

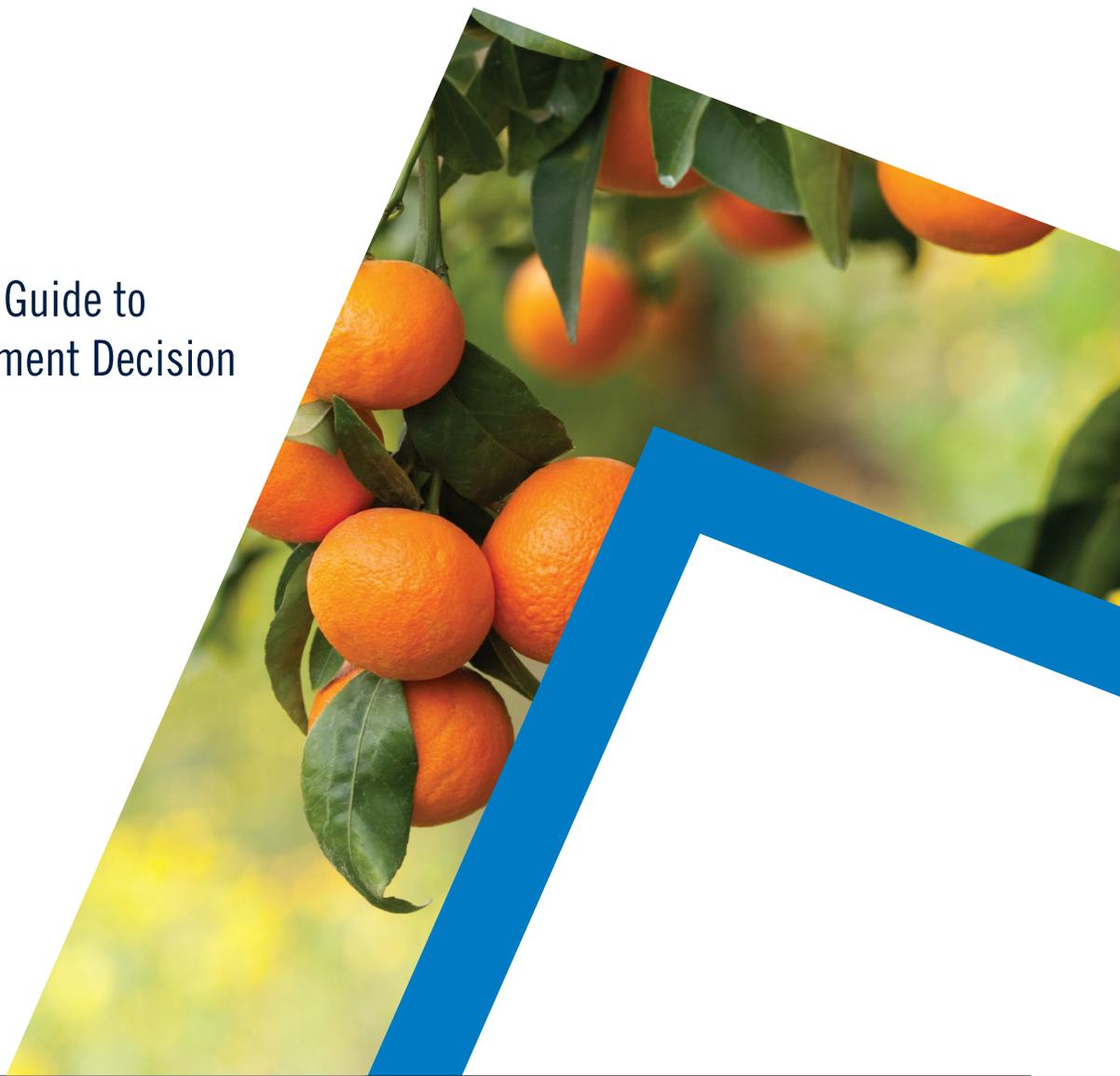


LOW-HANGING FRUIT:

Why You Should Plant U.S. Agriculture in Your Institutional Portfolio

A Comprehensive Guide to Making an Investment Decision

OCTOBER 2020



MAKING THE INVESTMENT CASE

RETURN AND DIVERSIFICATION BENEFITS



SUSTAINED LONG-TERM PERFORMANCE

Farmland has consistently performed well against stocks, bonds, and real estate over the last 20 years.

	FARMLAND	TIMBERLAND	REAL ESTATE	STOCKS	BONDS
1-Year	4.8%	1.3%	6.4%	31.5%	8.7%
3-Year	5.9%	2.7%	6.7%	15.3%	4.0%
5-Year	7.0%	3.1%	8.3%	11.7%	3.0%
7-Year	9.7%	5.1%	9.2%	14.7%	2.7%
10-Year	11.0%	4.4%	10.2%	13.6%	3.7%
15-Year	13.4%	6.6%	8.4%	9.0%	4.2%
20-Year	12.3%	5.9%	8.3%	6.1%	5.0%

PERFORMANCE: BEST SECOND-BEST

FARMLAND HAS PRODUCED THE HIGHEST ANNUAL RETURNS AND SHARPE RATIO OVER THE LAST 20 YEARS



	FARMLAND	TIMBERLAND	REAL ESTATE	STOCKS	BONDS
St. Deviation ³	7.5%	6.5%	8.1%	17.6%	3.3%
Sharpe Ratio	1.21	0.43	0.64	0.24	0.55
Max 1-YR Return	33.9%	19.4%	20.2%	32.4%	11.6%
Min 1-YR Return	2.0%	-5.2%	-17.0%	-37.0%	-2.0%
Neg. Returns (# yrs)	0	3	2	5	1

PERFORMANCE: BEST SECOND-BEST



ASSET CLASS DIVERSIFICATION

Low or negative correlations to other asset classes such as stocks and bonds make farmland a powerful diversifier in a mixed-asset portfolio.

	FARMLAND	TIMBERLAND	REAL ESTATE	STOCKS	BONDS
Farmland	1.00	0.82	0.50	0.07	-0.39
Timberland		1.00	0.55	0.02	-0.31
Real Estate			1.00	0.15	-0.20
Stocks				1.00	-0.33
Bonds					1.00



HIGH INCOME AND TOTAL RETURN

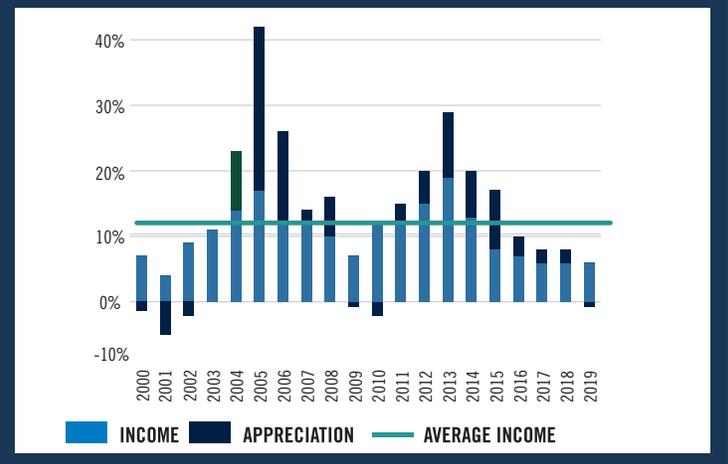
Direct farming operations and leases have provided a steady source of income return. Productivity gains and commodity price increases drive appreciation gains. Strong crop prices and robust net farm income have boosted farmland values significantly over the last 20 years.

PERMANENT CROPS

HAVE GENERATED TOTAL ANNUAL AVERAGE GROSS RETURNS OF

14.2% | **10.3%** | **3.8%**
OVER THE LAST 20 YEARS ⁴ INCOME APPRECIATION

NCREIF FARMLAND PERMANENT CROP ANNUAL RETURNS (2000-2019) ⁴

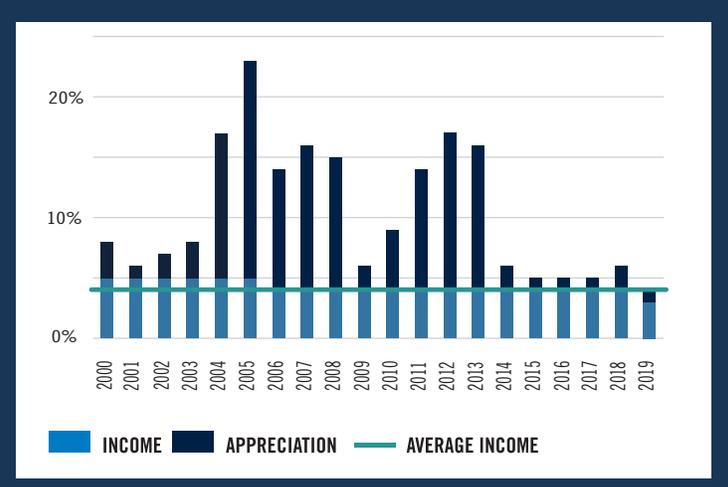


ROW CROPS

HAVE GENERATED TOTAL ANNUAL AVERAGE GROSS RETURNS OF

10.6% | **4.3%** | **6.1%**
OVER THE LAST 20 YEARS ⁴ INCOME APPRECIATION

NCREIF FARMLAND ROW CROP ANNUAL RETURNS (2000-2019) ⁴



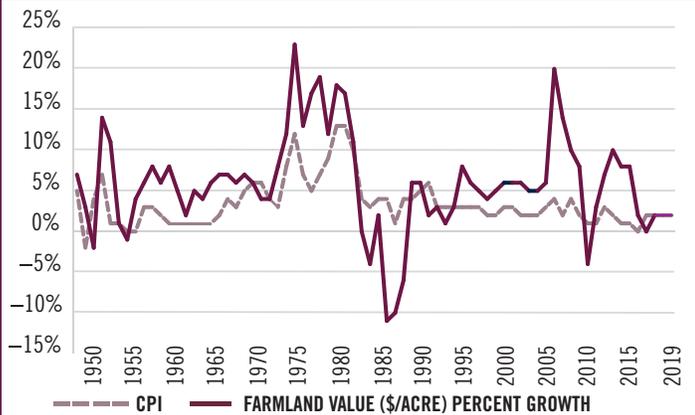
CAPITAL PRESERVATION AND GROWTH



POTENTIAL INFLATION HEDGE

Farmland is a real asset that has proved to be a better store of wealth than stocks or government bonds in periods of higher inflation.

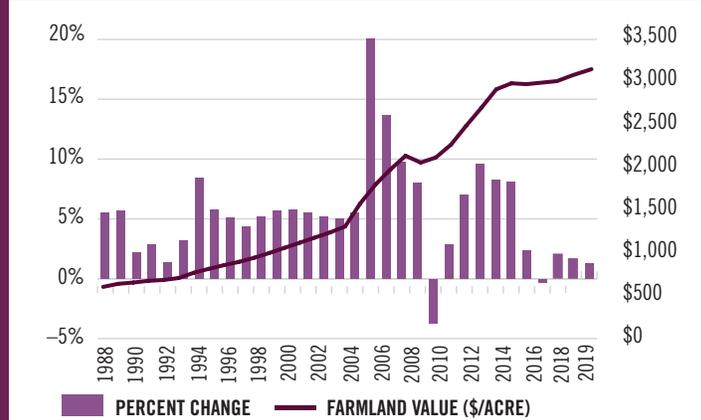
FARMLAND VALUE PERCENT GROWTH VERSUS INFLATION (1948-2019) ⁶



PROLONGED VALUE GROWTH

Farmland has posted mostly positive returns, proving effective in preserving capital under various market conditions.

FARMLAND VALUES \$/ACRE AND ANNUAL PERCENTAGE CHANGE (2000-2019) ⁶



EMERGING ASSET CLASS WITH ESTABLISHED BENCHMARK



EMERGING INSTITUTIONAL ASSET CLASS

Despite robust growth, U.S. farmland institutional ownership is still in its nascent stage and is likely to increase.

3% OF U.S. FARMLAND IS OWNED BY INSTITUTIONAL CAPITAL ⁵



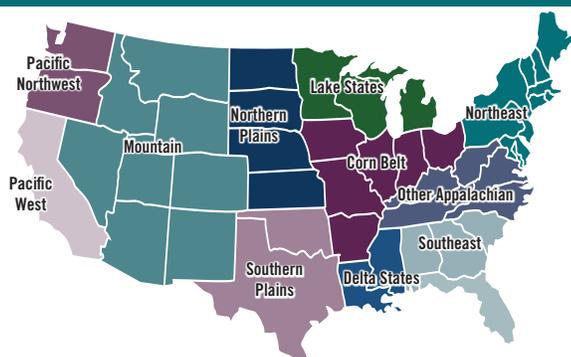
ABILITY TO BENCHMARK PERFORMANCE

NCREIF Farmland Property Index provides transparency and allows investors to benchmark manager performance.

NCREIF FARMLAND PROPERTY INDEX ⁴

1990
INCEPTION DATE

100%
INSTITUTIONALLY-OWNED PROPERTIES



NCREIF FARMLAND PROPERTY INDEX MARKET VALUE ⁴

\$11.4BN

TOTAL



ROW CROPS



PERMANENT CROPS

REGION	\$ BILLION	PERMANENT CROPS	ROW CROPS
PACIFIC WEST	4.4	100%	0%
DELTA STATES	2.2	0%	100%
CORN BELT	1.3	0%	100%
MOUNTAIN	1.0	0%	100%
SOUTHEAST	0.7	0%	100%
PACIFIC NORTHWEST	0.7	100%	0%
LAKE STATES	0.4	100%	0%
SOUTHERN PLAINS	0.2	0%	100%
TOTAL	11.1		

PERMANENT CROPS **ROW CROPS** - Represents \$100 million

All returns shown are gross of fees. Past results are not a guarantee or an accurate indicator of future results. Data as of December 2019 unless otherwise noted. ¹ Supporting indices: (1) Farmland: NCREIF Farmland Index, (2) Timberland: NCREIF Timberland Index, (3) Real Estate: NCREIF Property Index, (4) Stocks: S&P 500 Index, (5) Bonds: Bloomberg Barclays US Aggregate Bond Index. Sources: NCREIF, S&P, Barclays Global Investors, PGIM Real Estate. ² Benchmark returns over different time periods ending December 2019. ³ Standard deviation is based on annual returns. ⁴ The reported aggregate NCREIF Farmland Index AUM does not tie to the summation of the detailed AUM by NCREIF regions due to rounding and constraints imposed by masking in the publicly available data. Sources: NCREIF Farmland Index, PGIM Real Estate. ⁵ Source: NASS USDA, 2017 Census of Agriculture. ⁶ Sources: USDA Economic Research Service, PGIM Real Estate.

DIGGING INTO THE DETAILS

COMPETITIVE ADVANTAGES OF INVESTING IN THE U.S.

PRODUCTION & EXPORT POWERHOUSE

The U.S. is the leading producer and a top exporter of some of the world's most important commodities. The U.S. benefits from a large domestic market and a low per-unit production cost of several large commodities.

SELECT U.S. COMMODITY PRODUCTION AND EXPORTS RANKINGS (2019/2020) ⁷

ROW	PRODUCTION ⁸			U.S. RANKING	
	U.S.	WORLD	U.S. (%)	PRODUCTION	EXPORTS
Corn	347.8	1,111.6	31.3%	1	1
Soybeans	96.9	339.4	28.5%	2	2
Wheat	52.3	763.9	6.8%	6	3
Cotton	20.1	121.3	16.6%	3	1
PERMANENT					
Apples	4.7	75.7	6.2%	3	3
Fresh Oranges	4.9	47.5	10.3%	4	3
Table Grapes	1.0	23.4	4.3%	6	3
Walnuts	0.6	2.1	26.9%	2	1
Orange Juice	0.3	1.7	19.2%	2	5
Almonds	1.0	1.3	77.3%	1	1
Pistachios	0.3	0.7	57.3%	1	1

COMPLETE COMMERCIAL BASE

The U.S. is the birthplace and heart of agricultural suppliers such as John Deere and Caterpillar. Also, large and well-recognized processors and marketing firms can provide long-term contracts for commodity production.

OPTIMAL GEOGRAPHIC CONDITIONS

The U.S. has extensive, supply-constrained farm areas with favorable and diverse climatic and soil conditions for the production of a wide variety of major permanent crops and row crops.



400+
COMMODITIES
GROWN ⁹

80%
OF WORLD'S ALMOND
SUPPLY GROWN ¹⁰

1 OF 5

GLOBAL REGIONS WITH
A MEDITERRANEAN
GROWING CLIMATE ⁹

ADVANCED INFRASTRUCTURE

Transportation infrastructure is a key variable in moving farm goods. The U.S. has an advanced network of strategically-located highways, railroads, and seaports that facilitates swift commodity shipment worldwide.



MISSISSIPPI RIVER IS THE PREMIER CONDUIT FOR TRANSPORTING COMMODITIES TO EXPORT MARKETS ¹¹

WELL-CAPITALIZED FARM ECONOMY

The U.S. is home to major commodity exchanges and a deep set of private- and government-sponsored financial institutions that provide consistent capital to the farm sector. This financial infrastructure facilitates farmland production through credit and risk transfers.

KEY INVESTMENT CATEGORIES FOR YOUR PORTFOLIO

PERMANENT CROPS

25+ YEARS

PRODUCTIVE LIFE OF SOME
TREES AND VINES

- PERMANENT CROPS:** Long-lived trees or vines that can take many years to grow enough to have a commercial crop.
- SUB-CATEGORIES:** Development and mature.
- PLANTING:** Once planted, switching crops to react to market conditions is expensive and difficult.
- MANAGEMENT:** Can direct operate the farm or lease to a tenant.
- RETURNS:** Returns are weighted heavily to operating income.

IN THE TREE

ON THE VINE



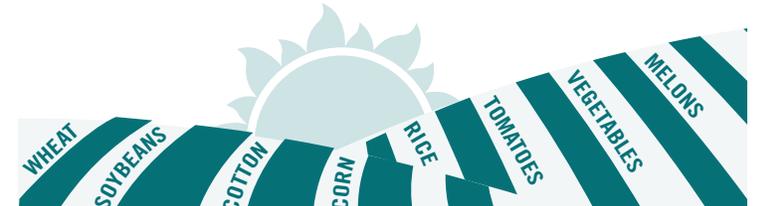
ROW CROPS

1 CALENDAR
YEAR

PLANT AND HARVEST CYCLE
OF MOST ROW CROPS

- ROW CROPS:** Crops planted annually that are typically mechanically harvested on a large scale.
- SUB-CATEGORIES:** Commodity vegetable and specialty.
- PLANTING:** Plantings changed quickly to react to market conditions.
- MANAGEMENT:** Mostly leased to experienced regional farmers.
- RETURNS:** Operating leases allow for steady income returns.

IN THE FIELD



WHY NOW IS A GOOD TIME TO INVEST



TECHNOLOGY DRIVING PRODUCTIVITY

Farm productivity growth has been driven by government- and private sector-supported research. The U.S. is also home to innovative start ups focused on farming information technology, robotics, and automation.

FARM TECH

INVESTMENT REACHED

\$8.6 BILLION
OVER THE LAST
5 YEARS ¹²

FUNDING FOR FARM ROBOTICS, MECHANIZATION AND EQUIPMENT

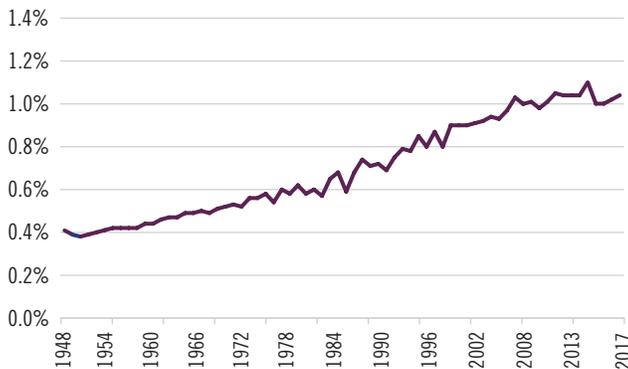
STARTUPS WAS

\$179 MILLION
IN 2019 ¹³
OVER 66 DEALS



NUT CROPS ARE MECHANICALLY HARVESTED

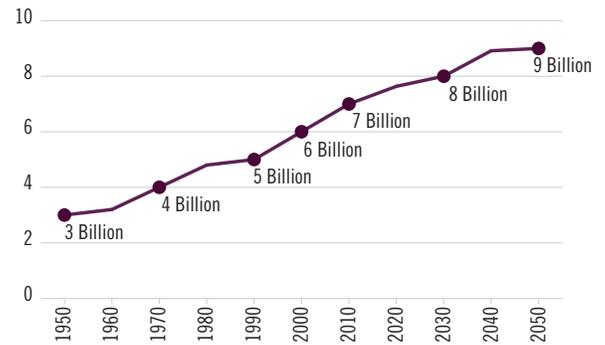
TOTAL FACTOR PRODUCTIVITY GROWTH OF U.S. AGRICULTURE (1948-2017) ¹⁴



RISING GLOBAL DEMAND

Increasing global demand for higher value-added crops that are healthy and nutritious coupled with improved incomes and expanding diets will continue benefitting the U.S. farm sector.

WORLD POPULATION IN BILLIONS (1950-2050) ¹⁵



GROWING INSTITUTIONAL OPPORTUNITIES

An aging farmer generation, fractional family ownership structure, and technological advances requiring sizable capital investment will naturally transition farmland holdings from individuals to institutions.



U.S. FARMER

58%

ARE PART-TIME ⁵

57.5

AVERAGE AGE ⁵

96%

OF FARMS ARE OPERATED
BY FAMILIES ^{5,16}

PORTFOLIO STRUCTURING



PORTFOLIO STRATEGY

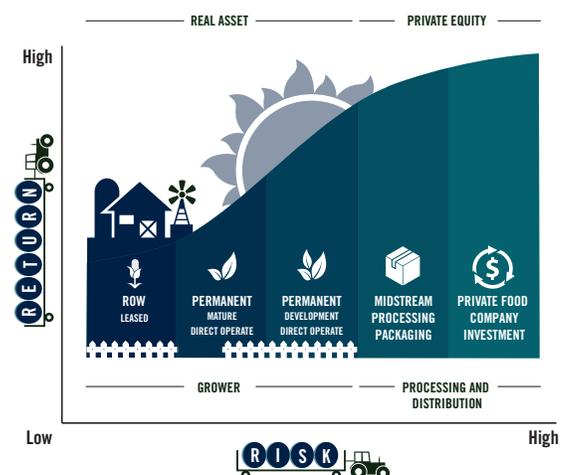
Client return objectives and risk tolerance form the starting point for agricultural portfolio construction and influence whether the strategy is real asset- or private equity-driven. This section focuses on a real asset, "inside the farm gate" strategy. Portfolio considerations include:

INVESTMENT CATEGORIES: Row crops that can be readily adjusted to changing market conditions are typically viewed as being less risky than permanent crops. Within permanent crops, development is more risky than mature.

MANAGEMENT STYLE: Leased investments have credit exposure but can provide stable, bond-like cash flows. Directly operated investments have commodity exposure and give managers more control over the improvements. They offer access to full operating profits, which may vary annually.

DIVERSIFICATION: Crop type and geographic diversification are important components of risk management.

AGRICULTURAL INVESTMENT PORTFOLIO STRATEGIES



⁷ Source: Foreign Agricultural Service USDA, PAI Research. ⁸ In million metric tons. ⁹ Source: California Department of Food and Agriculture. ¹⁰ Source: 2019 Almond Almanac, Almond Board of California. ¹¹ Source: USDA / Federal Grain Inspection Service 2018 Annual Report. ¹² Source: Pitchbook, Finistere Ventures, 2019 Agtech Investment Review. ¹³ Source: Agfunder AgriFood Tech Investing Report - Year in Review 2017. ¹⁴ USDA Economic Research Service as of December 2017. ¹⁵ U.S. Census Bureau, International Data Base. ¹⁶ Includes families, family partnerships, and family corporations.

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NCREIF Farmland Index: The NCREIF Farmland Index is a quarterly time series composite return measure of investment performance of a large pool of individual agricultural properties acquired in the private market for investment purposes only. All properties in the Farmland Index have been acquired, at least in part, on behalf of tax-exempt institutional investors - the great majority being pension funds. As such, all properties are held in a fiduciary environment. Reinvestment of dividends is not applicable to this asset class. Note: A benchmark Index is not professionally managed, does not have a defined investment objective, and does not incur fees or expenses. Investors cannot invest directly in an index. Source of the Benchmark: NCREIF - National Council of Real Estate Investment Fiduciaries.

Risk Factors: Investments in commercial real estate and real estate-related entities are subject to various risks, including adverse changes in domestic or international economic conditions, local market conditions and the financial conditions of tenants; changes in the number of buyers and sellers of properties; increases in the availability of supply of property relative to demand; changes in availability of debt financing; increases in interest rates, exchange rate fluctuations, the incidence of taxation on real estate, energy prices and other operating expenses; changes in environmental laws and regulations, planning laws and other governmental rules and fiscal policies; changes in the relative popularity of properties risks due to the dependence on cash flow; risks and operating problems arising out of the presence of certain construction materials; and acts of God, uninsurable losses and other factors which are beyond the control of the Manager. As compared with other asset classes, real estate is a relatively illiquid investment. Therefore, investors' withdrawal requests may not be satisfied for significant periods of time. Other than its general fiduciary duties with respect to investors, PGIM REF has no specific obligation to take any particular action (such as liquidation of investments) to satisfy withdrawal requests. In addition, as recent experience has demonstrated, real estate is subject to long-term cyclical trends that give rise to significant volatility in real estate values.

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For more information on the role of U.S. farmland in institutional portfolios, visit: pgim.com/insights/pgim-expertise/Diversity-of-Real-Assets

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