Introduction To

Farmland Investing

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The goal of the typical investor is to maximize returns for a given amount of risk. In this paper, we will highlight that alternative investments are a critical component in achieving this objective. While alternative investments cover a broad range of financial strategies, assets, and instruments, there is one that stands out: farmland.

Farmland has proven to be a unique asset class that has delivered superior returns with relatively less risk or volatility, and there are additional benefits that farmland adds to the overall diversification of most portfolios. Although farmland is an attractive asset class from an absolute returns perspective, it is one of the least understood due to historical constraints in the market. As modern financial platforms evolve, farmland investing, which was historically dominated by large institutions, is becoming increasingly accessible to passive financial investors of all shapes and sizes. In this paper, we seek to provide a general understanding of farmland as an asset class and highlight the various financial characteristics that make it an essential addition to any investor's portfolio.

The Benefits of Including Alternative Investments in an Investment Portfolio

Broadly speaking, alternatives investments ("alternatives") are investments in assets other than stocks, bonds or cash. Alternative investments may also use strategies that go beyond traditional methods of investing, such as long/short equities or arbitrage strategies. Since alternatives tend to behave differently than typical stock and bond investments, adding them to a portfolio may provide broader diversification, reduce risk, and enhance returns. Common types of alternative investments include real assets, commodities, venture capital, hedge funds, and private equity.

Alternative investments are often misunderstood. Some investors still think of alternatives as high-risk, exotic funds reserved for ultra-high-net-worth individuals and institutions. The reality is that alternative investments can become an integral part of nearly every portfolio. However, just as adding one stock or mutual fund does not lead to significant diversification, adding a single alternative investment may similarly have limited impact. Investing in only one alternative strategy may provide some diversification benefits, but it can also concentrate risks. Therefore, even investors[1] with some exposure to alternatives to should evaluate opportunities to further diversify away risk, while improving portfolio returns.

Within the alternative investment space, real assets have proven to improve traditional portfolios in multiple ways[2]:

Diversification:

With low or negative correlations to traditional stocks and bonds, as well as to each other, real assets provide diversification to an investment portfolio. As private investments, they tend to not move in lockstep with traditional assets or commodities, in part because they are relatively illiquid and are not exposed to speculative trading in public markets.

Higher Risk-Adjusted Returns:

For over 25 years, real assets have provided similar or higher returns than stocks with much lower volatility, resulting in higher risk-adjusted returns. Similarly, real assets delivered higher risk-adjusted returns compared to bonds or publicly-traded REITs.

Sources:

1 Blackrock (https://www.blackrock.com/us/individual/education/what-are-alternative-investments)
2 Nuveen Fall 2018 - Private real assets improving portfolio diversification with uncorrelated market exposure (Global)

Liability-Matching Characteristics:

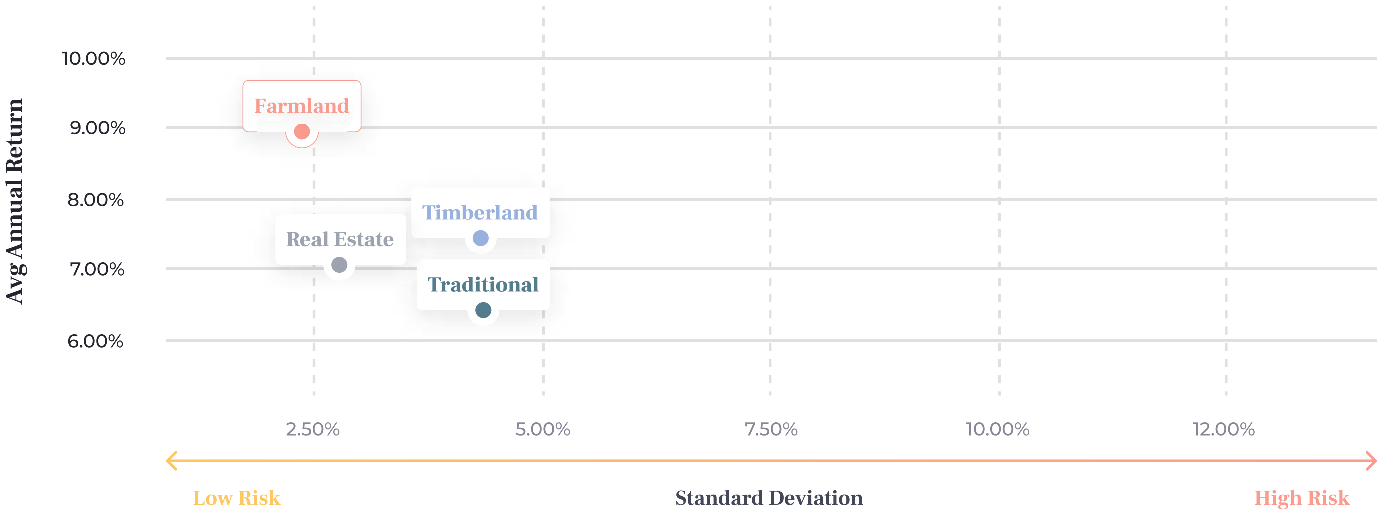
Real assets have the potential to provide bond-like current income from contractual lease obligations and the sale of commodities, along with long-term capital appreciation from land improvements and rising land values to help meet future liabilities.

Inflation Hedging:

Historically, real assets have provided a strong hedge against inflation. Both the cash yield and the land value of a real asset is linked to inflation measures, such as the Consumer Price Index (CPI). For example, when inflation rises, commodity prices also tend to increase, leading to a higher cash yield from the land. Also, rising commodity prices increase the profitability of timberland and farmland, causing land values to appreciate and therefore providing a long-term hedge against inflation.

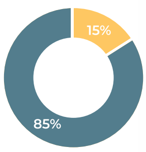
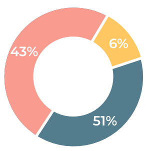
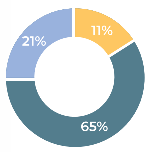
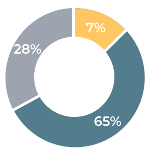
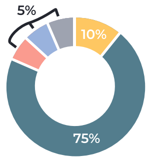
TIAA Investments / Nuveen, a global investment manager, has conducted a mean-variance optimization analysis, which suggests the inclusion of real assets in a traditional portfolio (stocks and bonds) improves the risk-adjusted returns of the portfolio. In the following table, efficient frontier charts show the impact of adding farmland, timberland, and real estate individually to a stock/bond portfolio. Each category of real assets increased returns, with similar or lower levels of risk, resulting in higher Sharpe Ratios.

Real Assets Increased Risk-Adjusted Returns Of Traditional Portfolios



Farmland Performance Comparison (1992 - 2016)

Stocks · Bonds · Farmland · Timberland · Real Estate

	100% traditional portfolio	**Adding only farmland**	Adding only timberland	Adding only real estate	Adding 3 categories of real assets, fixed at 5% each
Allocation representing highest risk-adjusted return, based on Sharpe Ratio					
Average annual total returns	6.53%	8.71%	7.38%	6.86%	6.89%
Standard deviation	4.14%	3.16%	4.38%	3.37%	3.44%
Sharpe Ratio	1.05	2.07	1.19	1.39	1.37

Data are based on rolling one-year total returns, calculated on a quarterly basis foer periods ended 31 Mar 1992 through 31 Dec 2017. Asset classes represent the following indexes: stocks - Russell 3000 Index and MSCI ACWI ex USA Index; bonds - Bloomberg Barclays U.S. Aggregate Index and Bloomber Barclays Global Aggregate Index; privately held U.S. commercial real estate - NCREIF Real Estate Index; privately help U.S. farmland - NCREIF Farmland Index; privately held U.S. timberland - NCREIF Timberland Index, Indexes are unmanaged and unabvailable for direct investment. Mean-variance optimization based on historical returns is intended for illustration purposes only and should not be considered investment recommendations.

Sources: NCREIF, FactSet, Nuveen, LLC.

Benefits of Including Farmland in an Investment Portfolio

As highlighted above, farmland investing can be an attractive component to a long-term investment strategy. Among real assets, farmland had the greatest impact on returns and received the largest allocation in an unconstrained portfolio at 43%, followed by real estate at 28% and timberland at 24%. The financial benefits of including farmland in portfolio construction have been well-documented in prior publications.[3] We will provide a brief summary here.

The historical returns of farmland investing have been uncorrelated to conventional assets and securities, such as stocks, bonds, real estate, timber, and even short-term agricultural commodity prices. Therefore, the inclusion of farmland in a portfolio increases its diversity, and such a portfolio may be more resistant to adverse market conditions. In addition to being an uncorrelated asset with low volatility, farmland has delivered a higher average annual return than most asset classes with the exception of public REITs. It is worth noting that while public REITs have a higher average annual return, they are also one of the riskiest asset classes as the standard deviation of the annual returns is 20%—nearly three times higher than that of farmland. Not only has Farmland outperformed most asset classes in the last 26 years (1992 – 2017), but also from a portfolio perspective, it has the added benefit of exhibiting lower volatility in returns while being uncorrelated to other asset classes. This results in a higher Sharpe Ratio—the Sharpe Ratio is a method in which investors can quickly evaluate returns on a risk-adjusted basis. The higher the Sharpe Ratio, the greater excess return that is being delivered after considering and standardizing for the asset's volatility.

3 https://www.valuewalk.com/wp-content/uploads/2014/07/JK_IntroToFarmland_714-1.pdf

Correlations of Real Assets, Commodities and REITs (1992 - 2017)

Real assets had low correlations to other asset classes - and to each other

	Stocks		Bonds		Private real assets			Public real estate & commodities		
Market Indexes	U.S.	Non U.S.	U.S.	Non U.S.	Real estate	Farmland	Timberland	U.S. REITs	Agriculture	Timber Proxy
U.S. stocks	1.00									
Non-U.S. stocks	0.77	1.00								
U.S. bonds	-0.06	-0.31	1.00							
Non-U.S. bonds	0.05	0.02	0.70	1.00						
Private Real Estate	0.22	0.18	-0.22	-0.21	1.00					
Private Farmland	0.01	0.17	-0.35	-0.27	0.39	1.00				
Private Timberland	0.17	0.15	0.17	0.15	-0.04	0.22	1.00			
U.S. REITs	0.54	0.50	0.16	0.10	0.15	-0.03	-0.02	1.00		
Agriculture Commodities	0.21	0.29	0.13	0.39	0.16	0.04	0.13	0.21	1.00	
Timber Commodities Proxy	0.62	0.74	-0.16	0.01	0.03	-0.15	-0.01	0.61	0.15	1.00

Data are based on rolling one-year total returns, calculated on a quarterly basis for periods ended 31 Mar 1992 through 31 Dec 2017. Asset classes represent the following indexes: U.S. stocks - Russell 3000 index; non-U.S. stocks - MSCI ACWI ex USA index; U.S. investment-grade bonds - Bloomberg Bardays U.S. Aggregate Index: non-U.S. investment-grade bonds - Bloomberg Bardclays Global Aggregate Index: privately help U.S. commercial real estate - NCREIF Real Estate Index; privately held U.S. farmland - NCREIF Farmland Index; Privately held timberland - NCREIF Timberland Index; publicly traded U.S. real estate investment trusts and Forestry Index (2004 - 2017) with the returns of companies representing 4% or more of the index between 1991 and 2003. Indexes are unmanaged and unavailable for direct investment.

Sources: NCREIF, FactSet, Nuveen, LLC.

Performance of Real Assets, Commodities and REITs (1992 - 2017)

Real assets had higher risk-adjusted returns versus most other asset classes

	Stocks		Bonds		Private real assets			Public real estate & commodities		
Market Indexes	U.S.	Non U.S.	U.S.	Non U.S.	Real estate	Farmland	Timberland	U.S. REITs	Agriculture	Timber Proxy
Mean	11.24%	8.08%	5.88%	5.65%	8.62%	11.76%	10.08%	12.60%	-0.65%	9.56%
Standard Deviation	17.10%	19.44%	4.31%	5.94%	8.24%	6.85%	9.83%	20.13%	19.68%	21.64%
Sharpe Ratio	0.49	0.27	0.71	0.48	0.71	1.31	0.74	0.49	-0.18	0.31

Data are based on rolling one-year total returns, calculated on a quarterly basis for perdiods ended 31 Mar 1992 through 31 Dec 2017. See Exhibit 1 for the indexes representing asset classes. It is not possible to invest in an index. Indexes are unmanaged and unavailable for direct investment.

Sources: NCREIF, FactSet, Nuveen, LLC.

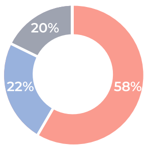
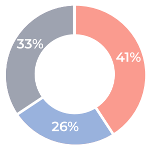
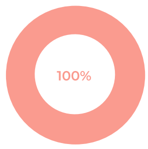
Comparison of Farmland to Other Real Asset Classes

Nuveen has also conducted a risk-return analysis comparing private real assets — namely, farmland, timberland, and commercial real estate. Farmland dominated a portfolio consisting of these three types of private real assets. An efficient frontier can be seen below which compares three portfolios (maximum Sharpe Ratio, minimum risk, and maximum return), each of which is comprised of farmland, timberland, and real estate allocations.

Structuring a Portfolio of Farmland, Timberland and Private Real Estate (100% Private Real Assets)

Farmland dominated returns, with timberland and real estate enhancing diversification

Performance (1992 - 2017)

Portfolios on the Efficient Frontier	Highest Sharpe Ratio Portfolio	Minimum-Risk Portfolio	Maximum-Return Portfolio
Allocations: Farmland, Timberland, Real Estate			
Average annual total returns	10.76%	10.30%	11.76%
Standard deviation	5.64%	5.52%	6.85%
Sharpe ratio	1.52	1.47	1.31

Data are based on rolling one-year total returns on a quarterly basis for periods ended 31 Mar 1992 through 31 Dec 2017. Asset classes represent the following indexes-privately held U.S. commercial real estate - NCREIF Real Estate Index; privately held U.S. farmland - NCREIF Farmland Index; privately help U.S. timberland - NCREIF Timberland Index. Indexes are unmanaged and unavailable for direct investment. Mean-variance optimization based on historical returns is intended for illustration purposes only and should not be considered investment recommendations.

Sources: NCREIF, FactSet, Nuveen, LLC.

Farmland Dominated the Most Risk-Efficient Portfolio

at 58%, which also included 22% timberland and 20% real estate, benefitting from low correlations among the categories;

The Lowest-Risk Portfolio Contained 41% Farmland

and increased timberland and real estate to 33% and 26%, respectively, reflecting relatively low or negative correlations between categories;

The Highest-Return Portfolio Consisted of 100% Farmland

reflecting higher returns and lower volatility compared to timberland and real estate;

Overview of Farmland as an Investment Asset

It is estimated that only 7% of Earth's land is suitable for cultivation, and most of the world's productive arable land is already in crop production. However, global population is expected to grow from 7.7 billion to 10 billion by the year 2050. Also, as greater numbers of people rise from poverty to the middle class, diets will improve and people will consume more meats and proteins. Food production will have to increase by 70% by the year 2050,[4] and 90% of the growth in crop production will come from higher yields[5]. As farmers push productivity higher, land appreciates in value[6].

By 2050, the demands on agriculture to provide sufficient food, fiber, and energy are expected to be 50 to 70 percent higher than they are today. In the U.S., only 324.1 million acres of agricultural land had productivity, versatility, and resilience ("PVR") values with the optimal soil characteristics and growing conditions to support intensive food and crop production with minimal environmental limitations. This is slightly more than one-third of agricultural land. However, research shows that between 1992 and 2012, almost 31 million acres of agricultural land were irreversibly lost to development.[7] Even more alarming, this loss included almost 11 million acres optimal PVR land intensive food and crop production. While a 3.2 percent loss does not sound devastating, it is roughly equivalent to losing one of the most productive growing regions in the United States, California's Central Valley.

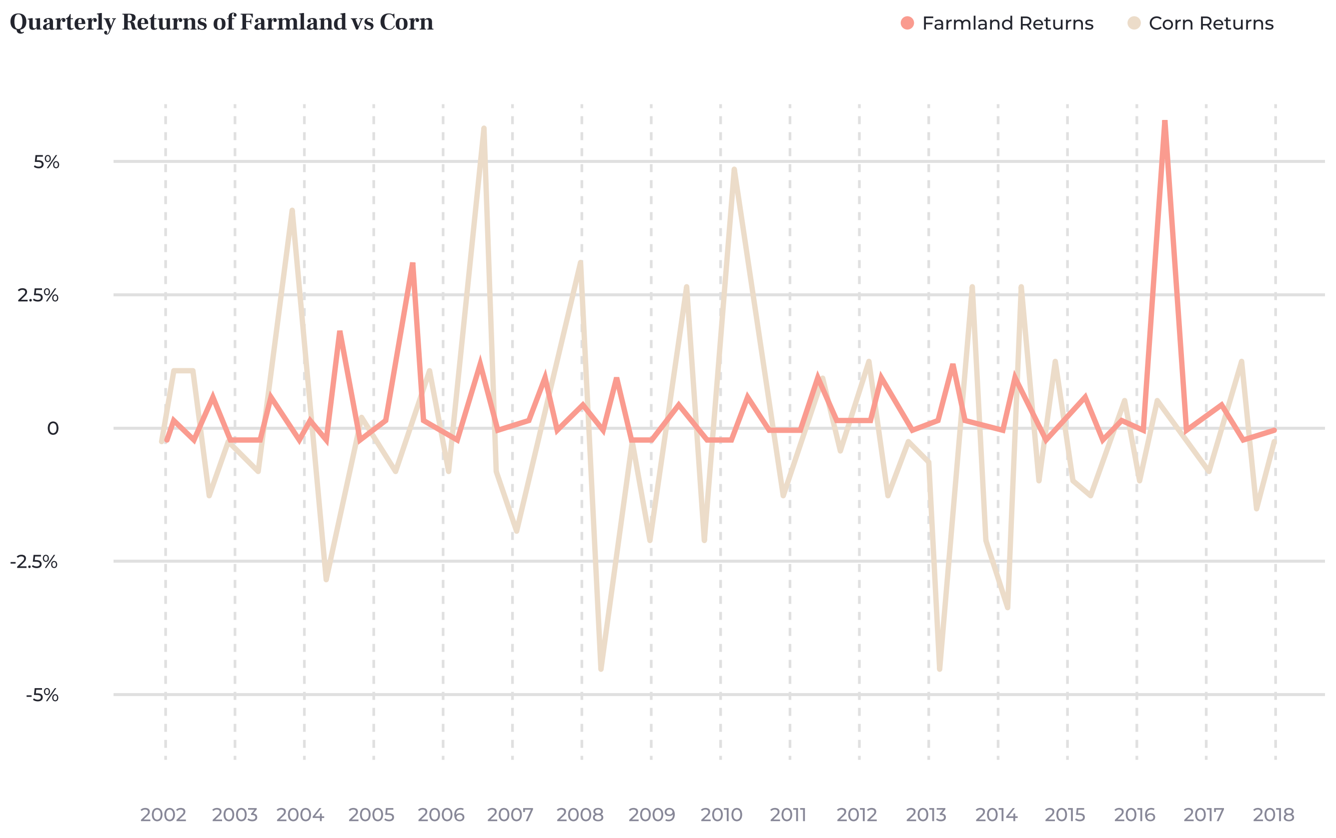
Similar to traditional real estate, returns from farmland investing consist of both lease income and land and related asset appreciation. The current income component can be structured as either an annual lease payment or a profit share from annual crop sales. While soil quality and water availability are relatively fixed determinants of a property's potential yield, technological and management improvements can be brought to bear on individual properties to enhance yields and returns to investors. Capital improvements, such as irrigation, laser leveling, and drainage can increase current income, as well as future value, as improvements that permanently increase productivity are eventually capitalized into land values.

Sources:

5 United Nations estimate
6 Capitaline (https://www.capitaline.net/farmland-investment/)
7 American Farmland Trust (Farms Under Threat: The State of America's Farmland)

Farmland investing is fundamentally different from investing in food or agricultural commodities, and the two should not be confused. Farmland investing provides the opportunity to hedge short-term exposure to volatility in harvest conditions or commodity prices through fixed lease payments. As crop markets change over the long-term, land can be replanted or converted to more attractive crops and adapt to long term structural changes in market environments.

The returns of agricultural commodities are generally much higher than farmland, but so is the standard deviation and risk. The chart below plots farmland returns against the returns of a cash crop like corn; it is clear that the cash crop is more volatile relative to farmland. The average quarterly return of U.S. corn futures since 2002 is roughly 2% with a standard deviation of 15%, which implies a Sharpe Ratio of 0.12.



Types of Farmland Investing

Farmland investing can take on various forms. Types of farmland can be grouped into three general categories:

Row Cropland

Row cropland investments produce annual crops such as corn, soybeans, cotton, wheat, and rice. In general, these have lower annual cash flow yields but less volatility. They typically have shorter harvest periods and involve lower upfront capital expenditure. The crop decisions are made annually providing additional flexibility for farmers to react to relatively current market conditions.

Permanent Cropland

Permanent cropland investments include perennial crops such as fruit and nut crops, which have both pre-productive and mature periods. Pre-productive or "greenfield" investments must mature before they reach economic profitability, and these investments have a "J-curve" return profile. Some permanent crops, like almonds, peak in productivity and then decline, so orchard age is an important factor in estimating productivity and value. These crops have longer investment horizons and offer opportunities for higher profitability and higher yields but also carry a higher risk.

Livestock

Livestock investments include land leased to local operators for grazing or direct livestock ownership and operation. In extreme cases, poor herd management can lead to a temporary reduction in land value due to animal damage.

Recent Trends in Farmland Investing

Agricultural land ownership is fragmented, with ownership resting largely with families who own a single property and farm it themselves. Non-owner-operators or, in other words, investors, owned 29 percent of US farmland in 2007. They lease the land to operators to ensure guaranteed income. Institutions with alternative investment allocations are attracted to farmland for similar reasons that attracted them to timberland over the last few decades. The low correlations, relative stability of returns, and inflation protection offered by both agriculture and timberland have been the primary drivers for institutional interest. Agricultural land assets sit at an estimated $8.3 trillion in total value with an estimated $1 trillion [8] of that being investable. This represents a compelling opportunity for institutional investors.

Until recently, agriculture and farmland did not have a natural home in the investment portfolios of the mainstream institutions. This is now changing and has the potential to make significant changes to capital ownership structures in the industry and the number of investments in the sector over time.[9]

Institutional farmland investments typically focus on globally competitive agricultural sectors including:

- Corn, soy, wheat, rice, and other bulk commodity row crops that can be produced most efficiently at scale.
- Relatively storable permanent crops, such as tree nuts or wine grapes.
- Large-scale livestock production, including dairy and beef cattle operations.

Since the early 2000s, institutional investors, including pension funds, university endowments, sovereign wealth funds, and family offices, have joined the space in different waves. In 2005 there were fewer than 20 farmland funds operating around the world. By the end of 2017, the number of farmland funds had reached 145, with an aggregated AUM of $32 Billion, as shown in the following figure.[10]

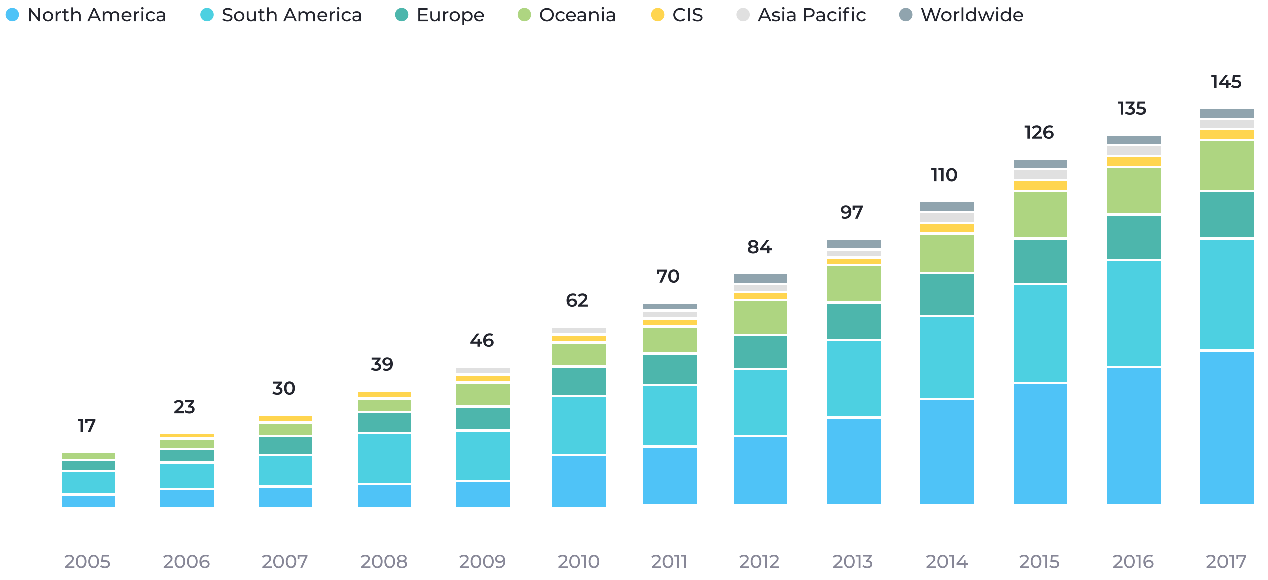
Sources:

8 Source: FAO 2011, GMO 2011, HNRG 2012, Global Ag Investing Research & Insight Estimates 2012, Macquarie Agricultural Funds Management 2012

9 Global AgInvesting Research & Insight

10 Valoral Advisors (2018-Global-Food-Agriculture-Investment-Outlook)

Evolution in The Number of Farmland Funds by Region



Sources: Valoral Advisors

Breakdown of Existing Farmland Investment Funds by Region and Agricultural Focus

	Row Crops	Permanent Crops	Mixed Products	Beef	Dairy	Fresh Produce	Organic Focus	Total
North America	42	4	8			1	2	**57**

Sources: Valoral Advisors

Historical Review of Farmland Price

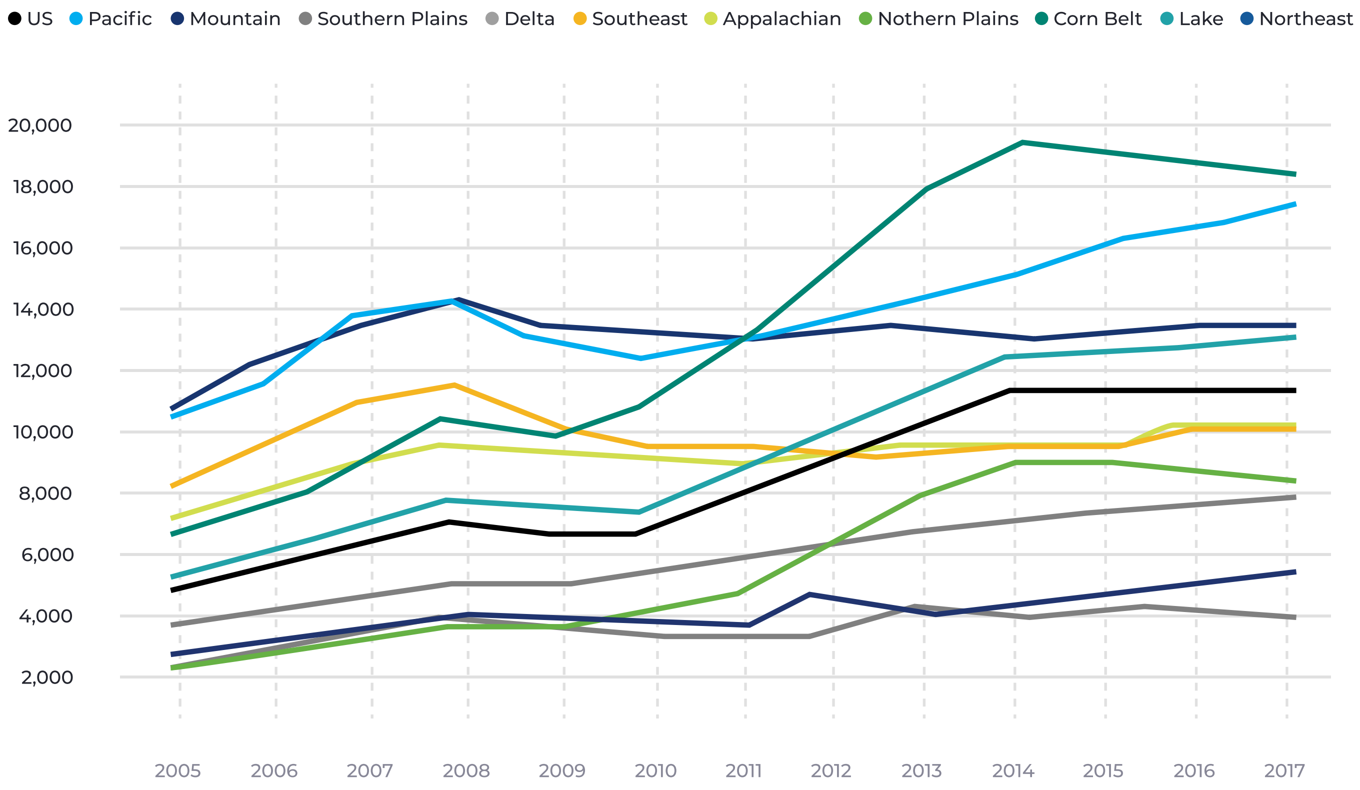
In the 2000s, there was a swift movement of capital into farmland. The massive increase in demand for food crops and animal protein – mainly from China and other emerging markets – drove agriculture commodity prices up across the board, increasing farm income and delivering record appreciation rates in land values. Since 2000, the NCREIF Farmland Income Index, which tracks the value of U.S. farmland, has more than tripled. A similar positive trend in farm income growth and appreciation of land values occurred in other major crop-producing regions, such as South America, Oceania, and Europe.

The 2010s were a different chapter for farmland. While the global farmland investment space successfully weathered the 08'/09' economic crisis and benefited from the race for real assets during this period, it ultimately fell victim to the downturn in agricultural commodity prices which resulted from increased global acreage, conducive weather, and the resulting record stocks.

U.S. farmland prices have leveled off since 2014, after exhibiting rapid growth over the previous decade, supported by relatively strong farm income, low borrowing costs, and the entry of institutional investors. While variations may differ from the survey, the general trends are clear. Other U.S. farmland price indexes[11] compiled by Creighton University and the St. Louis Fed point to similar price pressure in the last three years.

As a result of these trends, we are convinced there are plenty of deep-value U.S. farmland acres currently and/or soon-to-be-available for sale, and we are excited by this opportunity.

U.S. Cropland Prices by Region ($ / Hectare)



Sources:

11 Creighton University; St. Louis Federal Reserve Bank

Challenges of Investing in Private Real Assets and Farmland

There are several barriers to entry that make it difficult for investors to undertake investments in private real assets, particularly in farmland. Direct investors must deal with the following hurdles:

Lack of Transparency:

Sophisticated due diligence capabilities are essential to analyze the potential profitability and cash-flow profile of the assets and opportunities.

Capital Requirements:

Deep financial reserves are necessary to achieve economies of scale, as well as to invest in technology and infrastructure.

Operational Risks:

Investing in farmland involves a range of operational risks that include: weather, pest damage, marketing perishable crops, and complying with local regulations. Expertise in local markets and access to a network of local operators can allow investors to transfer operational risk and gain steady income through leasing contracts.

Vehicles to Gain Exposure to Farmland Investing

Public Farmland REITs:

Today, there are two main farmland REITs listed in the U.S: Gladstone Land - listed since 2013 - and Farmland Partners – listed in 2014 and which has subsequently acquired another U.S. farmland REIT - American Farmland. Farmland REITs typically lease the land to local tenants, through a wide range of possible lease contracts. Besides crop prices, cash yields are driven by the quality of the portfolio and tenants, the lease arrangements, and efficiencies in scale and expenses. Long-term appreciation in the value of the farmland portfolio is a major driver of total return.

Technology Driven Fractional Ownership Platforms:

These platforms are relatively new, and FarmTogether would fall under this category. These companies provide a platform for investors to choose from a variety of passive farmland investment opportunities. The service provider is responsible for the curation, due diligence, leasing and management of the operations. The platforms allow investors to directly invest in properties and build their own portfolio depending on their investment perspective and risk appetite (e.g., row crop vs. permanent crop, fixed lease vs. variable lease, etc.)

Summary

Farmland investing is a subset of real asset investing that provides income via lease payments and capital appreciation. The historical returns related to farmland investment have been attractive. The NCREIF benchmark not only shows positive returns every quarter since 2002 but also that the standard deviation of the returns is low, allowing investors to generate consistent returns with limited variability.

An investment in farmland will help create a diversified portfolio that may help hedge against adverse market conditions. Direct investment into a specific farmland fund that targets a specific operation may be a more attractive investment relative to a farmland REIT on a risk-reward basis. FarmTogether provides an investment platform that allows qualified and accredited investors to actively manage their farmland portfolios and compare several deals.

If you would like to learn more about FarmTogether, please contact us at info@farmtogether.com