will likely remain flat in 2024 as sellers simply won't bring land to the market if they don't like the price. There simply isn't enough pressure in agriculture to bring land values down against the long-term expected values despite the fact that the rising financing costs put pressure on those who rely on leverage.

As we strive to provide reliable data to landowners, investors, and managers nationwide, we welcome your feedback, observations, and questions about this report.

A special thank you to Bruce Sherrick, Professor and Director of the TIAA Center for Farmland Research, and Eric O'Keefe, Editor of The Land Report, for their input and expertise. Thank you to Peoples Company land professionals Doug Hodge, Mark Williams, Ashley Poduska, Curtis Buono, Adam Woiblet, George Baird, Boyd Harris, Kayla Rowan, and Blake Singleton who understand the complex forces shaping local farmland markets.



STEVE BRUERE | President, Peoples Company



Table of Contents

- 4** National Farmland Market Overview
- 14** Pacific West Market
- 16** Pacific Northwest Market
- 18** Delta Market
- 20** Lake States Market
- 22** Southeast Market
- 24** Northern Plains Market
- 26** Southern Plains Market
- 28** Corn Belt Market
- 31** Tracking the Performance of Farmland Investments: The National Council of Real Estate Investment Fiduciaries (NCREIF) Farmland Index
- 34** Evaluating Impacts of Transition to "Net Zero" on Farmland Values
- 42** Smart Money vs. Scared Money: Reconsidering Farmland in Today's Market

NATIONAL FARMLAND MARKET OVERVIEW

By **Bruce Sherrick**, Professor and Director
TIAA Center for Farmland Research, University of Illinois

U.S. farmland markets have again demonstrated incredible resilience and stability through much of 2023 with continued strength in prices, but with signs of tapering trajectories compared to the previous two years. Transactional volumes have slowed over the majority of the U.S. and major grain commodity prices have retreated a bit from their recent strong levels with rebuilt grains stocks and stabilized demand, but crop insurance and other forms of support performed as expected providing a secure base against which longer term planning is possible; and longer term prospects for income remain remarkably positive as well due to new and expanded demand prospects (discussed in more depth later in this report). Farmers still have incredibly strong balance sheets reflecting accumulated farm-related income, and myriad stimulus-related and *ad hoc* payments that have had long-tails and strong demand supported by monetary expansion. On the flip side, the Federal Reserve (Fed) interest rate actions have eliminated options for low cost debt to fund expansion and have also increased operating debt costs. The Fed's actions

were in response to its reversal in stance about inflation with the recognition that there were both monetary effects of expanded money supply and supply shocks that lingered post pandemic as supply chains were rebuilt and rerouted. In short, inflationary smoke signals became flames of concern that registered in excess rates in food, wage, energy, housing, and transportation components of the CPI. As inflation has receded, portions of the CPI increase appear to have more "stickiness" than others, and food and wage components in particular remain to be fully reset. In the longer run, the positive impacts of inflation on farmland values likely outweigh the negatives of higher interest rates both due to low debt loads in the sector, and because the stability of returns to agricultural investments induces the equivalent of "flight to quality" when uncertainty increases. Regional and crop specific differences in performance have begun to materialize more apparently than during the recent halcyonic period where all ag investments seemed to be "above average" and the key to excelling was simply participating in the asset class at all. Looking forward,

more creative strategies will continue to emerge and define differences in performance, but the asset class remains incredibly stable and attractive, albeit with even greater complexity to enter due to lower transactional volumes, and related thin-market effects. And, the role of changing technologies, changing approaches to management, and changing sources of demand for specific attributes of products, traceable methods of production, environmental impact costs/benefits, and new uses for caloric, solar, and wind energy from the greening of the energy complex, will continue to change the relative values of farmland by region and production potential.

What seems clear is that the future for the asset class remains exceptionally positive in the long run, but with somewhat increased turbulence in the shorter term.

The intent of this publication is to provide both a fact-based annual update with consistent data and reasoned



explanations of empirical outcomes, and to provide context to interpret major issues impacting the future performance of agricultural assets. Thus, it is appropriate to both revisit information in last year's National Land Values Market Overview, and to provide updated and extended discussions of factors that remain on the horizon related to agricultural assets. Last year's report included guarded optimism about farmland markets, and correctly anticipated the slowing pace and the role that interest rate market maturation and normalization would play in determining capitalization rates or current income analogs for farmland investments. Farmland markets had already anticipated and largely mimicked, in advance, the movements in price levels for related investments that now seem largely justified by macro-market environments, and have predictably performed remarkably well as an inflation hedge. The reasonably positive

projections from a year ago, if anything, again turned out to be a bit modest compared to actual farmland performance. Transactional volumes slowed a bit more than anticipated, and prices have been slightly stronger, but not surprising given the demand side effects. Looking forward, the Farm Bill debate has again become part of the regular ag-news cycle on its regular cadence for use in testing interest in, and opportunities for increased agricultural-related support. The tone of this cycle has shifted slightly toward emphases on conservation and carbon-linked payments, and for increasing levels of prices used in various income support programs. Crop insurance and elements of other titles related to nutrition assistance seem to have achieved sacrosanct status, and there are no obvious reasons to expect anything other than even stronger support via commodity title programs as well. Debates around ad hoc spending programs have also begun moving from whether

"we should..." to *"how much can we..."* at this point in the election cycle, and regardless of merit, will very likely benefit agricultural asset markets in the large.

In what follows, updated data on national land values and factors influencing the long term performance of the asset class are provided building on past reports, and highlighting new influences and changes in macro-market conditions. A slightly longer-term orientation is used in this year's report with the intent to put recent anomalous movements in interest rates and inflation into perspective and to provide justification for the continued optimism for the asset class in the face of short-term pressures. After discussing the factors that impact farmland markets, the report presents regional updates that include historic performance and more specific treatment of local factors impacting returns to that region's agricultural assets.

FACTORS IMPACTING FARMLAND MARKETS

Farmland markets can be classified by use and type including cropland, pastureland, and a third category that combines all farm-related land and real estate including buildings and fixtures. The investable segment of farmland focusses on cropland which can be further divided by use into categories of annual row-crop production (e.g., corn, soybeans) and permanent crops (e.g., citrus, tree nuts, wine grapes). USDA is the more commonly referenced source of data as it publishes an annual survey of land values and lease rates by category, along with related information about acreage and use changes. These data are for *all* farmland-related acres and include farms that would not be considered to be commercial scale. As a result, the values tend to be attenuated toward the low end, but rates of return, and patterns of performance are highly reliable and consistently collected through time. At the same time, the National Council of Real Estate Investment Fiduciaries (NCREIF) provides robust information on a quarterly basis on performance of institutionally owned and professionally managed agricultural assets all reported on identically accounted bases. NCREIF has grown to the point of being the most accepted and relied upon system for evaluating performance of professionally managed farmland under what could be termed “return-seeking capital” managed under fiduciary requirements.

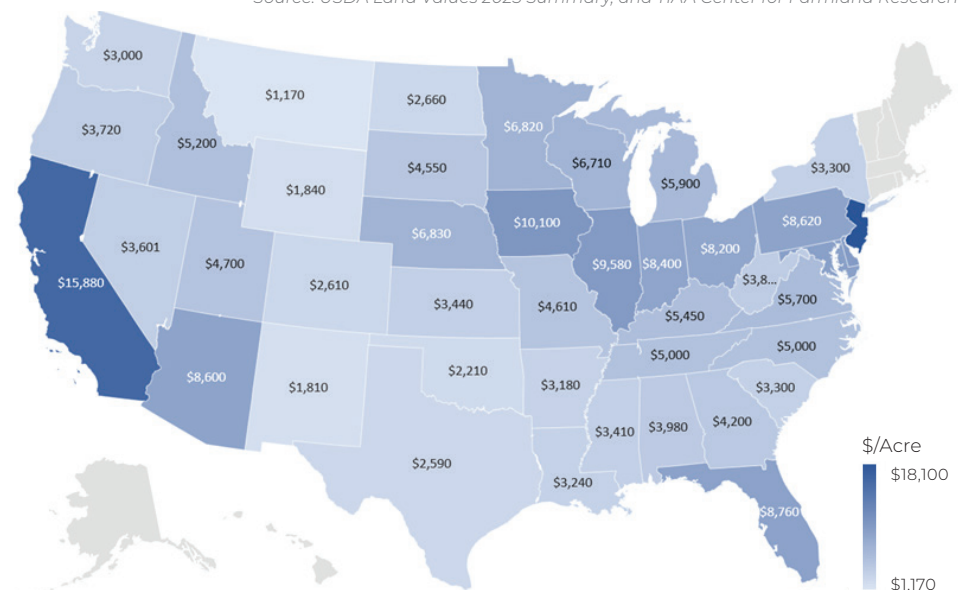


NCREIF data can be further subdivided into regions that naturally group states with similar production features and market access, and even further subdivided by management type whether directly operated or leased to a tenant-operator. Finally, the TIAA Center for Farmland Research at the University of Illinois developed and maintains a comprehensive data system on farmland returns including the impacts of property taxes, scale, and other features of operations. In addition, it has a returns database on equities, other real estate, fixed income, bond returns, and measures of inflation and input cost indexes that are developed with consistent statistical treatment of returns intervals to use in portfolio evaluations

of farmland in the context of alternative investments. In the materials that follow, these and derived summaries from individual states and production regions are presented to provide a comprehensive view of the performance of farmland investments through time and by crop/region of major influence. In the end, farmland values are determined by the relative level and riskiness of income earning potential in agricultural use, which is derived from relative productivity and output market conditions. And, as with other financial assets, farmland is valued based on what it expected to earn relative to its cost of capital and the relative performance of alternative investments.

FIGURE 1 — **Cropland Values \$/Acre 2023**

Source: USDA Land Values 2023 Summary, and TIAA Center for Farmland Research



It is instructive to first establish relative scales and recent movements in values. Figure 1 shows 2023 average cropland values by state, and Figures 2 and 3 show the percentage changes in value over one year and three years respectively. Note that 2023 has had first-half-year returns that somewhat exceed second-half returns. NCREIF and regional surveys have also shown slowing price increases during the third quarter and into the fourth quarter of 2023 as well. USDA data would consistently understate prices and financial performance relative to farmland that farmers and investors consider to be investment grade most suitable for commercial scale agricultural production, but again, are consistently collected through time and provide highly reliable patterns of performance.

In addition to the capital appreciation shown in the graphs, annual incomes in 2021 and 2022 were relatively strong and while 2023 income will be off its record high precedent, will remain fairly consistent to strong, relative to longer term historic standards. Figure 4 on the next page shows total return estimates for 2023 by state derived from rental income plus appreciation less property taxes and maintenance expenses. In these cases, annual cash income rates can be reliably estimated on a consistent basis through time, and changes reported on a consistent basis. Importantly, these are estimates averaged across all properties in a state and thus mask the wide variation in individual experiences that could be

FIGURE 2 — Cropland Percentage Change \$/Acre 2022-23

Sources: USDA Land Values, TIAA Center for Farmland Research

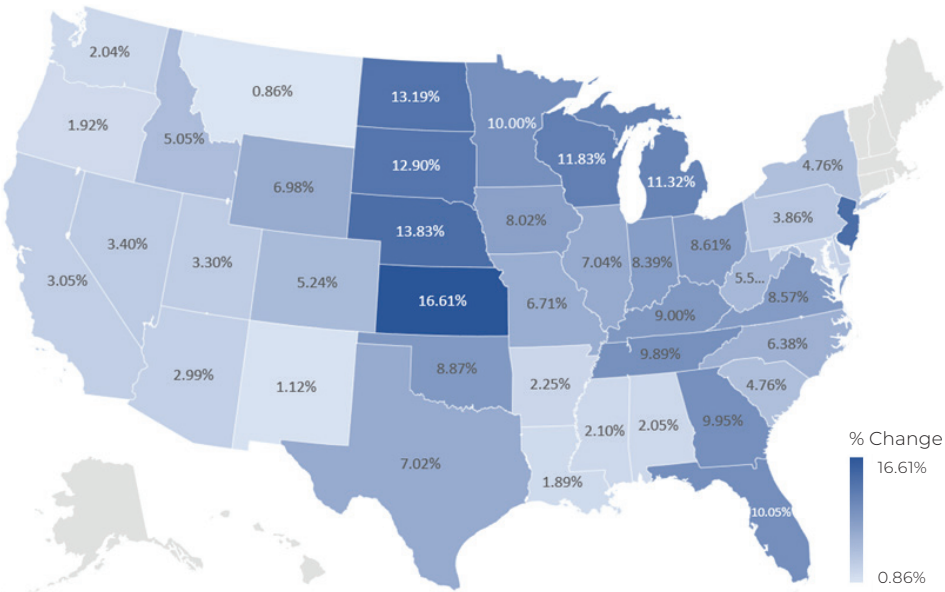
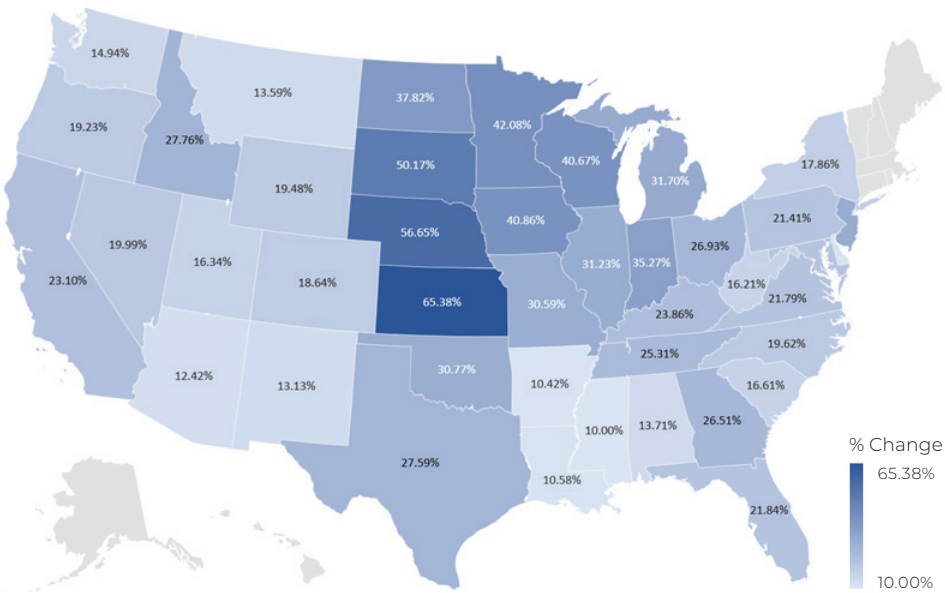


FIGURE 3 — Cropland Percentage Change \$/Acre 2020-23

Sources: USDA Land Values, TIAA Center for Farmland Research



expected to be encountered on a single farm, and are also likely conservative relative to commercial scale agricultural operations' results. In any case, the performance remains strong

by historic standard, and even more impressive when the stability of income through time is considered compared to other investment opportunities such as publicly traded equities.



FIGURE 4 **Total Annual Return 2023 (Est)**
Sources: USDA, TIAA Center for Farmland Research

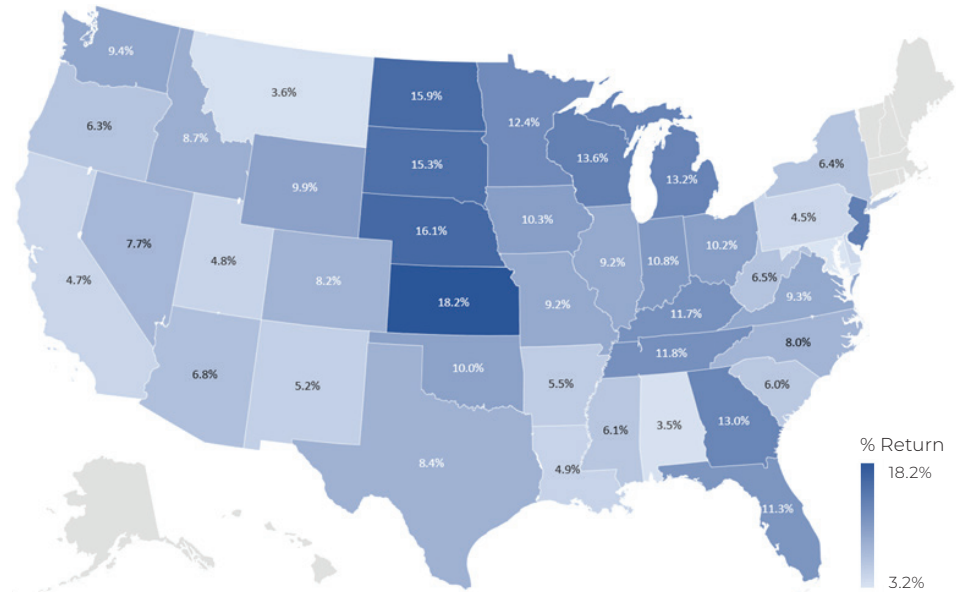


Table 1 provides additional historic context by aggregating this information into the same production regions used by the National Council of Real Estate Investment Fiduciaries (NCREIF) to group areas with similar production crops and practices and reporting total returns by hold period over selected intervals from 1 to 20 years and over the lifetime available in the NCREIF Index back to 1991. In addition to regional totals based on USDA data, the lower three rows provide total performance for assets held in the NCREIF index by type of production.

TABLE 1 **Total Cropland Return by Hold Period**
Sources: USDA, NCREIF, and TIAA Center for Farmland Research

Region	HOLD PERIOD					
	1-Year	5-Year	10-Year	15-Year	20-Year	1991-Present
Appalachia	9.47%	6.05%	4.86%	3.65%	5.57%	6.53%
Corn Belt	9.95%	8.46%	5.72%	7.83%	9.40%	9.61%
Delta	5.50%	6.18%	6.75%	7.34%	8.68%	9.06%
Lake	13.07%	8.94%	7.01%	7.17%	8.64%	9.60%
Mountain	6.44%	7.48%	6.84%	5.98%	8.25%	10.00%
Northeast	6.42%	5.13%	3.86%	2.05%	4.85%	5.03%
Northern Plains	16.39%	11.89%	7.90%	11.83%	13.00%	11.49%
Pacific Northwest	7.86%	9.48%	9.34%	9.63%	10.63%	11.51%
Pacific West	4.68%	7.66%	7.17%	6.44%	8.59%	8.27%
Southeast	8.43%	5.88%	5.14%	3.37%	5.64%	6.20%
Southern Plains	9.19%	8.00%	6.83%	6.25%	8.22%	7.74%
NCREIF Total Farmland	5.81%	6.13%	7.99%	9.77%	12.45%	10.45%
NCREIF Annual Cropland	10.99%	8.28%	7.24%	9.11%	11.04%	10.01%
NCREIF Permanent Cropland	-1.86%	2.88%	8.88%	10.64%	13.91%	10.84%

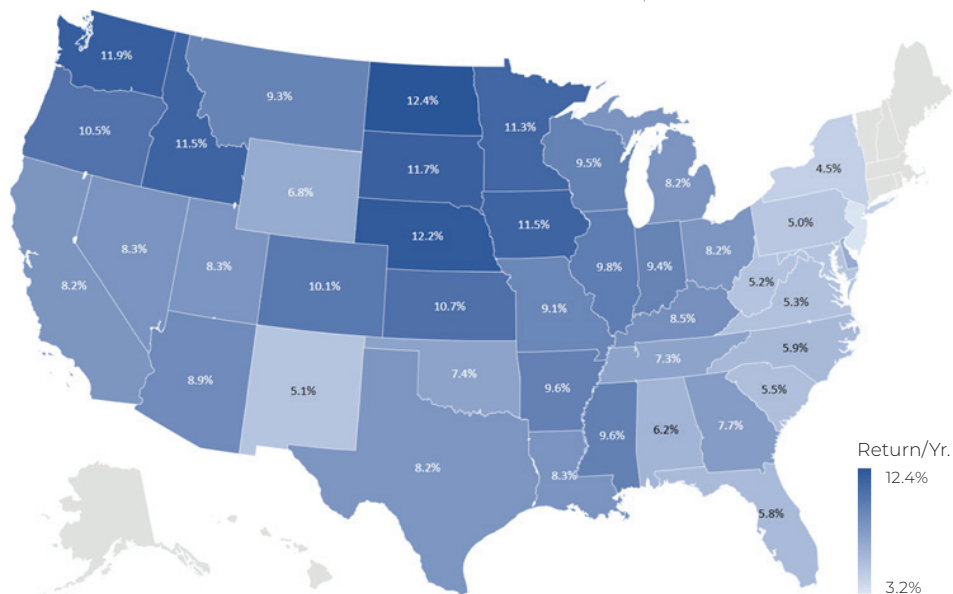
As evident in the table, longer term patterns become more consistent across regions and has been reliably strong and consistent in the major production regions. The low permanent cropland returns in the NCREIF index for 2023 (Q3 annual) and the low 5-year return result from heavy concentrations in almonds, pistachios, and wine grapes which have highly variable returns in specific years even though the longer term returns are quite strong. Finally, Figure 5 shows the average annual return by state over the previous 30-year period. The Pacific Northwest, Northern Plains, Lake States, and Cornbelt regions are predictably the strongest performers reflecting the stability in production, and the increasing yields and improving productivity of major row crop regions over that period. While not shown here, the returns patterns through time for annual crop production also shows much more stability than alternative investments as well.

THE MACRO ENVIRONMENT AND STRUCTURAL ISSUES IN FARMLAND MARKETS

It is important to consider the macro-economic, political, monetary status, trade relations, and social environment in which farmland investments are considered. Some factors are part of a long-term market structure and have trends that can be reasonably anticipated (e.g., population dynamics) while others are subject to actions and events that create unexpected opportunities and challenges (e.g. impact on prices of a pandemic

FIGURE 5 — Average 30-Year Annual Cropland Return by State

Sources: USDA, TIAA Center for Farmland Research



or war). In the following brief section, a framework is presented to evaluate land returns and in turn the asset values that occur as a result. Thereafter, the report discusses individual regions of the U.S. and provides additional discussions of the unique features that impact farmland returns in each region.

A historical perspective from the late 1800s believed to be attributed to George Morrow after whom the oldest continuously maintained experimental agricultural plot was named, asserts that *“there are two sources of return to agricultural land: first the annual income on the products grown thereon and second the increase in the value of the land itself. The latter will be the greater through time.”* This perspective recognizes that the most fixed factor of production will capture the

residual value after all the inputs and activities are paid for, and as a store of wealth, should compound in value in the same manner that principal in any investment account would. Moreover, the land base available for production has shrunk in areas where non-agricultural development has occurred, and as the world population increases, each acre of land has to account for a greater share of production both due to the direct increase in population and due to the shrinking available base in major production regions. Yield increases, and added lands in other parts of the world will need to equilibrate the long-term dynamics, but the point is that there are also pressures supporting farmland values from its relatively fixed supply with competing demands for non-agricultural use. The graphics shown earlier

highlight that the bulk of the recent return to farmland has in fact been mainly due to capital gains while current return (sometimes referred to colloquially as cap rates) have been compressed following the lower interest rate levels and higher multiples implied in asset values. The relative appreciation versus income has been particularly skewed in recent years, but the sentiment from the historic quote remains accurate over the long run as well. The loading of returns into capital gains provides a particularly attractive feature to an investor who does not need to consume the annual income provided, but can defer to later dates with an associated lower effective tax rate on total returns. For individual investors, there are also significant potential tax and estate benefits from owning farmland through favorable ways to transfer to future generations with stepped-up basis.

Ownership structures are also receiving extra scrutiny with (unfortunately often misfounded) focus on foreign ownership, large holdings by high net worth investors, and so on. Realities around economics of scale will continue to result in consolidation of production units and increasing shares of land leased from a non-operator owner. Currently, around 60% of annual production farmland is leased and as often noted, “the land doesn’t know who owns it, and the weather doesn’t care”. The point is that economics related to lowest cost forms of ownership and operation

work themselves out through market forces through time, and advantages of scaling include dilution of some of the fixed costs of production. There is also an important role for smaller scale operations, in particular when complex production or specialty crop outputs are the focus. The distribution of farms by size and sales class is bimodal with small and part-time operations and increasingly larger operations generating the bulk of the commodity outputs. Institutional owners have also increased their share of land but still represent just a few percent of the total farmland in the U.S. They tend to be more environmentally cautious due to enhanced reporting requirements and have in fact led on initiatives related to development and reporting of sustainable farming practices. As the features of farmland returns including strong diversification benefits relative to stocks and bonds, inflation protection, and long-duration capital appreciation and protection, institutional owners could represent the lowest cost capital for owning farmland in many cases, and provide expansion opportunities to the operators to whom they lease their land. Several states have anti-corporate farming laws while others view the option for institutional investments to be supportive of progressive farming operations to be beneficial. In any case, the factors that attract capital at the lowest cost to agriculture will continue to be metered by both market and political forces.

Technological advancements in agriculture have also been nothing short of miraculous in terms of yield advancement, water management, in-field operational efficiency, and genetic improvements that accommodate a huge array of specific environmental conditions and weather influences. Nitrogen efficiency (e.g., nitrogen per bushel of corn) and yields per acre have continued nonstop improvements while using far less and much safer crop protection inputs (pesticides and herbicides). Feed efficiency in livestock likewise has improved to the point that almost 40% less feed calories are required across major species (poultry, pork, beef) per pound of gain compared to only a half century earlier. In-field real time kinetics (RTK) related to autosteering, and variable seed placement, improved seed treatments, and yield scouting and monitoring



technologies likewise have become completely commonplace and allow specific response and optimization of production practices that were literally impossible only 20 years ago. Water management improvements have largely been derived from conditions where water costs have become meaningful, or where water depletion risk has increased. Again, the adaptability of agricultural production systems has been nothing short of incredible, including responses to potentially changed climatic conditions where production regions especially further north have become increasingly viable for corn and coarse grain production – and the returns to agriculture in these regions has followed suit as well.

Another area to outline, with details provided as warranted later in the publication, relates to the changing role

of agriculture in the climate debate due to both scientific and consumer-based recognition that photosynthetic activity represents an important aspect of any effort to account for and manage net greenhouse gas (GHG) emissions. Dozens of efforts have emerged and competed for farm-level practice payments for cover crops and tillage practice changes that could be claimed in efforts to mitigate or offset greenhouse gas emissions. As the market for eco-services has begun to mature and consolidate, it is clear that at least accounting for environmental impacts through nutrient and cover management plans will become (or in some cases remain) a base requirement for consumer acceptance of agricultural products. The positive turn for agricultural participants is that it is increasingly likely that there will be positive payments associated with the

production of products with sustainable practices rather than implicit penalties or taxes for the failure to do so. The Inflation Reduction Act, and numerous follow-on legislative actions have strengthened the federal commitment to the greening of the energy complex through systems that will likely generate new sources of revenue for agricultural land-based energy activities. These will not be uniformly distributed of course, and the differential regional effects thus are important to more fully appreciate as well. The point is that energy management activities along with regular production activities will increasingly be part of the collection of things we refer to as “farm management” and the complexity of evaluating all potential sources of revenue associated with a land-based investment will continue to increase.





In last year’s report, the rather obvious observation was made that the eventual impact of quantitative easing and direct stimulus during the pandemic would lead to price and wage inflation, and that direct observational measures of price changes whether originating from supply chain interruptions or from monetary excess, signaled “real” rather than purely temporary inflation. What is less obvious is that the farmland market somewhat anticipated the need for inflation and real interest rates to re-converge, and maintained its historic response to inflation in expectation form. In other words, the farmland market pre-cast

inflation to be higher than was communicated in Fed-related signals and moved accordingly. While it is not nearly so simple or direct a relationship to be locked in a cause and effect formula, farmland’s price performance neither overreacted to the artificially low rates held by the Fed through the bulk of the pandemic, nor did they ignore the reality of inflation signals before recognized in official statements and interest rate hike actions by the Fed. All of this is to say that the information also provided a year ago about the relationship between inflation and farmland seems an even stronger relationship now.

Figure 6 below shows the historic relationship between aggregate farmland returns and inflation as measured by the CPI (all, non-seasonally adjusted). Importantly, the blue line shows the simple inflation rate and the orange line shows the aggregate return to a farmland index constructed from the top 32 states ranked by value of agricultural production. The patterns demonstrate the remarkable correlation displayed through time by farmland. Note that the one exception in 2009 is essentially a sympathetic response to the housing crisis and a reported set of values that quickly recovered and returned to its “normal” relationship.

FIGURE 6 Farmland Aggregate Returns and Inflation 1991-Present

Sources: Bureau of Labor Statistics, USDA, TIAA Center for Farmland Research

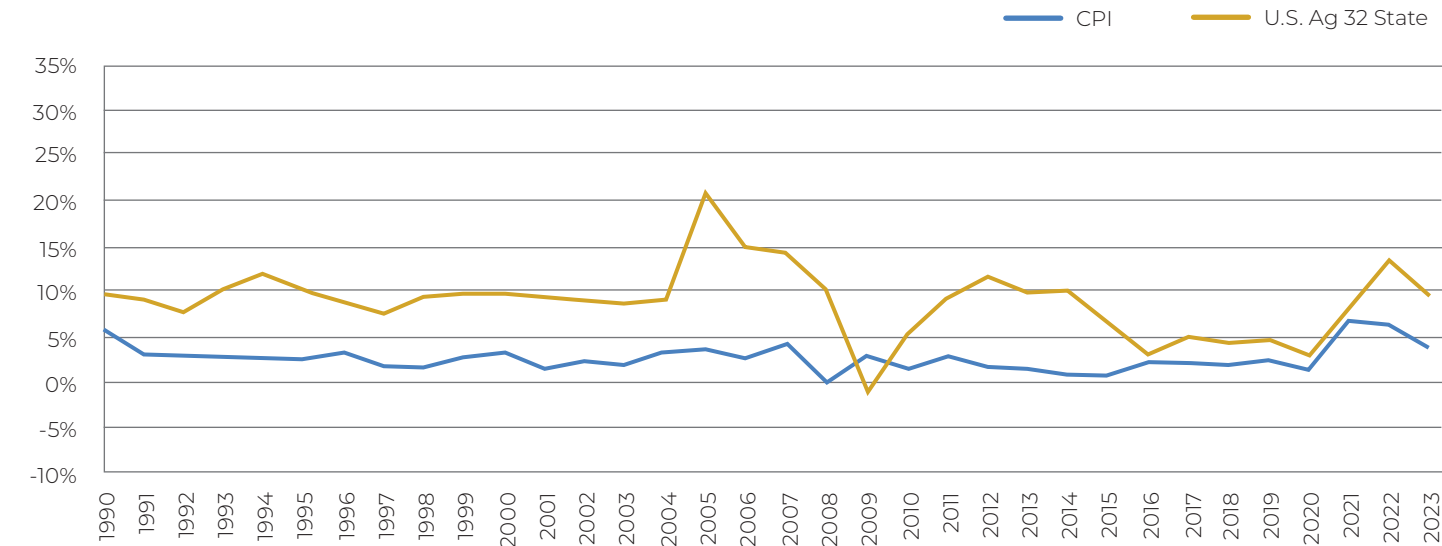


TABLE 2 — Farmland Returns Relative to CPI by Decade

Decade	Farmland to CPI Spread
1970 to 1979	12.2%
1980 to 1989	2.1%
1990 to 1999	6.4%
2000 to 2009	7.9%
2010 to 2019	5.1%
2014 to 2023p	3.9%
1970 to 2023f	6.6%

To further summarize, Table 2 shows the average spread over inflation by decade and for the very long-term period from 1970-2023. Each decade somewhat proxies for a particular inflation regime and the period covers the remarkable run up in prices in the 1970s and the final abandonment of the gold standard, followed by a long period of reasonable stability and gradual decline in real rates, and finally of the period containing both the housing crisis and the pandemic. It is rather remarkable to see the consistency and strength in that relationship over such a broad set of economic environments.

A final feature to note this year in light of the slowed transactional

volumes reported over a majority of the agricultural production regions is that farmland tends to be owned for very long time periods, and is often traded among related parties without exposing to arm’s length market conditions. In the heart of the corn belt, only 1.5% or so of acreage turns over per year, and thus the impact of a slowdown feels amplified. If 1.5% slowed to 1%, despite the decrease of only .5% or one in 200 parts of the total, it would represent a 33.3% reduction in the number of parcels brought to market. Likewise the recent historic upturn in volume felt larger than it was in fact due to the same dynamics. Thin market features support asset values especially on the low side, and in particular in cases where farmers represents

the majority of the buyers. As predicted, the pause being experienced in the transactional markets has occurred and may remain until relative interest rate features are more completely understood and interest markets return to a normal term structure. Until that time, it will be even more difficult to move or acquire “at-scale” farmland holdings over short intervals of time.

In what follows in this publication, differences in the agricultural markets that define the major production regions are discussed and highlighted with implications for performance of farmland investments going forward. What remains clear is that advancements in information resources related to farmland market conditions will continue. And, the fact that the resolution of market forces in the continued production of food for an increasingly large and affluent world population, while navigating the demands for climate-smart sustainable production has defined the **theme** of this now annual publication and its intent to provide **food for thought** about farmland markets for years to come.



REGIONAL MARKET UPDATES

To get a more detailed view of some of the regional differences in farmland markets, the remainder of this report provides an update of the major regional markets.



PACIFIC WEST

Market CALIFORNIA

California remains the top-producing agricultural state in the U.S. with over \$55.9 billion in annual cash receipts for agricultural products representing just over 10% of the total U.S. agricultural production (USDA, 2022). In total, USDA recognizes over 400 different commercially grown commodities in California. Dairy leads the list with \$10.4 billion in annual production value followed by grapes at \$5.5 billion. California also holds dominant positions (99% or more) in almonds, artichokes, celery, figs, garlic, grapes/raisins, kiwifruit, melons/honeydew, nectarines, olives, pistachios, peaches, other stonefruit, plums/prunes, walnuts, and many nursery crops and seed production. In addition to being the top milk-producing state, California is of course renowned for its wine production, with the Napa and Sonoma wine-growing regions known worldwide. The agricultural sector is heavily dependent on export markets with nearly 40% of the total production going abroad, representing 12% of all U.S. agricultural exports. The top export destinations are Canada, the EU, China, Mexico, Japan, S. Korea and India.

California agriculture continues to face several significant challenges that will impact the

productivity and economic profitability of the state's agricultural sector. The most obvious issue relates to water usage and competition between agricultural use and usage within high-population centers in the downstate region. California had been suffering through a prolonged drought and got welcomed relief through a record seasonal snowpack and snowmelt in 2023. NOAA indicated that nearly 100% of the state was in a drought status at the beginning of the year, but by the end of November, less than 1% remained under excessively dry or drought conditions. The abundant precipitation significantly recharged reservoirs and also resulted in the state making it easier for farmers to capture excess flows as well as fast-tracking water storage and infrastructure projects like the Sites Reservoir so less water is lost to runoff in the future.

California's Sustainable Groundwater Management Act (SGMA) still holds substantial potential to rearrange agricultural production in the primary nut-producing regions in particular, and in major Central Valley vegetable production areas as well.

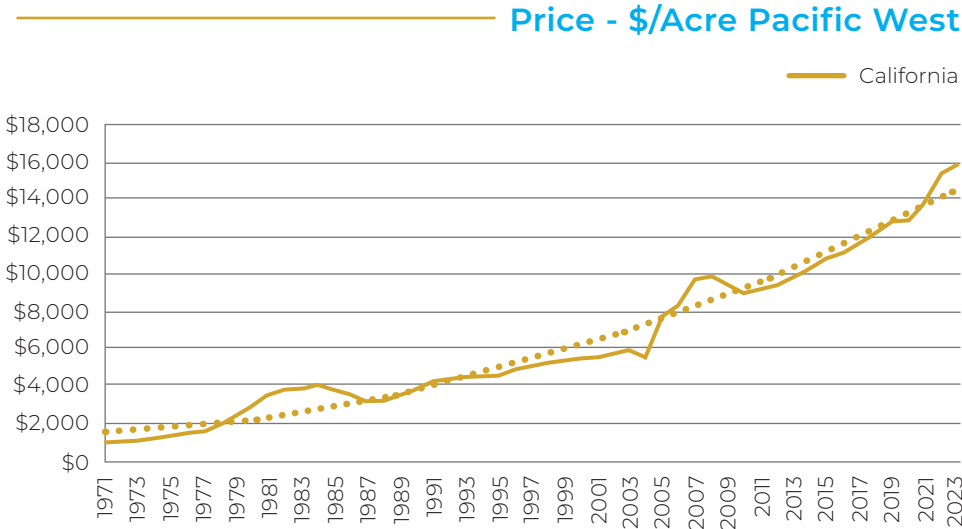
Forecasts continue to predict that substantial additional acreage will need to be idled with water diverted to more valuable production areas, and crops that can be grown elsewhere or are more water-price sensitive may be driven to other regions of the state or country as SGMA is fully implemented. To do so, some almond orchards are being "recycled" on a shorter timeline, and water rights are consolidated on highest-valued parcels. In addition to water challenges, California also relies on the largest number of hired and migrant workers with well over half a million per year. While agricultural labor has always represented an important management issue, scrutiny over labor treatment, initiatives surrounding minimum wage and overtime requirements, and increased attention on all things related to immigration have heightened the concern in continuing reliance on the agricultural pool and such high levels. Additional headwinds remain for almonds and wine grapes in particular through pricing pressures from oversupply and efforts to continue to consolidate production units.

The land transaction market has seen wide variation throughout 2023, with activity shifting from large-scale transactions at the start of the year to mostly smaller farms toward the year's end. Many investors and institutional funds have paid more attention to capital expenditures and value enhancement projects than to new acquisitions, and they

have been slower to deploy funds due to increased debt costs and uncertainty about the pace of recovery of some specific commodity prices. The industry is currently in a phase of “right sizing and resizing” permanent crop acreages and there is some optimism for near-term price stabilization for some commodities, such as almonds. As was the case in prior years, land with strong water rights and lower-cost access to ground and surface water occupies a distinctly different class than land without strong water rights. “Farming the water” remains a descriptive phrase for selling water usage like any other commodity as a component of a parcel value.

In terms of financial performance, overall appreciation in land values has remained fairly strong across the lower volumes and has resulted in recent returns in particular remaining competitive with other regions.

Variation across crops has increased and the headwinds for some tree-nut regions, winegrapes, and certain citrus varieties remain but have perhaps receded from a year ago. The table below shows the total returns and components for selected periods including the most recent three-year period. The lower section of the table shows inflation (CPI) and 10-year Treasury yields for comparison (CMT-10).



PACIFIC WEST CALIFORNIA				
California Average	1991-2023	2010-2023	2014-2023	2021-2023
Income	3.74%	2.81%	2.79%	2.23%
Capital Gain	4.66%	3.88%	4.92%	7.23%
Total Return/Year	8.40%	6.69%	7.70%	9.46%
AfterTax and Exp	8.28%	6.57%	7.18%	8.89%
Ptax and Exp	0.12%	0.12%	0.53%	0.57%
CPI	2.56%	2.62%	2.90%	5.96%
CMT-10	4.17%	2.50%	2.48%	3.33%

PACIFIC WEST CALIFORNIA SUMMARY

The California farmland market is the most massive and diverse in the country with unique climactic delineations, unique soils and growing conditions, and proximity to consumers and export channels. Water-related access and cost differences are emerging that will continue to create both stresses and opportunities as SGMA reaches full force and as the state’s own investments in water-related infrastructure mature. Still, the sheer magnitude and diversity of its agricultural production guarantee that California will remain a critical player in not only its own, but also in the future prosperity of the U.S. institutional investors have historically focused on California due to access to large-scale operations with little production competition, but have been relatively less active as interest rates have increased and pricing uncertainty remains elevated. As coined by Schumpeter, “creative destruction” is a necessary part of the movement toward increased longer-term efficiency, and the next few years will be critical in determining and shaping the production system realignments that will occur.

PACIFIC NORTHWEST

Market

The Pacific Northwest (PNW) includes the incredibly productive and diverse agricultural regions of Washington and Oregon. Washington leads with roughly \$13 billion in annual agricultural production with over two thirds of that represented by crop production. Apples represented about 16% of the state's total value of agricultural production (slightly down from its historic share) and account for more than 70% of the total U.S. production. Milk production ranks second with wheat, cattle and potatoes rounding out the top five. Washington is also the top U.S. producer of blueberries, hops, pears, and sweet cherries, and it is the number two U.S. producer of apricots, asparagus, grapes, potatoes, and raspberries. In total, over 300 agricultural products are commercially grown in Washington, and the flexibility to shift production based on evolving demands is a key differentiating feature for the region.

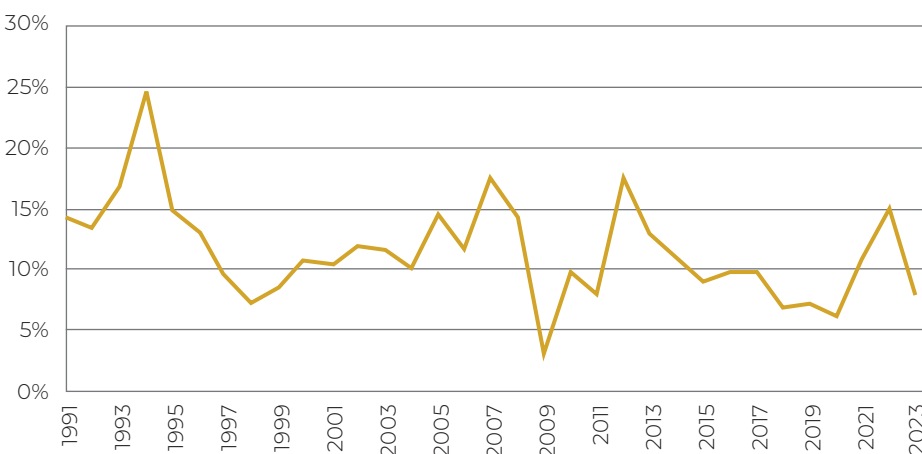
Oregon's total annual value of agricultural production is about half that of Washington's, but also produces an incredibly diverse set of more than 220 crops over 16 million acres of production. Oregon is viewed as a progressive state with a family-farm centric ethos, and higher than average share of women in ownership or leadership positions.

The top commodities produced in the state are hay, milk, wheat, potatoes, wine grapes, berries, hazelnuts, and pears. It is noted for its major wine grape and berry production regions and has a very strong dairy sector as well.

It is worth noting that Idaho, in a neighboring production region, directly competes with eastern Washington and Oregon. Idaho and Washington together form the top potato production region in the U.S., growing approximately with Idaho accounting for about \$1.5 billion and Washington accounting for just under \$1 billion in annual sales. In addition to potatoes, Idaho ranks first in the nation for production of barley, and alfalfa hay. The state is also the second largest grower in the U.S. of sugar beets and hops, and Idaho is the third largest producer of cheese and milk. Key features of the PNW region

include massive water resources and a highly developed water rights system. Some slight drought concerns remain for northwest portions of Washington and sub areas of the Willamette Valley, but have substantially abated relative to the previous year. And, while some portions of the Pacific Northwest do face specific water supply constraints, producers with access to the Columbia River water system and historic permitted wells hold a major advantage relative to those in other parts of the country. Enforcement and allocation issues are always in the news, but approximately 8 million acres are irrigated with water from the Columbia River representing only about 6% of the Columbia River Basin's yearly runoff. Hydropower from dams in the region results in the area also having clean energy sources that rank among the most affordable in the United

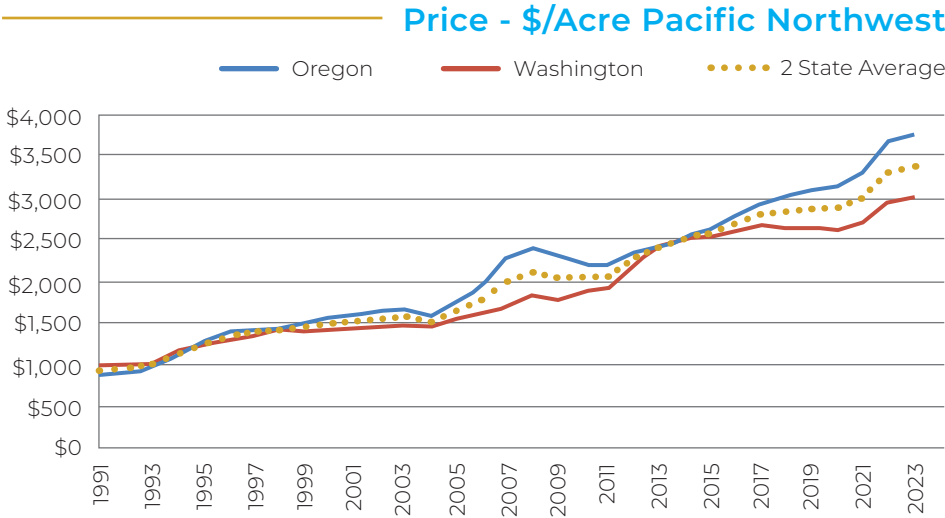
Total Return/Year



States. Low-cost energy for irrigation results in a substantial cost advantage compared to some parts of California for example, where electricity costs can be roughly 10 times as expensive per kwh. The irrigation infrastructure in the region is highly developed, and water rights are correspondingly highly influential in determining best uses, and production locations for major crops.

Headwinds for the region are reasonably light but include continued labor issues and the need to manage production and harvesting costs under emerging laws related to overtime and temporary worker treatment. Wine grape production in the region is also strong but consolidating and reorganizing with stories related to loss of access to historic marketing channels, and the need for more scale increasingly of note. The large recent sale of the Chateau St. Michelle in 2021 has continued to create ripples in the industry as production systems supporting the industry adjusted. Land transaction volumes have slowed dramatically, but the longer-term turnover patterns tend to revert through time with indications of a bit of a “back-log” for land sales. High demand remains and sales prices have also remained reasonably strong.

Turning to the financial performance of agriculture in the region, the Pacific Northwest has been among the strongest performing regions, despite some recent issues with apple prices, and export market access for other crops. The pattern for land appreciation in the region



has been notably smoother than in other production regions, and both small and large-scale investment opportunities exist with a mixture of institutional scale and family farm sized operations. Over both the most recent three-year cycle, and over the long term since 1991,

gross returns have averaged around 12% per year, representing an exceptionally attractive investment with low annual income risk and reasonably stable appreciation. Those features of the returns pattern make the region particularly attractive for long duration investors in particular.

PACIFIC NORTHWEST

2 State Average	1991-2023	2010-2023	2014-2023	2021-2023
Income	8.02%	6.72%	6.43%	6.32%
Capital Gain	4.14%	3.68%	3.41%	5.50%
Total Return/Year	12.16%	10.40%	9.84%	11.83%
AfterTax and Exp	11.51%	10.10%	9.34%	11.35%
Ptax and Exp	0.65%	0.29%	0.50%	0.48%

PACIFIC NORTHWEST SUMMARY

The Pacific Northwest remains in an attractive position to continue to absorb displaced production from other areas due to its flexibility in productive capacity, low energy and water resource costs, proximity to West Coast consumers, and increasing reputation as a supplier of vegetable crops, specialty crops, wine grapes, along with dominantly established hay, wheat, potatoes, dairy, apples, and seed production industries. The historic performance of the region and the versatility to respond to changing demand conditions suggest that the future will remain among the top performing regions into the future.



Market

The Delta region is comprised of Arkansas, Mississippi, and Louisiana. The region's agricultural outputs include rice, soybeans, corn, sugarcane, cotton, grain sorghum, and peanuts on the grain side, and over 1.6 billion chicken broilers per year. Farmland productivity levels and values generally lie on a gradient from the Mississippi River with higher values the nearer the river. The region has good to excess rainfall, and groundwater resources that are well-suited for irrigation. However, the Delta does suffer from higher weather risks, including periods of excessive heat and catastrophic excessive rainfall events that result in flooding and soil erosion. Access to the river transportation system results in a much stronger basis than in areas where transportation costs to final markets are higher, though recent low-water events have strained that channel to export markets as well.

With annual production valued at about \$20 billion, Arkansas agriculture represents the largest single industry, according

to the Arkansas Department of Agriculture. Operating approximately 42,000 farms across 14 million acres, Arkansas is the top producer in the region. The state ranks first in U.S. rice production, producing nearly 50% of the nation's rice at a value close to \$1.4 billion with well over half exported. Agriculture in Mississippi is a \$9 billion industry, employing over 17% of the state's workforce, according to the Mississippi Department of Agriculture & Commerce. There are approximately 35,000 farms in the state covering 10.4 million acres (for context, there are also 19.2 million acres of forest land in the state). The Big-4 outputs are corn (\$630 million), cotton (\$625 million), cattle/calves (\$318 million) and catfish (\$260 million). Louisiana is a large poultry grower with sales of roughly \$2 billion, and the second largest sugarcane producer in the U.S. behind Florida, with annual production worth nearly \$1.2 billion. The state's other top commodities include soybeans (\$712 million), cattle (\$465 million), rice (\$506 million) with aquaculture and feed grains each adding about \$500 million.

The Delta is also well known for being the home of Walmart - the largest food retailer in the world, Tyson Foods - the largest poultry and meat processor in the nation, and Riceland Foods - America's largest rice exporter.

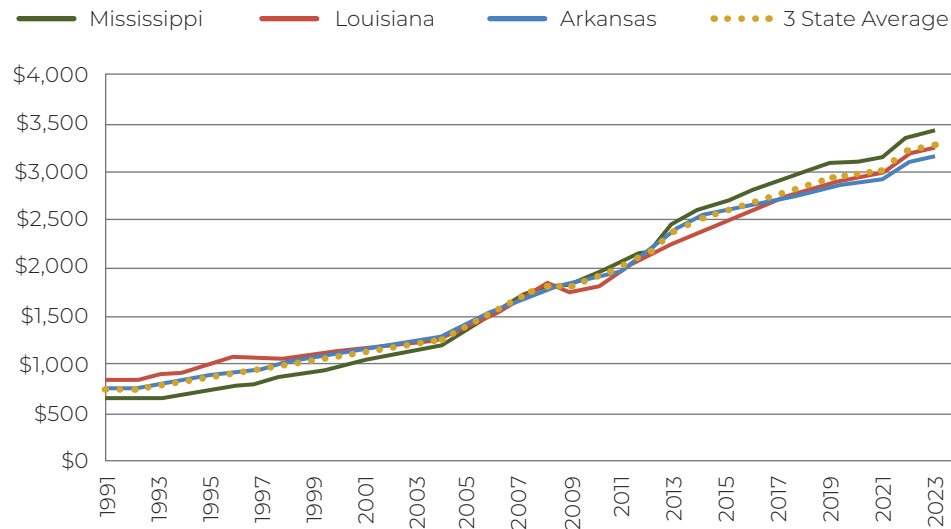
Access to these off-takers and market makers allows integrated livestock and agricultural operations to thrive in the Delta. The Delta also tends to have larger farmland tracts and highly productive soils, with a very visible focus of institutional owners. Agriculture in the Delta was described as being "less democratized" in the sense that there are fewer bidders and sellers for farmland, larger tracts, less developed systems of farm managers around tenant networks, and an evolving identity pursuing larger scale, highly efficient commercial farms while still having a reasonable number of local smaller scale farms. While agriculture in the region has traditionally focused on row crops, there is a growing effort to attract large-scale vegetable operations and develop the infrastructure associated with vegetable and small-format fruit production, bringing competition to other areas in the U.S. that are facing higher pressures from population growth and water scarcity. Transactional volumes in 2023 slowed to a crawl, but values held or even increased. Anecdotally, more of the sales moved "off market"

with a few institutional fund transactions nearing end of life. And, considerable attention is

being paid to foreign ownership issues with state-mandated study bills, and legislative

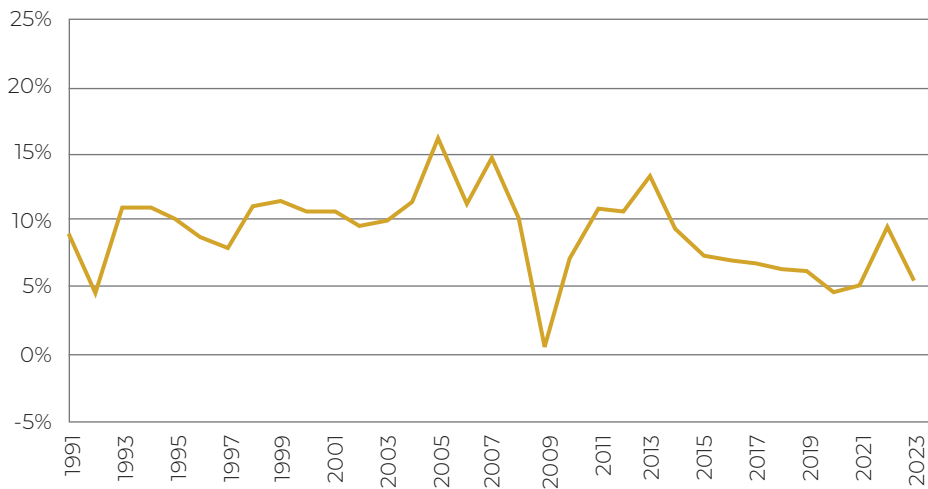
considerations of additional restrictions on ownership and use. Development of solar and wind resources in the region has also begun to increase, but not to the point of meaningfully affecting production acreages.

Price - \$/Acre Delta



Annual price appreciation and annual income features of the region are comparable if not a bit tame compared to other row-crop production regions, with it noted that the Delta performs much like a throttled version of the Corn Belt, with similar but slower and somewhat more muted reactions to major market forces. The volatility in returns has also been fairly mild and annual cash returns are highly predictable.

Total Return/Year



DELTA

3 State Average	1991-2023	2010-2023	2014-2023	2021-2023
Income	4.89%	3.89%	3.78%	3.69%
Capital Gain	4.71%	4.40%	3.30%	3.35%
Total Return/Year	9.60%	8.29%	7.08%	7.04%
AfterTax and Exp	9.06%	7.82%	6.75%	6.72%
Ptax and Exp	0.53%	0.46%	0.33%	0.33%

DELTA SUMMARY

The Delta faces its own unique challenges, but lower land costs, plentiful water, larger parcel size, and the opportunity to enhance profitability with more sophisticated farming methods have attracted—and will continue to attract—the attention of investors in the region. The longer-term return performance is highly competitive, even if the transactional market volume has been challengingly low in terms of making acquisitions and gaining exposure at scale to the region's agriculture.



LAKE STATES

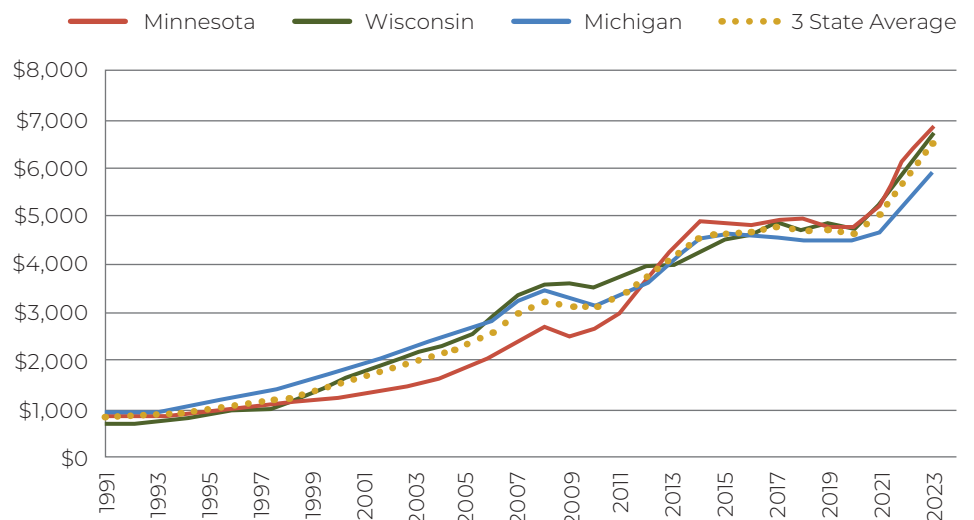
Market

The Lake States region primarily includes Michigan, Minnesota, and Wisconsin. The region shares some features with the Pacific Northwest in that there are numerous microclimates influenced by bodies of water and incredible diversity in the agricultural industries supported. Michigan has the most varied production in the region, with areas of row crop production as well as large regions driven by apples, stone fruit, berry/cherry production, and a growing wine grape region. Wisconsin has an agricultural history driven by dairy production and crops used to support livestock, but the concentration and emergence of large-scale dairies in the West and Southeast have led to consolidation of the dairy industry in the Lake States as well. The lower tier of counties in Minnesota are nearly indistinguishable from neighboring areas in Northern Iowa with high-quality soils primarily used for corn and soybean production.

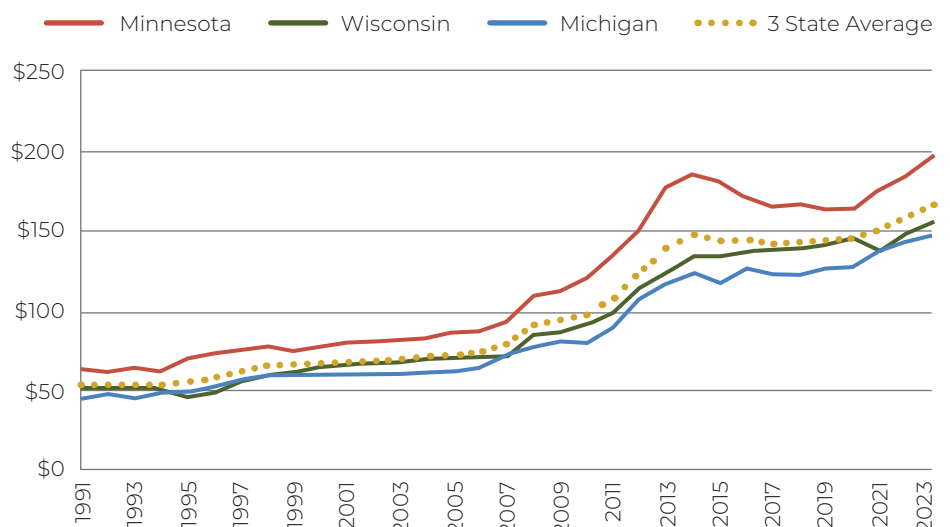
Michigan produces more than 300 different types of food and agricultural products across more than 9 million acres of farmland

in 44,000 farming operations. Michigan is known for its apples (third in the U.S. in production at over 1 billion pounds per year) and Montmorency tart cherries (first) and sweet cherries (fourth). The state is the sixth largest producer of milk, ranks second in the nation for the production of all dry beans, and is the leading U.S. producer of potatoes for

Price - \$/Acre Lake States



Cash Rent - \$/Acre Lake States



potato chip processing according to the Michigan Economic Development Corporation. The blueberry industry has faced challenges from other parts of the country and from varietal obsolescence over the past few years, but conversion to other crops is relatively easy and alternatives exist within the ongoing equilibrium-seeking ag markets. Institutional investors were very active in Michigan historically, but few large-scale acquisitions or dispositions occurred in the past year. In many ways, Michigan has the greatest opportunity to continue to define its agriculture with the greatest optionality of the states in the Lake region.

Minnesota also has around 67,000 farms operating on over 25 million acres with the leading crops being corn and soybeans – primarily in the lower portions of the state. Sugar beets, wheat, and pulses (beans, lentils, and peas) are grown in the Northwest in the Red River Valley. Minnesota also has a mixture of dairy, beef cattle, and poultry production as well.

Wisconsin (known as America’s Dairyland) is home to nearly 1.3 million cows and over 6,300 dairy farms producing over \$5.8 billion of dairy products per year ranking it second in the U.S. behind California. Wisconsin cheesemakers produce 25% of the nation’s cheese – over 3.4 billion pounds annually. The entire ag sector in Wisconsin adds \$105 billion annually to its economy with dairy contributing over \$45 billion, according to the Wisconsin Department of



Agriculture, Trade and Consumer Protection. Wisconsin ranks first in the nation for snap beans for processing, cranberries, ginseng, dry whey for humans, milk goats, and corn for silage, and the state is one of the top producers of processing vegetables.

Returns to farmland in the Lake States have been very strong recently with the most recent 3-year gross average of 14.2% per year, or an estimated 13.6% after property taxes and maintenance expenses.

As can be seen in the graphs as well, appreciation has been especially strong by historic standards, with income remaining steady but at slightly lower levels than in historic periods. As a result, investments in the Lake States appear very attractive over the long term, but like much of the remainder of the U.S., sales volumes have substantially decreased, and sellers appear more cautious about market timing. As noted, values have also held very well, but some concern is beginning to emerge about longer-term market prices for major outputs.

LAKE STATES

3 State Average	1991-2023	2010-2023	2014-2023	2021-2023
Income	3.81%	3.06%	2.99%	2.76%
Capital Gain	6.63%	5.41%	4.63%	11.44%
Total Return/Year	10.44%	8.47%	7.62%	14.20%
AfterTax and Exp	9.60%	7.87%	7.02%	13.57%
Ptax and Exp	0.84%	0.60%	0.61%	0.64%

LAKE STATES SUMMARY

The Lake States farmland performance has benefitted from steady production of basic commodities and fruits and vegetables, and a natural symbiosis with the livestock industries in the region. While row crop yields and prices are both lower than in the corn belt, the financial performance has been similar with recent years slightly outpacing the Corn Belt. The balance in the market between steady prices and low volumes of land traded is likely to continue for some time as the region continues to produce low-risk crops while having options for conversion that are more valuable and flexible than most other regions.



SOUTHEAST

Market

The Southeast market includes Florida, Georgia, Alabama, and South Carolina (and though excluded from the NCREIF Region, North Carolina is sometimes considered in the SE as well). That collection of states spans an immense region with highly differentiated crop production by region. The area does have a warmer climate, flatter lands in general, and good water availability but also faces severe weather and flooding, inadequate access to farm labor, and competition with residential uses for growing populations.

Florida's once thriving fresh market citrus industry has struggled to maintain scale and profitability due to the Huanglongbing (HLB), or "Citrus Greening," crisis. The citrus that remains is primarily used for production of juice oranges and grapefruit. The state is the top U.S. producer of fresh tomatoes, fresh sweet corn, and watermelon, representing about 54%, 36% and 32%, respectively, of the nation's cash receipts for those crops. Florida also leads the country in the production of sugarcane for sugar, producing

16.5 million tons in 2021, or 51% of the nation's total. Other significant commodities include vegetables such as bell peppers, cucumbers, and cabbage, leading to the state having the second highest cash receipts in the U.S. for all vegetables and melons behind California. Overall, Florida generates around \$8 billion in agricultural sales each year.

Georgia's farm-level agricultural output is larger than Florida's at approximately \$10 billion annually. The top valued agricultural output is now broilers (chickens) with \$4.2 billion in annual sales followed by cotton with around 2.2 million bales worth over \$1 billion. Representing 51% of the nation's peanuts market, the state produces around 3.3 billion pounds of peanuts annually, making it the top U.S. producer. Georgia also ranks second in the nation's production of pecans, onions, and broilers, with shares of 33%, 14%, and 13%, respectively, of the total cash receipts for those commodities. Despite being known as the "Peach State," Georgia only has about 8,200 acres of peach production that accounts for about \$35

million in annual sales which ranks it third in the U.S. for peach production behind California and South Carolina.

North Carolina's agricultural production generates \$10-13 billion in annual cash receipts, with 66% coming from livestock, dairy, and poultry, and the remainder from crops. The state ranks in the top five for several commodities, including tobacco, sweet potatoes, poultry and eggs, cucumbers, and bell peppers. North Carolina produced 47% of the nation's tobacco and 58% of the country's sweet potatoes in 2021.

Agribusiness is South Carolina's largest economic sector, contributing nearly \$42 billion and over 200,000 jobs to its economy, according to the state's Farm Bureau. South Carolina has the third most timber acreage in the U.S., behind Georgia and Oregon. South Carolina has crop enterprises on about 5 million acres of farmland, with the state's top commodities including corn, cotton, hay, soybeans and peanuts, South Carolina generated almost \$8 billion in agricultural sales forecast for 2023.

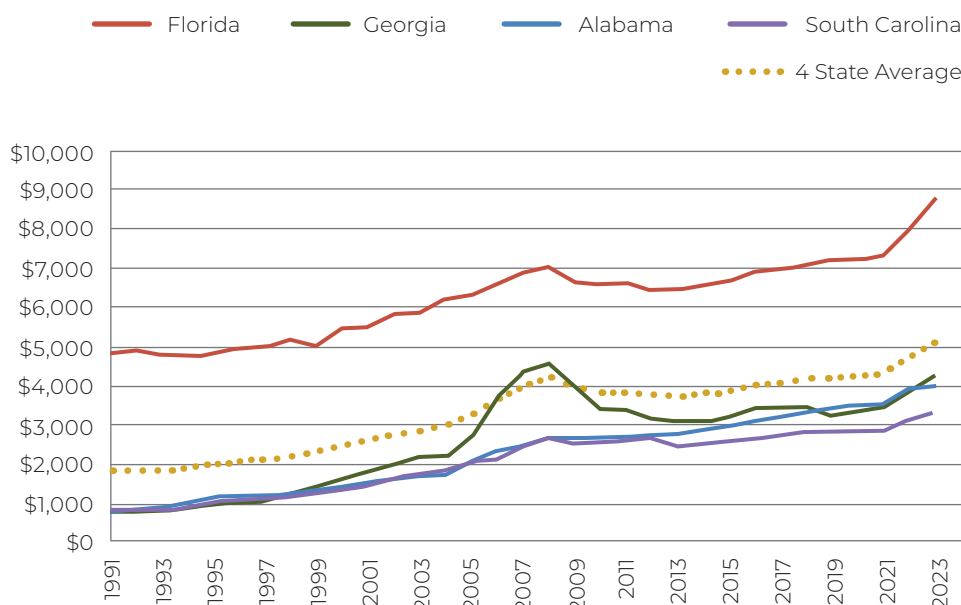


Alabama has 38,500 farming operations covering 8.2 million acres. Corn was the top commodity produced in the state in 2022, followed by cotton, which is grown in 59 of Alabama's 67 counties. Producing almost 610 million pounds of peanuts in 2021, Alabama is the nation's second largest producer behind Georgia. Rounding out the major agricultural enterprises, Alabama producers rank second or third most years in poultry production with Alabama Poultry and Egg Association reporting that the industry accounts for more than \$15 billion in total annual revenue.

Agricultural production is undergoing continued change in the Southeast, in particular in Florida and in coastal areas suitable for residential and lifestyle uses. Moreover, recent impacts of bird flu and associated decimation of the poultry populations has led to wider swings in profitability and production though 2023 and appear to have been an upturn for that industry.

The interaction between population growth and farmland in production uses is one of the key features of this region to continue to monitor.

Price - \$/Acre Southeast



SOUTHEAST

4 State Average	1991-2023	2010-2023	2014-2023	2021-2023
Income	2.03%	2.03%	2.10%	2.08%
Capital Gain	3.46%	1.89%	3.27%	6.36%
Total Return/Year	5.49%	3.89%	5.37%	8.44%
AfterTax and Exp	6.20%	3.78%	5.14%	7.99%
Ptax and exp	-0.72%	0.11%	0.23%	0.45%

SOUTHEAST SUMMARY

The Southeast remains a set of fairly distinct markets presenting different problems and opportunities for agricultural asset owners. Florida has largely recovered from its most recent hurricane event and is still reinventing its agricultural industry after the loss of much of its fresh-market citrus industry. On the bright side, development opportunities, retirement transitions, and lifestyle “farming” have supported the state’s overall income. Georgia and the Carolinas have reentered the conversation about attractive places for agricultural investments and offer consolidation opportunities and diverse cropping options as well, and the recent returns data show a resurgence in performance after a long period of average to lower relative performance.

The Northern Plains containing Kansas, Nebraska, North Dakota, and South Dakota has emerged as a top performing region over the past several years through rapidly appreciating values and strong income production.

North Dakota has emerged as a major producer with a large land mass of 39 million acres devoted to agriculture. The top enterprises are wheat, edible beans, canola, and livestock, with sugarbeets, corn, soybeans, barley, and sunflowers representing highly valuable specific region crops. Farm sizes are large, and average land values are lower reflecting the lower general productivity of the state's soils, but certain regions have emerged as prime corn production areas as genetic improvements, and climate risk changes are being recognized.

South Dakota has over 43 million acres devoted to agricultural production with just under a third devoted to corn and soybean production (and the areas considered most investable). The southeastern corner of the state, defined by the area between the Missouri River and Big Sioux River, had a major flood event in 2019 that substantially affected production, but shares some similarities with NE Iowa and SW Minnesota, though with somewhat lower productivity potential soils and a history of higher weather risk. South Dakota has attracted significantly more hog and dairy production over the past decade and has also boosted yield and productivity measures in primary crops through



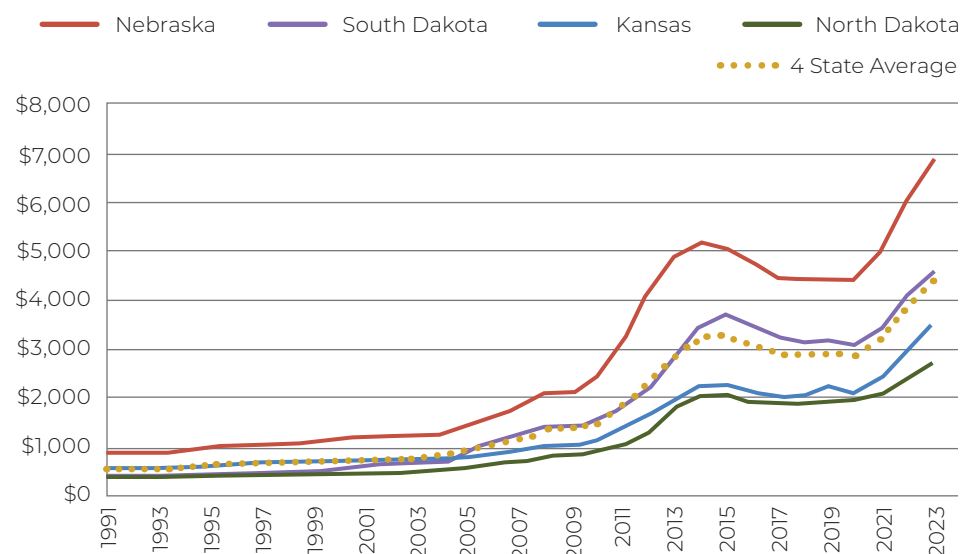
Market

genetic improvements and management practices with shorter season crops.

Nebraska has 45 million acres devoted to agricultural production and typically ranks in the top five states in terms of total agricultural production values. Ranked in order of value of production are: cattle and calves, corn, soybeans, hogs, dairy, hay, and wheat. As the state with the largest number of irrigated acres, Nebraska faces perennial issues related to risk

of drought and its dependence on the Ogallala aquifer for irrigation on about 9.3 million acres (NDEE, NDR). Additionally, Nebraska has been grappling with issues related to property taxation as it has one of the highest effect agricultural property tax burdens of the region. In 2023, the legislature did pass a bill to increase the minimum tax credit in a manner that is understood to generally help farm-level property tax burdens, but the larger system of taxation remains contested.

Price - \$/Acre Northern Plains



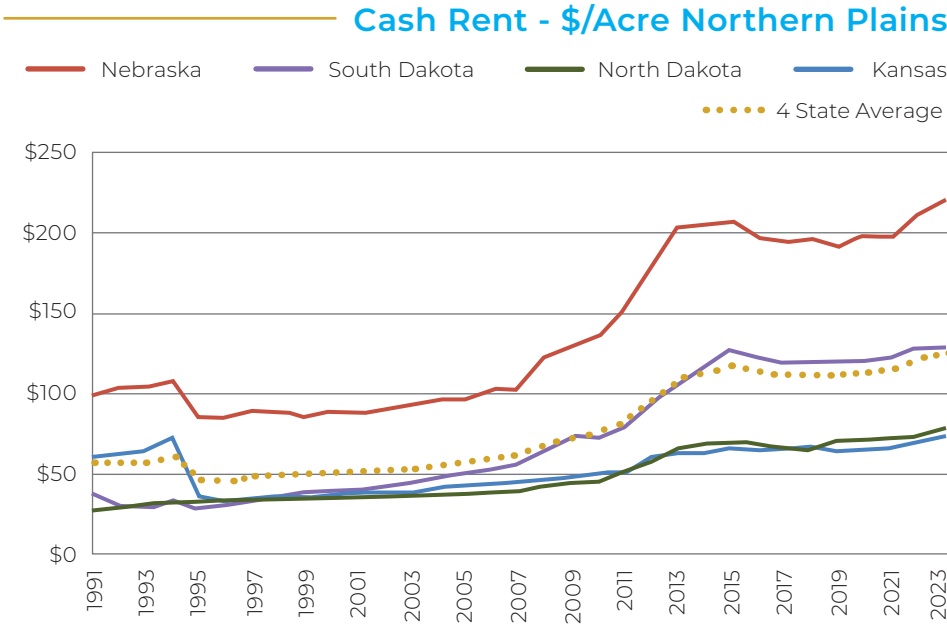
And, while not fully settled, there is optimism that there will be successful and meaningful reform emerge from the focused attention on the issue.

Kansas, known as the Sunflower State, has experienced the greatest rate of price appreciation of the states in the Northern Plains over the past three years, and has had the highest total return as well. Kansas includes 45.7 million acres devoted to agricultural production with major commodities in order of output value including cattle, wheat, corn, sorghum, and soybeans. Despite its name, Kansas ranked fourth in the U.S. in sunflower production, in part because of the relatively higher valued crops that are suitable for production on the same land. Kansas ranks third in beef production but still supplies nearly 7% of the country's beef. As with Nebraska and parts of western Oklahoma and Texas, water issues related to the declining Ogallala Aquifer remain crucial to manage, especially in the western and west-central regions of the state. Kansas' land value appreciation rates have been among the top in the country over the past three years, and thus its total return pattern has been impressive as well.

All four of these states have some version of anti-corporate farming restrictions that limit the degree to which institutional investors can own farmland.

While there is substantial debate and reasonable arguments on both sides, the economic implication would generally be thought to be a reduction in demand for farmland, with a potential implication of less

support in times when land values might fall. That potential issue has not been remotely tested however in the recent few years where this region has witnessed the highest appreciation rates in the country.



NORTHERN PLAINS

4 State Average	1991-2023	2010-2023	2014-2023	2021-2023
Income	5.98%	3.83%	3.59%	3.19%
Capital Gain	6.89%	9.38%	4.74%	15.36%
Total Return/Year	12.86%	13.21%	8.33%	18.55%
AfterTax and Exp	11.49%	12.47%	7.90%	17.65%
Ptax and Exp	1.37%	0.74%	0.43%	0.91%

NORTHERN PLAINS SUMMARY

The Northern Plains has been an incredible performer in terms of returns to cropland over the 30-plus year window tracked. Strong support from underlying related agribusinesses and heavy dependence of states on agriculture as its main underlying industry provide a strong business climate for success. Lower historic relative cropland values and acceleration in production advances created a kind of “operational leverage” in gearing up the returns per dollar of underlying asset value. Water issues will continue to be critical issues to manage, but emerging demands for greener energy sources from wind and solar also favor this region in the long term.



SOUTHERN PLAINS

Market

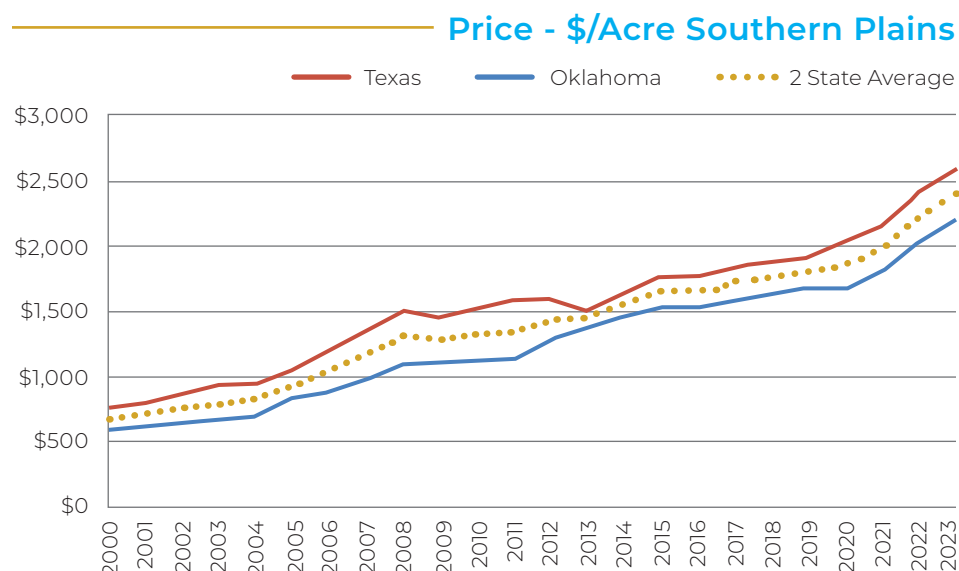
The Southern Plains region of the United States is represented by Texas and Oklahoma which combine for over 160 million acres of crop and pasture/ranchland. Due to the sheer size of the area, it represents a substantial portion of the agricultural land mass in the U.S. and is responsible for a large share of both beef and wheat production. It also occupies a pivotal role in the energy market complex, both for traditional oil and gas production, and as a corridor for wind and solar energy conversion potential in the future.

Texas leads the nation in beef production with over 4.4 million beef cows and over 15 million calves and cattle on feed. Its broiler industry is growing rapidly with nearly 725 million broilers produced annually. The primary agricultural activities surround cattle, wheat, and a growing poultry presence. In terms of annual production values, Texas'

annual production values are \$12.3 billion cattle, \$2.9 billion broilers, \$2.6 billion cotton, \$2.1 million milk products, over \$1 billion corn, and \$500 million sorghum. While these numbers are exceptionally large, they are dwarfed by the value of oil and gas production in the state which has provided incredibly

strong support for state and local governments through royalties and taxes, and for landowners through energy rights leases and production payments.

Oklahoma is second in the country in beef production behind Texas, with roughly one-third of the scale in terms of cows and cattle on feed. Oklahoma ranks second in the U.S. for hard red winter wheat production and third for total bushels harvest of all wheat. Oklahoma has a relatively diverse set of production regions with strong areas devoted primarily to sorghum, soybeans, and cotton as well. The Southern Plains states are prone to periodic droughts. In response, the irrigation infrastructure has been built up through time with significant upgrades to improve efficiency in use, but water access and cost remain key issues for the future. There are ongoing efforts to develop more drought-resistant crop varieties to sustain agricultural productivity, and farmers and ranchers also

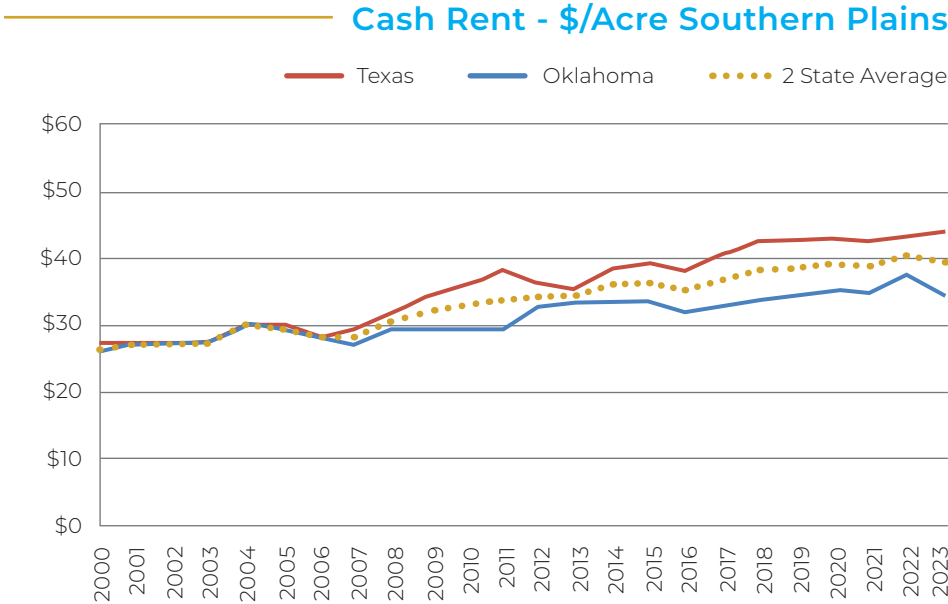


have embraced conservation practices to ensure the long-term sustainability of the land.

The energy industry in the Southern Plains is a dynamic and influential sector that plays a pivotal role in shaping the region's economic landscape and in turn land values.

Renewable energy efforts have also gained significant traction in the Southern Plains, with the region emerging as a major player in wind energy production. Wind farms in Texas and Oklahoma take advantage of consistent winds that sweep across the plains, contributing to a substantial portion of the region's and nation's total wind power capacity. This diversification towards renewables aligns with broader trends in the energy industry, reflecting a growing emphasis on sustainability and reduced reliance on fossil fuels. Solar projects are also gaining momentum, taking advantage of the abundant sunlight in the region and relative valuations of land for alternative uses. The development of solar farms, coupled with advancements in solar technology, positions the Southern Plains as a promising player in the solar energy market for the future.

The energy industry's impact on the Southern Plains extends beyond production, influencing infrastructure development, job creation, and economic growth. The region's strategic location,



well-established transportation networks, and supportive regulatory environment have attracted significant investments, leading to the expansion of

energy-related infrastructure, including pipelines, refineries, and power plants as well as major import/export linkages in the crude oil space.

SOUTHERN PLAINS

2 State Average	1991-2023	2010-2023	2014-2023	2021-2023
Income	2.57%	2.17%	2.06%	1.80%
Capital Gain	5.62%	4.58%	5.18%	8.90%
Total Return/Year	8.19%	6.75%	7.24%	10.70%
AfterTax and Exp	7.97%	6.59%	6.83%	10.34%
Ptax and Exp	0.22%	0.15%	0.42%	0.36%
CPI	2.57%	2.62%	2.90%	5.96%
CMT-10	3.31%	2.50%	2.48%	3.33%

SOUTHERN PLAINS SUMMARY

The energy industry in the Southern Plains is a powerhouse, driven both by its agricultural outputs and its role in the energy complex in the U.S. It stands to maintain its leadership in both the traditional oil and gas production sector and in the rapid growth of renewable energy sources. The region's ability to navigate both water and energy-related challenges, and to continue to evolve with consumer's protein demands, will be crucial in determining its long-term success and impacts on land values that result.

CORN BELT

Market

The Corn Belt includes the relatively homogenous row-crop heavy production region across much of the Midwest, including Iowa, Illinois, Indiana, Ohio, and Missouri. Iowa and Illinois rank first and second, respectively, in the value of agricultural outputs in the region, and all five states rank in the top 13 nationally in terms of agricultural production value, each in the top 10 for corn and soybean production.

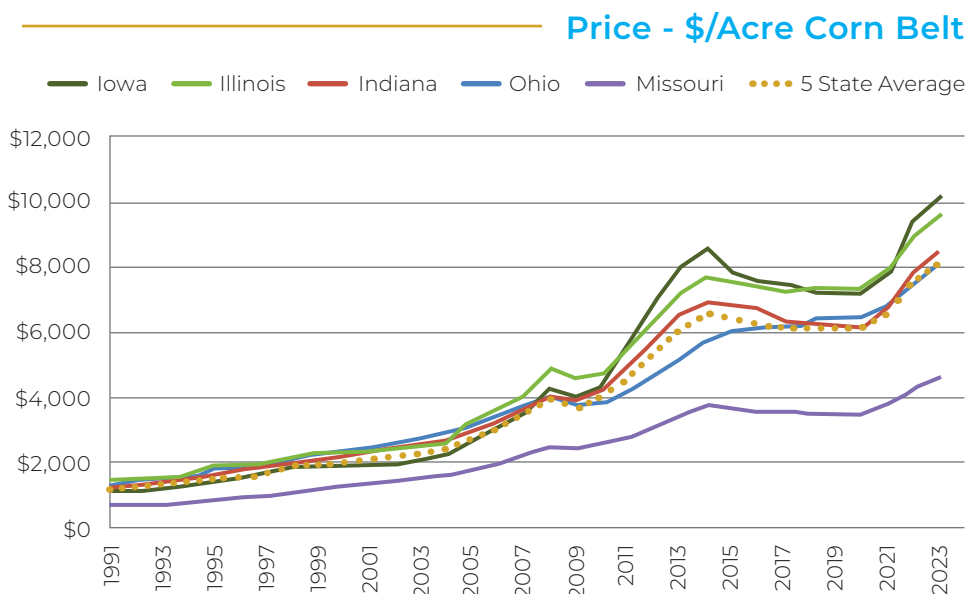
of steady annual income that follows and generally exceeds the return to Treasuries, with reliable but more variable appreciation over time. Total returns have been competitive or have exceeded returns from investments in publicly traded equities with much lower volatility, but the “thin market” and heterogeneous nature of farm investments does make access to the asset class more complicated than direct

investments in equities. As noted in the overview, but at an even more profound level, farmland investments in the Corn Belt have served as remarkable inflation hedges with highly correlated returns that have exceeded inflation in all but a few distinct years. Additionally, the Corn Belt tends to be somewhat of a leading indicator for returns in other parts of the country with exposure to coarse grain production and tends to register both increases and decreases in economic fortunes a bit ahead of the regions such as the Delta and PNW to some degree.

Farmland in the Corn Belt has continued its remarkable recent run of years with high appreciation rates and above-average farm incomes. However, transactional volumes have slowed considerably in the later parts of 2023, and there remains a sense of caution about future sales volume returning in 2024. Neighboring farmers have always been the primary

The total value of production exceeds \$125 billion in receipts across all commodities in the region annually.

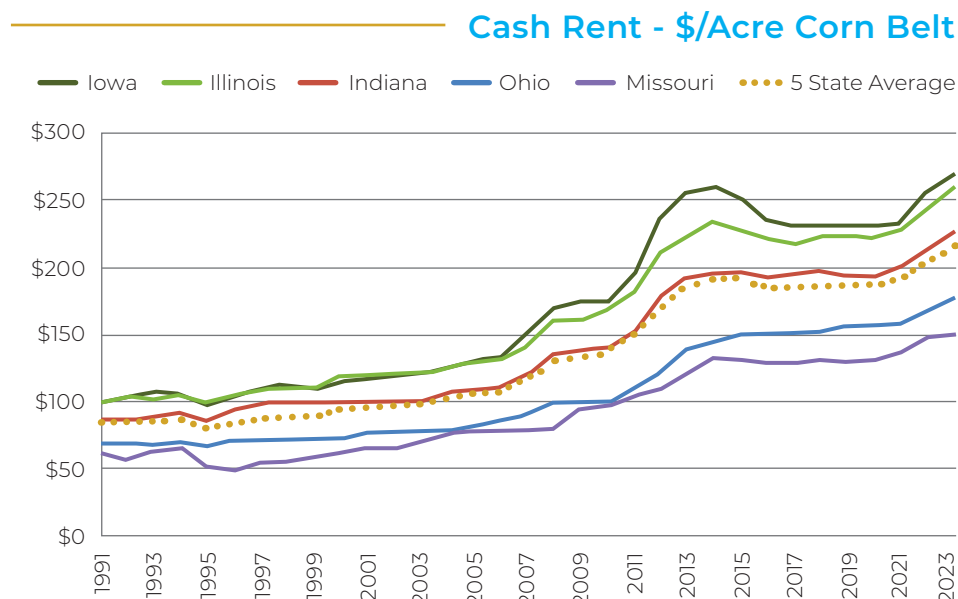
As suggested by the name, the region dominates in the production of corn (and soybeans) with Illinois and Iowa combining for over 30% of the nation's total annual production. The financial performance of investments in the Corn Belt can be characterized as a long history



purchasers of farmland in the Corn Belt, but the share of active farmer cash purchasers has increased markedly as higher current interest rates have kept some leveraged buyers and institutional buyers on the sideline. The market has shown considerable strength with prices leveling or backing off only slightly from the peaks in early to mid-2023. High-quality farmland in the Corn Belt is truly viewed as the gold standard for agricultural investments in any case, so it shows the greatest residual demand of any region and has the greatest concentration of “deep pocket” buyers of any region of the country.

The basic economic factors that drive the farmland markets in the Corn Belt can be summarized as income, interest rates, and inflation. On the farmer side, income potential is the most important factor whether for purchasing or for paying cash rents to control the land. A collection of positive factors over the past few years included a run-up in commodity prices along with the attendant support of crop insurance prices, a strong balance sheet effect from the series of government payments stemming from the trade war with China, and pandemic-related payments, strong world demand signals, and ever-increasing choruses calling for payments to support future conservation and carbon sequestration efforts at the field level.

Turning to the impact of elevated interest rates, the sector carries very low aggregate long-term



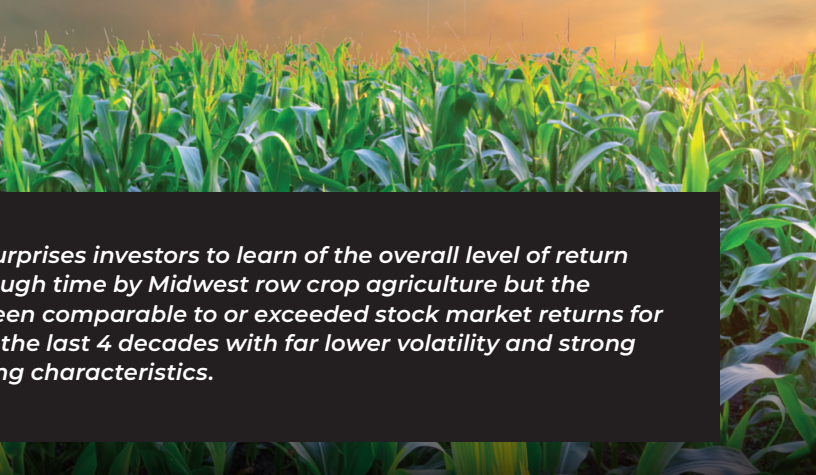
real estate leverage at about 13%, and much of that is in fixed-rate financing that to some degree became locked in with increases in new-money borrowing rates over the past 18 months. Operating loans do represent an increased burden, but for many operators, even a 4% increase in their operating line rates equates to just a few bushels of production. The main effect of increased interest rates is probably to limit the interest of investor-buyers who typically carry more leverage than individual farmers. Finally, the rationalization of expected inflation at new higher levels

compared to the levels artificially held low following both the housing crisis and the pandemic actually bodes well for long-term farmland prices. In total, the “valuation” effects in farmland have shifted a bit toward the appreciation side and away from the current income side, but apparently with little impact on long-term expected total returns.

The table below summarizes the performance of the region along with the ten-year treasury rate (CMT-10) and the inflation rate (CPI) for reference as well. As shown, the recent few years has resulted in very attractive returns

CORN BELT

5 State Average	1991-2023	2010-2023	2014-2023	2021-2023
Income	4.02%	3.02%	2.93%	2.75%
Capital Gain	6.15%	5.93%	3.13%	10.10%
Total Return/Year	10.18%	8.95%	6.06%	12.85%
AfterTax and Exp	9.61%	8.47%	5.72%	12.30%
Ptax and Exp	0.56%	0.48%	0.34%	0.56%
CPI	2.56%	2.62%	2.90%	5.96%
CMT-10	4.17%	2.50%	2.48%	3.33%



to Corn Belt agriculture and has maintained or expanded the margin over inflation (though the average inflation rate will likely continue to increase as forward periods with new higher levels are added). And remarkably, correlation with inflation over the last decade has exceeded 75%, with nearly lock step turning points as well.

Farmland markets in the Midwest in general continue to move toward cash rent and flexible cash rental arrangements with a tick up in custom farming arrangements as well. About 60% of total acreage is leased in the Corn Belt and these lease arrangements are viewed as “sticky” for many reasons. The result to those outside the ag sector may appear to be slow to respond, as rental rates tend to move less quickly than annual incomes, with the resulting smoothness of annual returns to investors being incredibly stable.

The transactional pace question that has many concerned in the farmland brokerage space is whether the volume of transactions will return to its more normal historical levels. The long-term volume of agricultural land brought to market in arms-length transactions has been about 1.5% of total acres over much of the Corn Belt. From late 2020 through parts of 2022, the volume was meaningfully higher than historical averages but has slowed significantly in nearly all markets. This pattern raises the question about whether the previous period represented an abnormal acceleration, or

It sometimes surprises investors to learn of the overall level of return generated through time by Midwest row crop agriculture but the returns have been comparable to or exceeded stock market returns for the majority of the last 4 decades with far lower volatility and strong inflation hedging characteristics.

whether there is a building balance of transactions that will accelerate in the future if economic conditions change. In either case, the demand for exposure to farmland in otherwise equity-heavy portfolios remains strong, and thus buyers sidelined by higher interest rates are likely to return as well as conditions evolve and interest rate markets normalize.

Farmland is a slow-turnover, long-duration asset with higher acquisition and disposition costs

than pure financial assets, and thus requires intentional and committed acquisition strategies to attain meaningful holdings. The Corn Belt has a great deal of historic and continuing interest by non-operating investors – a feature that is likely to continue and return with capacity to absorb any increase in transactional volume without requiring substantial decreases in prices given the attractive return features of investments in the region.

CORN BELT SUMMARY

The Corn Belt continues to be the most important region for row crop production in the U.S. and thus in turn for the world. The region has performed exceptionally well during recent periods of instability in traditional financial markets, higher returns to alternative investments, and under increasingly unified expectations around inflation. Government payments for, and societal interest in moving toward a lower carbon energy sector have transitioned the conversation about farmland from being cited as a primary pollutant to being recognized as a critical resource to move toward greener energy generation in the future. Interest rate markets (and expected inflation levels) are beginning to normalize, and the rationalization of higher borrowing costs has begun to creep into normal capital costs for ownership while also registering the positive effects of inflation on long-term appreciation. In total, the factors surrounding agricultural production and investment valuation models that create the steady and competitive returns, inflation hedging features, and diversification benefits in the Corn Belt region appear to remain firmly intact in the region for now and into the future.



TRACKING THE PERFORMANCE of FARMLAND INVESTMENTS:

The National Council of Real Estate Investment Fiduciaries (NCREIF) Farmland Index

Investors seeking accurate information about the returns profile they might earn from an investment into a diversified holding of farmland would most likely rely on the National Council of Real Estate Investment Fiduciaries (NCREIF) Farmland Returns data system. While NCREIF is most well known for its family of commercial real estate fund indexes, it also produces indexes for timberland and farmland investments. The NCREIF Farmland data were first made available in 1991, and are reported using a consistent accounting system across all contributing members, and are tracked by location, property type, and management type. The properties in the system are held primarily by qualified institutions (e.g., pension fund and related managers), and are regularly appraised under specific and complete guidelines intended to provide an accurate mark-to-market valuation each quarter. The index contains only commercial-scale properties in active agricultural production, and all returns are reported on a fully accounted accrual unlevered basis to allow a direct

assessment of property-level performance on a common base.

As of third quarter 2023 (most recent available at time of publication), the total market value of the index was \$16.35 billion comprised of \$10.0 billion in annual cropland and \$6.35 billion in permanent cropland across a total of 1,341 properties across 12+ different production regions. Average property values are high relative to the broader population of farms in the U.S. at approximately \$12.2 million per farm. Table 1 (page 33) contains summary information organized in panels from top to bottom that represent different classifications by type, location, and hold period. Returns are presented as annual returns by different hold periods as of each third quarter-end. Each year's property weights are determined by the actual properties in the fund at each point in time.

Over the 32-year history the **Total Farmland** returns have averaged 10.55% per year with a standard deviation of returns of 6.69%. The ratio of the standard deviation to average

return termed the coefficient of variation or CV is viewed as a measure of relative riskiness and is about 63%. For comparison, equity indexes like the S&P or NYSE would run in excess of 200% and individual securities are often well over 500%. The breakdown between annual and permanent cropland in the top panel gives similar lifetime average returns. Annual cropland returns over the previous few years have been exceptional, while low tree nut and fruit prices have hampered the returns to permanent crops. Over the 20-year period, permanent crop returns exceeded annual crop returns by about 2%-2.5% which was historically viewed as a reasonable premium for the higher risk involved in permanent crops. While permanent crops present higher risk than annual crops, both still tend to be safer than equity investments in public securities as measured by CVs or related riskiness measures. The most heavily represented areas for permanent crops are along the west coast, and for row crops, the Midwest and Delta regions naturally dominate the index.

Importantly, the index focuses on commercial-scale operations and has historically shown higher rates of return across the board than measures derived from USDA sources which include a much broader set of farm types and sizes.

The second section of the table shows **Annual Cropland** returns by region ordered by total value. The lower section of that panel also summarizes by commodity, produce, and “all other” to provide a sense of the regions and crop type differences. The longer term averages are more similar than the short term recent performance which strongly favored Corn Belt and Lake State region annual crop production. Annual crops tend to have more stable returns or lower standard deviations than permanent crop returns and are viewed by many as equivalent to “fixed income” with strong appreciation performance.

The section showing **Permanent Cropland** is subdivided by region, type of crop, and additionally by management type – directly operated versus leased. This portion of the table highlights the differences between crop types, periods of time and type of operation. It would be expected that over the long run, directly operated permanent crops would generate slightly higher returns than leased reflecting the additional risk. This relationship holds over the long run, but exposure to a single crop type, or marketing episode can substantially impact the short term returns as shown for almonds in particular.

The final panel in the table groups all asset and management types by **Region Totals** and provides the same information in cases where all the region is only annual crops to highlight those cases. A recent addition to the

reportable portion of the index is the Northern Plains which has performed relatively well over its short period during which it had enough properties to be reported without risk of individual property or manager information being shown. Since its inception over 32 years ago, the index has grown and matured into the most broadly referenced and most reliable source of data for measuring and describing returns to at-scale investments in farmland managed under fiduciary requirements for third party investors. As such it deserves special attention for its relevance both in terms of the actual values, and for comparison to alternative investments. In almost every case, the conclusion remains that farmland is an incredibly good diversifying investment with low relative risk, good inflation hedging performance, and strong capital preservation security.

For more information visit ncreif.org/data-products/farmland/.

Most of the participants in NCREIF Farmland Index are also members of Leading Harvest. This group of investors is putting more emphasis on the environmental aspects of their investments in addition to the financial performance. Investor interest in understanding and reporting their ESG-related impacts has grown and Leading Harvest has emerged as the de facto standard for verifying and reporting sustainability and conservation efforts within the sector. For more information on Leading Harvest, visit LeadingHarvest.org.

TABLE 1 — NCREIF Farmland Property Returns by Type, Location, and Hold Period

	Total \$ Value Q3 2023	1-Year	5-Years	10-Years	15-Years	20-Years	Lifetime	Standard Deviation	Years in Index
Total Farmland	\$16,353,084,652	5.81%	6.13%	7.99%	9.77%	12.45%	10.55%	6.69%	32
Annual Cropland	\$10,008,002,301	10.99%	8.28%	7.24%	9.11%	11.04%	10.01%	4.88%	32
Permanent Cropland	\$6,345,082,351	-1.86%	2.88%	8.88%	10.64%	13.91%	10.84%	9.97%	32
Annual Cropland									
Delta States Annual Cropland	\$2,999,946,419	9.57%	7.69%	6.57%	9.14%	10.49%	9.59%	4.83%	32
Corn Belt Annual Cropland	\$2,200,779,127	17.55%	12.18%	6.79%	10.10%	11.63%	10.44%	7.61%	32
Mountain Annual Cropland	\$1,214,491,079	10.80%	6.25%	6.65%	9.00%	10.49%	9.44%	5.51%	32
Pacific West Annual Cropland	\$1,012,787,010	5.42%	6.50%	8.68%	7.97%	11.25%	10.45%	7.44%	32
Pacific Northwest Annual Cropland	\$566,149,426	6.30%	6.94%	9.56%	10.42%	10.79%	9.04%	6.24%	32
Lake States Annual Cropland	\$564,145,493	14.32%	9.47%	6.56%	7.53%	8.81%	8.31%	6.52%	29
Southeast Annual Cropland	\$617,820,689	10.77%	7.97%	8.14%	7.93%		7.73%	2.60%	16
Southern Plains Annual Cropland	\$321,713,972	8.86%	7.70%	7.05%	8.04%		8.95%	3.69%	17
Annual - Commodity	\$6,142,585,238	13.00%	9.37%	6.72%	9.53%	10.94%	9.92%	5.40%	32
Annual - All Others	\$2,728,452,396	8.98%	6.85%	7.63%	8.36%	11.23%	10.16%	5.83%	32
Annual - Fresh Produce	\$1,136,964,666	5.69%	6.26%	8.23%	8.02%	10.61%	10.04%	7.16%	30
Permanent Cropland									
Pacific West Permanent Cropland	\$5,302,405,978	-3.17%	2.91%	9.99%	12.24%	15.50%	12.70%	12.25%	32
Pacific Northwest Permanent Cropland	\$646,913,872	6.30%	-0.14%	3.07%	4.68%	6.20%	3.55%	11.89%	26
Lake States Permanent Cropland	\$109,550,191	16.88%	9.28%	3.62%	6.39%			13.17%	16
Wine Grapes	\$2,245,212,758	0.90%	2.59%	8.62%	8.50%	9.78%	9.74%	8.71%	27
Almonds	\$1,156,661,008	-10.67%	-0.79%	9.29%	11.46%	16.24%	12.19%	19.88%	32
Pistachios	\$1,116,877,261	-3.26%	9.00%	12.73%	19.30%	21.62%	21.67%	17.03%	21
Citrus	\$494,496,839	0.25%	3.01%	7.45%	7.52%	11.54%	9.16%	10.82%	31
Apples	\$463,192,176	7.46%	-1.27%	1.92%	4.14%	5.97%	2.71%	15.48%	25
Permanent Cropland Operated	\$4,700,189,024	-3.87%	1.94%	8.81%	11.09%	14.54%	11.02%	11.25%	32
Leased Permanent Cropland	\$1,644,893,326	4.28%	5.77%	7.96%	8.71%	11.04%	9.26%	9.41%	32
Region Totals									
Pacific West	\$6,315,192,988	-1.85%	3.45%	9.64%	11.17%	14.49%	12.11%	10.90%	32
Delta States (all ann.)	\$2,999,946,419	9.57%	7.69%	6.57%	9.14%	10.49%	9.59%	4.83%	32
Corn Belt (all ann.)	\$2,200,779,127	17.55%	12.18%	6.79%	10.10%	11.63%	10.44%	7.61%	32
Mountain (all ann.)	\$1,224,491,079	10.94%	6.34%	6.70%	9.04%	10.36%	9.32%	5.37%	32
Pacific Northwest	\$1,213,063,298	6.23%	3.49%	6.32%	7.21%	8.23%	6.73%	7.94%	32
Southeast	\$853,488,512	6.92%	6.62%	7.56%	6.80%	11.19%	8.62%	10.74%	32
Lake States	\$673,695,684	14.85%	9.38%	5.54%	7.53%	9.45%	8.43%	9.62%	29
Northern Plains	\$423,052,083	11.51%	8.35%				5.91%	6.82%	8
Southern Plains (all ann.)	\$321,713,972	8.86%	7.70%	7.05%	8.04%		8.95%	3.69%	17

EVALUATING IMPACTS of TRANSITION TO “NET ZERO” ON FARMLAND VALUES

By **Dave Muth, PhD**

Capital Markets - Managing Director, Asset Management
Peoples Company



In 2021 the U.S. rejoined The Paris Agreement, a legally binding international treaty on climate change, and published “The Long-Term Strategy of the United States, Pathways to Net-Zero Greenhouse Gas Emissions by 2050 [1]. Net zero refers to a balance between the amount of greenhouse gas (GHG) that is produced and the amount of GHG removed from the atmosphere. Agriculture accounts for approximately 10% of total GHG emissions in the U.S. [2]. This statistic often draws negative attention to agriculture, and by extension

to farmland as an asset class. Specific sources of agricultural GHG emissions include methane from cattle production, nitrous oxide from nitrogen fertilizer and soil respiration, and are often identified as targets for regulatory action in efforts to reduce the overall carbon intensity of agriculture.

Achieving a net zero economy will require a fundamental shift in energy sources for every U.S. economic sector. This shift is referred to as the low carbon energy transition, or simply stated, a transition away from

using fossil fuels as a primary energy source toward renewable energy production and low carbon intensity production such as nuclear power. Necessarily, much of the change in energy production methods will occur in agriculturally intensive regions and thus impact the use of farmland.

The conversation about transitioning to a low carbon energy economy has become politically charged with some asserting that it represents an existential threat and that any cost is justified, while others

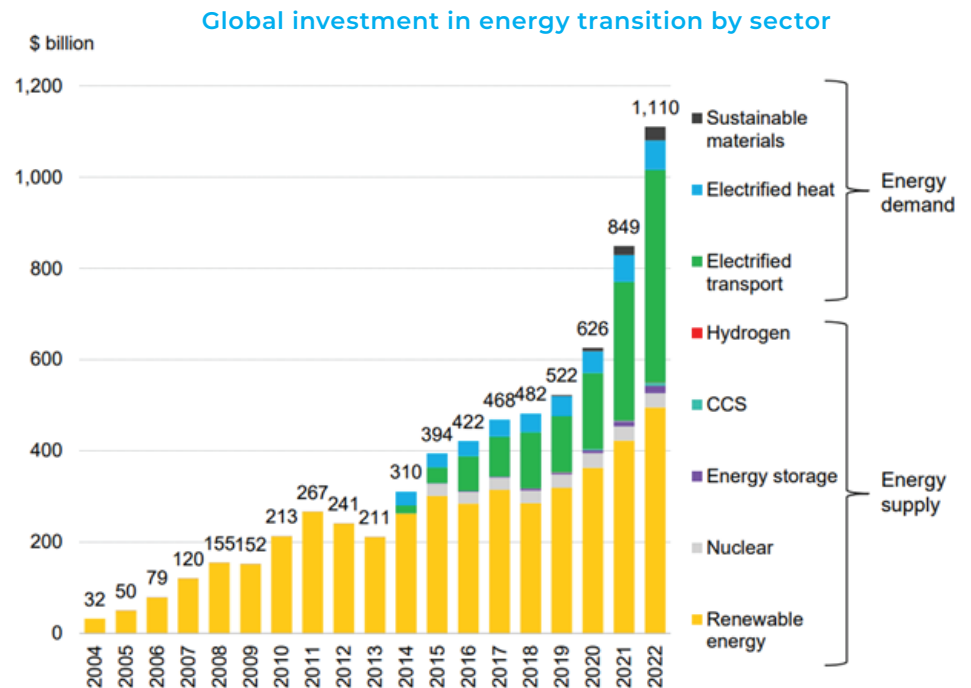
challenge the feasibility and cost-benefit results from efforts with unclear impact. In any case, current policy initiatives, and public and private investments have begun making major investments and commitments to monitor and reduce the carbon intensity of the energy sector.

The 2022 global investment into the low carbon energy transition exceeded \$1.1T according to BloombergNEF (Figure 1) [3]. Many existing transition projects are facing challenges with increased costs of capital and it is not settled whether global economies will increase or decrease future spending, but the BloombergNEF analysis identified a need to increase that investment to an average of \$4.55T annually over the remainder of the decade (Figure 2) to meet the global net zero objectives in The Paris Agreement. In any case, the purpose of this article is not to debate the merits of various proposals, but rather to evaluate the potential impact of net zero and low carbon energy transition investments on U.S. farmland over the next several decades.

LOW CARBON ENERGY TRANSITION

A fundamental component of low carbon energy transition is broad, cross-sector electrification using lower carbon intensity methods of power generation. Fossil fuel-based electricity generation is highly concentrated with energy resources transported to large-capacity generation plants and consumed to generate electricity along with the attendant GHG emissions. Renewable electricity

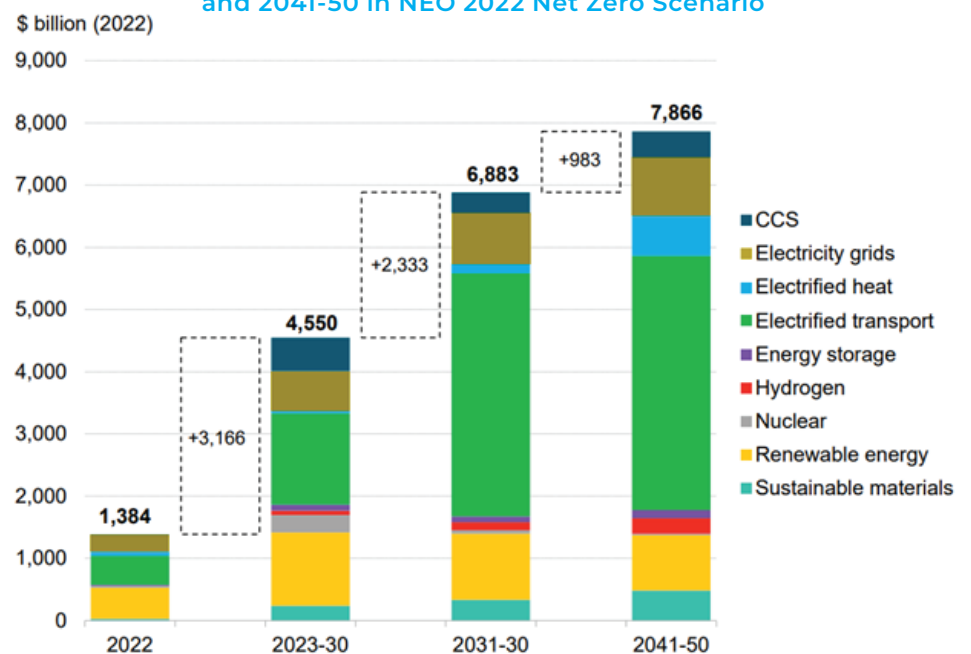
FIGURE 1 — Global investment is increasing significantly to support a low carbon energy transition.



Source: BloombergNEF. Note: start-years differ by sector but all sectors are present from 2019 onwards; see Appendix for more detail. Nuclear figures start in 2015.

FIGURE 2 — Energy transition investments need to continue to increase substantially over the next three decades to achieve stated net zero goals.

Comparison: 2022 energy transition and grid investment versus required annual investment in 2023-30, 2031-40, and 2041-50 in NEO 2022 Net Zero Scenario



Source: BloombergNEF. Note: future values are from the New Energy Outlook 2022, except electrified transport, which is from the Electric Vehicle Outlook 2021 Net-Zero Scenario. The Net-Zero Scenario target global net zero by 2050 in line with 1.77 degrees Celsius of warming. Investment includes electricity grids.

generation is in most cases highly distributed - i.e. wind and solar generating capacity requires a large land footprint and generate relatively low output nodes across many locations. Evaluating the impact of the energy transition on farmland across different states and regions requires an accurate understanding about where those resources will be located. The data used for this evaluation come from the Net-Zero America Project (NZA) [4] led by researchers at Princeton University. The NZA is a collaboration between public and private organizations including funding provided by BP and ExxonMobil. The NZA developed a range of scenarios for achieving net zero goals, each assembled with unique constraints and assumptions. This evaluation uses the data produced from the NZA's 'High Electrification' scenario. This scenario provides a framework to evaluate the impact of the necessary development of renewable energy across U.S. farmland while maintaining an economic balance with other energy supply options under the transition to Net Zero by 2050. Within that scenario, there are three low carbon energy transition resources discussed that have the potential to substantially impact U.S. Farmland.

Wind Energy: Naturally available wind resources have significant geographic overlap with the most intensely farmed regions of the U.S. Generally consistent topography and large areas with lower population density coupled with the natural available wind resource make the Corn Belt,



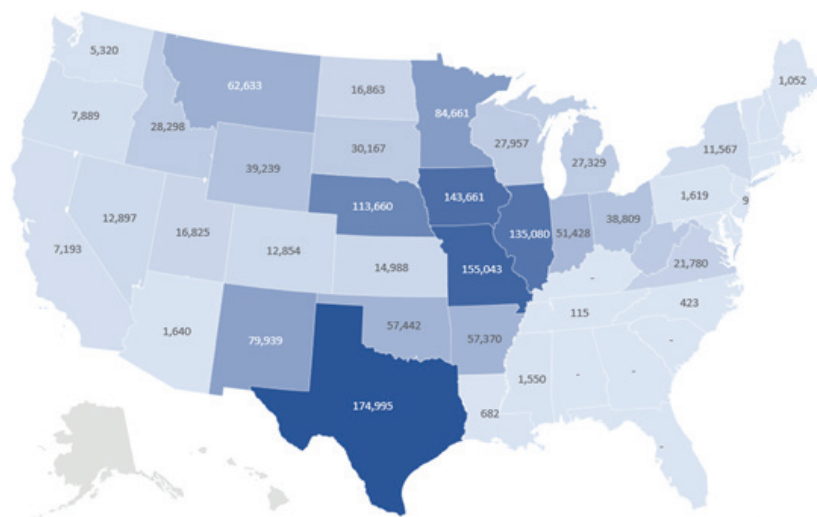
Northern Plains, and Southern Plains regions particularly attractive for wind energy development projects. Turbine farms fully integrated into actively managed farmland are common across these regions.

Figure 3 provides a state-level summary of the wind generating capacity that would need to be installed by 2050 as identified in the NZA analysis. Establishing the wind generating capacity

installed in each state provides the ability to estimate revenue streams created from the installations. Assuming that each turbine generates 2.75 MW, the annual initial lease rate for each turbine is \$10,000, and the lease rate escalates annually by 2.5%, the revenue created in 2050 can be established for each state. One way to characterize the total economic value of the increased investment in wind generation is to apply a base

FIGURE 3 — NZA identified wind generating capacity in MW's by state in 2050.

2050 State Level Wind Generating Capacity (mw)

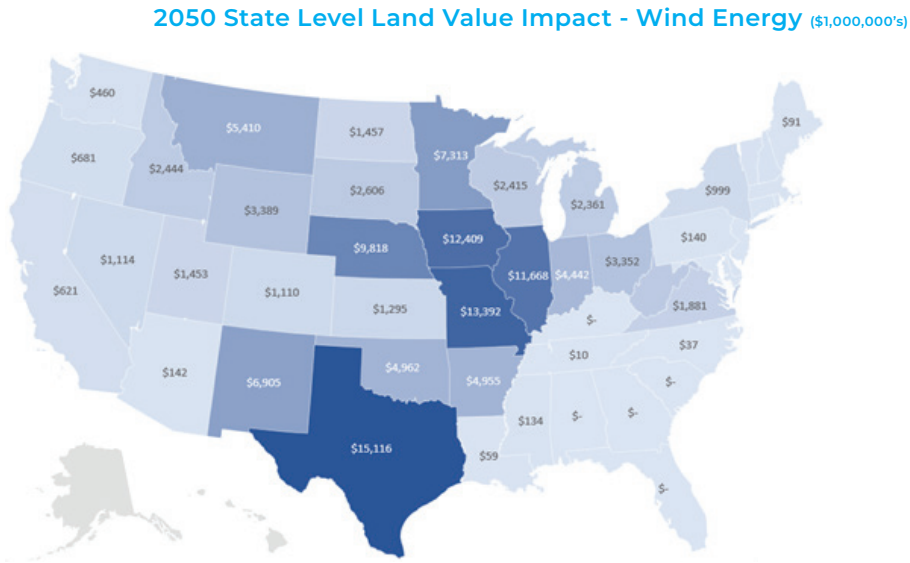


market capitalization rate for the turbine revenue stream. In this case that capitalization rate is set at 8.0%. Figure 4 shows the implied financial value of the wind energy revenue streams by state under these assumptions with the total U.S. land value impact of nearly \$130B. Several states in the Plains and Corn Belt in particular would receive the bulk of the increased revenue from wind energy generation.

Solar Energy: Installing solar generation panels over farmland presents a different challenge. When solar panels are installed on actively managed farmland, crops can no longer be grown and thus the offset production must also be accounted for in addition to the increased revenue associated with energy production. Fewer acres producing crops also reduces access to several economic benefits for farmland including crop insurance revenue protection, federal subsidy programs, inflationary influences, and long-term productivity gains. However, there are situations where converting farmland acres to solar production creates improved financial outcomes for the owners.

Solar lease rates vary across regions and current land use with examples ranging from \$300-\$2,000/acre depending on access, connectivity and sun suitability among other things. Lease rates at these levels can make solar installation financially attractive on farmland acres, particularly for acres that have crop productivity limitations. Examples of farmland with productivity limitations include irrigated farmland assets

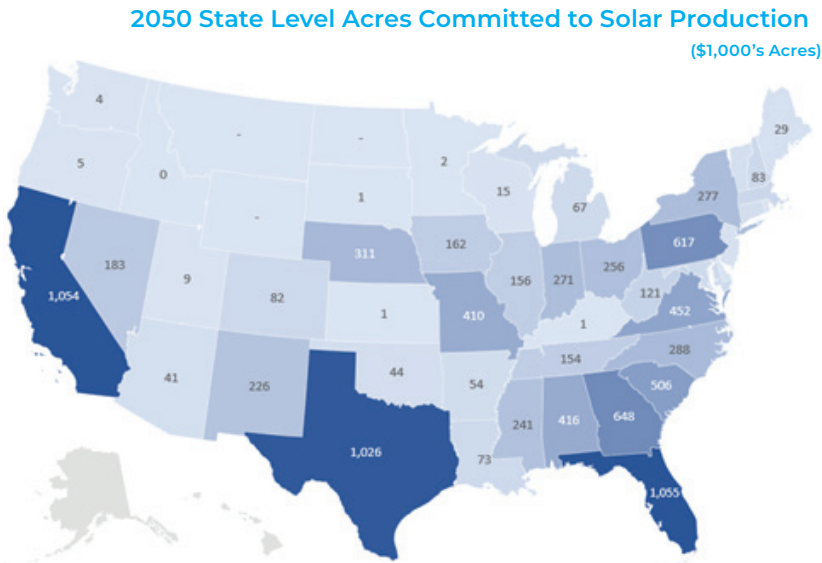
FIGURE 4 — Land value impacts in 2050 by state from the wind energy revenue stream.



facing constraints on available water resources or assets with lower quality soils. These scenarios represent opportunities to achieve substantially higher future income streams from solar leases. Utilizing the analysis in the NZA, Figure 5 provides a

summary of the solar installation acres by state in 2050 required to achieve net zero goals. These acres represent an opportunity to improve future income and value for farmland where solar installations present the best long-term financial outcome.

FIGURE 5 — NZA identified acres of solar by state in 2050.



Biofuels Production: Biofuel production in the U.S. has expanded revenue sources for farmland through increased demand for feedstocks with the greatest impacts in the Corn Belt and Plains regions through the development of ethanol markets over the past two decades. The U.S. ethanol industry grew to 17.5 billion gallons of annual capacity in 2021 [5], representing over 80% of the current biofuels production capacity in the U.S. Further electrification of the passenger vehicle fleet will put downward pressure on current ethanol markets. At the same time, achieving the Net Zero goals

will also require displacement of over 16 billion gallons annually of aviation fuel [6] and 45 billion gallons annually of diesel fuel [7] providing substantial opportunity for offsetting and increasing demand for feedstocks for production.

Technical pathways for biofuel production have been developed and massively improved over the past few decades. Achieving net zero goals will require further scaling and of these technologies to deliver low carbon liquid fuels to sectors that cannot feasibly electrify including aviation, heavy transport, and industrial

uses. Emerging ethanol-to-jet fuel production pathways create opportunities to redirect existing biofuels production toward the large sustainable aviation fuel (SAF) market. Achieving net zero goals will create substantial additional demand of oilseed and cellulosic feedstocks to supply SAF and renewable diesel pathways. While it is difficult to explicitly project the impact of the resulting increased demand for feedstocks on regional farmland values, U.S. farmland will necessarily play a critical role in supplying the biomass feedstocks required to realize a net zero economy.



CARBON STORAGE

The U.S. Long-Term Strategy [2] identifies the ability of U.S. land to capture and store carbon as a critical component of achieving net zero goals. Carbon storage is required to achieve net zero because a subset of economic activities will be challenging, or even infeasible, to fully decarbonize. Offsetting the impact of these carbon emitting activities requires capturing and storing atmospheric carbon. Forest-based carbon markets are somewhat more developed with formalized carbon credits in offset markets regularly

traded. Sequestering carbon in farmland provides more complex challenges than in forest settings due to difficulty in measuring and verifying additionality and permanence. Additionality relates to verification that the net additions to carbon sequestration was a direct result of the sale of an associated activity against which a carbon credit is linked. Permanence relates to the simple reality that management practices that can sequester carbon in annual production systems can also be reversed and release carbon that had previously been stored in the soil. The challenges of additionality

and permanence have limited the development of farmland carbon markets and trades happening in these markets are often discounted or simply focus on payments for specific practice adoption without any verification of the carbon impact.

The carbon cycle in farmland soils is a complex process. Sophisticated models are required to simulate that complexity and forecast the impact of management practices on the carbon stored in farmland soils. This evaluation utilized the Carbon Reduction Potential Evaluation (CaRPE)

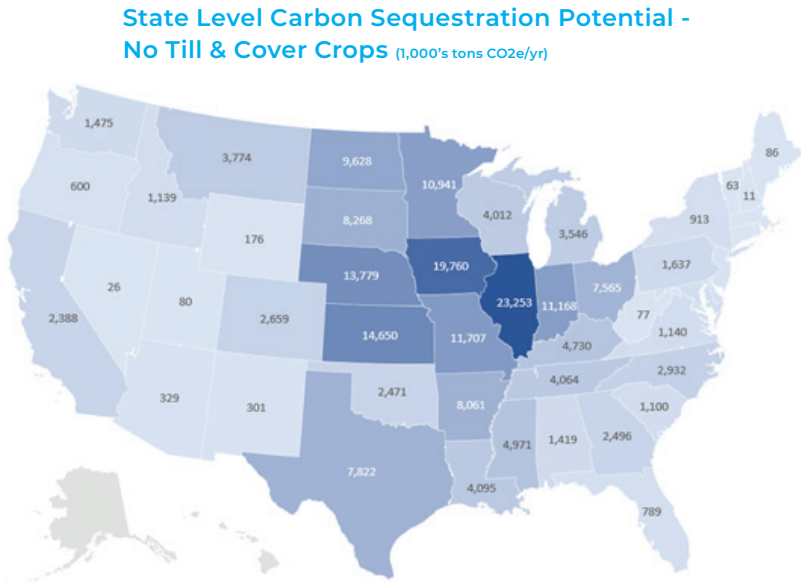


tool to evaluate the carbon market opportunity for U.S. farmland [8]. CaRPE integrates data from USDA on farmland acreages by county and USDA's COMET-Planner tool [9] then calculates soil carbon storage potential from implementing select soil conservation practices. This integrated framework factors in soil characteristics in a particular county to forecast how management practices such as cover crops impact carbon storage in those soils. The framework then applies that forecast across the range of soils and acreages in farmland in a given county to provide a projection of total soil carbon storage potential for the county.

Utilizing the result from this analysis, Figure 6 provides the state level carbon sequestration opportunity from the full implementation of no-tillage and cover cropping practices. There are incentive payments available from USDA and within several states to encourage the use of these practices as well as emerging incentives within federal crop insurance programs that encourage use of these and related conservation practices. The largest opportunities for carbon sequestration are in the Corn Belt, Delta, Northern Plains, and Southern Plains regions.

Evaluating the impact on farmland values from this revenue stream requires assumptions on the market value of the carbon and the capitalization rate for that income. Assuming a future stabilized value in farmland carbon markets of \$50/tCO₂e and a capitalization rate of 4.5%

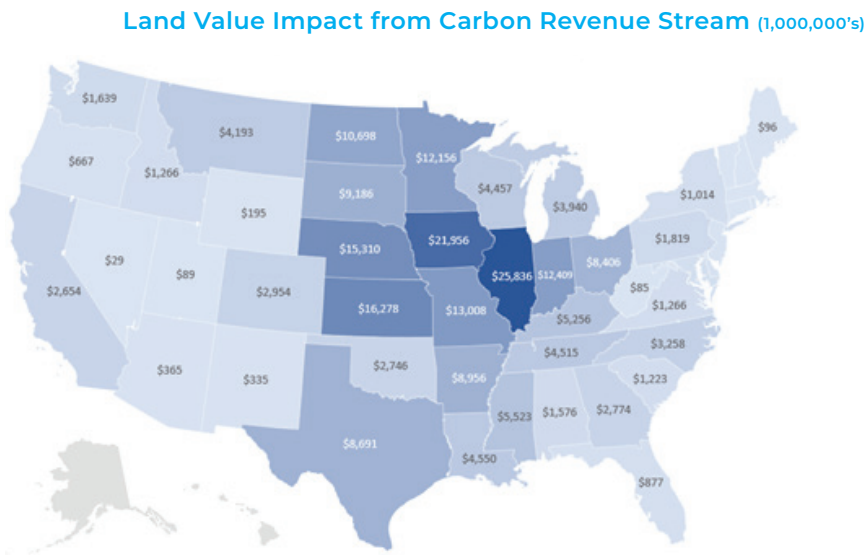
FIGURE 6 — CaRPE analysis of soil carbon sequestration potential from implementing no tillage and cover cropping practices.



capitalization results in the values shown in Figure 7 for land value impacts by state. It is not yet clear how the land market will value carbon storage revenue streams. The assumption of a lower cap rate, 4.5%, than other revenue streams is based on two primary factors: 1) the practices that create carbon storage in farmland soils

do not change the core land use and 2) food supply chains are putting pressure on farmland operators to adopt many of the same practices for sustainable supply chain initiatives. Utilizing these assumptions, the carbon storage income results in an aggregate potential value impact of nearly \$224B for U.S. farmland.

FIGURE 7 — Land value impact from fully realized carbon sequestration revenue streams.



The combined impact of wind, solar, biofuels, and carbon storage represents a substantial opportunity for increased value creation in farmland. Figure 8 provides a forecast of the combined asset value creations from projected wind, solar, and carbon storage revenue streams by state as developed and discussed through this analysis. Table 1 shows the combined asset value opportunity aggregated by agriculture region.

FIGURE 8 — Combined land value impact projections from low carbon energy transition and carbon storage opportunities.

Combined Projected Land Value Impact in 2050 (1,000,000's)

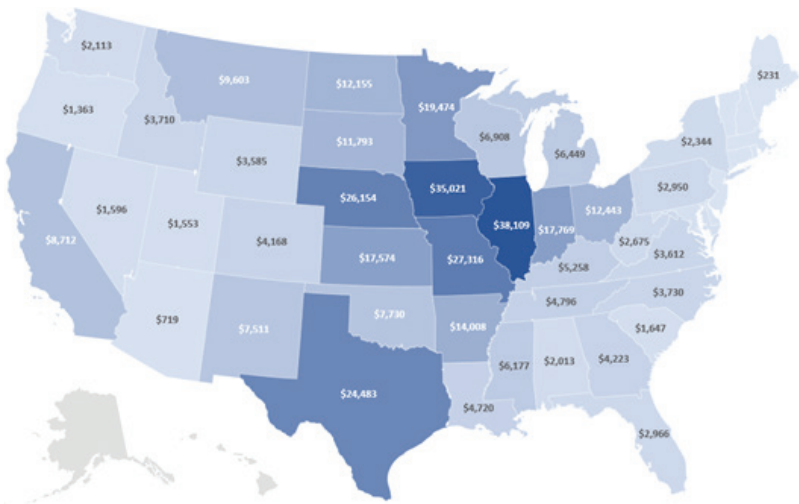


TABLE 1 — Regional summary of net zero land value impacts.

Region	Wind Energy	Carbon Storage	Solar Energy	Combined Total
Appalachia	\$4,435,477,234	\$14,381,212,588	\$1,254,931,766	\$20,071,621,588
Corn Belt	\$45,263,331,032	\$81,615,392,005	\$3,778,832,411	\$130,657,555,448
Delta	\$5,148,204,859	\$19,029,379,929	\$728,175,256	\$24,905,760,044
Lake	\$12,088,224,606	\$20,553,954,768	\$189,580,192	\$32,831,759,565
Mountain	\$21,967,937,638	\$9,426,497,552	\$1,050,385,752	\$32,444,820,942
Northeast	\$1,812,377,878	\$4,649,097,687	\$1,843,484,545	\$8,304,960,109
Northern Plains	\$15,174,537,378	\$51,472,091,979	\$1,028,612,397	\$67,675,241,753
Pacific Northwest	\$1,140,932,781	\$2,306,172,275	\$28,549,384	\$3,475,654,440
Pacific West	\$621,343,283	\$2,653,828,949	\$5,436,971,679	\$8,712,143,911
Southeast	\$-	\$6,449,316,822	\$4,399,645,491	\$10,848,962,313
Southern Plains	\$20,077,234,135	\$11,436,237,218	\$699,821,183	\$32,213,292,536
	\$127,729,600,823	\$223,973,181,771	\$20,438,990,055	\$372,141,772,649

REFERENCES

1. <https://www.whitehouse.gov/wp-content/uploads/2021/10/US-Long-Term-Strategy.pdf>.

2. <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>.

3. <https://about.bnef.com/energy-transition-investment/#toc-report>.

4. <https://netzeroamerica.princeton.edu/about>.

5. <https://www.eia.gov/energyexplained/biofuels/ethanol-supply.php>.

6. <https://www.transtats.bts.gov/fuel.asp>.

7. <https://www.eia.gov/energyexplained/diesel-fuel/use-of-diesel.php>.

8. <https://carpe.shinyapps.io/CarpeTool/>.

9. <http://comet-planner.com/>.

U.S. policy has established defined goals and initiated substantial investments toward a net zero economy by 2050. A low-carbon energy transition path that includes large-scale installation of wind and solar generation capacity in conjunction with substantial development of low-carbon intensity biofuels is critical to achieving net zero goals. Each of these components of the energy transition positively impacts farmland values through the creation of new or expanded revenue streams. Farmland will also contribute to the large-scale carbon storage necessary to achieve the net zero goals creating additional revenue streams. Using the analysis from the NZA, the new and expanded revenue streams from wind, solar, biofuel, and carbon storage development are both substantial and uniquely distributed across U.S. production regions. Doing so will help transition the conversation about farmland from being cited as a primary pollutant to being recognized as a critical resource to move toward lower carbon energy generation in the future.



SMART MONEY vs. SCARED MONEY: RECONSIDERING FARMLAND IN TODAY'S MARKET

By **Steve Bruere**
President
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Throughout my 20-year career at Peoples Company, I have been involved in billions of dollars of real estate transactions and have witnessed firsthand the financial performance of U.S. farmland through numerous economic shocks including the great financial crisis, Ben Bernanke's quantitative easing experiment, Trump's trade wars, the COVID-19 pandemic, Russia's invasion of Ukraine, and now the nation's battle with persistent inflation. On a pure return basis, farmland has outperformed most traditional equity and fixed-income strategies and has done so with incredibly low volatility compared to other asset classes over that time period. Savvy investors have been attracted to numerous characteristics of farmland as an investment including its positive correlation with inflation, low or negative correlation with publicly traded equities, and steady annual income in conjunction with reliable long-term appreciation. However, farmland is traded in thin-market conditions where

less than 2% transacts in the open market on an annual basis, and in heterogeneous and large transaction sizes compared to equities. Farmers represent approximately 70% of all purchases, and many sales are considered "private-market" in that they were not listed publicly or sold at auction. Thus, although many recognize the desirability of farmland as an asset, fear of a mistiming or of simply not gaining access to a feasible transaction is a major barrier for many investors to make farmland investments.

Farmland is often a multi-generational asset. Many farms in operation today are century farms, meaning they have been held by a specific family over one hundred years. Thus, as the saying goes, "The best time to buy a farm is when someone wants to sell." Novice investors who try to play the market by waiting for the optimal time to buy are often frustrated by the difficulty of actually completing a transaction, while those who understand farmland realize that the specific entry point is not always the main driver in an investment thesis with longer duration portfolio considerations. The primary focus of seasoned investors is to purchase the "right farm" with the recognition that price paid becomes less important with the passage of time; and that the effort to build their total position is often a multi-year endeavor during which their other assets may also move either up or down in value. Interestingly, over the previous 20-year period, even diversified indexes like the S&P 500 or the NYSE or

NASDAQ recorded negative total returns 4 or 5 years each with the maximum drawdown in 2008 often exceeding 50% of asset value and requiring 2-4 years just to get back to even. By contrast, the NCREIF Farmland Returns performance had zero total negative return years in that period, and even at worst 1.3% return in permanent crops and 4.2% minimum in total annual row crops. Individual properties, like individual stocks can have better or worse performance of course, but the comparison of these broadly diversified indexes provides a powerful indicator of relative performance. Moreover, during that same period, farmland provided positive inflation hedging characteristics and offset through negative correlation with equities and much of the risk in a diversified portfolio setting. This complementary feature to other investments while providing inflation protection is currently front-of-mind for investors concerned about the current economic conditions as well. At the same time, the recent incredibly strong performance of farmland with high teen to low twenty percent annual appreciation has raised red flags about the "entry point" for farmland investments.

During my time in the industry, I have collaborated with some of the most sophisticated landowners helping them to locate and aggressively purchase farmland during some of the strongest times in the market. These investors often were viewed as having paid a premium relative to the overall market to

acquire high-quality assets in the best farming regions. Early in my career some of these transactions made less intuitive sense but as I have followed the subsequent performance of these portfolios as well as the broader farmland market, I recognize several key tenets of successful investing. First, strong land prices bring exceptional assets to the market that otherwise would not be for sale. These types of farms have delivered long-term outperformance for their owners and can rarely be acquired at will or on a regular time pattern. At the date of acquisition, the purchase price may seem strong, but as time passes the relationship to broader market forces and to their other investments becomes the primary features driving performance. And, farmland with its strong appreciation tendencies includes the natural tax advantage of assets where the capital gains can be deferred and compounded. Farmland owners' heirs will never complain about the original purchase price on an asset with a stepped-up basis - and other advantages. And, as noted elsewhere it should be viewed in the context of other assets over the horizon intended to be owned, not as a single period return generating asset in isolation.

That last point seems to be questioned more adamantly than usual in the current economic environment. As we head into the typically bustling fall land market, escalated interest rates are cited as taking a toll on farmland. Midwest farmland generates current income or cap rates ranging from 2.5% to 3.0% while farm mortgages

are now steadily averaging 7.0% to 8.0% forcing leveraged buyers out of the market and creating suppressed demand. It is important to note that the aggregate leverage on farm real estate is less than 14% in total and thus the nationwide impact of interest rate hikes has been less detrimental to farmland than to other real estate markets including commercial and residential, but buyers requiring new debt to purchase are clearly impacted and the overall burden of the cost of capital is elevated in any case thereby deterring numerous buyers from participating at these strong price levels.

Perhaps an even more considerable factor impacting the farmland market is the new competition from alternative investments with higher yields. Currently, CDs, bonds, T-bills, and other liquid investments are generating short-term yields of 4.0% to 5.5%. At these rates, some farmland investors and institutional owners are beginning to cash in their farmland investments, becoming sellers rather than buyers and taking their money to these other opportunities. The question that raises is how could one get "back in" if and when the yield curve normalizes and other asset prices have adjusted in response.

After thinking through these current conditions along with lessons from the past, I have concluded that the market may be setting the stage for one of the most opportunistic buying opportunities in my career. As individual leveraged buyers' participation is limited and

cash buyers exit the market, the market is open to investors who understand the historical performance of farmland, are not hypersensitive to purchase price, and want to take advantage of lower demand. While farmland values could soften to recalibrate with increasing Fed funds rates, prices may also remain strong and increase if inflation persists or reaccelerates. The confidence in the view that farmland will continue to provide an effective hedge against inflation and maintain its key diversifying position in portfolios as an appreciating generational asset has never been stronger.

One of the young members of our farmland diligence team recently quipped, "Scared money doesn't make money." Smart money seems to know that timing purchases of generational assets including farmland are a coinflipper's folly and that hindsight will smooth out any current over/under payments for portfolio-building transactions. The limited supply of high-quality farms that are currently transacting in the market presents an extremely rare opportunity. Even if the market softens, in the long term investors can be confident that acquisition economics will be largely irrelevant. While purchasing an alternative short-term asset with a higher current cash yield and limited appreciation opportunities may be appealing now, these vehicles do not provide the benefits of farmland and generational value. Smart money stays focused on the long-term impacts of portfolio-wide positions while transacting in the present.



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