Introduction to Investing in Agriculture – Framing Opportunities Across the Value Chain and Around the Globe

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HighQuest Group - advisory services, media and industry events

Strategic advisor in global food, agribusiness and biofuels

The world's leading resource for events, research, and insight into the global agricultural investment sector
Supporting informed decision-making for strategic and financial investors across the global agricultural value chain
HighQuest Consulting

FOOD & AGRIBUSINESS VALUE CHAIN

UPSTREAM
- INPUTS
  - Seeds
  - AgChemicals
  - Fertilizers
  - Machinery
- FARMING
  - Crop
  - Livestock
  - Aquaculture

MIDSTREAM
- STORAGE, TRANSPOTATION
  - Storage
  - Truck
  - Rail
  - Barge/Ship
  - Port Terminals
- MANUFACTURING/PROCESSING
  - Meat
  - Poultry
  - Fish
  - Dairy
  - Egg
  - Grain, Oilseed
  - Bio-Energy
  - Fruits, Veg
  - Snacks, RTE
  - Beverages

Who are HighQuest Consulting’s Clients?

<table>
<thead>
<tr>
<th>TRADERS, PRIMARY PROCESSORS</th>
<th>FINANCIAL INVESTORS</th>
<th>FOOD PROCESSORS</th>
<th>AG INPUT PROVIDERS</th>
<th>EQUIPMENT MANUFACTURERS</th>
<th>GOVERNMENT ASSOCIATIONS</th>
<th>CO-OPS</th>
<th>AND MORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADM</td>
<td>Andra A-P-fonden</td>
<td>Dean</td>
<td>Bayer Crop Science</td>
<td>Bühler</td>
<td>OECD</td>
<td>OceanSpray</td>
<td>Dupont Pioneer</td>
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<tr>
<td>Bunge</td>
<td>Apollo Investment Corporation</td>
<td>Perdue</td>
<td>Science Dow AgroSciences</td>
<td>CNH</td>
<td>USDA</td>
<td>Mountain View Seeds</td>
<td>Pioneer</td>
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<tr>
<td>Mitsui &amp; Co</td>
<td>GE Capital</td>
<td>Suntory</td>
<td>Novus</td>
<td>John Deere</td>
<td>USSEC</td>
<td>Wheat Growing Connection Solutions</td>
<td>CHS</td>
</tr>
<tr>
<td>Samsung</td>
<td>Tyson Foods</td>
<td></td>
<td>Syngenta</td>
<td></td>
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<td>CPP Investment Board</td>
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</table>
Why food and agriculture – investment thesis?

- **Supply & Demand Imbalances**: Demand for land & soft commodities is being driven by several strong macro trends.
- **Inflation Hedge & Wealth Preservation**: Historically a tested store of value in inflationary environments.
- **Low Correlation to Other Asset Classes**: Outperformed traditional asset classes long-term.
- **Under-Owned by Institutional Investors**: Farmland is an underinvested asset class because access and execution are difficult.

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Agriculture value chain - “conceptually simple and yet challenging for efficient execution”

A complex market structure requires appreciation for how margins are shared amongst players at different points along the supply chain.
Where to invest in food/agriculture?

- There are many ways to invest in most stages of the agricultural value chain via equities, corporate bonds, futures, options and ETF’s.

- However the farming/production sector is not as easily investable, as it traditionally has been a fragmented industry with tightly held family run enterprises. This is slowly changing due to increased consolidation, driven by the demographics of the farming community and pressures to achieve economies of scale in production.

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**Fertiliser, Seeds, Pesticides:** BASF, Syngenta, Yara  
**Farm Investments:** TIAA-Cref, Hancock, Macquarie, Rabo Farms  
**Processing, Trading:** Cargill, ADM, Bunge  
**Further Processing & Marketing:** Kraft, Nestlé  
**Food Distribution:** Tesco, Walmart

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**Institutional Investment In Agribusiness**

- Direct Investments  
- Closed-End Funds  
- Tailor-Made Structures
Range of investment opportunities in the ag sector

Real Assets
- Farmland
- Infrastructure

Private Equity
- Upstream
  - inputs (seed, chemicals, fertilizer, technology services, capital goods)
- Downstream
  - storage and logistics
  - value added processing of ingredients
  - food/feed/industrial processing

Venture Capital
- Biotech
- Enabling technologies (precision ag, biologicals and big data)

Water theme investments

Liquid Assets
- Public equities
- Commodity index funds
Agriculture – an emerging asset class?

**Farmland**

<table>
<thead>
<tr>
<th>USD $ billion</th>
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<tbody>
<tr>
<td>8,300*</td>
</tr>
</tbody>
</table>

**Timber**

<table>
<thead>
<tr>
<th>USD $ billion</th>
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<tbody>
<tr>
<td>425*</td>
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</table>

<table>
<thead>
<tr>
<th>Total land value</th>
<th>8,300*</th>
<th>425*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investable universe</td>
<td>1,000*</td>
<td>300*</td>
</tr>
<tr>
<td>Institutional ownership</td>
<td>45*</td>
<td>60*</td>
</tr>
</tbody>
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*Estimates

- Institutional investment in farmland represents less than 0.5% of the total – most land around the world is privately owned.
- However institutional investment in farmland has been growing at 8-10% p.a.; currently +/- $45 billion.
- While historically most investment has been concentrated in North and South America, there is new institutional appetite for agricultural investment in Australia and the Eastern Europe.
- While farmland is an immature asset class in comparison to timber, the investable universe for farmland is over 3x size – many traditional institutional timber investors are either now investing or looking to invest in farmland.
Key issues driving farmland values

- **Population growth and increase in GDP**
  - World population 9 billion in 2050
  - Increased demand in developing markets, particularly Asia, SE Asia and North Africa
  - Shift in diets from grain to animal protein (*Bennett’s law*)

- **Increasing urbanization**
  - Pressure on available arable land for crop production
  - Increasing reliance on processed foods

- **Constraints on supply**
  - Water access
  - Climate change
  - Linkage to energy markets (biofuel mandates)
  - Deceleration of yield increases
  - Environmental regulations on production

- **Human capital**
  - Generational transfer in both developed and developing markets
  - Lack of capacity building in developing markets
End of the commodity super cycle?

Hard commodity prices 1960-2016
Real 2010 USD

Soft commodity prices 1960-2016
Real 2010 USD

Source: World Bank
Middle class consumption in China and India continues to fuel growing demand for commodities

Global Middle Class Consumption
2000-2025

Source: OECD
Protein demand increases a global phenomenon

Substantial increases in protein consumption between 2000 and 2010

Source: Baumé, FAPRI
China has driven demand for U.S. exports over past decade

U.S. agricultural exports to China have grown more than 200% in the past decade, reaching over $20.2 billion in 2015

U.S. Soybean Exports to China

Source: USDA FAS
Impact of climate change in Iowa

Even in the USA!

In Iowa, the last 5 years are all outside the 95th percentile of 120 years of rainfall data.

Data Source: State of Iowa Climatologist
Potential agricultural yield decreases by 2050 due to climate change

Have yield improvements hit an inflection point?

Global Yields for 4 Major Crops
Historical and Projected

Trailing 10-Year Yield Improvement
Corn

Rice

Wheat

Soybeans

Source: USDA, HighQuest analysis
Opportunities for increasing productivity in emerging markets

Total Factor Productivity Growth of Agriculture
Average Change in Growth Rates (1961-2009)

- Developed Countries: 1.43%
- Developing Countries: 1.96%
- Sub-Saharan Africa: 3.37%
- Latin America: 1.78%
- Brazil: 2.42%
- China: 2.60%
- Southeast Asia: 1.53%
- Russian Federation: 2.24%

Source: OECD, FAO
U.S. farmland returns have exceeded DOW and S&P over the last 10 years.
Annual and permanent cropland returns compared to other assets

Asset Returns in the U.S. 1992-2016

- Annual Cropland Return
- Permanent Cropland Return
- Timberland Return
- Commercial Real Estate Return
- 10-year Treasury Yield
- Moody's Aaa Yield

Source: NCREIF, Federal Reserve Board
Farmland values low relative to capitalized value

Illinois Cropland - Nominal and Capitalized Values
1970-2016

Source: USDA NASS, University of Illinois
Farmland returns have been higher than CPI (inflation rate) – can mitigate impact of market volatility on returns

Farmland Correlation to CPI

Farmland to CPI = 0.37

Source: NCREIF, Federal Reserve Board
Returns on US farmland compared to other assets

Mean Return vs. Standard Deviation
1991-2016

- NCREIF Farmland
- NCREIF Timber
- NCREIF Property
- Russell 2000
- S&P 500
- Moody's Aaa
- 10-yr Treasuries
- Gold

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TIAA farmland funds attract institutional investors across the globe

August 2015 - TIAA closes its largest agriculture investment fund to date with $3 billion in commitments.
TIAA Global Asset Management - $639 billion AUM($130 billion in alternatives.)*

Farmland Investment History
• Investing in agriculture since 2007
• Manages $8 billion in farmland assets
• TCGA I- $2 billion in commitments (2012)
• TCGA II- $3 billion in commitments (2015)

Farmland Investment Strategy
• Invest in high-quality farmland, both permanent and row crops
• Geographic focus - North America, South America and Australia
• Investment strategy developed with majority-owned subsidiary Westchester Group, a farmland asset manager

Notable Investors
• AP2
• British Columbia Investment Management Corporation
• Caisse de dépôt et placement du Québec
• Greater Manchester Pension Fund
• New Mexico State Investment Council
• New York State Common Retirement Fund
• Saudi Aramco

*2015 values
Early 2015 - Paine & Partners closes fourth fund - **$893 million** in commitments. Fund is focused on the investment in global food and agribusiness companies – has acquired three portfolio companies.

**Company Profile**
- P&P and predecessor firm has managed over $3.6 billion in assets
- Deployed over $1 billion in capital in agribusiness sector over the last decade

**Agriculture investment strategy**
- Focus on upstream investment, particularly ag input companies to reduce cyclical and seasonal risks experienced by investing in underlying commodities
- Invest in agricultural technology and sustainability-focused companies to drive efficiency in food production

**Representative Portfolio Companies**
- **Suba Seeds**: Producer, packer, and distributor of specialty vegetable seeds
- **AgBiTech**: Australian producer of biological pest controls
- **Spearhead Int.**: Farming group with diversified crop and geographic exposure throughout Europe
- **Verdesian Life Sciences**: Investment platform focused on plant health and nutrition
- **ScanBio**: Norwegian producer of fish protein concentrate, meal, and oil from fish by-products

**Notable Investors (Fund IV)**
- Maine Public Employees’ Retirement System
- Minnesota State Board of Investment
- New Mexico Public Employees’ Retirement Association
- University of Texas Investment Management Company
Long-term fundamentals in food and agriculture are attracting investments from pension funds in Europe and Canada

<table>
<thead>
<tr>
<th>Second Swedish National Pension Fund (AP2)</th>
<th>Canada Pension Plan Investment Board</th>
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</thead>
<tbody>
<tr>
<td><strong>Fund type:</strong> Pension fund</td>
<td><strong>Fund type:</strong> Pension fund</td>
</tr>
<tr>
<td><strong>Country:</strong> Sweden</td>
<td><strong>Country:</strong> Canada</td>
</tr>
<tr>
<td><strong>AUM (Dec. 2015):</strong> SEK 300 bn (US$35.7 bn)</td>
<td><strong>AUM:</strong> CAD 278 bn (US$217 bn)</td>
</tr>
<tr>
<td><strong>Investment breakdown:</strong></td>
<td><strong>Investment breakdown:</strong></td>
</tr>
<tr>
<td>• 44% Equities</td>
<td>• 52% Equities</td>
</tr>
<tr>
<td>• 31% Fixed-income securities</td>
<td>• 27% Fixed-income securities</td>
</tr>
<tr>
<td>• 25% Alternative investments</td>
<td>• 21% Alternative investments</td>
</tr>
<tr>
<td><strong>Agriculture Investment Strategy:</strong></td>
<td><strong>Agriculture Investment Strategy:</strong></td>
</tr>
<tr>
<td>• Agriculture represents 3.4% of AUM, approximately $1.3 billion USD</td>
<td>• Directly invests/acquires farmland portfolios</td>
</tr>
<tr>
<td>• Crop breakdown - 60% row crop, 30% permanent crops and 10% dairy</td>
<td>• Launched agricultural investment program in 2012 with geographic focus on U.S., Canada, Australia, New Zealand and Brazil</td>
</tr>
<tr>
<td>• Geographic breakdown - 66% U.S., 23% Brazil and 11% Australia</td>
<td>• Purchase of 40% of commodity trader Glencore for $2.5 billion USD (2016)</td>
</tr>
<tr>
<td>• Investment strategies carried out largely in collaboration with TIAA</td>
<td>• Acquired Assiniboia Farmland LP’s Saskatchewan farmland fund</td>
</tr>
</tbody>
</table>

Source: Company websites, Preqin
### Washington State Investment Board

**Fund type:** Pension fund  
**Country:** United States  
**AUM (Dec. 2015):** $106.9 bn.  
**Investment breakdown:**  
- 36% Equities  
- 34% Fixed income  
- 30% Alternative investments  

**Agriculture Investment Strategy:**  
- $50 million investment in ACM Permanent Crops LLC, a permanent crop fund  
- Investment Laguna Bay Agricultural Fund I (A$250 million), focused on agriculture in Australia and NZ  
- $300 million investment in Teays River, a US agricultural holding company operating in organic dairy, seed production, table grapes and row crops  
- $100 million investment in UBS AgriVest, a US permanent and vegetable crop fund  
- $250 million investment in Wood Creek Capital for the investment in US midstream ag assets

### University of Texas Investment Management Co.

**Fund type:** Endowment/Operating  
**Country:** United States  
**AUM:** $35.9 bn.  
**Investment breakdown:**  
- 56% Equities  
- 24% Fixed income  
- 20% Alternative Investments  

**Agriculture Investment Strategy:**  
- Most active endowment fund in agriculture investment  
- Investment in Mandala Agribusiness Fund, a PE fund with a focus on the Indian market  
- Investment in Aqua Capital, a PE firm focused on midstream ag. investment in South America  
- $100 million Investment in Paine & Partners Fund IV, a US PE firm focused on upstream and midstream ag  
- Investment in Black River, previously a Cargill subsidiary focused on the food sector, now independently-operated and known as Proterra
# Examples of funds which have recently completed capital raises

<table>
<thead>
<tr>
<th>Fund</th>
<th>Sectoral Focus</th>
<th>Geography</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arlon</td>
<td>Private Equity</td>
<td>North and South America</td>
</tr>
<tr>
<td>AMERRA Capital</td>
<td>PE + Financing</td>
<td>Global</td>
</tr>
<tr>
<td>Agriculture Capital Management</td>
<td>Farmland + Midstream</td>
<td>U.S.</td>
</tr>
<tr>
<td>Aqua Capital</td>
<td>PE - food and ag</td>
<td>South America</td>
</tr>
<tr>
<td>Blue Road</td>
<td>PE - supply chain</td>
<td>North and South America</td>
</tr>
<tr>
<td>Homestead</td>
<td>Farmland</td>
<td>U.S.</td>
</tr>
<tr>
<td>Hancock Agricultural Investment Group</td>
<td>Farmland</td>
<td>Global</td>
</tr>
<tr>
<td>International Farming Corporation</td>
<td>Farmland + AgTech</td>
<td>U.S.</td>
</tr>
<tr>
<td>Macquarie Infrastructure and Real Assets</td>
<td>Farmland</td>
<td>Australia, Brazil and the U.S.</td>
</tr>
<tr>
<td>Proterra Investment Partners</td>
<td>Farmland + PE</td>
<td>Global</td>
</tr>
<tr>
<td>Rabo Equity</td>
<td>PE</td>
<td>India</td>
</tr>
<tr>
<td>Tillridge Global Agribusiness</td>
<td>PE - midstream</td>
<td>North and South America</td>
</tr>
</tbody>
</table>
Improved productivity will be achieved by combining new “hardware” (seeds) and “software” (management practices).
Digitization and miniaturization is accelerating change in agriculture.
Alternative oilseeds and insects are becoming increasingly competitive protein sources in traditional plant protein markets

Soybeans

Camelina

Crickets

Pongamia
Historic acceleration in early stage food and ag tech investments

2014
- $2.36 billion raised
- 264 deals
- 271 unique investors

2015
- $4.6 billion raised
- 572 deals
- 672 unique investors

2016
- $3.23 billion
- 508 deals

Sectors attracting investments
- Inputs/biologicals
- Precision ag
- Big data applications (“smart farms”)
- Novel feed/food ingredients
- Genetic prospecting (nexus of pharma/ag/food)

Source: Ag Funder’s AgTech Investing Report – 1st Half 2016.
Key areas to track: impact of generic industry disruptors on subsectors of ag tech

- Ubiquitous connectivity and sensors
- Autonomous robotics
- Gene sequencing and rapid phenotyping
- Data capture, aggregation, analytics and prescriptions
- Novel materials
- Innovative business models

- Farm-2-Consumer
- Alternative Proteins
- Animal Nutrition and Health
- Food Safety & Traceability
- Smart Equipment & Hardware
- Decision Support Technology
- Food Commerce
- Food Tech
Trends in agricultural investing as it emerges as an asset class

• **Increasing tendency for large institutions such as pension funds to bring sectoral expertise in-house to pursue direct investments as opposed to investing in funds.**

• **Permanent crops and situations involving mix of real assets with exposure to operating risks attracting investments as investors seek higher returns.**

• **Sustainability and consumer concerns regarding quality become drivers for the adoption of new technologies and business models (ex. – indoor farming of leafy vegetables adjacent to large consumption markets).**

• **Frontier markets in Africa attracting capital.**

• **Argentina back in the game.**

• **Distressed assets in Brazil.**

• **Ag tech continues to attract capital.**
Example of sub-allocation framework for an ag portfolio

**Type of Asset**
- Permanent crops
- Dairy
- Land-based animal protein production
- Aquaculture

**Geography**
- Australia
- South America
- Eastern Europe
- Russia
- Asia
- Africa

**Operational / Development**
- Land ownership (free title)
- Risk-sharing lease structures
- Farm management
- Land development/conversion
- Upstream or downstream value chain investment

Core 6-10%

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Informed decision making for global agricultural investing

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