

# Research Note

## Hancock Agricultural Investment Group

### *Benefits Of Farmland Investments*

#### **Introduction**

This *Research Note*, developed by Hancock Economic Research and the Hancock Agricultural Investment Group, evaluates the historical performance of farmland relative to traditional financial and equity real estate investments for the 1971 to 2010 period.

This *Research Note* includes analysis of:

- ◆ the historical risk and return of farmland relative to traditional investments;
- ◆ the diversification benefits of farmland investments; and
- ◆ farmland investments as an inflation hedge.

This research uses data from 1971 through 2010, which is the longest period for which data is available for most assets. Encompassing a full-market cycle for the farm sector, this 40-year period is believed to provide a reasonable historical representation of investment performance and to be indicative of long-term market trends.

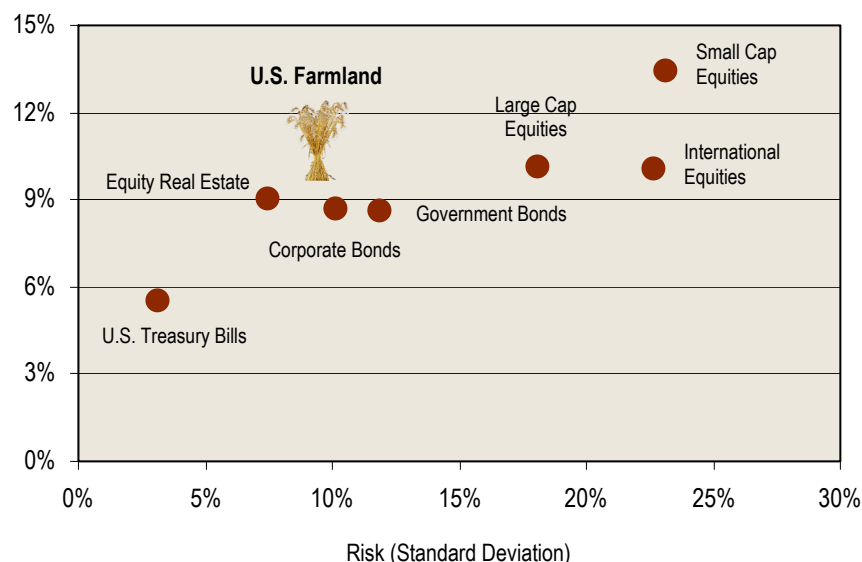
#### **Farmland's Competitive Risk/Return Profile**

Farmland investments can provide a competitive risk/return profile relative to traditional financial investments.

When considering the addition of an asset class to a portfolio, analysis of an asset's expected risk and return provides a method of assessing potential investment benefits. The following chart and table illustrate the historical performance of farmland investments relative to traditional asset classes for the 40-year period from 1971 to 2010.

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**HAIG Annualized Return 1971-2010**



**Risk: Standard Deviation**

**Historical Risk and Return of Farmland and Traditional Investments 1971-2010**

Asset class	Annualized Return	Standard Deviation	Risk/Return Ratio	Sharpe Ratio
<b>Equities</b>				
Large Cap Equities	10.14%	18.09%	1.78	0.39
Small Cap Equities	13.42%	23.13%	1.72	0.45
International Equities	10.03%	22.70%	2.26	0.31
<b>Bonds</b>				
Long-term Government Bonds	8.57%	11.87%	1.38	0.47
Long-term Corporate Bonds	8.65%	10.18%	1.18	0.55
<b>Cash</b>				
U.S. Treasury Bills	5.53%	3.14%	0.57	0.81
<b>Real Estate</b>				
Equity Real Estate	8.99%	7.47%	0.83	0.80
<b>U.S. Farmland</b>	<b>10.86%</b>	<b>9.10%</b>	<b>0.84</b>	<b>0.86</b>

See Appendix for data sources

Over the last 40 years, farmland investments experienced higher returns than all asset class categories excluding small cap equities. These returns have come with lower volatility than all asset class categories excluding U.S. Treasury Bills and Equity Real Estate. While the risk/return profile is a good indicator of investment performance, the risk/return and Sharpe ratios are more valuable when comparing the relative investment performance among assets. The Sharpe ratio indicates the excess return over a representative risk-free rate, the 10-year U.S. Treasury note (here three percent), per unit risk.

Analysis of the historical risk/return ratio suggests that farmland experienced less risk per unit of return than both stocks and bonds. Analysis of the historical Sharpe ratio suggests that farmland investments experienced the greatest excess return per unit of risk of any of the asset classes presented.

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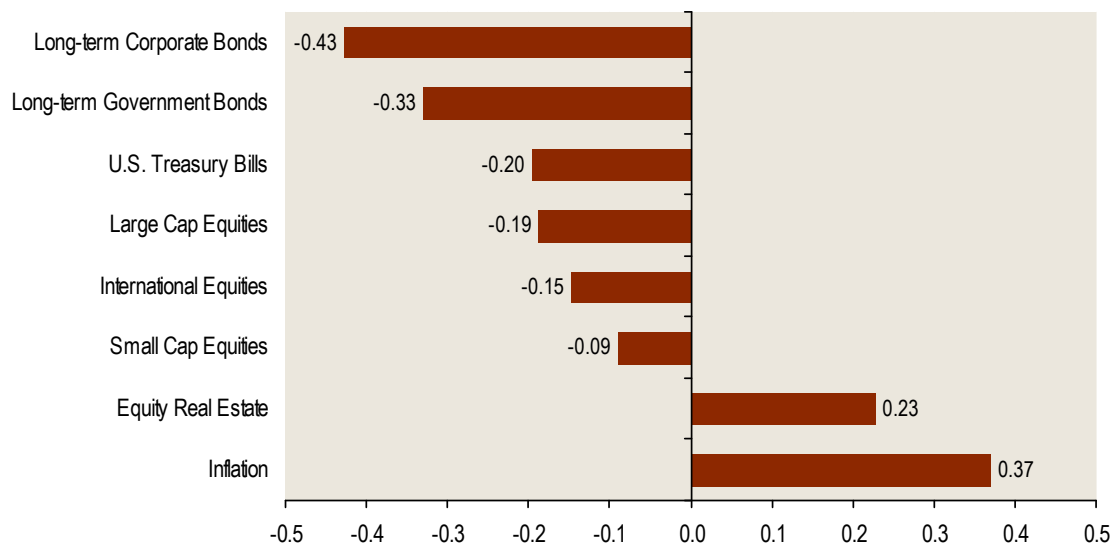
## Farmland as a Portfolio Diversifier

Adding farmland to a diversified portfolio often helps reduce unsystematic risk without sacrificing expected return.

### Correlation Analysis

In addition to risk/return considerations, asset allocation decisions should also include an evaluation of the relationship between each asset class and the total portfolio. One method of quantifying this relationship is to calculate historical return correlations among asset classes.

Historical Correlations with Farmland 1971-2010



Farmland returns were negatively correlated with traditional financial assets over the last 40 years. The negative correlation indicates that the addition of this asset class to a diversified portfolio will reduce the overall portfolio risk.

Additionally, farmland's low correlation with equity real estate suggests that farmland investments can serve as a complement to or substitute for traditional real estate investments.

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## Beta Analysis

Calculations of historical farmland beta provide another measure of the diversification benefits of farmland investments. Within a portfolio, beta captures the relationship between an asset's return and a market portfolio's return and can be used to measure an asset's contribution to the overall risk of the market portfolio.

For a given diversified portfolio, market returns are calculated as the weighted averaged returns for a diversified portfolio of equities, bonds, cash and real estate. The market portfolio illustrated below is used to represent a typical, simplified asset mix of tax-exempt institutional investors. It is worth noting that over the past two decades, both public and corporate plans have increased their exposure to alternative assets, such as hedge funds and private equity, and real assets, including timberland, farmland, and commodities. In 2010, Pension & Investments reported that alternative assets and real assets constituted up to 12% of the 200 largest defined benefit pension funds. Due to limited reliable historical data for these asset classes, they have not been included here.

### Market Portfolio

Asset Class	Asset Allocation
<b>Equities</b>	
Large Cap Equities	34%
Small Cap Equities	11%
International Equities	5%
<b>Bonds</b>	
Long-term Government Bonds	20%
Long-term Corporate Bonds	20%
<b>Cash</b>	
U.S. Treasury Bills	5%
<b>Real Estate</b>	
Equity Real Estate	5%

See Appendix for data sources

From 1971 to 2010, farmland returns demonstrated a beta of -0.25 when compared to the market portfolio. In other words, on average, a 10% decrease (increase) in the return on the market portfolio was accompanied by a 2.5% increase (decrease) in the return on farmland investments. Since farmland's beta is negative, investments in farmland may be expected to lower the risk (standard deviation) when included in a diversified portfolio.

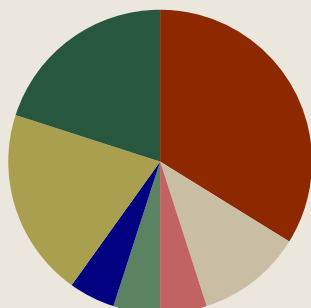
## Impact of Farmland on Expected Portfolio Performance

The following demonstrates that the addition of farmland to a diversified portfolio can reduce risk without reducing expected returns and therefore can improve a portfolio's Sharpe ratio.

Three investment strategies with varying farmland allocations are illustrated below. **Portfolio A** represents the market portfolio, i.e. a typical diversified portfolio exclusive of farmland. **Portfolios B** and **C** include 5% and 10% farmland allocations respectively. Pro rata reductions were made from the other asset allocations to allow for the inclusion of farmland within the market portfolio.

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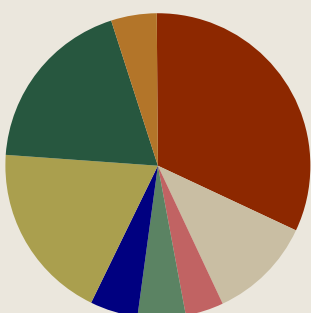
**Portfolio A - 0% Farmland**



- Large Cap Equities: 34%
- Small Cap Equities: 11%
- International Equities: 5%
- US Treasuries: 5%
- Equity Real Estate: 5%
- Long-term Government Bonds: 20%
- Long-term Corporate Bonds: 20%

Expected Return: 10.26  
 Standard Deviation: 10.50  
 Sharpe Ratio: 0.69

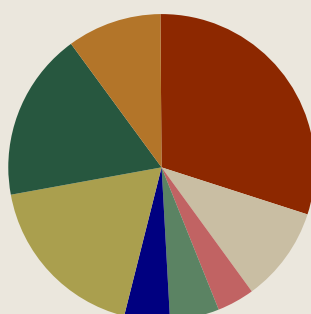
**Portfolio B - 5% Farmland**



- Large Cap Equities: 32%
- Small Cap Equities: 11%
- International Equities: 4%
- US Treasuries: 5%
- Equity Real Estate: 5%
- Long-term Government Bonds: 19%
- Long-term Corporate Bonds: 19%
- Farmland: 5%

Expected Return: 10.35  
 Standard Deviation: 9.79  
 Sharpe Ratio: 0.75

**Portfolio C - 10% Farmland**



- Large Cap Equities: 30%
- Small Cap Equities: 10%
- International Equities: 4%
- US Treasuries: 5%
- Equity Real Estate: 5%
- Long-term Government Bonds: 18%
- Long-term Corporate Bonds: 18%
- Farmland: 10%

Expected Return: 10.39  
 Standard Deviation: 9.07  
 Sharpe Ratio: 0.82

See Appendix for data sources. Risk-free rate of 3% used to calculate Sharpe ratio.

**Benefits Of Farmland Investments** (Continued from page 5)

As illustrated by **Portfolio C**, over the last 40 years, a 10% allocation to farmland increased returns by 0.13%. More significantly, allocations to farmland decreased risk: by 0.71% with a 5% allocation and 1.43% with a 10% allocation. Improvements gained through the addition of farmland are further evidenced by improving risk/return and Sharpe ratios. With an increasing allocation to farmland, the average portfolio experiences less risk per unit of return and greater excess returns per unit of risk.

**Impact of Farmland on a Portfolio: Summary**

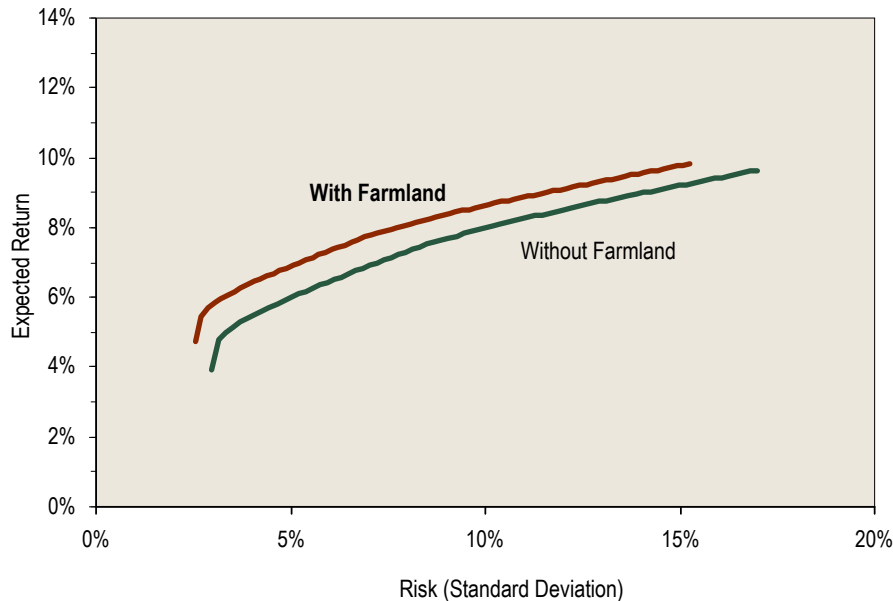
Farmland Allocation:	0%	5%	10%
Portfolio Return	10.26%	10.35%	10.39%
Portfolio Risk	10.50%	9.79%	9.07%
Risk/Return	1.02%	0.95%	0.87%
Sharpe Ratio	0.69%	0.75%	0.82%

**Risk-Efficient Frontiers**

A risk-efficient portfolio maximizes the expected return for a given level of risk or minimizes the risk for a given level of expected return. Investors accumulate assets with negative or low-positive correlation to enhance the risk efficiency of their portfolio

Two risk-efficient frontiers for diversified portfolios are illustrated below—one with farmland at 10%, the other without. The frontiers are calculated from the 40-year historical returns, standard deviations and correlations. Certain allocation restraints, as noted in the chart below, are imposed to ensure results consistent with typical institutional management strategies.

**Efficient Portfolios With and Without Farmland**



Note: The following asset allocation constraints were imposed: Farmland (10%), Equity Real Estate (10%), International Equities (10%), and Small Cap Equities (15%).

Adding farmland to a diversified portfolio shifts the efficient frontier up and to the left. This demonstrates that for a given level of risk, the addition of farmland can improve the portfolio’s expected return.

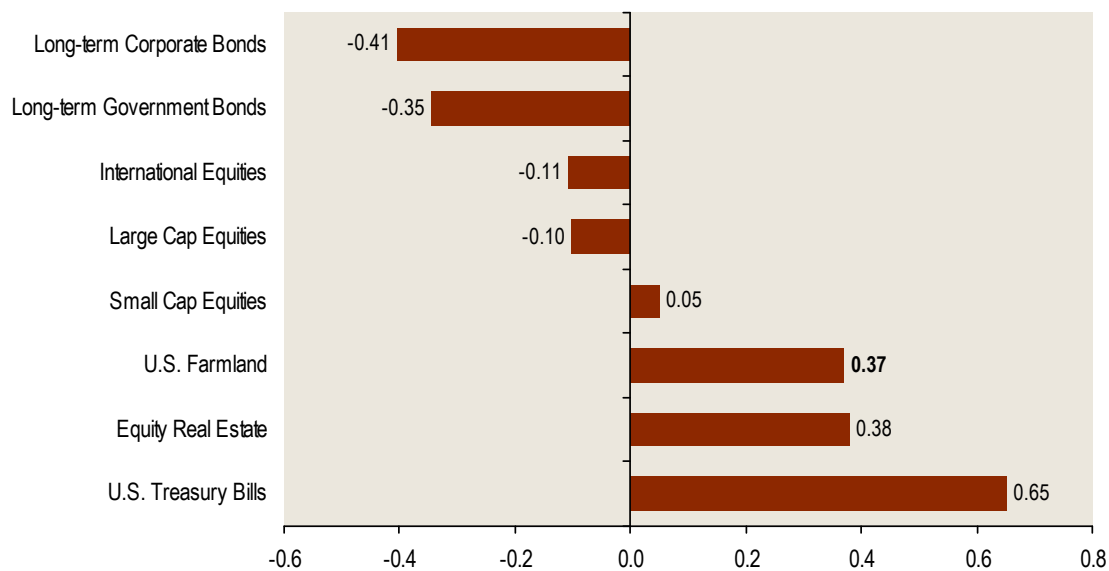
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## Farmland as an Inflation Hedge

Farmland investments can provide an inflation hedge and an effective vehicle for capital preservation.

Historical farmland investment returns were highly correlated with inflation over the last 40 years, while financial asset returns were negatively correlated with inflation. As a result, during times of high or rising inflation, farmland returns increased, while financial asset returns decreased. This suggests that farmland investments can provide an effective vehicle for capital preservation and offset some of the negative returns of financial assets during times of rising inflation.

### Historical Correlations with Inflation 1971-2010



Additionally, from 1971-2010, farmland investments generated nominal annualized total return of 10.9%, which exceeded the 4.4% rate of inflation, producing a real annualized return of 6.2%.

## Conclusion

This *Research Note* indicates that farmland investments can provide investors with many benefits. Some key highlights emerge from historical analysis of farmland investments:

- ◆ Farmland investments can provide a competitive risk/return profile relative to traditional investments.
- ◆ Due to negative correlations with the returns of common financial assets, farmland can improve the risk/return ratio of a diversified portfolio of equities, bonds, cash and equity real estate.
- ◆ Farmland investments can provide an inflation hedge and an effective vehicle for capital preservation.

*Past performance is no guarantee of future results. Potential for profit as well as loss exists.*

## Appendix

Asset Class	Data Source
U.S. Farmland	Hancock Broad Farmland Index: 1971 - 1990. National Council of Real Estate Investment Fiduciaries Farmland Index: 1991 - 2010.
Large Cap Equities	Standard and Poor's 500 Index
Small Cap Equities	Ibbotson Associates' Small Cap Index
International Equities	Morgan Stanley Europe Australia, Far East Stock Market Index (EAFE)
Long-term Corporate Bonds	Ibbotson Associates' Long-term Corporate Bond Index
Long-term Government Bonds	Ibbotson Associates' Long-term Government Bond Index
U.S. Treasury Bills	Ibbotson Associates' U.S. Treasury Bill Index
Equity Real Estate	Ibbotson Business Real Estate Index: 1971 - 1977. National Council of Real Estate Investment Fiduciaries Property Index: 1978 - 2010.
Inflation	Ibbotson Associates' Inflation Index