AGRI PARTNERS

Farmland Investment Research Report 2014

An Agri Partners White Paper

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Executive Summary

Today, investors find themselves questioning whether traditional asset classes, such as publicly traded equities and bonds, will deliver returns that were anticipated even 5 years ago. They are beginning to search out alternatives.

"Real Assets" is a category that is quickly becoming the new foundation asset class, encompassing a range of tangible assets - including farmland. Farmland, like other 'Real Assets', offers a persuasive blend of yield: equity-like upside, plus inflation sensitivity.

WHY FARMLAND?

Population growth, resource scarcity and climate change are the three defining trends of modern times. Individually, each is a major issue, but they are made all the more powerful by being inextricably linked. Over time, as their impacts converge, the effects on the global economy will become progressively pronounced. Agriculture, and by extension farmland, is positioned at the nexus of this convergence.

With more mouths to feed, increasingly affluent populations in developing countries demanding a higher protein, more resource intensive diet and the emergence of biofuels, world demand for agricultural commodities is soaring. Yet on the supply side, keeping up with rising demand is becoming increasingly challenging due to climate change, fundamental limits to further growth and a plethora of pressures on existing production.

The Food Price Spikes of 2008 and 2011 are an indication of things to come. Low grain stocks combined with a huge jump in agricultural commodity prices, caused panic over the world's food supply. Agricultural commodities have continued on this upward trend into 2013, in spite of the global economic climate. World food production is entering a new era - characterised by increasing pressure from both supply and demand forces.

Chapter 1 begins with a brief look at the dynamics of supply and demand for agricultural commodities and how this affects farmland values. It highlights the fact that both farmland incomes and values are rising in step with agricultural commodity prices despite rising input costs. It also addresses the fundamental principles governing cropland expansion. It describes how farming economies exploit the most productive land first, meaning that in most viable farming regions, only marginal land remains undeveloped.

It moves on to analyse in more detail the fundamental tug of war in agriculture between growing demand on the one hand, and constraints to supply on the other. The greater the tension between supply and demand, the higher agricultural commodity prices, farm incomes and farmland values will rise.

For example, per capita income continues to grow, especially in developing countries. People typically demand more meat in their diet. Because it requires 3-10 kg of grain-based livestock feed to produce each kg of meat, more grain is required to both graze the livestock and to produce the feed.

On the supply side, additional land capable of growing food economically and sustainably is limited. Most of the most productive and economically viable land is already being used and expanding the supply of irrigated land is difficult and expensive. Diminishing global water supplies and the loss of land due to rising urbanisation, land degradation and desertification are reducing the amount of land suitable for crop production.

Extreme weather events, caused by climate change, are already having a noticeable effect on food production. The various climate forecasting models are unanimous with respect to global warming's negative impacts on global food production in many regions of the world. Global warming will effectively reduce the amount of land suited to agriculture, either due to raising temperatures or drought-related stress to a point where yields are adversely affected.

Chapter 1 goes on to highlight how high oil prices may produce acceleration in the demand for land. Should oil prices remain at its recent highs, or continue to rise further in the future, demand creation from the biofuels sector has the potential to outstrip food demand, even in the short to mid-term.

The implications for agriculture are clearly apparent. Looked at together, these convergent trends lead to the inescapable conclusion that the upward pressure on agricultural commodity prices will not be letting up any time soon.

Chapter 2 discusses farmland's attributes as an asset class. Farmland is a stable, income-producing asset, which has throughout history, been the most basic repository of wealth and value through good times and bad. A large number of studies across a range of markets and timescales have demonstrated that farmland has consistently produced superior total and risk-adjusted returns compared to other asset classes.

The asset class also has a number of features that make it particularly appealing under current market conditions. Farmland returns have a low or negative correlation with traditional asset classes such as publicly traded stocks and bonds, and only a modest

positive correlation with commercial real estate. This makes farmland an attractive diversification tool that can help reduce the impact of broader market volatility.

Additionally, farmland values generally increase faster than the rate of inflation, making farmland an effective inflation hedge and capital preservation tool. This may be especially appealing to investors concerned about inflationary government policies of low interest rates and quantitative easing. These characteristics, combined with underlying supply and demand fundamentals, have resulted in farmland, in many parts of the world, continuing to outperform almost all other asset types despite the continuing global economic uncertainty.

Chapter 3 gives an overview of the principle methods used by the investing community to gain exposure to the agriculture sector, before discussing the benefits of direct investment in farmland, using the UK as an example. According to a 2012 study from UK estate agent, Savills:

"The capital value growth of UK farmland is likely to outperform many commodities markets, residential property, UK gilts and West End offices over the next five years. We expect the average value of farmland in the five years from 2012 to increase by 36%".[1]

There are several advantages to direct investment in farmland, including the fact it is a fixed asset that appreciates in value over time. It also provides a regular income stream from the farming activity undertaken on the land. Portfolio diversification is one of the main advantages of direct investment in farmland, and included in the chapter is a discussion about appropriate portfolio weightings.

Surprisingly, farmland has yet to generate a level of interest among asset managers commensurate with its importance in the economy, or its historically proven investment potential. Adding farmland investments - to a well-diversified portfolio - can help increase returns and reduce risk.

Given its superior performance and portfolio optimisation potential, the lack of recognition can only be attributed to a deficiency of knowledge and expertise on the part of the mainstream asset management community. This of course is a positive thing, for shrewd investors, because speculative pressure on prices remains lower than in many other types of real estate and asset classes.

To help investors select farmland for direct investment, Chapter 3 outlines the key things to consider when making direct farmland investments. This includes the need for specialist guidance and expertise from a specialist advisor/manager who properly understand the asset class. Much of the value of an advisor is in assisting an investor to enhance returns and reduce risk. This work is generally performed prior to the acquisition actually being made. A good investment partner will use their expertise to assess key elements, to ensure the right assets are targeted at the right prices, and that the future income streams from rents are as secure as possible. Direct farmland investment is not without risk. The chapter also covers some of the key areas that should be addressed by due diligence and in land selection.

Global population growth, evolving diets in developing countries and the need for fuel means mounting demand for agricultural commodities, food products and biofuels. World commodity stocks are low, and there is little potential for bringing additional productive farmland into production. Direct farmland investment enables investors to benefit from the on-going growth of the agricultural sector, whilst providing an effective wealth preservation tool. Adding farmland investments to a well-rounded portfolio will increase returns and reduce risk.

1 Savills, 2012. Market Survey Agricultural Land.

Chapter 1

INTRODUCTION

According to the OECD, *"for decades, global agriculture was characterised by policy-induced production surpluses in industrialised countries and stagnating growth in developing countries. Policy reforms and economic growth across the globe have been changing demand and supply fundamentals sufficiently to turn agriculture into a more market-driven sector which provides investment opportunities… Agricultural trade is projected to increase."*[2]

The interrelationships between supply and demand for farmland are complex. Demand for land increases when commodity prices rise. In response, supply increases if further land is brought under cultivation. However, there are many other factors at play. For example, efficiency increases or yield enhancing technologies might mean that less land is required to produce the greater supply of commodities required in the future. On the other hand, losses in productivity from climate change and land degradation could have the opposite effect.

DEMAND

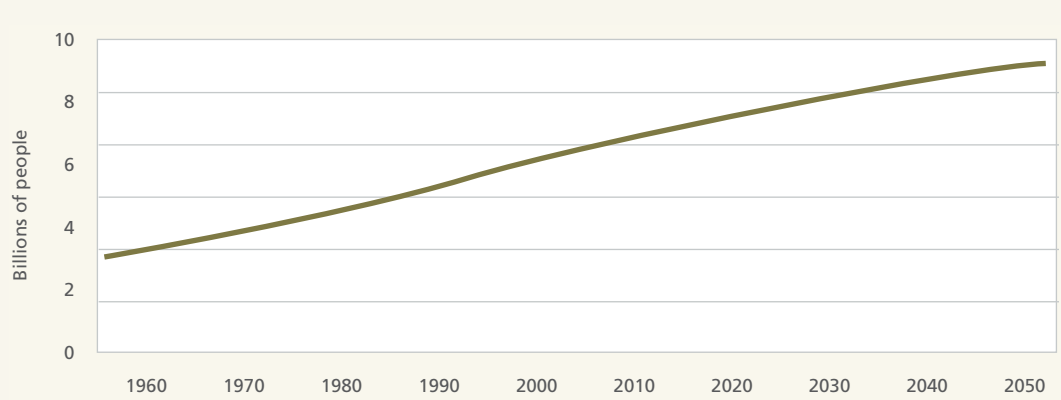
Science and technology can improve productivity per hectare but, fundamentally, production of food, biofuels, drugs and fibre requires land. Interest in farmland is rising and with commodity price volatility, growing populations, environmental concerns, and worries about food security driving demand, this interest will continue to grow.

POPULATION

As Figure 1.1 shows, the world population surpassed 7 billion in 2011. Although the rate of annual population growth peaked in the late 1960s and has declined since, for each 20 year period the world's population has continued to increase by more than a billion. The United Nations (UN) projects world population could reach 9.3 billion by 2050 and 10+ billion by the end of the 21st century. If fertility rates increase, the population could surpass 10 billion by 2050[3].

An increased population brings two primary impacts on agricultural land. First, it increases demand for agricultural produce – food, drugs, fibre and biofuels, and secondly, it increases competition for land. A higher population requires more housing, which requires land. So, population growth is an indicator that demand for agricultural land will continue into the future.

Figure 1.1 – World Population 1960 - 2050



Source: FOASTAT

In 2009, in an article in Yale University's Environment 360[4], Jonathan Foley, Director of the Institute of the Environment, University of Minnesota, argued that the global community faced a *"crisis in land use and agriculture that could undermine the health, security, and sustainability of our civilization."* Foley states that while the impact of climate change has received vast attention, human population growth, and the corresponding rising global demand for meat and dairy products, alongside the growing need for biofuels from corn, sugarcane, and other sources should be an equivalent cause for concern. *"We are putting tremendous pressure on the world's resources."* In order to cope with the rising global population, Foley contends, *"If we want any hope of keeping up with these demands, we'll need to double, perhaps triple, the agricultural production of the planet in the next 30 to 40 years."*

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2 OECD-FAO Agricultural Outlookhttp://www.oecd.org/site/oecd-faoagriculturaloutlook/

3 UN, 2012, World Population Prospects: The 2012 revision. http://esa.un.org/unpd/wpp/index.htm

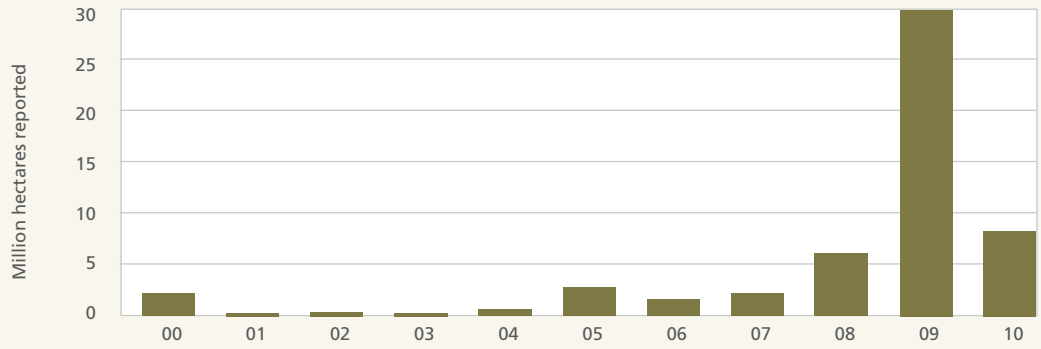
4 E360, 2009, The Other Inconvenient Truth: The Crisis in Global Land Use. Foley, J. http://e360.yale.edu/content/feature.msp?id=2196http://e360.yale.edu/content/feature.msp?id=2196

The World Bank states that private sector investment in agriculture, including foreign direct investment, must rise from around $142 billion per year to $209 billion per year (a rise of nearly 50%) in order to feed a growing population[5].

INVESTOR SPECULATION (COMPETITION FOR LIMITED ASSETS)

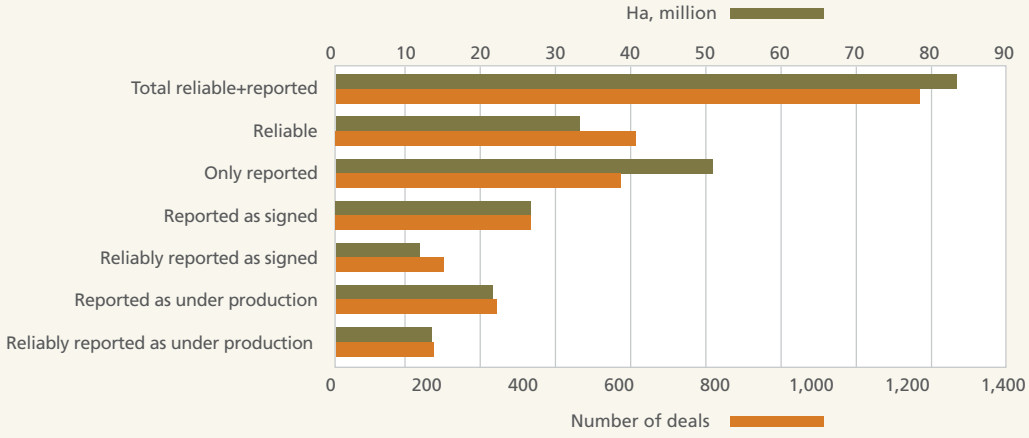
Private financial sector investment in agriculture is a small but rapidly growing trend, involving large financial institutions, hedge funds and real estate investment trusts alongside private/public companies that are pursuing farm ownership/management strategies. These investors have been increasingly drawn to agriculture principally because of the current outlook for income generation, as a hedge against inflation, capital appreciation, and uncorrelated returns with traditional asset classes.
In the 2012 report on Foreign Investment in Farmland by Deutsche Bank stated *"there is a global rush for land"*[6]. According to the report, since 2000, recorded agricultural land transactions involving foreign investors amounted to 83 million hectares of land in developing countries (Figure 1.3). This is 1.7% of the world's agricultural area. Targeted farmland is often located in Africa, especially in Sub-Saharan Africa, where land acquisition opportunities are abundant.

Figure 1.2 – Pace of global land acquisitions



Sources: Land Matrix, DB Research

Figure 1.3 – Large-scale land acquisitions from agriculture



Sources: Land Matrix, DB Research

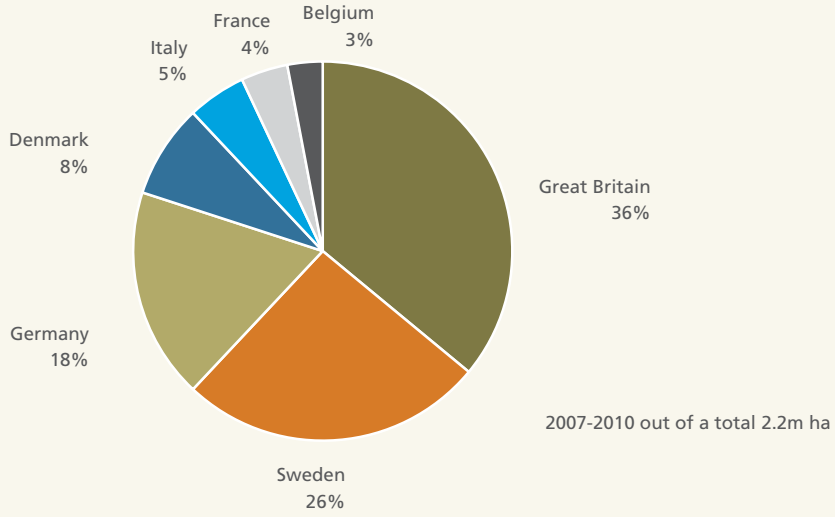
Farmland Investors are increasingly drawn from emerging countries, especially China, India, Brazil and Malaysia. However, farmland remains popular with private actors from America and Europe (Figure 1.4) and public or state-owned companies – especially from

5 World Bank, 2012 Land and Food Security http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTARD/0,,contentMDK:23284610~pagePK:148956~piPK:216618~theSitePK:336682,00.html

6 DB Research, 2012. No Low Hanging Fruit.http://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD0000000000296807/Foreign+investment+in+farmland%3A+No+low-hanging+fruit.PDF

the Gulf States.
Deutsche Bank state that *"Investment in farmland is driven by long-term trends such as growing consumption of food and biofuels in a context of limited availability of arable land, water and energy: investors are interested in securing access to food or other agricultural products, access to water and financial returns in an alternative asset class. Both food and non-food crops (e.g. biofuel crops, rubber) are of interest."*

Figure 1.4 – European investors in land by country



Sources: GRAIN, DB Research

In January 2013, an article in the Financial Times[7] discussed the features which are making farmland a particularly attractive asset class for financial investors. The FT believes investors are drawn to farmland because land investments are largely isolated from the other financial investments in their portfolios. This provides greater diversification and acts as a hedge against inflation. Likewise, both pension funds and hedge funds are investing in farmland for the long-term because it offers both a capital asset, whose value is rising, alongside an annual income stream.

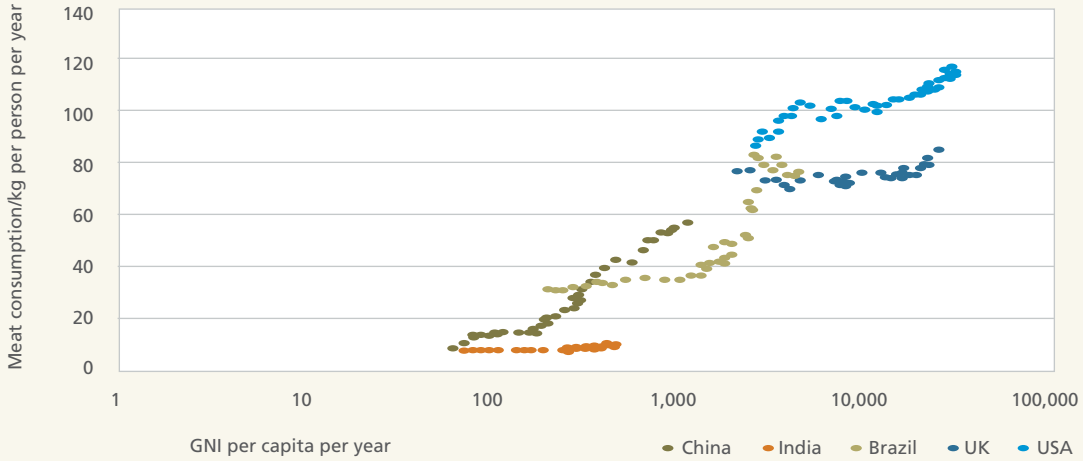
EMERGING MARKET AFFLUENCE & ECONOMIC GROWTH = HIGHER CONSUMPTION

Experts agree that alongside population growth, rising incomes and urbanisation across the world will continue to drive demand for food, particularly livestock and vegetable oils, this in turn will drive demand for animal feed and industrial products. As living standards rise, so do the amounts and quality of food we consume. Food consumption is estimated to increase from 2789 kcal/person/day in 1999-2001 to 3130 kcal/person/day in 2050, and will require agricultural production to nearly double in developing countries[8].

7 FT.com, 2013. Investors take an interest in farmland, Scott, M. http://www.ft.com/cms/s/0/a0933e86-333b-11e2-aa83-00144feabdc0 html#axzz2gNQu2L2o

8 Bruinsma, J. 2009. The Resource Outlook to 2050: By How Much Do Land, Water Use and Crop Yields Need to Increase by 2050?. Paper presented at the Expert Meeting on How to Feed the World in 2050, Food and Agriculture Organization of the United Nations, Rome.

Figure 1.5 – Changing consumption of meat in relationship to gross nation income in China, India, Brazil, UK and USA (1961 – 2007)



Source: Changing consumption of meat in relationship to gross nation income in China, India, Brazil, UK and USA (1961 – 2007) – FOASTAT/Worldbank

A 2010[9] study analysed the relationship between food supply, consumption and income. It compared food consumption patterns for 57 countries and developed time trends for western and southern Europe. In low income countries, Gross Domestic Product (GDP) increase was accompanied by changes in food consumption patterns (Figure 1.5). People in low income countries typically derived nutrition from carbohydrates with a low consumption of meat and dairy. People in high income countries consumed substantial amounts of meat and dairy.

When economic growth occurs, the amount of meat and dairy the population consumes increases. This in turn stimulates livestock farming, which is more resource intensive than producing carbohydrates like rice or wheat. In fact, it produces a substantially greater demand for grains, as the need for cattle feed increases. This in turn generates increased agricultural land use as additional land is required to house the livestock, and to produce the grain to feed them.

BIOFUELS

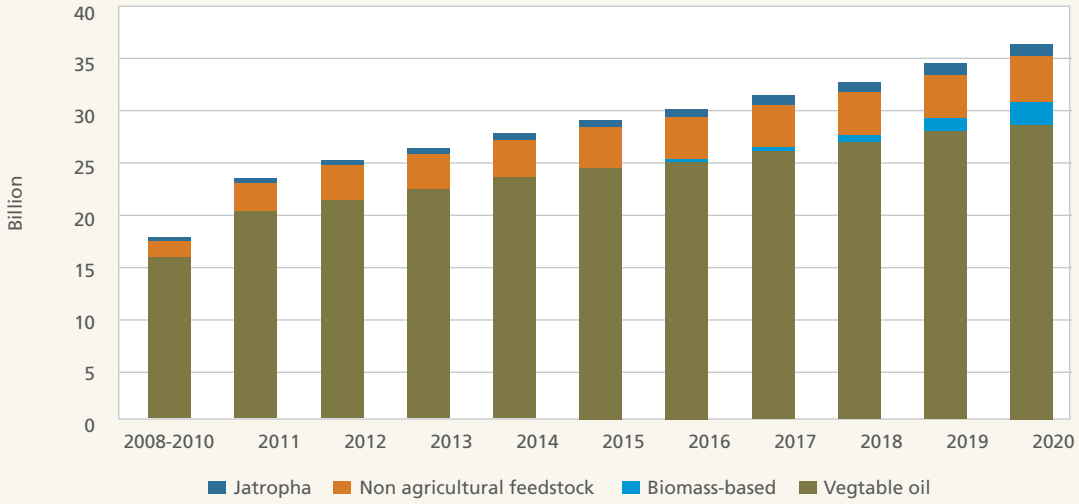
Biofuels have become an integral part of the EU's energy policy. To tackle climate change and depleted oil reserves, EU member states approved the Renewable Energy Directive in 2010. Under this policy, EU biofuels consumption is projected to double between 2010 and 2020 with 25 million tonnes of biodiesel from vegetable oil, and about 10 million tonnes of ethanol from sugar and grain, being consumed annually in Europe by 2020.[10]

Supplying tens of millions of tonnes of biofuel will require a substantial rise in agricultural output (Figure 1.6), or a correspondingly large reduction in the quantities of food produced. Barring any new scientific developments to dramatically increase crop yields, the extra agricultural production has to come from clearing land to expand farms, both in Europe itself, and in the developing world.

9 Appetite, 2010. Food consumption patterns and economic growth. Increasing affluence and the use natural resources. Gerbens-Leenes PW, Nonhebel S, Krol MS. Source University of Twente, AE, The Netherlands. p.w.gerbens-leenes@utwente.nl

10 Euractiv, 2013. For science's sake, the EU must legislate on biofuels land use change, Malins, C. http://www.euractiv.com/science-policymaking/science-sake-eu-legislate-biofue-analysis-529495

Figure 1.6 – Evolution of global biodiesel production by feedstocks used



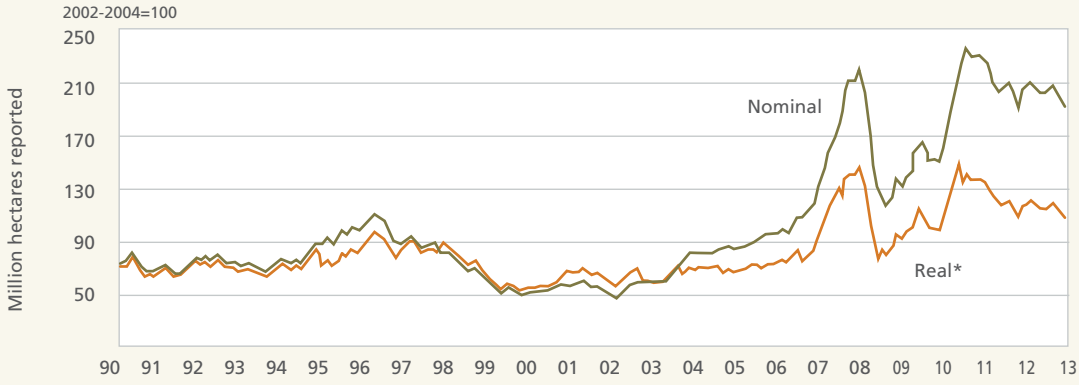
Source: OECD and FAO Secretariats.

The expansion in the production and use of biofuels is expected to have significant effects on feedstock prices (such as grains like wheat and corn used to produce biofuels) and consequently, the value of the land on which they are produced. According to the 2009 report from the United Nations, *"Biofuels could have a significant impact on food prices if oil prices remain high or the cost of biofuels production declines"*[11].

FOOD SECURITY (UK EXAMPLE)

The UK has a highly successful agricultural industry, but a range of domestic and international factors can affect food production and in turn prices for consumers in the UK. This became clear during the world food price spike of 2008. After this crisis, the FAO Food Price index has continued to rise, reaching a peak in 2011, demonstrating that the 2008 spike was not a random occurrence (Figure 1.7).

Figure 1.7 - FAO Food Price Index



*The real price index is the nominal price index deflated by the World Bank Manufactures Index (MUV)

Source: Food and Agriculture Organization of the United Nations

The UK's single largest manufacturing sector is the food and drink supply chain and it accounts for 7% of GDP, employing 3.7 million people, and worth £80Bn per year[12].

11 United Nations Environment Programme Rapid Response Assessment, 2009. The Environmental Food Crisis: The environment's role in averting future food crisis http://www.grida.no/publications/rr/food-crisis/

12 Food Matters: Towards a Strategy for the 21st Century. http://webarchive.nationalarchives.gov.uk/+/http:/www.cabinetoffice.gov.uk/media/cabinetoffice/strategy/assets/food/food_matters1.pdf

In 2007, the UK farming sector exported £12Bn of food and drink whilst importing 40% of its needs[13]. The UK is therefore categorised as a food-trading nation, having a thriving food import/export market driving economic growth. Even so, the UK still needs to secure its food production capabilities, to stop it becoming too reliant on imports and price increases. The challenge for the UK is to produce and supply enough high quality, nutritious food in a sustainable way, for its growing population.

SUPPLY (DECREASES IN SUPPLY OF AGRICULTURAL PRODUCE DUE TO):

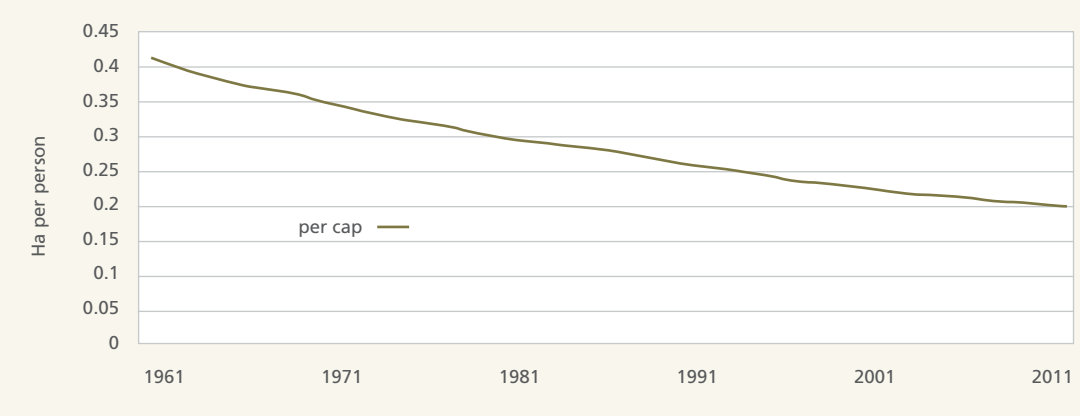
RESOURCE SCARCITY

"Already, we have cleared or converted more than 35 per cent of the earth's ice-free land surface for agriculture, whether for croplands, pastures or rangelands. In fact, the area used for agriculture is nearly 60 times larger than the area of all of the world's cities and suburbs".[14]

With regard to land supply, the world turned a corner sometime in the early part of the 20th century, from a state of increasing supply of food and farmland availability, relative to the population, to a state of decreasing supply relative to the population. For a while technological advances allowed us to overcome this and keep pace with the increasing demand for food. We are now living in an era, where for the second time in recent human history, per capita food supply is in decline (the first was prior to the Green Revolution, at a time when there was widespread starvation in Asia and Africa), and this is all taking place at a time when climate change threatens to constrain both further expansion of agricultural land as well as yields on existing land.

In 1961, the world population was 3.081 billion. In 2006, it was 6.593 billion, an increase of 114% in just under 50 years. Over the same period the total amount of arable land (i.e. the land upon which cereals are grown; excludes lower quality grazing land) globally, increased from 1.281 billion hectares to 1.411 billion hectares, an increase of only 10.1% in the same period[15]. As Figure 1.8 shows, this has resulted in half the amount of arable land being available to each human on the planet in 2011 (0.20 per person) compared to 1961 (0.42 ha per person).

Figure 1.8 - Trends in per capita arable land availability 1961-2011



Source: FOASTAT

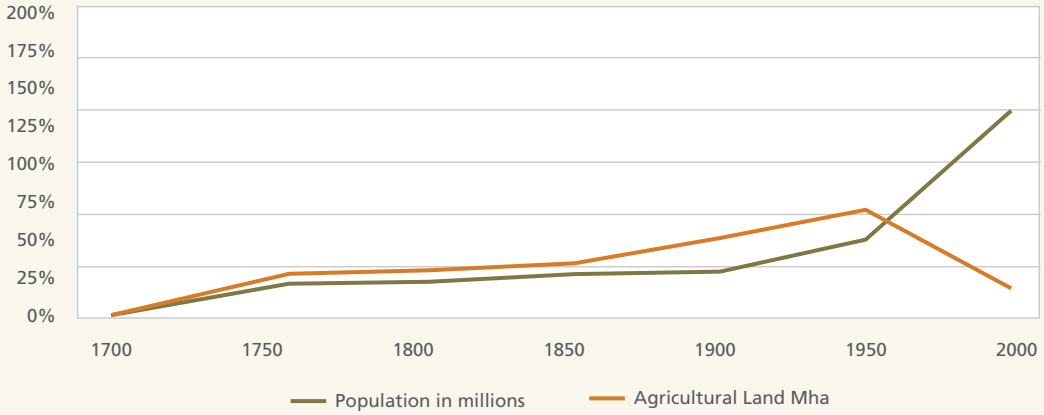
This implies that whilst in the more distant past there may have been enough space to expand cropland, this will be less the case in the future. Indeed, looking at Figure 1.9, which plots the rate of change in the global population against the rate of increase in the area of agricultural land, this is glaringly apparent. In the earlier portion of the graph, human population and farmland increased roughly in step with each other. During the 50's the two trend lines diverge very markedly. This is the point at which the Green Revolution took over from cropland expansion as the dominant means by which the human carrying capacity of the planet has increased. However, as later sections will show, the productivity gains delivered by the Green Revolution are now also in decline.

13 DEFRA, 2009. The Future of our Farming. http://archive.defra.gov.uk/foodfarm/policy/farming-future/documents/farm-future-leaflet090709.pdf

14 E360, 2009, The Other Inconvenient Truth: The Crisis in Global Land Use. Foley, J. http://e360.yale.edu/content/feature.msp?id=2196http://e360.yale.edu/content/feature.msp?id=2196

15 2009. Farmland Investment in the 21st Century.

Figure 1.9 – Percentage change (50 year average) in agricultural land and population between 1700 and 2000



Source: Integrated Model to Assess the Global Environment (IMAGE), Netherlands Environmental Assessment Agency, 2006; United Nations Population Division, 2007

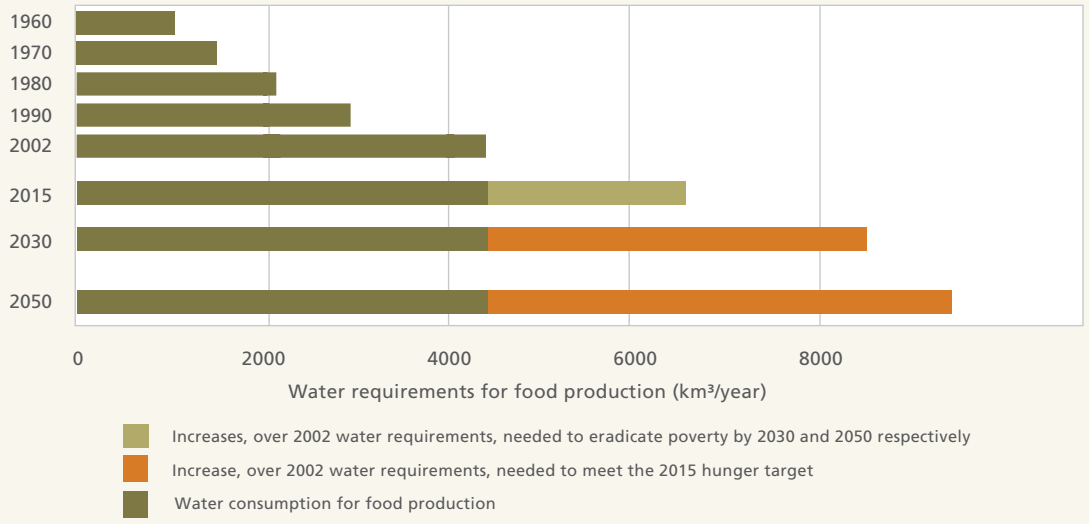
IMPACTS OF WATER SCARCITY

Water is essential to humanity, not simply in its raw form as drinking water, but also by virtue of being one of the most important limiting factors in food production. According to OCED[16], farming accounts for around 70% of water used in the world today and 47% of the world's population could be living under severe water stress by 2050. The increased burdens on water supply caused by urbanization, industrialisation and climate change will create more competition for water resources.

As Figure 1.10 indicates, current projections are for a doubling in demand for water required for food production by 2050 with an increase in demand of 22–32% by 2025. In consequence, according to the United Nations, water related issues alone may account for an estimated 1.5% reduction in world food production by 2030 and at least 5% by 2050.

Under a "business-as-usual" scenario water withdrawals are expected to increase in 59% of the world's river basin areas by 2025. Furthermore, studies indicate that the increase in water demand will outweigh the improvements in water use efficiency assumed in many forecasting models. Climate change could also impact water supply and agriculture due to changes in the seasonal timing of rainfall and snow pack melt, as well as a greater incidence and severity of floods and droughts.

Figure 1.10 – Historical and projected changes in water consumption for food production between 1960 and 2050

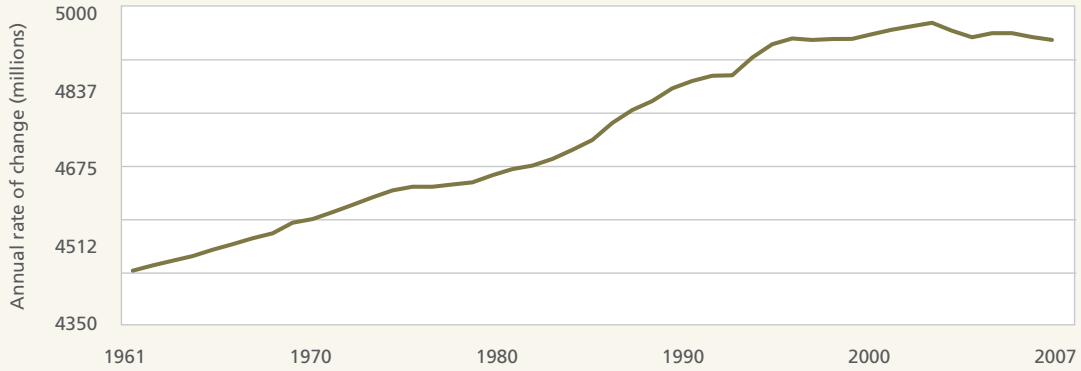


Source: De Fraiture et al., 2003; Shen et al., 2008; United NationsEnvironment Program, 2005

16 OECD, 2013. Water use in agriculture. http://www.oecd.org/environment/wateruseinagriculture.htm

This begs the question, what potential is there to expand irrigated land? As Figure 1.11 indicates, the trend for the expansion of irrigated land has flattened off in recent years despite the rise in demand for food and the accompanying financial incentive. During the last decade (1998 to 2007), the average annual rate of expansion in the area of agricultural land equipped for irrigation was 0.6%, whereas during the 60's the average annual rate of increase was 2.1%; over three times lower. This is due in part to the fact that the land most suitable for irrigation has already been brought into cultivation.

Figure 1.11 – Trends in global area of land equipped for irrigation



Source: Food and Agriculture Organisation of the United Nations, 2009

Like the best rain fed lands, the best-irrigated lands are developed first. Due to higher irrigation development costs and already stretched water supplies in many regions, it is assumed that the downward trend in the new development of irrigated cropland will continue in the future.

LAND DEGRADATION

Dr. David Tilman, a leading expert on global resource competition explains: *"Most of the best quality farmland is already used for agriculture, which means that further area expansion would occur on marginal land that is unlikely to sustain high yields and is vulnerable to degradation."*[17]

According to WHO *"Land degradation is caused by multiple forces, including extreme weather conditions, particularly drought, and human activities that pollute or degrade the quality of soils and land utility negatively affecting food production, livelihoods, and the production and provision of other ecosystem goods and services."*[18]

To date, due to deforestation and inappropriate agricultural practices, roughly 2 billion ha of the world's agricultural land has become degraded[19]. This includes an absolute decline, measured by satellite imagery between 1981 and 2003 of 12% of the global productive land area[20]. This is an area inhabited by 1.5 billion people, some 15–20% of the global population. Some estimates suggest that at current rates up to 30% of all agricultural land will be unusable by 2020[21].

Annually, the global rate of land degradation, which is due chiefly to soil erosion, is estimated to be between 20,000 and 50,000 km^2. To put this in perspective, taking an average annual loss rate of 35,000 km^2 equates to 95 km^2 per day or 1,109 m^2 per second. This means an area roughly the size of Tokyo, Singapore or New York City is lost every week or one International Football Association standard size football pitch every 7 seconds[22].

Losses are greatest in the developing world of Africa, Latin America and Asia, where population increases are highest and land management and husbandry practices are less well established. Losses in North America and Europe are 200% to 600% lower. It is estimated that 950,000 km^2 of land in Sub-Saharan Africa is threatened with irreversible degradation if nutrient depletion continues at current rates[23].

17 Science, 2002. Agricultural sustainability and intensive production practices. Tilman et al.

18 WHO, 2013. Land degradation and desertification. http://www.who.int/globalchange/ecosystems/desert/en/

19 World Resources Institute, 2005. Ecosystems & Human Well-being: Wetlands & Water. World Resources Institute, Washington, DC.

20 Ecological Economics 26 (1), 1998. Food security and sustainable use of natural resources: A 2020 Vision. Pinstrup-Andersen, P. and Pandya-Lorch, R.

21 Investment and Pensions Europe , November 2007. The answer lies in the soil. Spotlight on: Alternatives.

22 2009. Farmland Investment in the 21st Century.

23 Advances in Agronomy, 2004. The global impact of soil erosion on productivity. 81: 1-95den Biggelaar et al.

Due to overgrazing, compaction and erosion from livestock, some 70% of all grazing land in dry areas is considered degraded[24]. As a February 2009 report by the United Nations on the worsening global food crisis puts it: *"Environmental degradation and loss of ecosystem services will directly affect pests (weeds, insects and pathogens), soil erosion and nutrient depletion, growing conditions through climate and weather, as well as available water for irrigation through impacts on rainfall and ground and surface water. These are factors that individually could account for over 50% in loss of the yield in a given 'bad' year"*[25].

CLIMATE CHANGE

According to the World Bank forecast, climate change could have significant impacts on yield. Agricultural productivity could actually decrease during the next 30 years, rather than increase as more optimistic forecasts are predicting. Against a background of rising demand this could have significant implications for commodity prices in the coming years. In their words: *"New results published since 2007 point to a more rapidly escalating risk of crop yield reductions associated with warming than previously predicted."* In fact in the lower latitudes, especially in seasonally dry and tropical regions, even small local temperature increases (1 to 2°C) are now projected to decrease crop productivity, which in turn would increase the risk of hunger and starvation[26].

There is a strong link between the state of the environment and food production. The natural environment is the platform upon which all life and food production is based. Yields are affected by the complex relationships between numerous environmental factors, from the length of the growing season (as dictated by weather and water availability), to the availability of insects for pollination, and the natural control of weeds, diseases and insect pests. All of these factors in combination, known as ecosystem services, help to sustain agricultural productivity.

Figure 1.12 summarises the interactions between climate driven phenomena and their capacity to either increase or decrease agricultural yields. The negative impacts of climate change on productivity have already been observed in many regions of the world and are particularly severe in Africa where drought and disease have had devastating effects on yields[27].

Figure 1.12 – Impacts of climate driven phenomena on agricultural productivity

Climate driven phenomena	Agriculture, forestry and ecosystems
TEMPERATURE CHANGE Over most land areas, warmer and fewer cold days and nights, warmer and more frequent hot days and nights	Increased yields in colder environments Decreased yields in warmer environments Increased insect outbreaks
HEAT WAVES/ WARM SPELLS Frequency increases over most land areas	Reduced yields in warmer regions due to heat stress Wildfire danger increases
HEAVY PRECIPITATION EVENTS Frequency increases over most land areas	Damage to crops Soil erosion Inability to cultivate land due to waterlogging of soils
DROUGHT Affected areas increase	Land degradation Crop damage and failure Increased livestock deaths Increased risk of wildfire
CYCLONES AND STORM SURGES Frequency increases	Damage to crops Windthrow (uprooting) of trees Damage to coral reefs
SEA LEVEL RISE Increased incidence of extreme high sea-level (excluding tsunamis)	Salinisation of irrigation water, estuaries and freshwater systems

Source: Intergovernmental Panel on Climate Change, 2008

24 FAO, 2006. Livestock's long shadow, pp. 416. FAO, Rome. ftp://ftp.fao.org/docrep/fao/010/a0701e/a0701e.pdf

25 United Nations Environment Programme Rapid Response Assessment, 2009. The Environmental Food Crisis: The environment's role in averting future food crises.

26 WHO, 2012. Turn Down the Heat. http://climatechange.worldbank.org/sites/default/files/Turn_Down_the_heat_Why_a_4_degree_centrigrade_warmer_world_must_be_avoided.pdf

27 Science 205, 2002. Soil Fertility and Hunger in Africa. Sanchez, P.A.

PEAK OIL/ FOSSIL FUELS

Outside of climate change factors, the issue of oil production deficiencies relative to demand and the resultant rise in oil prices has the potential to be the most significant source of uncertainty for agricultural commodity prices. Agriculture both supplies and demands energy; hence, markets in both sectors have historically shown themselves to be linked. The nature and strength of these linkages have changed over the years, but agricultural and energy markets have always adjusted to each other, with output and consumption rising or falling in response to changing relative prices.

Rapidly increasing demand for liquid biofuels is now binding agriculture and energy more closely than ever. The reasons for this are twofold. Firstly, higher oil prices could change the composition of demand for crops, as new markets are created for biofuels. Secondly, oil and other fossil fuels (in particular natural gas used in fertiliser production) are crucial components in modern agriculture. Fluctuations in price and availability of fossil fuels could have a major impact on agricultural economics and productivity.

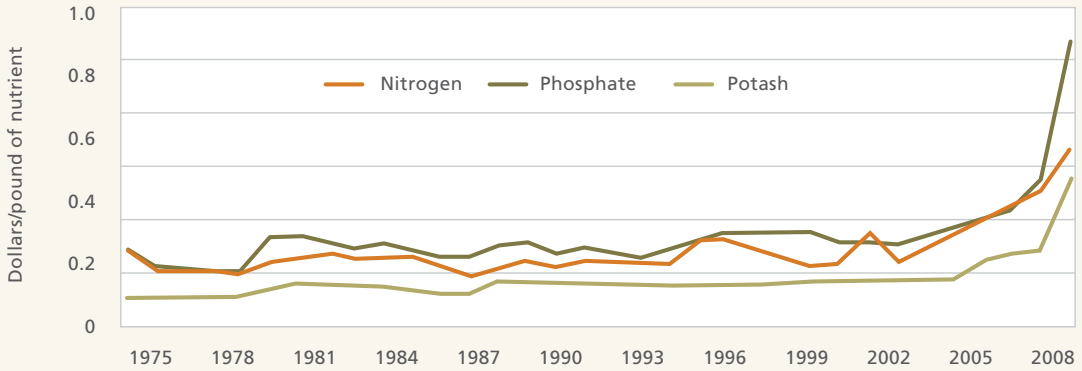
The FAO 2012 Energy Smart Food Report estimates that the world's food production systems — from the farms where food is grown to further along the processing and marketing chain — consume 30% of all available energy[28]. A 2002 study from the John Hopkins Bloomberg School of Public Health estimated that, using current agricultural systems, three calories of energy are needed to create one calorie of edible food, with grain-fed beef requiring thirty-five calories for every calorie of beef produced[29]. If the energy used in processing and transporting food is included, it takes an average of seven to ten calories of input energy to produce one calorie of food[30].

The single biggest culprit in the consumption of fossil fuels in industrial farming is the use of agrichemicals (pesticides, fertilisers, growth agents etc.). These chemicals are absolutely critical to support the supply side of the equation. Increased fertilizer application has been responsible for at least 50% of yield increases[31].

From 1961 to 1999, the use of nitrogenous and phosphate fertilizers increased by 638% and 203%, respectively, whilst the production of pesticides increased by 854%. As much as 40% of energy used in the food system goes towards the production of artificial fertilizers and pesticides. Nitrogenous fertilizers are synthesized from atmospheric nitrogen and natural gas, a process that takes a significant amount of energy. Producing and distributing them requires an average of 62 litres of fossil fuels per hectare[32].

As Figure 1.13 shows, during the 2008 price spikes, fertiliser prices reached historic highs, due to a combination of rising global demand and high oil prices, and farming input costs increased dramatically. This in turn resulted in a drop in worldwide grain production, which fed through to higher agricultural commodity prices. The result was that at the same time as fertiliser prices were reaching historic highs, so were agricultural commodity prices.

Figure 1.13 - Prices of fertiliser nutrients since 1975



Source: US Department of Agriculture, 2008

Farmers with suitable cash flow or access to credit thus benefited from higher fertiliser prices, whilst farmers in poorer countries suffered. The higher regional differentiation in production and demand also lead to greater reliance on imports for many countries,

28 FAO, 2012. Energy Smart Food Report. http://www.fao.org/docrep/015/an913e/an913e.pdf

29 Environmental Health Perspectives 110, no. 5, 2002. How Sustainable Agriculture Can Address the Environmental and Human Health Harms of Industrial Agriculture.

30 Heller, M.C., and Keoleian, G.A., 2000. Life Cycle-Based Sustainability Indicators for Assessment of the U.S. Food System. Ann Arbor, MI: Center for Sustainable Systems, University of Michigan.

31 FAO, 2003. World agriculture: towards 2015/2030. FAO, Rome. ftp://ftp.fao.org/docrep/fao/004/y3557e/y3557e.pdf

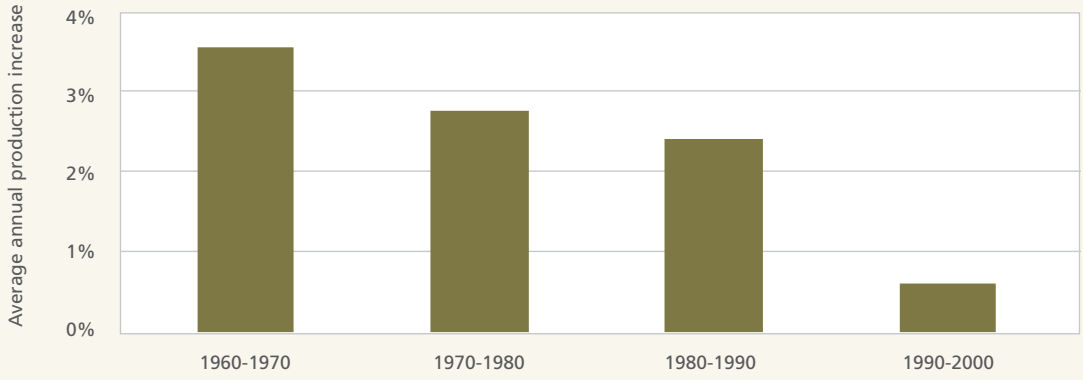
32 2009. Farmland Investment in the 21st Century.

further exacerbating the demand side of the equation. High income countries also generally have better access to international markets and strong demand from wealthier domestic consumers and are therefore more able to capitalise on upward fluctuations in commodity prices. Indeed, farm incomes in the developed world increased substantially during 2007 and 2008, despite higher input prices[33].

DIMINISHING RETURNS FROM THE 'GREEN REVOLUTION'

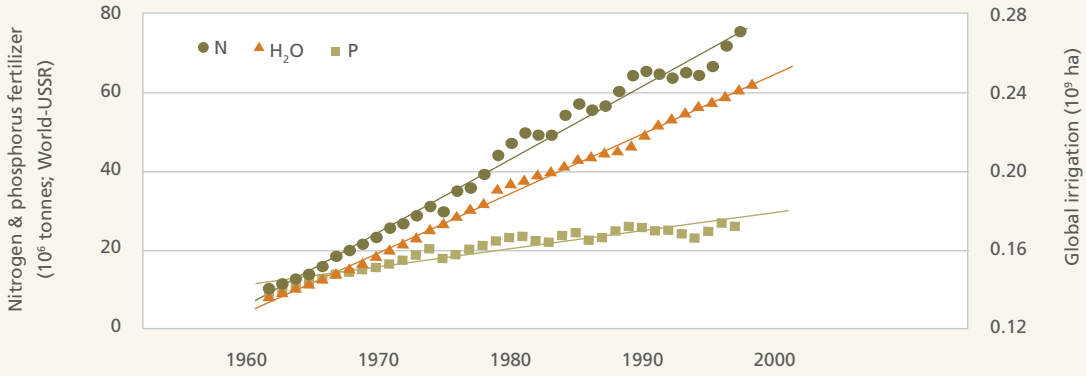
Looking back through history at the agriculture super cycle, each early period of productivity growth was based upon cropland expansion. The last bout of supply growth, however, stemmed primarily from the Green Revolution. The Green Revolution was a tremendous breakthrough in crop production due to the use of technology (Figure 1.14). It was comprised of the introduction of high yield varieties of stable crops, investment in irrigation, fertilizer, and literacy campaigns for farmers. This was so successful at increasing farm yields that, until the mid-80's, per capita grain production actually increased, despite the rapidly rising population.

Figure 1.14 – Average annual production increases during the four decades between 1960 and 2000



Source: Food and Agriculture Organisation of the United Nations, 2009

Figure 1.15 – Total global nitrogen fertiliser use between 1960 and 2000



Source: Food and Agriculture Organisation of the United Nations, 2002; Tilman et al, 2002

According to the Food and Agriculture Organisation of the United Nations, the roughly 100% increase in world crop production between 1961 and 1991 was achieved mainly through a combination of increased yield per unit area (78% contribution) and greater cropping intensity (7% contribution) with a relatively minor contribution from increased cropland and rangeland area (15% contribution).

However, in the words of the World Bank report - Global Economic Prospects 2009: *"Yield gains associated with the green revolution are waning in many countries. Productivity levels in much of Africa and Europe and Central Asia are also declining; they are only one half those of best-practice developing countries, even after having controlled for differences in climate and soil. Unless*

33 Financial Times (30 May 2009). Landowners cast net wider to make a living.

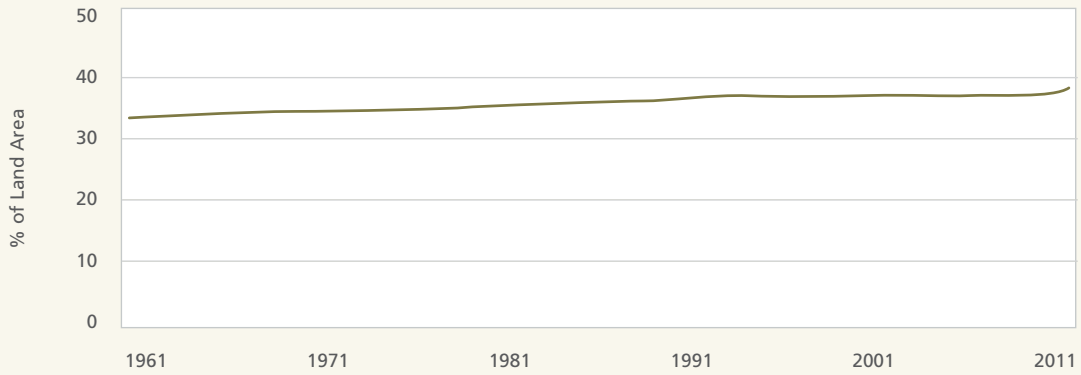
large-scale agricultural investment and knowledge creation and dissemination are stepped up, food production in many of these countries will not keep pace with demand. Simulations suggest that if productivity growth in developing countries disappoints, global food prices will be higher, and many developing countries—especially those with rapidly growing populations—will be forced to import more-expensive food from high income countries"[34].

With the benefits of the Green Revolution beginning to wane, how will the world increase production in step with a doubling of demand by 2050, taking into account the numerous pressures on supply, including climate change, land degradation and the constraints on cropland expansion? So far, the main agricultural policy making organisations have failed to come up with an answer. What is certainly the case is humankind will be paying a lot more for food whilst we figure out the answer.

CONSTRAINTS TO CROPLAND EXPANSION

As can be seen in Figure 1.17, between 1961 and 2011 there has been only a 4% increase in the amount of land worldwide used for agriculture. This implies considerable constraints exist in terms of cropland expansion.

Figure 1.17 – % of Land Area used for Agriculture



Source: FAOSTAT

In the case of the EU, the US and much of Asia, the expansion of cropland is constrained due to overdevelopment and expanding urban areas, whilst the conversion of any remaining non-agricultural land to agriculture is further restricted by wildlife conservation policy. Assuming forested lands are also excluded from cropland expansion, then it is clear that much of the expansion in these areas will need to happen in fallow or marginal land or in areas currently utilised as grazing land[35].

It is commonly assumed, therefore, that much of the hoped for expansion in cropland area will be achieved in the less developed regions of the world such as South America and Sub-Saharan Africa. These regions are generally less saturated in terms of their agricultural development potential. According to some of the more optimistic assessments of land availability, the 228 million ha of arable land currently under cultivation in Sub-Saharan Africa has the potential to be increased to over 1 billion ha of primarily rain fed crops by 2030 (much of the irrigated land has already been developed, as discussed earlier). Similar estimates have been touted for the other areas such as South America, where expansion potential has been claimed to be 1 billion ha from the present figure of 208 million ha, although the majority of this would be on land currently occupied by forest[36].

The fundamental problem with these assessments is that they do not take account of the environmental and climate change effects of land use change and the conservation and water supply issues that such an expansion might come up against. Besides the obvious constraints of political instability in the case of Sub-Saharan Africa and the ecological cost in the case of South America, these figures have also been disputed on a purely practical and technical basis.

In a paper on the subject entitled *"Is there really spare land?"* - a critique on the estimates of available cultivable land in developing countries, the author states: *"The supposed existence of this spare land is widely quoted in forecasts of capacity to meet the food requirements for future population increase. It is argued here that these estimates greatly exaggerate the land available, by*

34 World Bank, 2009. Global Economic Prospects 2009.

35 MNP, 2006. Integrated modelling of global environmental change. An overview of IMAGE 2.4. Netherlands Environmental Assessment Agency (MNP), Bilthoven, The Netherlands.

36 United Nations Environment Programme Rapid Response Assessment, 2009. The Environmental Food Crisis: The environment's role in averting future food crisis http://www.grida.no/publications/rr/food-crisis/

over-estimating cultivable land, under-estimating present cultivation, and failing to take sufficient account of other essential uses for land. Personal observation suggests that the true remaining balance of cultivable land is very much smaller, in some regions virtually zero. An order of-magnitude estimate reaches the conclusion that in a representative area with an estimated 'land balance' of 50%, the realistic area is some 3–25% of the cultivable land. The impression given by current estimates, that a reserve of spare land exists, is misleading to world leaders and policy-makers"[37].

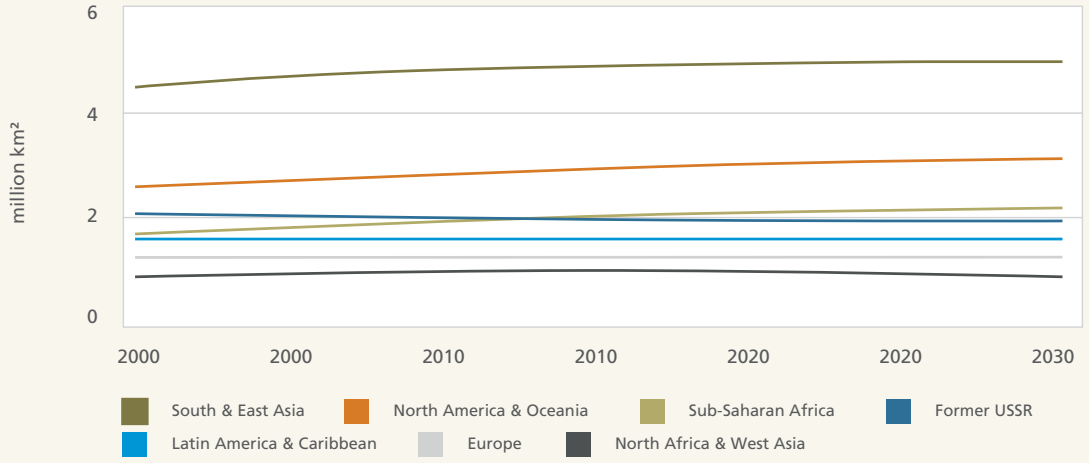
The main policy making organizations like WHO, the UN and the World Bank all seem to agree that agriculture has the potential to meet the food needs of 8–10 billion people. However there is no real consensus on how this can be achieved in an environmentally sustainable way.

FORECASTING FUTURE EXPANSION OF AGRICULTURAL LAND

One of the world's foremost scenario modelling systems, called IMAGE (Integrated Model to Assess the Global Environment), incorporates critical data on population growth, earth systems, climate change, economics and social factors. Run by a team of scientists, mathematicians, economists and other academics on a computer array at the Netherlands Environmental Assessment Agency (MNP) in Bilthoven in the Netherlands IMAGE has been operational since the late 80's. The mathematical models and assumptions which lie at its core are constantly updated with the latest theoretical research and observational data from around the world. Accounting for the effects of climate change and the need to increase agricultural output, the system is viewed by many as the pre-eminent forecasting tool for agricultural land use trends.

Figures 1.18 and 1.19, based on the IMAGE 2.4 model, take into account climate change constraints to expansion into forested areas and as a result, predict only modest increases in cropland area. When considering the need to support a doubling of global grain demand by 2050, it is clear that only a small portion of the required production increase could result from this level of cropland expansion. Despite the fact that this expansion takes place primarily at the expense of grassland and grazing lands, the model accepts that there will still be a trade-off between the environment and economic growth.

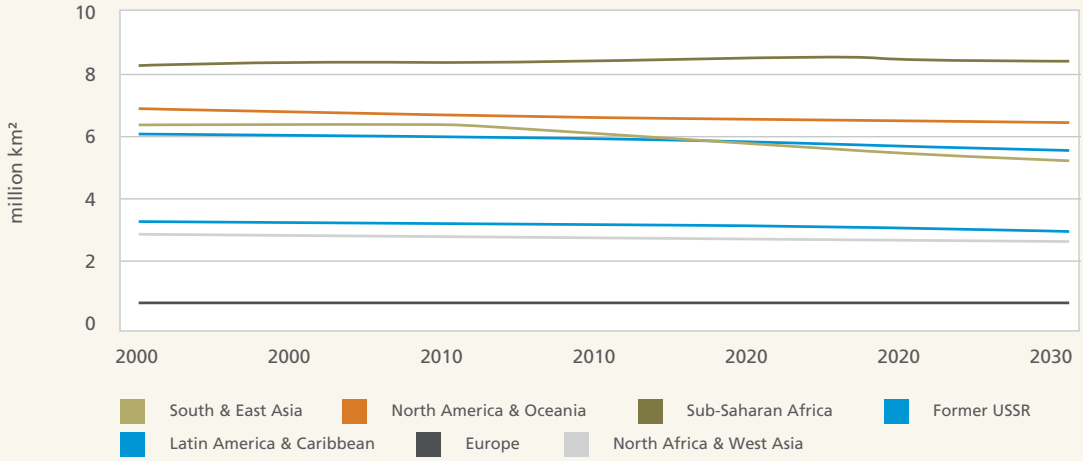
Figure 1.18 – Grassland area in a business-as-usual scenario up to 2030



Source: Integrated Model to Assess the Global Environment, 2008

37 Environment, Development and Sustainability, 1999, Volume 1, Issue 1, pp 3-18. Is there Really Spare Land? A Critique of Estimates of Available Cultivable Land in Developing Countries. Young, A.

Figure 1.19 – Arable land area in a business as usual scenario up to 2030



Source: Integrated Model to Assess the Global Environment, 2008

As mentioned previously, the potential for these expansion rates is further inhibited by the fact that a substantial proportion of the forecast growth, in cropland area, is supposed to take place in Sub-Saharan Africa, where political instability and conflicts, lack of transport and other infrastructure and ethical constraints will all conspire to hamper growth.

CHAPTER 1 CONCLUSION

Population growth, resource scarcity and climate change are the three defining economic trends of our modern times. Individually, each constitutes a major issue, but they are all the more potent by virtue of being inextricably linked. Over time, their paths will increasingly converge and their effects on global commerce will become ever more pronounced. Any sector positioned at the nexus of their convergence will offer investors the best mid-term opportunity and the potential for stellar returns over the long-term. Agriculture is one such sector. With more mouths to feed, increasingly affluent populations in developing countries demanding a higher protein, more resource intensive diet and the emergence of biofuels, world demand for agricultural commodities is soaring. Yet on the supply side, keeping up with rising demand is becoming increasingly challenging due to climate change, fundamental limits to further growth and a plethora of pressures on existing production.

Chapter 2

INVESTOR APPETITE FOR FARMLAND UNDER CURRENT MARKET CONDITIONS

Throughout history, land has been the most basic repository of wealth and value through good times and bad. As previously discussed, future supply and demand fundamentals can make farmland attractive to the long-term investor. In the view of a growing number of professional investors, farmland currently offers particularly appealing portfolio planning characteristics under recent market conditions.

The current market remains characterised by:

1. Price volatility in mainstream asset classes.
2. Unusually high levels of positive correlation between virtually all traditional asset classes and their subcomponents.
3. Uncertainties over valuations due to low levels of visibility with respect to the global economy.
4. Concerns over inflation in light of mass quantitative easing in many global markets.
5. The disappearance of 'risk free returns' on cash due to unprecedented low central bank interest rates.

Many investors are now looking for alternatives with the following characteristics:

1. 'Real' or 'hard' assets that are expected to provide protection of value.
2. Greater return than traditional fixed income investments provide in the current market climate.
3. Low correlation to mainstream investments such as stocks and bonds and traditional alternative investments such as commercial real estate and hedge funds.
4. Superior performance in an inflationary environment, to mitigate market risks due to global monetary policy (low interest rates, quantitative easing, commodity driven inflation etc.).
5. Good, long-term fundamentals to support future capital growth in an investment environment where short term visibility is at historic lows.
6. Simple, secure investments, preferably involving direct ownership of, or robust security over underlying assets.

NOTE

As this section will demonstrate, investing in farmland has the potential to provide all of the above features. This has resulted in rapidly rising interest among professional investors in farmland as an asset class. If this trend continues, it will provide meaningful support for farmland values in the coming years.

In the context of this document, when farmland investment is being discussed it is assumed that the investment is in direct freehold ownership of farmland. It is also assumed that the farmland is located in a developed, free market economy with a robust legal system protecting property ownership rights and allowing direct freehold ownership of land. Under such conditions an investor might expect to earn a return in three possible ways:

- Income from agricultural tenancies.
- Capital growth from rises in agricultural land values.
- The potential for windfall returns if land is rezoned for development at some point in the future (e.g. infrastructure, industrial, commercial or residential development).

FARMLAND AS A PORTFOLIO DIVERSIFICATION TOOL

A number of studies have shown that, historically, farmland returns have a low or negative correlation with traditional asset classes such as stocks and bonds and only a modest positive correlation with commercial real estate[38]. A study in the US, using data over a period of 33 years up to the 1980's, considered six asset classes including farm real estate, large and small capitalisation stocks, long-term corporate bonds and Treasury bills. The study concluded that inclusion of farmland in the portfolio had highly attractive characteristics, particularly in view of the low correlation with other assets in the portfolio (especially large capitalisation stocks)[39].

38 Ibbotson Associates, 1991. Stocks, Bonds, Bills, and Inflation: 1991 Yearbook.

39 Journal of Portfolio Management (12): 73-78, 1985. Farmland as a Portfolio Investment. Kaplan, H.M.

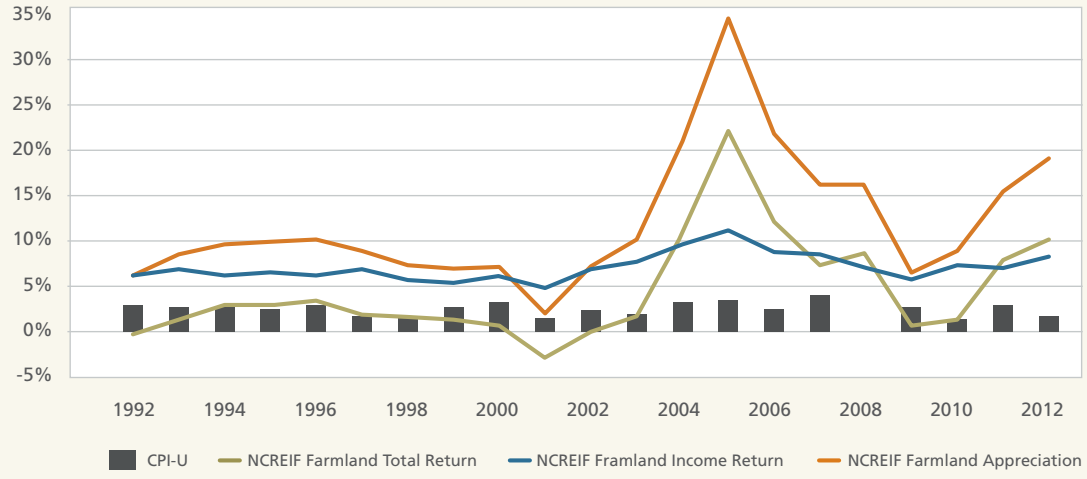
This conclusion is supported in a 2012 report form JP Morgan, which demonstrates a low correlation between Farmland and publically traded stocks and shares[40].

These characteristics make farmland an attractive diversification tool that can help reduce the impact of broader market volatility on a portfolio. The farmland component can be further diversified by varying crop types, management styles and geographic distribution within the portfolio. In a direct ownership structure, investors can acquire farmland across a range of farms in different countries and/or climate zones and under different asset managers.

FARMLAND AS AN INFLATION HEDGE

Over the long term, farmland returns have shown a positive correlation with inflation, making farmland an effective inflation hedge and capital preservation vehicle. According to the Hancock Agricultural Investment Group (HAIG), part of the US investment management division of Manulife Financial, *"Over the long-term, 1941-2011, annual average U.S. farmland appreciation exceeds U.S. inflation by approximately 1.71 per cent"*[41]. This view is corroborated by a 2010 report from Alliance Berstein, which shows a strong, positive relationship between inflation and US farmland values in the period 1909 to 2009[42].

Figure 2.1 – NCREIF Farmland Returns vs. Inflation



Source: NCRIEF

Unlike other popular hedges against inflation, such precious metals, farmland also provides a regular income to the investor. This makes it a useful replacement for lost 'risk free' income on cash deposits.

HIGH LEVEL OF CAPITAL SECURITY AND LOW LEVEL OF RISK

Many investors are now placing greater emphasis on capital preservation during periods of severe market turmoil. Data indicates that farmland has exhibited strong capital protection characteristics over prolonged periods of time.

Assuming farmland is properly managed in a jurisdiction where property rights are well protected, land is a solid asset, which is unlikely to depreciate in value. The asset is completely secure and immune to theft or fraud (as long as due diligence and conveyancing are professionally conducted at the point of acquisition). Farmland's risk/return profile compares favourably with more traditional assets such as stocks and bonds. Studies have shown that, even taking into account the transaction costs associated with less liquid assets, farmland performs an indispensable role in creating the optimal investment portfolio[43].

40 http://www.jpmorganinstitutional.com/blobcontent/286/105/1323337596718_Realization_new_world.pdf

41 HAIG, 2012. The Farmland Asset Class - A Comprehensive Overview.

42 https://www.alliancebernstein.com/Research-Publications/CMA-created-content/Investments_US/Instrumentation/RWP_DeflationInflationBlackbook.pdf

43 Journal of the American Real Estate and Urban Economics Association (16): 123-37., 1988. The Effect of Alternative Return Measures on Restricted Mixed-Asset Portfolios, J.R. Webb and J.H. Rubens.

FARMLAND'S SUPERIOR RISK- ADJUSTED RETURNS

The most commonly used measure of risk- adjusted return is known as the Sharpe Ratio. It is a measure of the excess return, or 'Risk Premium', per unit of risk in an investment asset or trading strategy and is used to assess how well the return on an investment compensates the investor for the risk taken. The higher the Sharpe Ratio for a particular asset, the higher the return earned per unit of risk an investor is exposed to when owning that asset.

As Figure 2.2 from the US National Council of Real Estate Investment Fiduciaries (NCREIF) shows, the Sharpe Ratio for US farmland was higher than large capitalisation US equities, T-bills and commercial real estate for the period 1991 to 2012. In terms of total returns, farmland was the highest performing commodity, and relatively low risk, in terms of standard deviation, compared to stocks.

Figure 2.2 – Asset Class Returns

Correlations 1991-2012									
	Mean 1991-2012	Std Dev* 1991-2012	Sharpe Ratio	CPI	Bonds	S&P	Farms	Timber	UR
Consumer Price Index (CPI)	2.50	0.90		1.00					
Bonds-Barclays Gov't	6.40	5.80	0.54	-0.06	1.00				
S&P 500	9.10	18.70	0.31	0.22	-0.14	1.00			
Farmland	11.50	7.10	1.16	0.21	-0.16	-0.09	1.00		
Timberland	10.50	9.80	0.74	0.33	0.16	0.19	0.22	1.00	
Urban Realty	7.50	9.10	0.47	0.20	-0.09	0.09	0.43	-0.04	1.00

Source: NCREIF 2012

A GENERAL LOOK AT FARMLAND'S PERFORMANCE AGAINST OTHER ASSET CLASSES

Some comparative studies on farmland have been criticised for taking numbers derived from agricultural equity type investments (i.e. data which include income from the commercial operation of a farm), thus making a direct comparison between straight farmland ownership and other asset classes difficult. However, in a much referenced and well respected study conducted in the US, where farmland was specifically analysed from the perspective of capital growth and income from rents, the findings were consistent with other studies in terms of its benefits compared to other asset classes.

The study concludes as follows: *"The study used cash rents after property taxes to derive the income part of the returns on farmland for the period 1967-88 and showed that diversification enhances portfolio performance for institutional investors. The results were robust across wide variations in variance and annual returns to farmland. For the period 1967-88, farmland exhibited a higher return than that of stocks and bonds. Further, returns on farmland were negatively correlated with stocks and bonds and positively correlated with inflation. Thus investment in farmland not only was a good hedge against inflation but also provided diversification for those who included it in their portfolio. The implication is that, by including farmland in their portfolio, they may be able to reduce the possibility of shortfalls of their funds in times of higher inflation."*

INVESTMENT APPEAL IN TIMES OF MARKET TURMOIL

In a Yale University discussion paper, Fairbairn states, *"Since 2007, capital markets have acquired a newfound interest in agricultural land as a portfolio investment… Capital gains are central to current farmland investments, both as a source of inflation hedging growth and of potentially large speculative profits. New types of farmland investment management organizations ("FIMOs") are emerging, including from among large farmland operators which formerly valued land primarily as a productive asset and source of use value"*[44].

Farmland acts in a similar way to gold in times of market turmoil. In essence, it offers a relatively low risk investment with the potential, especially in the current environment, to offer substantial returns.

44 Fairbairn, M., 2013. 'Like gold with yield': Evolving intersections between farmland and finance. Yale University.

FARMLAND AS A REAL ESTATE INVESTMENT

Whilst farmland falls under the general classification of real estate, it has a number of unique characteristics when compared with other forms of real estate. This has had the effect of sheltering farmland assets from the more extreme falls in commercial and residential property values during the recent global financial meltdown.

1. Fundamental Limits to Supply
   Unlike other forms of real estate where supply can be increased by building new units, the supply of farmland is fundamentally limited. This is especially true when considered in the context of the constraints to further expansion (and the potential for an aggregate reduction in global cropland area) discussed in this document.

2. Price / Earnings and Yield
   As a general rule, agricultural land values are supported by earnings. Farmland has therefore shown itself to be a reliable vehicle yielding, over a prolonged period of time, returns which include both the capital gains on principal as well as income. Indeed, farmland has been referred to by investors as 'gold with a coupon'.

3. Farm Sector Debt
   Further reassurance of fundamental value comes from the fact that both the debt-to-equity and debt-to-asset ratios are low in the farming sector. This reflects the fact that farmland values have risen in step with, or more rapidly than, debt levels over the past few years. As a general rule this is in stark contrast to residential and commercial real estate. The ratios in the farmland sector could also be taken as an indicator that the sector is less overbought (and therefore less likely to be overvalued) than other forms of real estate.

FISCAL ADVANTAGES OF FARMLAND INVESTMENT

In many of parts of the world, including many developed economies, there are a range of tax related incentives associated with farm real estate. These may result in favourable treatment across one or all of the standard taxes (such as income taxes and capital gains taxes) which would normally have an adverse effect on returns in other asset classes. In some instances there are also special exemptions with respect to inheritance tax which may make farmland particularly attractive for estate planning purposes.

Some countries have additional incentives for forestry related usage of farmland. In the UK, for example, foreign buyers of farmland are not charged capital gains tax at source and there are no withholding taxes on the repatriation of such profits.

FOR UK RESIDENT FARMERS AND FARMLAND INVESTORS

There are a number of tax incentives for farmland investors (and their farming tenants) that make farmland an attractive shelter for individuals with significant capital gains and inheritance tax liabilities. There are two different types of inheritance tax relief; Agricultural Property Relief and Business Property Relief.

Business Property Relief: http://www.hmrc.gov.uk/cto/customerguide/page16.htm#a
Agricultural Property Relief: http://www.hmrc.gov.uk/cto/customerguide/page17.htm#8

A NOTE ABOUT THE PERILS OF ASSUMPTIONS BASED ON HISTORICAL DATA

It is important to note that this chapter includes references to third party reports which discuss farmland as an asset class in a favourable light. These studies are specific to the circumstances they cover, such as: the time period covered by the study, geographical region and farmland type. For this reason, their conclusions, whilst providing an interesting insight into scenarios with similar conditions, should be used as a guide rather than a basis for any investment decision. Past performance is no guarantee of future performance and investors should of course be cautious in the use of historical data when making investment decisions.

DIRECT INVESTMENT IN FARMLAND – GUIDANCE FOR INVESTORS

As the previous chapter demonstrates, there is much historical evidence showing that farmland can enhance the overall performance of investment portfolios dominated by traditional asset classes such as publicly traded stocks, bonds and commercial and residential real estate. Farmland provides competitive returns anchored by a solid income component hedged against inflation (because rental income is linked to commodity prices which are positively correlated with inflation). Over the past five years, a number of institutional investors and specialist funds have acknowledged through their asset allocations the positive investment characteristics of agricultural land, farmland is beginning to be widely accepted in the mainstream investment community, especially at the private investor level.

Chapter 3

AN OVERVIEW OF AGRICULTURE INVESTMENT STRATEGIES

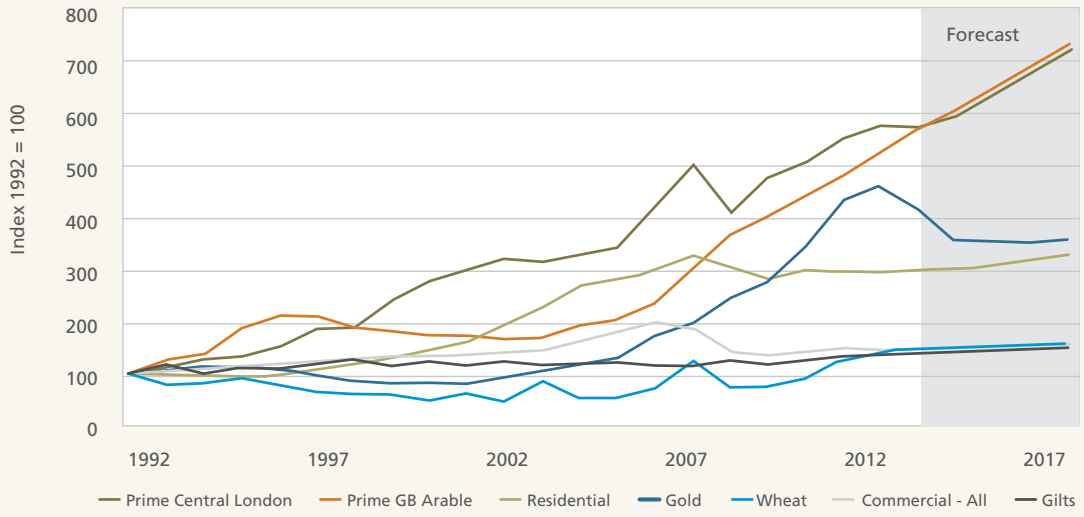
There are a number of different ways of investing in the agriculture sector. The choice of method will be determined by the investor's objectives: short, medium or long investment term; liquidity and income requirements; risk appetite, etc. Listed below are the principle methods used by the investing community to gain exposure to the agriculture sector.

1. Agricultural Commodities (Growth)
   Investors can get direct exposure to individual crop prices through investing in agricultural derivatives such as futures or options, or investing into a mixed basket of agricultural commodities through exchange-traded funds which track commodity indexes.
2. Direct Investment in Agricultural Equities (Growth & Income)
   There are a number of agricultural equity plays available to investors. It is possible to invest in large-scale commercial farming enterprises involved directly in crop production; or in other industries that supply the agriculture sector, such as (fertiliser, pesticide and seed producers and agricultural machinery manufacturers).
3. Collective Investment Funds (Growth / Income)
   Investing in farmland through a securitised or unitised fund, which invests over a portfolio of different farms or agri-related investment strategies.
4. Direct Farmland Investment (Growth & Income)
   Direct freehold ownership of agricultural land, with a fixed or variable rent.
5. Asset Backed Debt Investment (Growth / Income)
   Structured finance, by way of funding loans, loan syndicates or loan portfolios (securitisation), whereby farmland is used to both collateralise the loan and enhance investor returns.

Whilst a direct comparison is problematic, given the different risk and return profile of each method, the direct farmland investment is the least liquid and in order to best ride the mid to long-term fundamentals highlighted previously, should be treated as a mid to long-term investment.

The forecasts for the asset class are strongly positive. According to a 2012 study from UK estate agent, Savills, *"The capital value growth of UK farmland is likely to outperform many commodities markets, residential property, UK gilts and West End offices over the next five years. We expect the average value of farmland in the five years from 2012 to increase by 36%."*[45]

Figure 3.1 – Prime Arable Farmland Outperforms Other Assets



Source: Savills Research, Oxford Economics, IPD, HGCA, Kitco, Nationwide

The performance and trends of farmland has drawn increasing interest by investors looking for a safe harbour for their money that offers a higher return than low interest bank deposits. Earlier this year, Savills reported funds of more than £6bn were awaiting investment in UK farms, which given the low annual supply coming on to the market, will take a considerable amount of time to drawdown.

45 Savills, 2012. Market Survey Agricultural Land.

ADVANTAGES OF DIRECT FARMLAND INVESTMENT

Farmland is the foundation of all agriculture and the most basic repository of wealth and value within the sector. The fortunes of companies can wax and wane as management and market conditions change or one competitor outperforms another. Farmland on the other hand is fixed and will always gain in value over the mid to long-term as demand continues to rise.

Additionally, there is less volatility in farmland investment compared with agricultural equities and commodities. Farm enterprise profits are more vulnerable to fluctuations in commodity prices and input costs. It is this perceived volatility within the farming sector that has caused the non-agricultural investor to believe that farmland ownership is riskier than it actually is.

The reality is that the income of agricultural landowners and agribusiness lenders are more insulated from changing market conditions, given that rents or interest are a fixed cost which the agricultural enterprise must bear regardless of prevailing market conditions. Thus, in the case of tenancy arrangements with fixed rental rates, or loans with fixed interest, the asset class shows less volatility, producing a smoother and more reliable income stream.

ACHIEVING PORTFOLIO DIVERSIFICATION

Diversification is frequently cited as one of the advantages of investing in farmland through a collective investment fund structure. For investors with ample capital, similar diversification is possible through direct farmland investment by investing in a portfolio of farmland assets. Additionally, if assets are selected according to certain criteria, diversification is less of a concern than in the case of other asset classes. This is due to the fact that many farms operate a mixed cropping system with rotation between crop types. This creates diversification at the farm enterprise level and hedges against fluctuations in individual commodity prices. If such farms are specifically selected during pre-purchase due diligence, diversification at the portfolio level becomes less of an issue.

One comprehensive study, conducted in 2002, which looked at the importance of diversification in farmland portfolios, concluded that: *"With respect to farmland investment and geographic diversification, the results [of the study] question the ability of an optimised mean-variance portfolio to provide substantial improvement in comparison to a naive portfolio. The marginal improvement in portfolio efficiency of an optimised farmland portfolio is not statistically significant"*.[46]

PORTFOLIO WEIGHTINGS

Modern Portfolio Theory quantifies in mathematical and technical terms the old adage: *"Don't keep all your eggs in one basket"*. The modern asset manager seeks to increase return, or maintain return at stable levels, whilst reducing overall volatility (risk) by combining assets with low or negative return correlations. For these reasons, in order to achieve the intended portfolio objectives, asset ratios are as important as asset types. The question of appropriate portfolio weightings for farmland needs to be considered not only in the context of the current rather unique and unpredictable market conditions, but also in terms of the investor's future expectations of market activity.

REDUCING CAPITAL RISK

Aside from investment performance, there is also the matter of capital risk. It is hard to imagine an investment with better characteristics in this regard.

In a worst-case scenario, even if a farmland tenant is unable to make a rent payment, the investor still owns the underlying asset. The bulk of their capital is always preserved. This cannot be said of equities where the worst-case scenario is the loss of 100% of capital; or agricultural commodities where the loss of capital has the potential, under certain circumstances, to exceed the amount invested. Betting on short-term movements in commodity prices is not for the faint hearted.

Contemporary farmland investors are guided more by the long-term investment proposition, as dictated by fundamental trends in demand growth and the constraints to increasing supply discussed in the earlier part of this document. Preservation of capital invested in individual assets within a portfolio is one of the most important contributing factors to long-term performance across the portfolio as a whole. In the words of renowned long-term value investor, Warren Buffett: *"There are three rules I try to follow when investing: Don't lose money. Don't lose money. Don't lose money."*

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46 Journal of Real Estate Finance and Economics, 25 (1): 81-98. 2002. Farmland Investment Under Conditions of Certainty and Uncertainty. Hardin, W. and Cheng, P.

MISCONCEPTIONS ABOUT FARMLAND INVESTMENT

Despite the obvious advantages of farmland investment which not only make sense in theory, but also in fact (as proven by historical performance figures), many remain uncertain about diversifying into farmland. There are a number of reasons for this:

1. The perception of a lack of efficient market information on price and value.
2. The level of specialist expertise required identifying, assessing and acquiring farmland.
3. The perception of a lower level of liquidity within the asset class.
4. The 'lumpiness' of asset size usually restricts the asset class to high / ultra-high net worth or institutional investors.
5. The perceived burden of managing the asset.

On the first point, a study[47] conducted in the United States, which assessed farmland values over a prolonged period from 1900 to 1994, demonstrated that values only show inconsistencies in the short-term. It may not be possible for speculators with a short holding horizon to obtain systematic excess returns by trading in land markets (due to transaction costs), however, farmland markets are efficient and prices are consistent with standard farmland valuation models[48,49], even allowing for transaction costs, if a longer term investment horizon is accepted.

As for remaining points, in general, many investors fear that by adding farmland as a separate asset class into a portfolio may increase its complexity and maintenance costs. Simple inertia also plays a role to the extent that many investors (or their advisors / investment managers) have a greater degree of familiarity with more traditional asset classes and feel put off by a lack of experience in agricultural land investment.

The reality is that these issues can be dealt with by outsourcing the investment process to an advisor with the appropriate expertise. It's just that this sort of advisor is more difficult to find than advisors who know all about the equity and bond markets. Because the asset class does require a higher level of expertise and specialist knowledge, identifying the right partners is, of course, absolutely critical to investment success. The risks in farmland investing are very real for a novice but manageable for an expert.

THINGS TO CONSIDER WHEN CHOOSING A DIRECT FARMLAND INVESTMENT

While farmland investing is expected to provide a diversification benefit, an inflation hedge and a fixed income, it entails challenges and risks. The farmland marketplace is characterized by relatively few investment managers (relative to the sector's weight in the economy), an investing community with lower levels of expertise (compared with other asset classes), and in some regions, relatively sparse data regarding risk, income potential and valuations. This means identifying the right regions and investment partners are not only challenging, but also absolutely vital.

When choosing an investment advisor / manager, demonstrable expertise in all of the following fields will be required:

- Identification of potential acquisitions according to investment objectives
- Pre-purchase due diligence with respect to target farmland assets
- Acquisition and negotiation with respect to the purchase of farmland assets and rental incomes
- Post investment monitory and asset management (including both portfolio oversight and the tenant farmer)

Much of the value an advisor is able to add, by assisting an investor to enhance returns and reduce risk, will be performed prior to the acquisition actually being made. The investment partner will use their expertise to assess key elements that ensure the right assets are purchased at the right prices, and future income streams from rents are as secure as possible.

47 American Journal of Agricultural Economics 81, 1999. Transaction Costs and the Present Value Model of Farmland: Iowa, 1900-1994, Lence, S.H. and Miller, D.J.

48 Gutierrez, L., Erickson, K., Westerlund, J., 2005. The Present Value Model, Farmland Prices And Structural Breaks

49 Factor Markets Working Paper, No.53, 2013. The Empirical Content of the Present Value Model: A survey of the instrumental uses of farmland prices, Ay, J-S. & Latruffe, L.

Getting both the land and the tenant selection right requires specialist expertise in the advisor, and in any third party experts they employ. By way of providing an insight into the complexity of the process and the need to choose locations and partner with the right advisors, a list of some of the items due diligence might include (but not necessarily be limited to) is provided below:

- Land and internal infrastructure
- External infrastructure
- Environment
- Agriculture expertise
- Finance and valuation expertise
- Management expertise

RISK CONSIDERATIONS IN DIRECT FARMLAND INVESTMENT

Other than risk to revenue from farmland tenancies and any link with agricultural commodity prices, there are a number of other risks to investing in farmland.

- Security of Tenure (i.e. strength of Title)
- Land Management
- Climate and Weather
- Pests, Disease, Fire and Other One off Events
- Trade Tariffs

These risks can be mitigated at the asset selection stage by focusing in on high quality land in a low-risk country, which is well managed and insured.

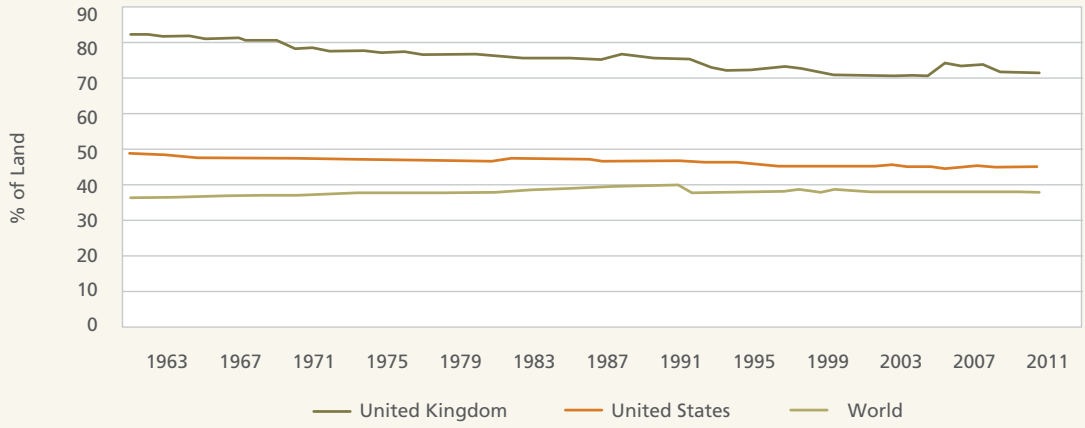
Conclusion

The trends observed in this document demonstrate that maintaining the balance between supply and demand, for both land and agricultural commodities, are likely to become more difficult as we move through the 21st Century. Some key trends are:

- Per capita food production has been in decline since the mid 80's
- The per capita availability of arable land has been in decline since the 20's
- Yield increases delivered by the green revolution are declining
- Demand for food, feed and fuel continues to rise

In other words, with each passing year, there is less food and farmland per person. Additionally, farmland is being lost, to urbanisation, land degradation and desertification, faster than it can be replenished by bringing new land into production.

Figure 4.1 – Agricultural Land (% of land area) 1963-2011



Source: World Bank

Some readers may find the trends discussed in this paper rather alarming. Therefore, before concluding, it is worth analysing the reality of food supply in the foreseeable future. The truth is that, theoretically we are producing more than enough food to feed humanity. The problem is due to the unequal distribution of food, driven by price.

The reason why price is an issue is due to the three Fs:

- Food
- Feed
- Fuel

A 'W' for wastage could also be added to the list.

The United Nations answered the question *"How many people can be fed with the cereals allocated to animal feed?"* in a 2009 report on The Environmental Food Crisis[50]. Using a simple calculation, it shows how we could feed the additional 2.5 billion people expected by 2050 with some grain to spare. However, this is unlikely to be realised, and competition for the world's limited (and potentially diminishing) land resources will continue to intensify in the foreseeable future.

The objective of this paper has been to assess the fundamental trends and the implications for farmland values over the next 20 years. As Chapter 1 shows, commodity prices sit at the centre of an intensifying tug of war between rising demands and diminishing supply. The greater the tension on the rope, the higher commodity prices, and with them, farmland values too. From the analysis of long-term trends, global agriculture is currently in a cyclical transition phase from rising supply to falling supply, relative to demand.

Cropland expansion was the primary driving force behind increased food production throughout most of history. As we have seen, in the 20th Century, the Green Revolution was responsible for producing a greater volume of food. Domestically, the work of the Green Revolution has been done and the production gains banked. Parts of Sub-Saharan Africa are among the last major regions

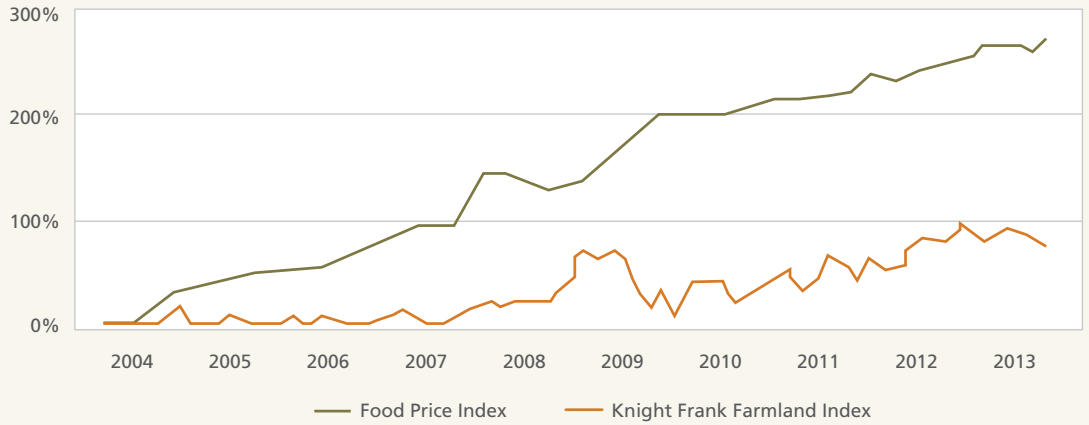
50 United Nations Environment Programme Rapid Response Assessment, 2009. The Environmental Food Crisis: The environment's role in averting future food crises.

of the world which still remain untouched by the Green Revolution. Unfortunately, this is unlikely to solve the world's supply problem. Bringing new land into cultivation and intensifying land use through irrigation, are costly options, with potentially adverse environmental consequences.

In recent times, western consumers have been able to feed themselves with an ever diminishing fraction of their income (recent economic developments notwithstanding). For this trend to continue, supply will need to expand at a sufficient rate to meet the doubling (or more) of demand which is forecast by 2050. However, supply is already falling short of rising demand, much as it did post 1920 when cropland expansion began to lag behind population growth. It is now quite clear that agriculture is at a point where a second Green Revolution is required.

This document concludes that agriculture is now entering one of the most challenging, but also most profitable, periods in its history. Figure 4.2 highlights how this time of transition in the commodity super cycle with food prices continuing to rise, even after the 2008 spike correlates to UK farmland values.

Figure 4.2 – Trends in UK Farmland and global food prices from Q3 2003 to Q3 2013



Source: Knight Frank Residential Research Q3 2013, IMF 2013, RICS 2013

In summary, from the various trends observed in this paper we can draw the following conclusions:

- More land is needed to feed the world's population
- All the best agricultural land is already in use
- Agricultural land is being lost at a faster rate than it is being added
- There are a number of fundamental constraints to further cropland expansion
- Crop breeding for increased yield is unlikely, in its current form, and at its current stage of maturity, to meet this challenge
- The appetite for Biofuels will continue to impact the agricultural sector, and increase the competition for land

This means that meeting the expanding demand for agricultural commodities, up to 2050, will be extremely challenging, if not impossible. Demand for both land and agricultural commodities will outstrip supply.

The world is now at the start of a transition period, when major new technological fixes are required to substantially impact the supply side of the equation. The demand side of the equation will inevitably increase, often driven by rising oil prices. It takes time for economic incentives to filter through into action in the agricultural economy. Based on historical prices and price inelasticity of food, there is scope for agricultural commodity prices to increase well beyond current levels. In the foreseeable future (i.e. the next 10 to 20 years, even up to 2050) farming is likely to become ever more profitable. This, combined with a shrinking supply of quality farmland (both in total and per capita terms) should lead to appreciation in farmland values.

As Chapters 2 and 3 discussed, farmland is likely to deliver increasingly attractive returns both in terms of income and capital growth over the next 20 years. Investment in agriculture provides an extremely effective means of capitalising on (and hedging against) the mutually reinforcing impact of the three most significant trends of the modern era: population growth, resource scarcity and climate change.

The best investment opportunities are those which are supported by fundamental long-term trends. It is extremely rare to find an investment that is supported simultaneously by a number of powerful trends, all of which converge to support the proposition. It is

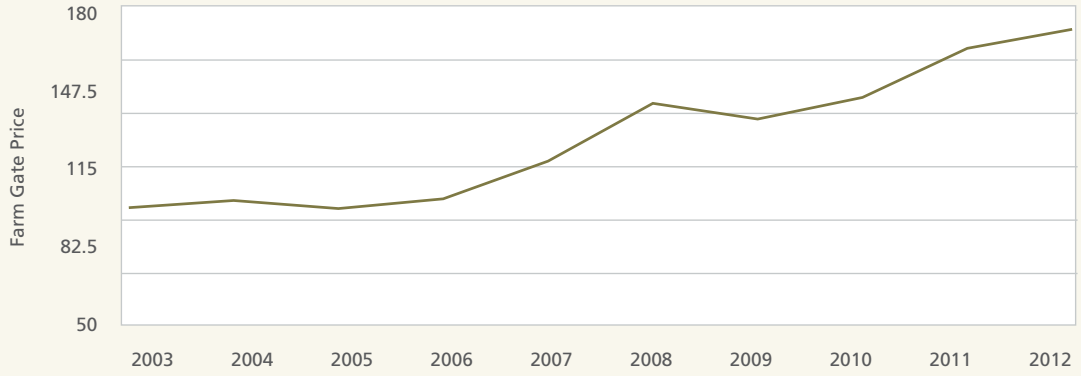
even rarer to recognise such an opportunity, at the right point in the business cycle, before the growth story has already played out.

The evidence in this document suggests we are in the early stages of a food and agricultural super cycle - driven by a structural shift in demand and constrained supply. These drivers are, to a large extent, not contingent upon the fortunes of the wider global economy. Farmland investment offers a compelling means by which to achieve exposure to these trends. Farmland is not only the source of the food, feed and fuel upon which mankind depends; it also represents a stake in a finite (and potentially diminishing) resource.

In the short term, UK agricultural land is attracting the attention of farmland investors due in part to a lack of land availability, efficient market and legal system and healthy prospects for UK farming enterprises. These trends merge to provide sturdy underlying support for prices.

UK farmland values are supported by net farm revenues, and as we saw in Chapter 2, when operational costs increase, for example, due to rising oil prices, the associated price rises in agricultural commodities keeps farms in developed countries in profit. Figure 4.3 below shows the UK Agricultural Price Index (API), a monthly publication by DEFRA. It measures the monthly price variations in agricultural outputs and inputs for the UK. The output series (blue line) reveals the price farmers received for their products between 2003 and 2012– otherwise known as the farm gate price.

Figure 4.3 – Agricultural price indices - Total Outputs Annual



Source: Defra

Now, more than ever, the world needs increased investment in agriculture, ensuring an efficient and sustainable production. A productive and responsible use of natural resources is particularly crucial to maintain food security. Equally investors need assets that are insulated from the vagaries of the current economic climate. Farmland provides a solid, long term investment, with all the advantages of gold, plus a regular income stream. In other words, farmland really is 'gold with a coupon'[51].

51 Risk appraisal and due diligence are essential for underpinning any investment strategy. For many factors such as soil type, rainfall and infrastructure, there are significant differences at regional and local levels. Full assessment requires experienced local knowledge.

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