

# Food and Agriculture – Optimising Resources to Increase Yields

## Executive Summary

There will be an estimated 60 million new mouths to feed each year in the first half of this century, and the global population is forecast to exceed 9 billion by 2050.<sup>1</sup> Approximately 80% of this growth will come from emerging markets, where new middle class consumers are demanding higher calorie food stuffs. Food supplies need to rise sharply - by 70% by 2050, if they are to meet demand.<sup>1</sup>

There is limited additional arable land, water, mineral inputs as well as rising concerns about pollution and climate change. As a result, optimising resource use and improving productivity is the most effective approach to increasing yields and consumer supplies. This can be achieved by increasing agricultural efficiency, improving distribution infrastructure and reducing wastage.

The implementation of these productivity improvements offers new growth opportunities for diversified businesses along the food and agriculture value chain, and provides a number of interesting investment propositions.

The Food and Agriculture sectors comprise a large diverse group of companies. Impax research shows that a portfolio combining both consumer-led food stocks and commodity-led agriculture stocks improves longer term risk adjusted returns compared to investing in just one sector alone.

The intrinsic characteristics of the food and agriculture industry make it an attractive area for investors seeking long term risk adjusted returns. The sector offers exposure to:

- Consumer-led food stocks, which are cash generative and underpinned by sustainable growth
- Higher beta agriculture stocks, which offer some positive correlation to soft commodities
- Corporate commodity risk management expertise

After a prolonged period of under investment, this industry is now attracting significant new capital globally in order to meet the diverse and complex challenges it faces. The established supply chains are changing, new ones emerging and there are also new investment opportunities emerging in ancillary goods and services. It is a complex and increasingly volatile sector requiring specialist insight and a rigorous investment process to support stock selection across the value chain.

In this paper Impax reviews the global macro trends behind industry growth, examines ways to increase agricultural efficiency, improve infrastructure and reduce wastage. It also considers a couple of interesting emerging investment themes and suggests an approach to constructing a food and agriculture investment portfolio in order to achieve the best risk adjusted returns.

**Figure 1: The food and agriculture value chain**



## Relentless Demand Growth

Providing enough food, along with energy, water and other materials is a major global challenge of the 21<sup>st</sup> Century. There will be an estimated 60 million new mouths to feed each year in the first half of this century, and the global population is forecast to exceed 9 billion by 2050.<sup>1</sup>

Approximately 80% of this growth is set to come from emerging markets, where rising consumer incomes are driving demand for higher calorie diets with increased preferences for protein, i.e. meat and dairy foods (Figure 2). China has now surpassed the US to become the world's largest food market<sup>2</sup> with meat consumption per capita rising from 9kg to more than 30kg per annum over the last 30 years.<sup>3</sup> Animal-based consumption requires significantly more resources than crop-based and in order to meet rising world-wide demand for meat, global food production needs to rise by 70% by 2050.<sup>1</sup>

The scale of this task is amplified by a number of supply-side challenges, particularly limited availability of arable land, water, mineral inputs, and concerns about pollution. 12% of the Earth's total land surface is currently under arable cultivation and only limited additional land can be readily brought into agricultural production through conversion or rehabilitation.<sup>4</sup> Extreme weather events, such as the severe heat waves recently seen in Australia, are also expected to become more frequent over the coming decades with a detrimental impact on crop yields. In 2012 the US experienced the hottest year on record and suffered from the worst corn crop in two decades.<sup>5</sup>

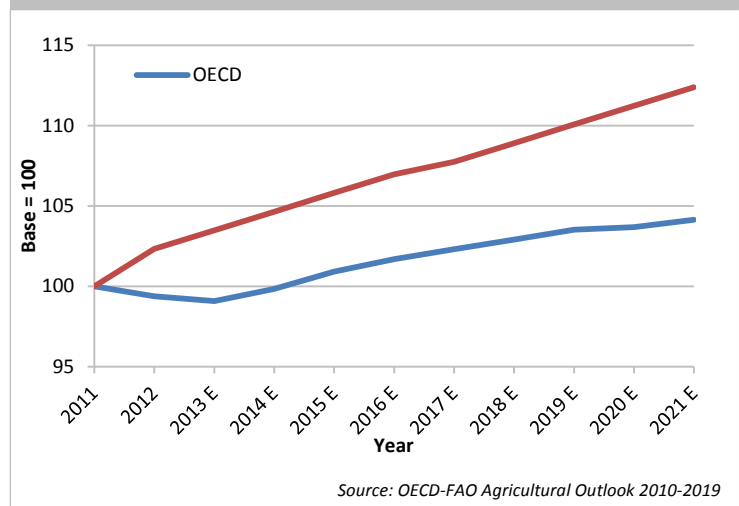
Given these supply-side obstacles, the best opportunity to work towards meeting demand is by making productivity improvements, such as increasing agricultural efficiency, improving distribution infrastructure and reducing wastage. Opportunities to implement these measures are found throughout the entire food and agriculture value chain, from manufacturers of agricultural inputs (such as fertilizer), to providers of distribution and commercial services for packaged food and beverages (Figure 1).

### 1. Increasing Agricultural Efficiency

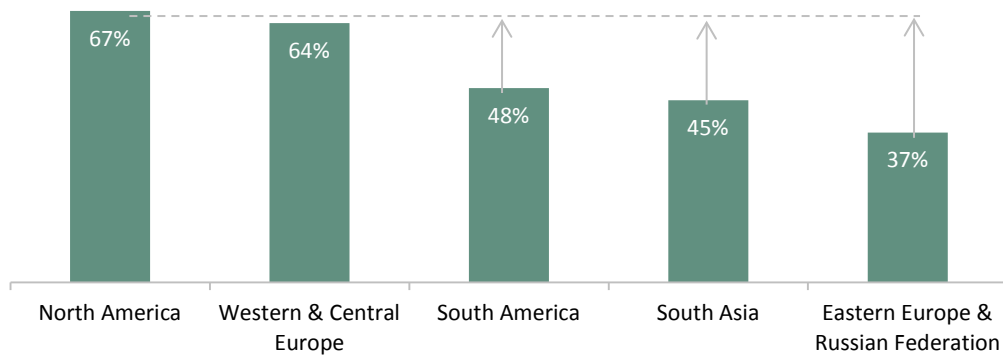
Over the last five decades, improved farming techniques and technologies have helped to expand the land area fit for cultivation and increase outputs.<sup>6</sup> However, significant yield gaps still exist, especially in areas where farming methods are less advanced, such as in South America, South Asia, Eastern Europe and the Russian Federation. Introducing modern breeding, feeding and milking methods, planting technologies and irrigation techniques can go some way to filling these gaps. For example, it is estimated that acceleration in the development of crop bio-technology could result in a doubling of productivity by 2030.<sup>7</sup>

Precision agriculture products offer some of the most effective ways to increase efficiency. These include satellite technology to enable seed planting with minimal land area wastage, prescription mapping that allows optimum amounts of fertiliser to be sprayed precisely where required, and 3D topography data to level fields. The precision agriculture industry as a whole is expected to have grown by 3.7% in 2012, generating US\$1.3 billion of revenue. This steady growth is set to continue over the next five years, as technology continues to advance and demand from agribusinesses increases further.<sup>8</sup>

**Figure 2: Growth in meat consumption in developing markets**



**Figure 3: % of economically attainable yield (2005)**



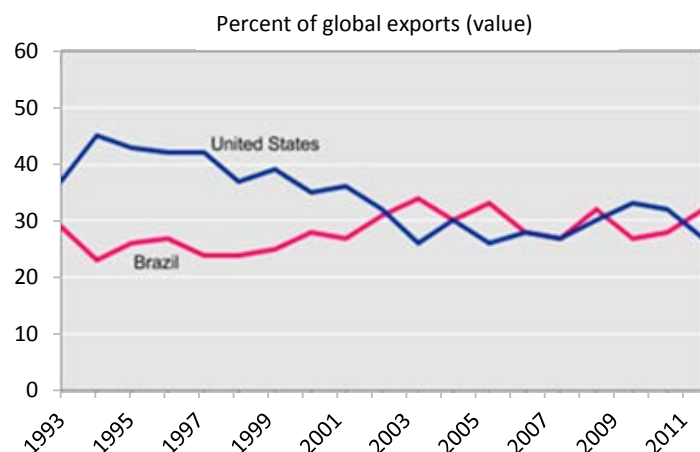
Source: Fischer et al., 2010 cited in OECD-FAO Agricultural Outlook 2012 pg 62.

## 2. Improving Distribution Infrastructure

Growing numbers of emerging market consumers and the poor harvests of the past few years mean that, at present, global demand growth for food and agriculture products is exceeding productivity growth. Businesses involved in the supply chain management of agricultural products and food ingredients need investment to enable them to achieve greater productivity.

These enhancements are occurring alongside upgrades to domestic infrastructure in emerging markets. Brazil, for example, has evolved with a rapidly changing agricultural geography but without any institutional mechanisms to facilitate investment in logistics infrastructure. In the past, growth of the Brazilian soya industry was hampered by poor road infrastructure which rendered the cost of shipping to port as almost as high as the production cost. However, the rail sector was part privatised in 2012, giving transportation firms the opportunity to improve the network. Partly as a result, Brazil is now the one of the largest exporter of soybeans, ahead of the US (Figure 4).

**Figure 4: World exports of soybean products, US and Brazil, 1993-2011**



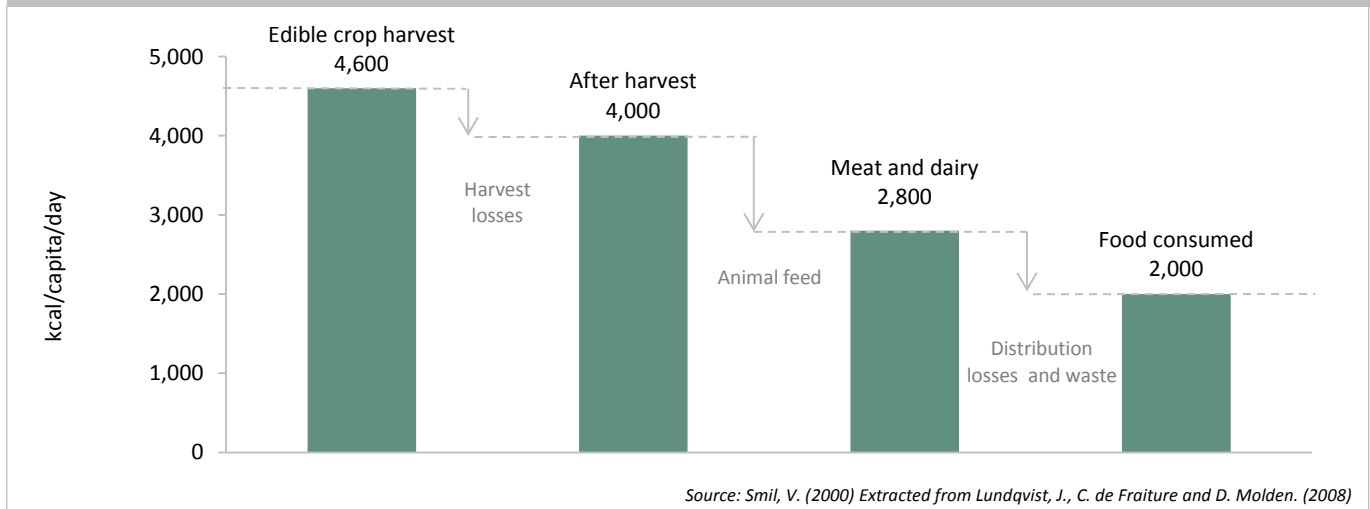
Source: USDA, 2012

## 3. Reducing Waste

Currently, it is estimated that total global food production equates to 4,600 kcal/person/day, but poor harvesting and distribution practices mean that up to 50% of all food produced is wasted between “plough and plate”, and only 2000 kcal/person/day is available for human consumption (Figure 5).

The type of wastage varies between emerging markets and developed markets. In the former, consumer waste is negligible, but dated farming methods and weak infrastructure hampers distribution ex-harvest and processing. As a result, most opportunities to reduce wastage are found through improving production techniques and investing in transportation. However, as a country’s economic wealth increases, a greater proportion of waste is incurred after consumer purchase and food storage becomes increasingly important. For example between 2001 and 2011 China was by far the fastest growing market for commercial refrigeration products, quadrupling in size and posting double digit annual growth rates over that period.<sup>9</sup>

**Figure 5: Food wastage from plough to plate**



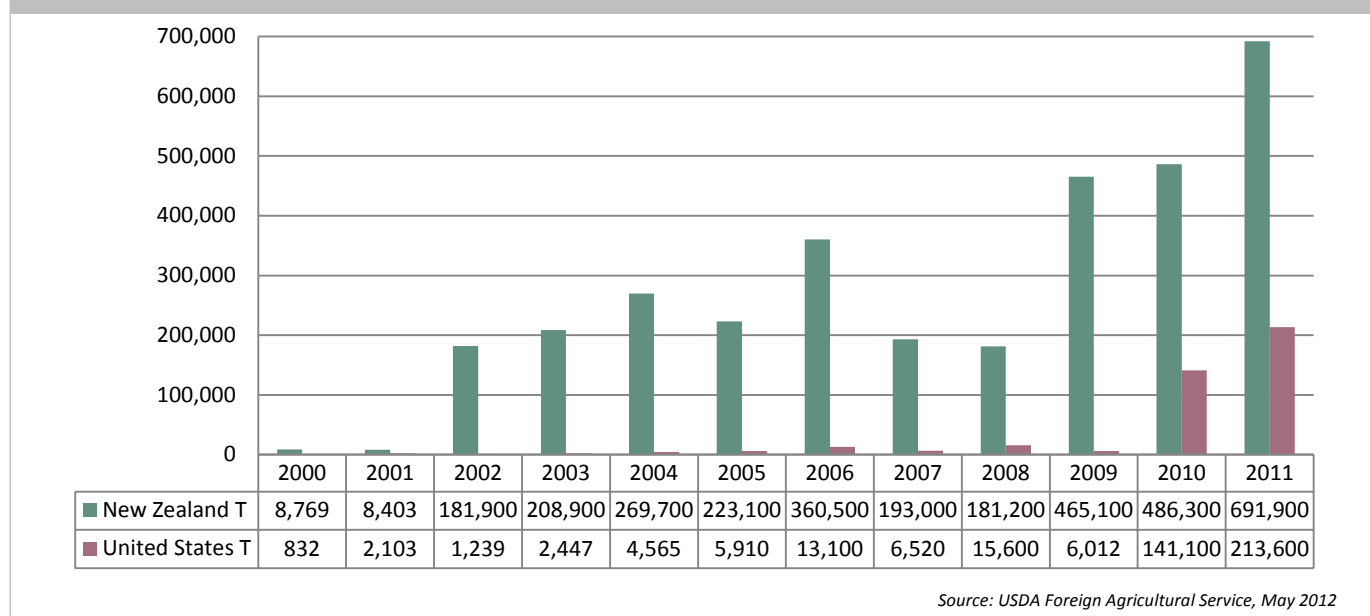
## Emerging Themes

At any one time Impax pays close attention to a number of emerging themes that are underpinned by the need to optimise agricultural resource use and increase food yields.

For example, the recent rapid growth of the North American shale gas industry has lowered the cost of natural gas, an input to the domestic nitrogen fertiliser industry. US producers can now purchase natural gas at around a quarter of the price of those, for example, in the Ukraine. As a result, American manufacturers of nitrogen fertiliser and other energy-intensive products are building new plants and hiring new employees in a bid to close the US's annual 9 million tonne nitrogen fertiliser deficit<sup>10</sup>. Shale gas is expected to constitute over 30% of global gas production by 2035<sup>11</sup>, making the US nitrogen fertiliser industry a promising area for investors.

The Chinese dairy market is set for similar expansion. Rising disposable incomes, growing health awareness and supportive government policy are leading to surging demand for milk, yogurt and infant formula. Total dairy consumption in China reached 19 million tonnes in 2006<sup>12</sup> and industry analysts predict the market will nearly double between 2010 and 2016<sup>13</sup>. Domestic farm technology and infrastructure is still in its infancy and China lacks the means to pasteurise and transport the required volumes of milk safely. Imports of semi-finished product are bridging this gap and the global dairy trade, in particular in New Zealand, is undergoing a revival (Figure 6).

**Figure 6: China's non fat dry milk imports from the United States and New Zealand 2000-2011 (metric tons)**



At the same time, programmes to improve local infrastructure, such as Nestlé’s “factory and farmers” model that provides Chinese dairy farmers with access to new technology, are improving the domestic industry’s longer term prospects<sup>14</sup>. This means that in the short term, foreign companies serving the Chinese market offer investors a solid growth opportunity, as well as domestic market producers in the longer term.

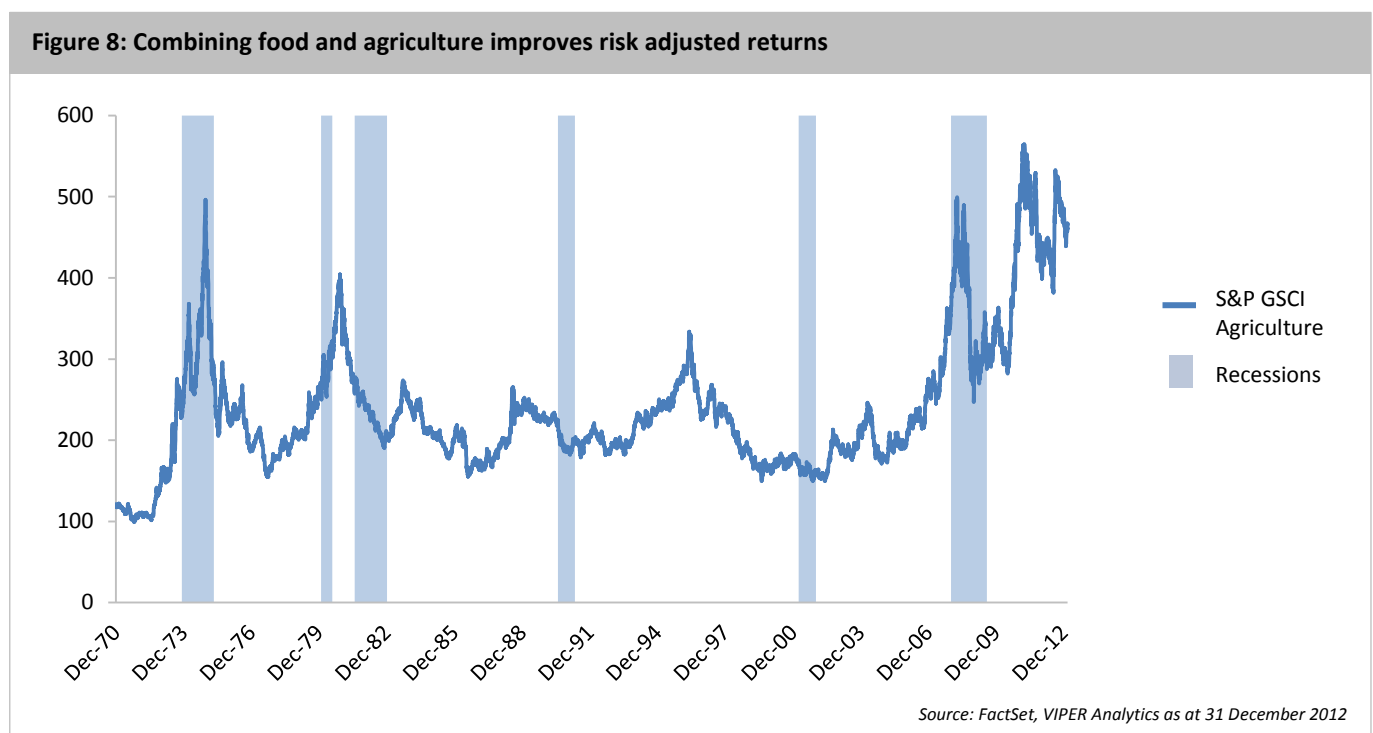
### Investing in Food AND Agriculture to Achieve Best Risk Adjusted Returns

The urgent need to increase efficiency, improve distribution infrastructure, and reduce wastage represents an exciting growth opportunity for well established, cash generative companies across the entire food and agriculture value chain. Investors looking to construct equity portfolios that capitalise on these opportunities should consider the divergent, yet complementary characteristics of food and agriculture stocks.

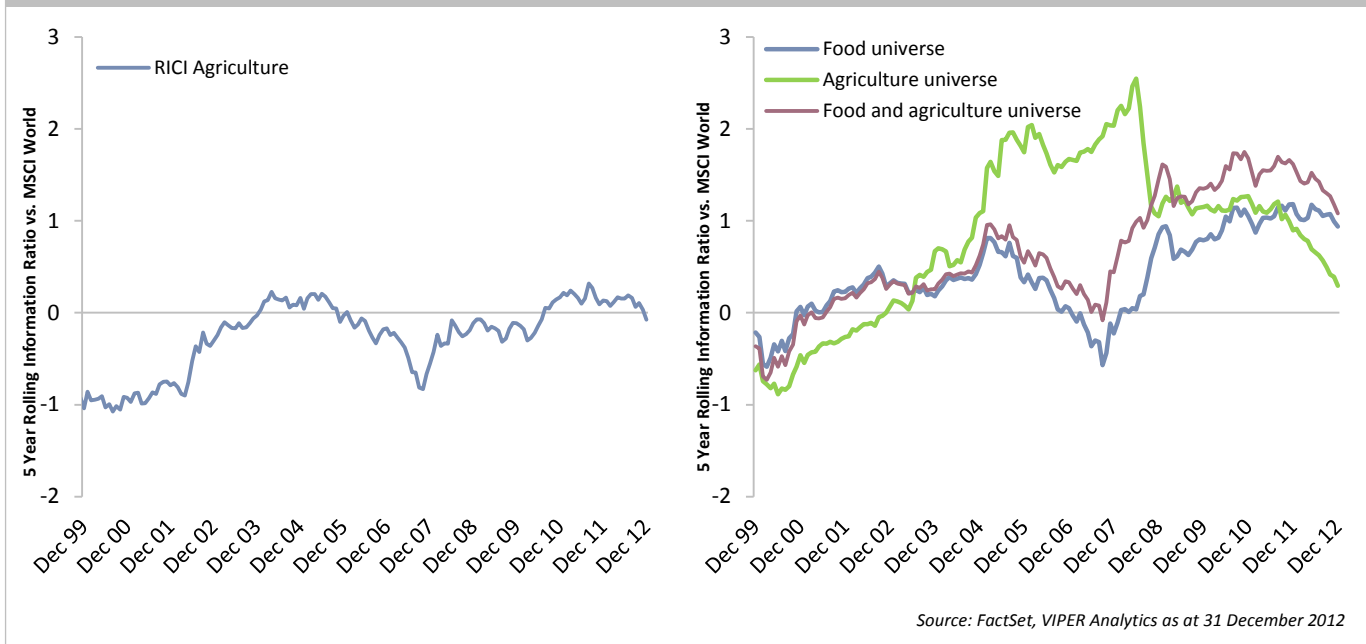
The investable universe is large and diverse, comprising over 1,000 companies with a market capitalisation in the region of US\$3 trillion. Food companies are characterised by sustainable growth, are cash generative and underpinned by secular change, whereas listed equity investments in agriculture companies are generally higher beta with some positive correlation to soft commodities (but without the “random walk” volatility of the underlying commodities).

Specific companies within the agribusiness sector have proven track records in managing this volatility, creating shareholder value. Thus buying equities in these businesses automatically provides exposure to their corporate commodity risk management expertise and bypasses the risks inherent in investing directly in soft commodities. In addition, the share price of these diversified businesses often does not properly account for the value gained from their exposure to food and agriculture and means they can offer investors additional upside.

Exposure to soft commodities may also buffer a portfolio from equity market downturns as historically commodities have had a low correlation to recessions (Figure 9). A dynamic allocation between the more consumer-led food stocks and commodity-led agriculture stocks should improve longer term risk adjusted returns (Figure 8).



**Figure 7: Food and agriculture equities deliver better risk adjusted returns**



## Conclusion

Major, far-reaching changes are taking place in global food and agriculture industries and demand patterns are changing dramatically. The supply response is imperfect, held back by inefficiencies and high levels of waste, notably in infrastructure, as well as the availability of additional land and water. The ability of many governments to continue to subsidize agricultural production has been declining for some years and will continue to be a factor for substantial changes in trade flows.

After a prolonged period of under-investment, this sector is now attracting significant new capital globally in order to meet these numerous complex challenges and additional investment opportunities are emerging along with new technologies. Investment in this dynamic area requires specialist insight of emerging themes and demand and a rigorous stock selection process in order to exploit the high growth opportunities at the right time.

Identifying investment opportunities has evolved beyond the common investment perception of “more mouths, need more food, need more capital”. Impax believes that in order to achieve the best risk-adjusted returns investors should seek exposure across the value chain. The most profitable long-term approach to investing in food and agriculture is to employ a dynamic allocation across a high conviction, value driven portfolio between the sectors and to identify companies where management has shown a proven track record of growing invested capital, making superior returns on that capital with relatively low volatility.

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## Figures

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