

Phoenix

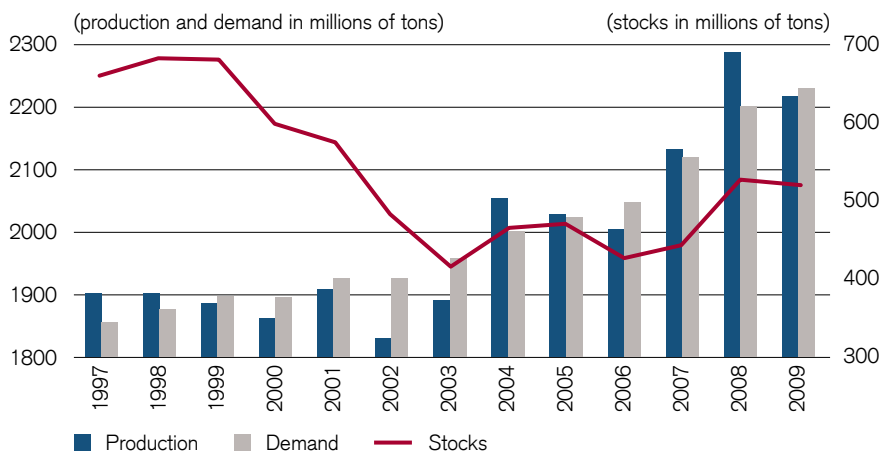
Farmland, an asset endowed with favorable strategic supply/demand dynamics

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Thanks largely to the exploitation of fossil fuels in agriculture, the mechanization of agriculture, and medical advances over the last 200 years, the world's population surged six-fold to 6bn by 2000 (6.8bn in 2009 with 9.1bn projected by the UN for 2050). This surge stands in stark contrast to earlier population developments – it took some 1800 years for the human population to reach one billion, up from an estimated 300m in 1 A.D.

The bicentennial population explosion has also dramatically curtailed available farmland acreage per capita, even as large undernourished segments of the population call for greater farmland allocations to enable higher food production (see chart 1). A global dietary shift towards heightened animal protein consumption (see charts 2 and 5), which requires much higher farmland acreage and water inputs as compared with grain-based diets, and biofuel demand are creating an even more intransigent land scarcity dilemma. Meanwhile, increased demand for residential land, soil erosion/degradation, salinization, water shortages, and decreasing crop yield improvement have magnified challenges arising from climate change (e.g., shifting precipitation patterns and desertification). All together, these intractable trends are

Chart 1: Rising global cereal demand amidst low stocks



Source: Food and Agriculture Organization (FAO) 2009

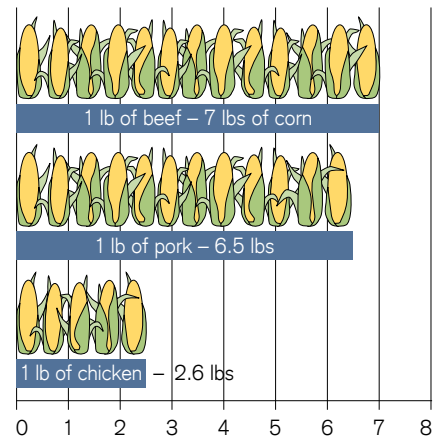
compounding the global per capita cropland shortage.

While human ingenuity, including implementation of “sustainable farming” techniques, should never be underestimated, securing higher food output juxtaposed against a dwindling stock of agricultural land – talk about a finite asset – clearly suggests a (further) secular rise in farmland prices is in the offing.

Declining arable land per capita, undernourishment challenges, and dietary shifts

In 1950, when the world population numbered only 2.6bn (vs. 6.8bn currently),

Chart 2: Meat production is feedstock intensive (conversion estimates)



Source: USDA

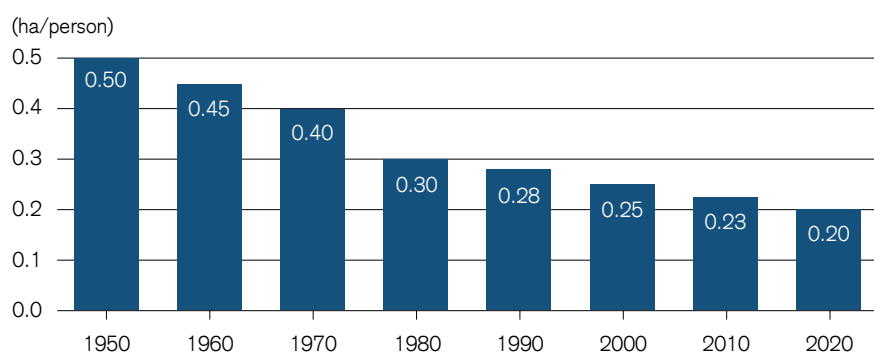
there was approximately 0.50 hectare (ha) of available cropland per capita (see chart 3), a minimum area considered essential for the production of a diverse, healthy, and nutritious diet of plant and animal products like that widely enjoyed in Europe and the United States (source: David Pimentel, PhD, College of Agriculture, Cornell University). As of 2000, with a 6.0bn population base, world arable land per person fell to 0.25 ha. By 2020, according to FAO/UN, land per capita is projected to drop to 0.20 ha. Forty years down the road from today, i.e., in 2050, OECD projections show further shrinkage to 0.14 ha per capita set against a 9.1bn population base.

Meanwhile, the ranks of the 1bn undernourished remain a big challenge that threatens to grow as per capita farmland acreage dwindles, exerting pressure on food supplies and prices alike (see chart 4).

Turning to dietary shifts, there is convincing historical linkage between rising wealth measured at purchasing power parity (PPP) and increased meat and dairy consumption (see charts 5 and 6). In fact, there is a fairly linear correlation between rising disposable income and kilos of beef consumed.

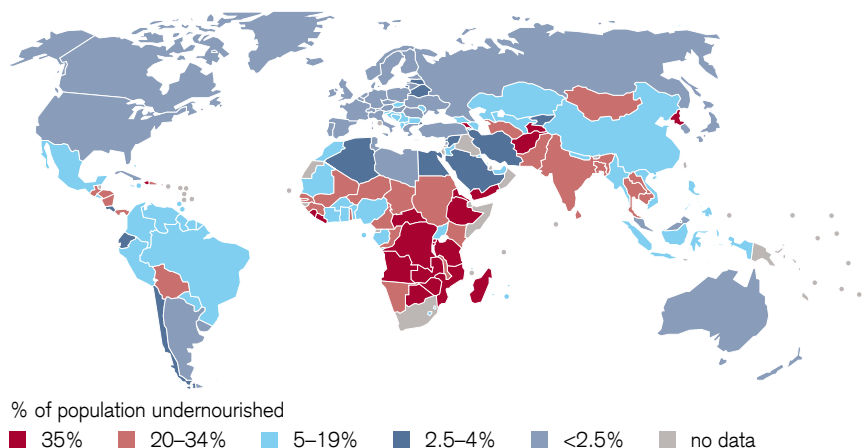
Naturally, diversion of land use to support heightened dairy and meat production via expanded feed grain acreage allocations reduces the land available for cultivation of other soft commodities, further pinching global food supply adequacy. Beyond the “land grab” associated with increased meat consumption and lower fiber intakes, there is also a pronounced step-up in water requirements, further depleting an already scarce resource and

Chart 3: Per capita world arable land



Sources: FAOSTAT, UN, Environmental Health Perspectives
(Data are rough estimates and can vary depending on assumptions – data shows relative trend)

Chart 4: Undernourished ranks



Source: United Nations

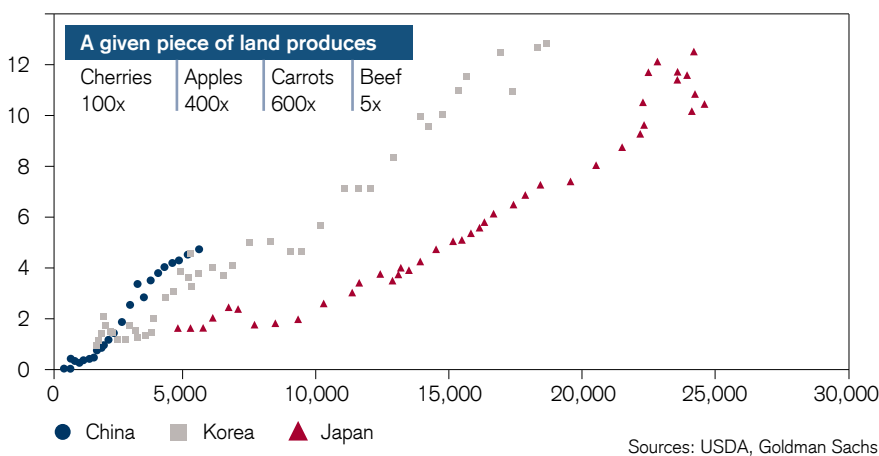
in effect reducing the global footprint of usable arable land.

Soil degradation and crop yield issues

Adding to the threat related to declining per capita farmland acreage: soil degradation (see chart 7) and crop yield issues (see chart 8). Approximately 15% of the earth's land mass (an area larger than the US and Mexico combined) has been degraded from an agrarian viewpoint by human activities.

Case in point: over the past 50 years, the US state of Iowa has lost 200mm of top soil, leaving just 250mm; the minimal soil depth for agricultural production is 150mm. Meanwhile, in the Chinese province of Manchuria, which Japan invaded in World War II for its natural resources, current erosion rates threaten to leave the land barren within 10 years. Spreading deserts already cover 20% of China, leading the Chinese Ministry of Agriculture to warn that China will struggle to meet its own grain needs due to the

Chart 5: Kilograms of beef consumption per capita (vertical axis) vs. real GDP PPP per capita in USD (horizontal axis)



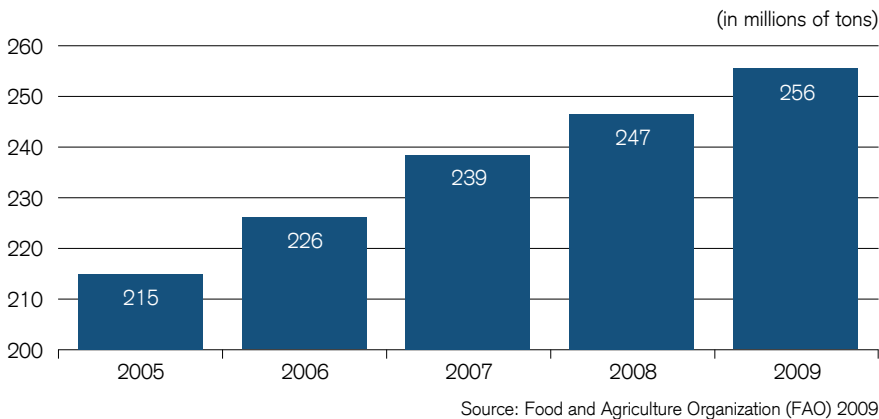
Water shortages

Per capita water availability has plunged around the world since 1950 (see chart 9). The decline has been most pronounced in developing countries, the same geographies that have realized the greatest population growth over the same time period.

The risk of widespread water shortages is rising as water tables fall thanks to farmers in the breadbaskets and rice bowls of the world pumping out groundwater faster than nature is replenishing it. Coupled with climate change, this is exerting downward pressure on crop yields while underscoring the need for massive step-ups in water infrastructure spending, more efficient irrigation systems very much included. The most strongly impacted regions include Central and Northern China, Northwest India, parts of Pakistan, much of the US, North Africa, the Middle East, and the Arabian Peninsula (see chart 10).

In addition, the world's glaciers are melting (especially pronounced in Asia), increasingly threatening river-based summer water supply adequacy for farmers and cities alike. But of greatest concern by far are the declining aquifer (water table) levels, as groundwater contains over thirty times the freshwater of rivers and lakes. Beijing, which gets about two-thirds of its water from aquifers, is now having to pump water from some wells that are more than 1000m deep. India, in turn, is pumping water from wells that are 400m deep on average, while well depth increases up to 30m a year in some regions. Moreover, India is extracting some 250 cubic kilometers of water a year from aquifers, some 2.5 times the precipitation-based replacement. Worryingly, the protracted drop in India's water

Chart 6: Rising milk and milk products production in Asia



deteriorating quality of its farmland. Discouragingly, it takes about 500 years for nature to replace 25mm of top soil lost to erosion, highlighting the gravity of the problem, namely that soil is for all intents and purposes a non-renewable resource (sources: Soil Reference and Information Center).

Low relative crop yields in developing countries coupled with diminishing yield

improvements will serve to magnify existing global farmland resource restraints. Moreover, there is an increasing disconnect between soaring fertilizer use and Asian grain yields, which are leveling off. For instance, China uses three times the fertilizer per unit of land as the US but achieves lower yields (source: UBS) as visible in chart 8, highlighting the need for more effective yield management.

table has occurred despite normal rainfall levels between August 2002 and October 2008, according to an information-gathering collaboration between NASA and the German Aerospace Center.

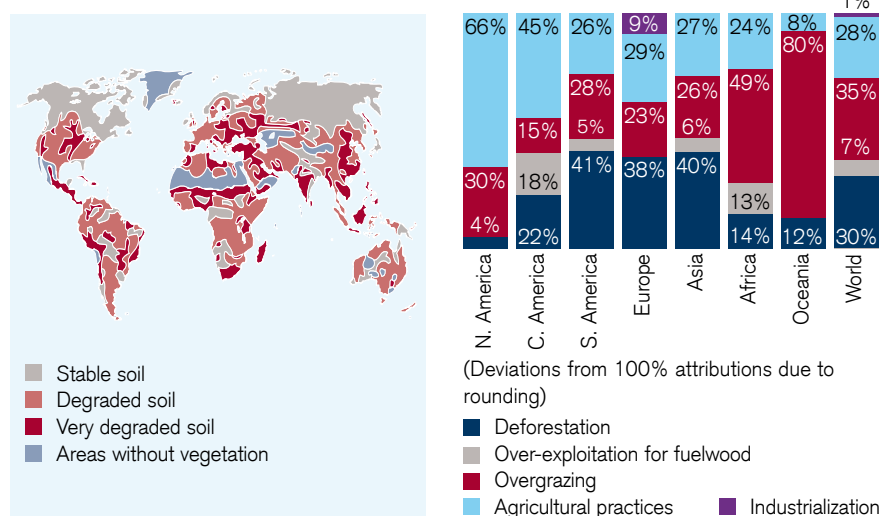
The new dynamic: food importers and sovereign investors

Whereas farmland investing attracted mostly private investors in the past, nowadays governments and sovereign wealth funds are major players as well. Currently, these investors are leasing or acquiring farmland in order to raise grains, which they intend to ship back home instead of buying on the world markets. Investment in foreign farms is not new, but the scale of current land deals has increased dramatically. A big land deal used to be around 100,000 ha – now the largest acquisitions are many times this size. In Sudan alone, South Korea has signed deals for 690,000 ha, the United Arab Emirates for 400,000 ha, and Egypt has secured a similar deal to grow wheat (see chart 11).

Last year a Swedish company called Alpcot Agro bought 128,000 ha of Russian farmland while Morgan Stanley bought 40,000 ha of Ukrainian farmland and Pava, the first Russian grain processor to be exchange-listed, plans to sell 40% of its landowning division to investors in the Gulf, giving them access to 500,000 ha. Thanks to rising land values and the underlying fundamentals in the grains market, farming has been one of the few sectors to remain attractive during the financial crisis (source: The Economist).

Nevertheless, the challenges of such investments are not negligible. Large-scale farming under difficult climatic conditions, as for example in Africa, needs

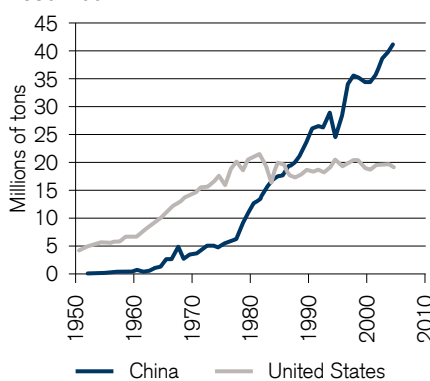
Chart 7: Soil degradation and principal causes of soil degradation



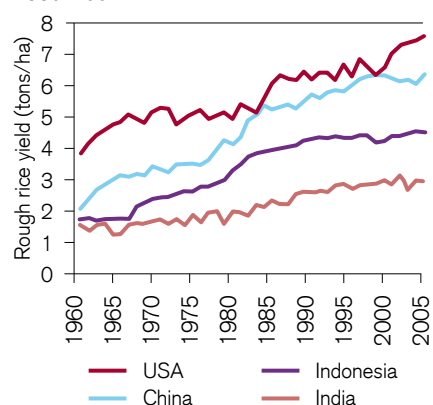
Sources: World Summit on Sustainable Development 2002, International Soil Reference and Information Centre

Chart 8: Fertilizer use and crop yield trends

Fertilizer use in China and the US, 1950–2004



US and Asian rice yields, 1960–2004



Sources: IFA, FAO, IRRI World Rice Statistics (2006)

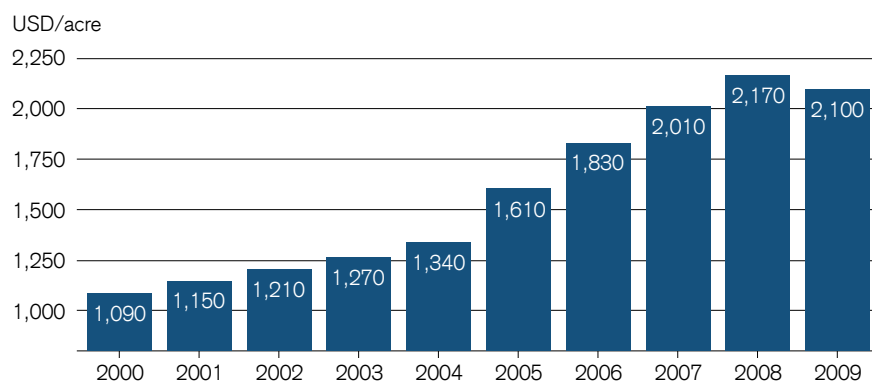
excellent technology, know-how, and management on ground.

How should strategically-oriented accounts invest in this asset class? The options include:

- Via publicly listed stocks and bonds

- Via private equity constructs
- Via hybrid, tailor-made vehicles with local expertise-based asset selection and cultivation policies

Clearly, the attractive demand/supply dynamics of this asset class are about

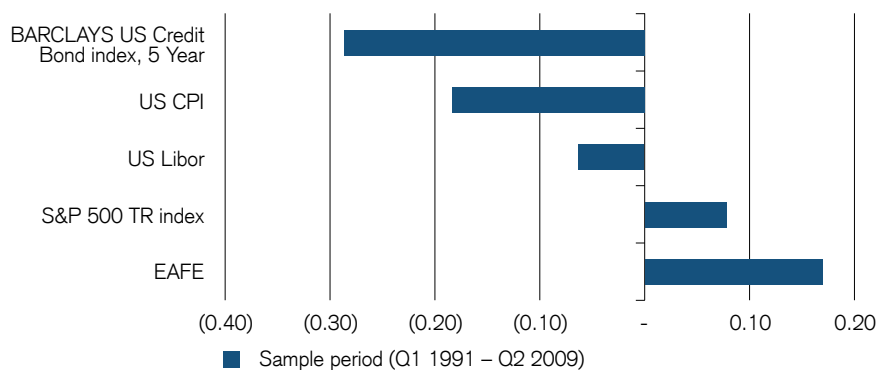
Chart 12: US average farm real estate value

Source: USDA-NASS, August 4, 2009

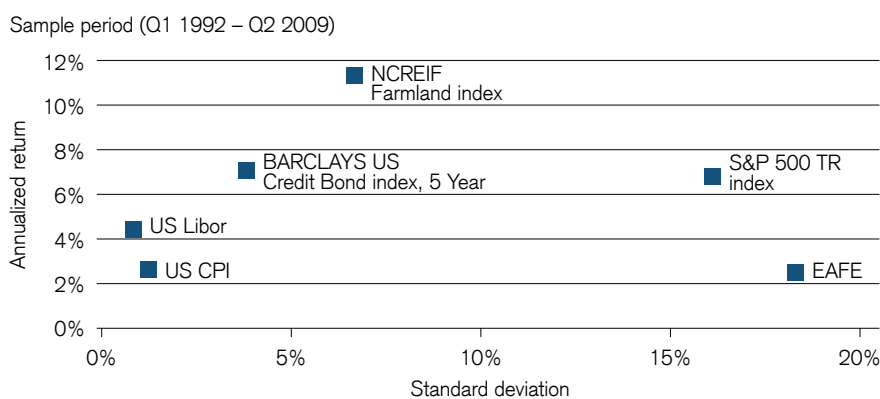
- Bad stewardship of farmland (over-fertilizing, soil depletion, deforestation, over-consumption of water, reduction of local species and biodiversity, etc.) issues that are often related to the “industrial-scale” farming necessary to sharply boost crop yields.
- Reputational risk: large foreign land-owners must be on guard against soil depletion-based “farmland abandonment” policies for the ill will thus generated would likely reduce investment access while increasing repatriation risk.
- Lacking local investment in education, agricultural skills, and infrastructure coupled with “land appropriation” from resident farmers would threaten to make regional populations poorer and more food dependent, generating ill will and possibly reducing long-term investor-based land access.
- Reduced local food supply associated with decreasing indigenous harvests and increasing exports of investor-owned harvests, which can ironically increase host country hunger despite bountiful local crop production, provoking political instability to the detriment of both the host country population and farmland investors.

Conclusion

Framed by constructive supply/demand attributes, farmland as an asset class offers truly unique portfolio diversification and constructive alpha attributes. This asset class also offers investors the opportunity to make a “profitable difference” while decreasing humanity’s hunger. The fact that “the devil is always in the (execution) details” couldn’t be more clearly on display than in this relatively illiquid asset class, however. Undoubtedly, farmland investment “tilted” towards sus-

Chart 13: Low farmland correlation to other asset classes

Sources: NCREIF, Bloomberg, Datastream, Credit Suisse

Chart 14: Farmland’s attractive return vs. volatility metrics

Sources: NCREIF, Bloomberg, Datastream, Credit Suisse

tainable farming practices will require an a priori readiness to accept lower near-term returns on investment in exchange for sustainable cultivation of both cropland and host-country interests, thereby setting the stage for enhanced long-term growth and profits. Obviously, knowledgeable owner-operator investors as well as patient capital are required for such an approach. Meanwhile, solid long-term, holistically-generated returns beckon – returns that stand in good stead to provide investors with first-rate inflation pro-

tection in a world full of resource depletion and expansionary money supply growth risks. The residual but declining aversion to illiquid assets dating back to the credit crisis provides a farmland asset purchase opportunity window, which is closing.