SOCIALLY RESPONSIBLE FARMLAND INVESTMENT

a white paper by Steve Bruere, President of Peoples Company and
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INTRODUCTION *by Steve Bruere*

I was raised on my family's farm in Warren County, Iowa, south of Des Moines, and grew up growing corn and soybeans and helping with our Pioneer seed dealership.

My grandfather owned a Ford-New Holland equipment dealership, also located in Warren County. He sold to the same hobby farmers and large-scale commercial farmers who were my parents' seed customers. It was a privilege getting to know the farmers and landowners in and around our local community. We talked and interacted with people from all walks of life, from the commercial farmers to organic farmers, and many "absentee" owners and investors with different backgrounds.

Growing up my brother and I had a sweet corn business. We took the produce to the farmers markets around the Des Moines Metro. Those were fascinating experiences as they allowed me to interact with all kinds of different families from high-net-worth foodies and restaurant owners to people on food stamps and "locavores" who preferred eating food that was locally produced and delivered directly to urban markets.

I also raised and sold pumpkins on a piece of ground a few miles from our homestead. The experiences of raising and selling sweet corn and pumpkins allowed me to understand that while Iowa is a farm state, the diversity of people who live in Iowa, their values and perceptions of agriculture vary greatly.

Outside of my sweetcorn and pumpkin business, my family farm was a good sized row crop operation which was well equipped with modern farm machinery. As a teenager, Roundup Ready beans replaced walking beans, BT corn replaced spraying for corn borers and precision farming meant my dad could plant in a straight row. The technology and sophistication introduced to agriculture while I was growing up was an amazing transformation for agriculture. It also represented a significant capital investment to acquire and maintain the equipment and operating assets. This ultimately meant many producers had to choose between upgrading equipment and renting more land or using their capital to acquire farmland to own.

This was the background that guided me as I started working for Peoples Company right out of college, and began brokering farmland transactions 12 years ago. My first year in the real estate business I had the opportunity to work with several farmers from my home area – I had grown up loading their trucks with seed. I was able to help them identify investors to purchase land they were currently farming but needed an investor to purchase and lease back to them. That's when I realized that if the farmer was to retain a lease on acres being sold then access to investor capital to acquire that farm could be the answer. This recognition led to several successful farm sales early in my career. I began to scale that business model as I built Peoples Company and facilitated several transactions between farmers and investors. While "investor" was an unpopular term for many in agriculture, it was very clear to me that farmers who were going to expand their farming operations with rented land would need access to investor capital to acquire farms that came up for sale. There was an old saying early on from a farmer client who said that no one likes an investor unless it's their own. That certainly resonated with me.

In late 2008 the financial crisis hit. The story line of rising demand for food, fiber and fuel began to make headlines and there was talk about the world population reaching 9 billion along with rising incomes in other parts of the world. The use of ethanol was growing rapidly. It was in this context that Peoples Company started hosting the Land Investment Expo. The timing was perfect. The media was searching for something positive to talk about in the news; agriculture and farmland fit the bill perfectly.

The thesis for investing in agriculture, and ultimately farmland, went main stream. At that point, our office started to receive calls from hedge funds, family offices, foundations and foreign investors – all interested in investing in farmland. Though a 3 percent to 4 percent annual cash return didn't do much for investor stakeholders prior to 2008, the prospect of a stable return with the opportunity for appreciation made it an attractive investment opportunity during the recession.

The past decade in the farm real estate business has been transformational, including the run up to $8-a-bushel corn, record farm profits, growing interest from institutional investors, and the media's fascination with farmland. The attention paid to agriculture has spurred the interest of social groups, environmental agencies and others with special interests looking to hold the agricultural industry accountable in ways that promote, or protect, their interest.

INTRODUCTION *by Steve Bruere*

The fact is public scrutiny is firmly planted in agriculture. As we write this paper there are several significant societal issues being debated and implemented that will have major impacts on both farm operators and farmland owners. A few of the higher profile domestic challenges include: the Des Moines Water Works lawsuit filed against three rural Iowa counties over their alleged role in high nitrate levels in that city's drinking water; the introduction and implementation of the Iowa Nutrient Reduction Management Strategy; the Clean Water Act definition of "Waters of the United States"; immigration reform essential to a sufficient agricultural labor force; California Proposition 2 forcing tremendous change in egg production based on demands for the welfare of chickens; and the on-going debate and role of the Renewable Fuels Standard in the use of corn-based ethanol. Changes in farm production due to weather patterns and the availability of water for irrigation stand among other calls for concern.

It's clear that societal issues such as these will play an increasingly significant role in agriculture. It's also safe to assume that those who ignore them may find themselves on the outside looking in. All these challenges, combined with uncertainty in the land market and apprehension over the world's ability to double food production by 2050 to feed 9 billion people, has helped give rise to the term "socially responsibly land investing."

The idea of socially responsible land investing is based on a practical look at farmland as an asset class, and its relation to the fabric and norms of society. Our reasoning behind presenting a case for making socially responsible land investing decisions is to provide food for thought regarding these challenges. We also set out to explore and shed some light on the societal impacts associated with new technologies and the growing appetite for outside capital sources as many farms are getting larger and several of the world's less developed regions are advancing their agricultural capacity.

One thing we know for sure is that a great deal of attention was paid to unprecedented farm profits and farmland value increases generated in the United States between 2006 and 2012. Even as commodity prices, farm profits and land values have cooled, the reverberations of a strong ag-fueled economy continue to spur interest in income-producing farmland.

Socially responsible land investing equates to thinking about more than just cash rents or dollar returns. The issues discussed here are global in nature and require the incorporation of management techniques that allow for the integral data to be captured, recorded, analyzed, measured and shared. The idea is to leverage the power of the technology and advances in agronomy to produce more on the good land while conserving more fragile acres. The questions being raised are both important and fascinating regardless of one's view on population growth, climate change or water quality.

I am proud to co-author this paper with Mike Duffy, Professor Emeritus at Iowa State University and a leading researcher in the field of agriculture and land values. The topics covered include a history of land investing, the shifting demographics in farmland ownership, the adoption of modern technologies in the ag sector, the need for outside capital, a case for farmland as an investment, and considerations for making socially responsible investing decisions.

Twelve years ago, the thought of co-authoring a white paper on "social responsibility" was not something I would have anticipated. In my role as the president of Peoples Company, I've been fortunate to meet many of the thought leaders in agriculture, both here in the Midwest and from different parts of the world. From organic farmers to politicians, from individual landowners to institutions, and from large-scale commercial producers to small specialty crop growers, my perspective has been shaped by the diversity offered in our agricultural systems and differing opinions in regards to land ownership.

I try to keep an open mind with everyone. I also look realistically at the future of agriculture and one conclusion I've arrived at is this: Societal demands for improvements in farming practices are here to stay. The technologies required to operate our farms in a socially responsible manner already exist. We can work together and implement farm specific measures to ensure that the land is taken care of and farm profitability is achieved within the scope of society's demands.

By increasing productivity to get the most out of the best acres while protecting the environmentally sensitive land, we can produce enough in agriculture to feed, fuel and clothe a fast-growing world in a socially responsible way.

How will the world feed nine billion people?

How will the world feed nine billion people in a manner that protects or minimizes the environmental damage caused?

How will the world feed nine billion people accounting for the impact on local producers and landowners?

And, how will the world produce enough food to feed nine billion people at a price everyone can afford?

These are questions being asked today. Such questions pose what are called 'wicked problems.' A 'wicked problem' is not wicked because it is evil but because such problems have such 'complex interdependencies that the effort to solve one aspect reveals or creates other problems.' The 'wicked problems' are difficult if not impossible to resolve because of incomplete, contradictory and changing perspectives that are hard to recognize.

Socially responsible farmland investment is an approach to dealing with the 'wicked' problem of feeding nine billion people but doing so in a manner that does not destroy the environment or disrupt the social fabric of the local communities. Additionally, the food production has to be affordable.

Socially responsible farmland investment is not a panacea nor is it a definitive answer to the 'wicked' problems. Rather this approach tries to address these problems recognizing there will be differences of opinion, there will not be one, best answer, and that solving the problems requires everyone working together. Compromise and understanding are essential if we are going to address the problems of feeding the world in a sustainable manner.

How we invest in farmland is not just an Iowa, Midwest or United States issue, it is a worldwide issue. Some organizations have been formed to stop or greatly restrict outside investment in farmland. One such organization is GRAIN, a small international non-profit that takes a position that even the establishment of guidelines and rules for responsible farmland investment by any non-local citizen is misguided, that farmland as an investment should be outlawed and any existing investments need divested. (See "Against the Grain, Responsible Farmland Investing"; GRAIN, Barcelona, Spain, 2012) Other organizations have been formed to promote and encourage outside investment. An example is the Canadian farmland investment fund Agcapita. There are many similar investment structures aggregating investor capital to purchase farmland in various locations throughout the world. Some governments in Africa have even offered large tracts of land for long term leases to encourage outside investment in their agriculture. The main benefits to the host country are perceived to be investor commitments to employment creation and infrastructure development; macro-level benefits like GDP growth, greater government revenue, a rise in local living standards; and access to new technology, capital and markets. In addition, improving the productivity of the country's agriculture undoubtedly serves as a huge point of interest for governments seeking foreign investment. Unfortunately, in some cases the anticipated benefits may not necessarily be provided. ("African Land Grabbing: Whose Interests are Being Served?" Ernest Aryeetey and Zenia Lewis, Brookings, 2010.)

In the U.S. returns to agriculture have been at record levels for the past several years. However, net farm income in the U.S. is forecast to decrease 12.2% in 2014 and another 22.4% in 2015. The 2014 income projection is the lowest since 2010 but it still remains higher than the previous 10 year average. (USDA/Economic Research Service, 2014 Farm Income Forecast, February, 2015, Washington D.C.) Record high incomes coupled with record low interest rates are the two major reasons for the increased interest and investments in farmland.

There are numerous reasons why we have seen the increase in farm income and the subsequent increase in farmland investments. There has been a shift in demand for using agricultural commodities for energy. The energy policies pursued by the United States dramatically increased the demand for corn based ethanol. This increased demand resulted in higher prices, increased income and a change in production in the U.S. and worldwide.

Coupled with the increased use of agricultural products for energy has been the increased income in many countries in the world, particularly Southeast Asia. Increasing individual income has led to a change in the diet and an increase in demand for agricultural products, especially meat. In fact some say it is not the 9 billion people that will be the primary driver of food demand it is the 2 billion additional people that will become middle class with their demand for higher calories and higher level proteins.

Increasing farm incomes, increasing individual incomes and a dramatic increase in the use of agricultural products for energy led to increased farmland prices and increased interest in farmland as an investment. The increased interest has been worldwide. In the United States land prices increased so dramatically that farmers and institutional investors began to purchase farmland in other countries. Some countries increased their acquisition of farmland as a food security measure. And, some investors saw an opportunity to take advantage of the changing fortunes in production agriculture. A Washington Post article reported on a study that found somewhere between .7 percent and 1.75 percent of the world's agricultural land has been transferred into non-local ownership. The article went on to say the big buyers were Britain, the United States, China, the United Arab Emirates, South Korea, South Africa, Israel, India and Egypt. They're mostly seeking out land in Africa and Asia, particularly in countries such as Congo, Sudan, Indonesia, Tanzania, Mozambique, Ethiopia and even Australia. The study was "Global Land and Water Grabbing" by Marie C. Rulli, A. Savion, and P. D'Odorica, Proceeding of the National Academy of Sciences of the United States of America, 2012.

The increased interest in farmland as an investment has led to the concerns that fostered the notion of socially responsible investment in farmland. Some argue that the investment is leading to the demise of indigenous populations and destroying cultures. Others argue that the increased investment is allowing farmers everywhere to take advantage of the increased demand and income. Regardless of the point of view farmland investment and the interest in the impact of how the investments are made has increased dramatically and will likely continue for the foreseeable future.

This paper tries to provide a background for investors in understanding what is meant by socially responsible farmland investment. It examines how multiple goals can enter into the decision making. Multiple goals include an adequate return but still provide asset preservation and environmental and social protections.

Our goal is to provide information for farmland investors, those interested in investing and people who are not necessarily going

to invest in farmland but who have an interest in food production, environmental and social aspects of farmland investing and ownership. There are many types of farmland investors and they own farmland for myriad reasons. There are owner-operators, retired farmers, widows and widowers, children of farmers, siblings, sole investors, partnerships, groups of investors, institutional investors and other types of investors. They own the farmland for current income, as a long-term investment, for sentimental reasons, as recreational or home property, and a host of other reasons.

Our intention is not to take sides nor promote one point of view over another. Everyone has their biases but we have tried to minimize their influence on this discussion. We want to provide enough information to help make informed decisions and meaningful debates regarding farmland investment and especially farmland investment in light of social responsibility.

A complete discussion is beyond the scope of this paper. Some issues will only briefly be discussed and others may not be discussed at all. Hopefully the farmland investor or those interested in farmland investment will find enough information to begin the discussion.

SOCIALLY RESPONSIBLE FARMLAND INVESTMENT

The recent rapid increases in farmland values have not gone unnoticed. Farmers, institutional investors, corporate and private investors have shown increased interest in farmland ownership. The increased interest was not just in the United States but worldwide.

Increased investor purchases lead to increased absentee ownership and increased concerns for some people. Concern over absentee farmland ownership is not new. However, the recent increase in absentee owners coupled with questioning our ability to produce enough food and the environmental and social consequences of outside investors gave rise to renewed, widespread fears regarding absentee ownership. These fears gave rise to a new term: ***Socially Responsible Farmland Investment***.

In 2011, an international group of institutional investors developed what they called Principles for Responsible Investment in Farmland.

The group identified five major areas to use as guidelines for responsible investment in farmland. These guidelines or areas were:

- Promoting environmental sustainability
- Respecting labor and human rights
- Respecting existing land and resource rights
- Upholding high business and ethical standards
- Reporting publicly about what a group was doing to promote and implement the principles

The United Nations "Principles for Responsible Investment" is an investor initiative in partnership with UNEP Finance Initiative and UN Global Compact. The set of principles were developed by an international group of institutional investors reflecting the increasing relevance of environmental, social and corporate governance issues to investment practices. The process was convened by the United Nations Secretary-General.

The primary objective is to better align investors with broader objectives of society. This organization is not specific to farmland, but does have a farmland sub-group. In addition to a set of six guiding principles the 1364 signatories (289 asset owners, 887 investment managers and 188 professional service providers) provide periodic Transparency Reports detailing their active implementation of the principles in their business activities.

Principle 1: We will incorporate Environmental-Social-Governance (ESG) issues into investment analysis and decision-making processes.

Principle 2: We will be active owners and incorporate ESG issues into our ownership policies and practices.

Principle 3: We will seek appropriate disclosure on ESG issues by the entities in which we invest.

Principle 4: We will promote acceptance and implementation of the Principles within the investment industry.

Principle 5: We will work together to enhance our effectiveness in implementing the Principles.

Principle 6: We will each report on our activities and progress towards implementing the Principles.

Some people are cynical of this work saying the principles are really just empty rhetoric. And some even contend that anyone outside the local area investing in farmland is wrong.

People have different life experiences that shape their points of view. Regardless of any personal perception of the validity or sincerity of those who developed the Principles for Responsible Investment the simple fact they were developed shows the changing awareness of issues surrounding farmland and farmland investment.

Socially responsible farmland investment simply means using multiple criteria to analyze and decide on a particular investment in farmland. In this paper we do not examine the issues from a broad, macro point of view but rather from the point of view of the individual investor. People will place weights on different considerations. Regardless, investing in farmland in a socially responsible manner will evaluate more aspects of the investment than simply the rate of return.

We use the term socially responsible farmland investment to avoid confusion with other approaches to farmland investment that consider multiple objectives. The guidelines outlined in 2011 and those by the United Nations group, match closely with our perceptions. An investor in farmland must consider the rate of return, the maintenance of their investment, the environmental impact of how they will be using the farmland, and the impact the change in ownership will have on labor and human rights.

HISTORY

Interest in farmland as an investment is not a new phenomenon. Professor William Murray noted, "In 1860 a large area of Iowa was in the hands of investors or speculators, whichever you choose to call them. They bought the land from the Federal Government and were holding it to sell to settlers at an advance in price." (Murray, William. "Iowa Farmland Values, 1803 – 1967, Palimpsest, Iowa Historical Society, 1967)

Murray went on to discuss how the interest in owning farmland as an investment changed with the fortunes of agriculture. Over the past century there have been at least three of these land booms. The first boom was at the beginning of the 1900s. Murray noted, "The farm land boom came in 1919. Events of the years 1900 – 1918 had set the stage for this speculative splurge. There was a frenzied effort by farmers, businessmen, doctors, lawyers, bankers and anyone who could get his hands on enough money to make the down payment on a farm purchase." In discussing the end of the boom in the fall of 1920 Murray noted, "…nothing like the 1919-1920 boom had ever happened before nor has it happened in the 47 years following 1920."

The history Murray was reporting was from 1803-1967. The next boom in land values was just six years away. In 1973 land values again soared. In the United States farmland values increased 23 percent from 1973 to 1974. (USDA/National Agricultural Statistics Service, Land Values, various years, Washington, D.C.) From 1974 to the peak in 1982 land values rose from $302 per acre to $823. The primary reason for this increase was the opening export markets which produced dramatic changes in the price of commodities. Corn went from $1.65 per bushel in 1972 to $2.97 in 1974. Soybeans went from $4.74 to $6.36 per bushel over the same time period.

The time period from 1973 to 1982 has been referred to as the second golden era for agriculture. As in the first golden era and when the country was being converted to farming, speculation in land by hoping to capture future increases in land values was a predominant theme. 'They don't make land anymore, everyone has to eat, and I made more money owning the land than I did farming it' where all comments made during the 1970s. These comments reflected the speculative mindset.

Recently we have experienced what was called the third golden era for agriculture. Farmland values increased rapidly over the past decade. United States farm real estate values have more than doubled over the past decade, going from $1,360 an acre in 2004 to $2,950 an acre in 2014. Farm real estate values increased every year but one over that time period. The average increase was 8 percent a year with double digit increases reported in 4 of the last 10 years.

The increases in cropland values in the U.S. Corn Belt were even more dramatic. From 2004 to 2014 average crop land values increased from $2,450 to $7,000 per acre. The Corn Belt crop land values increased every year but one over the past decade and increased an average of 11 percent per year.

Starting in 2014 there are signs that the most recent golden era is coming to an end. This discussion is not the focus of our efforts. The interest in farmland as an investment is still strong and the concern over outside ownership of farmland continues.

WHY THE CONCERNS NOW

The rapid increases in land values and the low returns elsewhere in the economy explain the interest by investors in farmland. But why the concern over socially responsible investment? There was concern during the Great Depression when rented versus owned land reached its peak in the United States. But, these concerns were of a different nature because the nation was just emerging from the worst depression in its history.

Feeding the world or how to feed nine billion people is certainly a concern expressed today. Discussing all the nuances of how to feed the growing world population is beyond the scope of this paper. What is relevant to the discussion is the argument that in order to feed the world production must increase. Similarly the adoption of new agricultural technologies and capturing economies of size are often put forward as ways to feed the world. These arguments, inefficient use of land and lack of modern technologies, impact the discussion on socially responsible farmland investment.

Depending on your point of view the international investment in farmland, particularly in the less developed countries, can be seen as a way to increase production and improve the situation for the population. However, others see such investments as a way to take land from people and displace them from their homes.

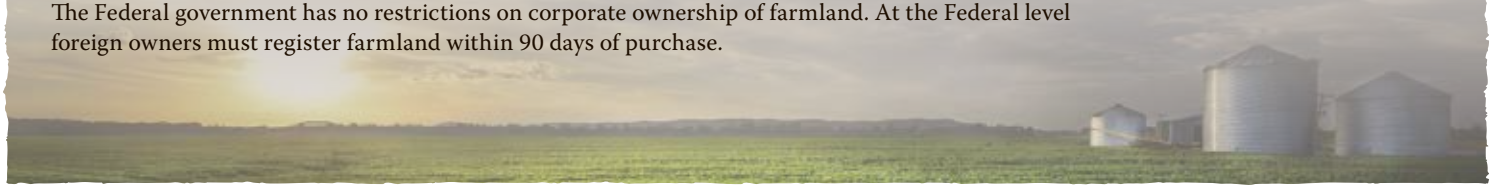
The use of capital intensive technologies can also be viewed from different perspectives. We will discuss the change in farm demographics in the United States shortly, but one point of view is that adoption of these technologies can increase production. A contrary point of view is that the adoption of these technologies is furthering the demise of the family farm and leading to corporate farming.

CORPORATE AND FOREIGN OWNERSHIP IN US

Investment in farmland often enters the political arena. A 2009 review of state farmland ownership statutes showed that eight states had some form of restriction on corporate ownership of farmland, seven states required corporate ownership to file special reports and two other states had some other special recognition for corporate ownership of farmland in their state. (Special report, Iowa State University Beginning Farmer Center, 2009) The remaining states had no restrictions on corporate ownership of farmland. It should be noted that at least one state recently removed their corporate restrictions on farmland ownership and other states have considered removing and revising their restrictions.

The same study by the Beginning Farmer Center examined restrictions on foreign ownership of farmland by state. With respect to foreign ownership of farmland 38 states required reporting or some form of certification for foreign owners, 10 states had some form of limitation on land ownership by foreign nationals and two states had no requirements or restrictions on foreign ownership.

The Federal government has no restrictions on corporate ownership of farmland. At the Federal level foreign owners must register farmland within 90 days of purchase.



Regardless of your point of view, changes in farmland ownership can change what is produced on the land and how it is produced. These changes can affect the ability to produce enough food at a reasonable price for the expanding world population. Farmland can be used to produce non-food products, flowers, etc., or exotic production such as shiitake mushroom or it can be used to produce basic food stuffs. How the farmland is used has implications for food production.

An issue besides the level of food production is the cost of the production. The cost considerations include non-land factors such as processing, transportation and distribution. What is being produced will influence the costs. Production is important in feeding the world but production of affordable products will be a key consideration.

Another area explaining the increased interest in farmland investment is the rapid increase in income in many countries, especially Southeast Asia. As income increases, the demand for food variety and meat protein increases. As mentioned earlier, some predictors of future food needs discount the 9 billion number and consider feeding 9 billion a political problem not a production problem. The number that concerns them is 2 billion – that's the number of projected entrants to the "middle class" where they will demand higher caloric intake per person as well as higher levels of protein as they move, for example, from rice to meat.

Animals add another step in the food chain. As a result not only does the type of production on farmland change but the caloric production available for human consumption drops. Any move up the food chain decreases the energy available. Animals need a certain amount of energy simply to survive. Nothing has 100 percent efficiency so there will be a loss in available caloric energy. These changes lead to an increased demand for farmland to provide the production for the changing food preferences.

Non-food uses for agricultural production have changed dramatically. These uses increased demand for certain agricultural products. This led to a change in price and an increase in farmland investment. The United States passed a law requiring the use of corn based ethanol in the nation's fuel supply. This requirement totally changed the demand for the basic United States corn production and influenced world-wide production. Corn use for fuel went from an 'other' use category to a major component of the United States corn balance sheet. Preliminary estimates for 2014 indicate ethanol will represent over 30 percent of United States corn utilization. (Wisner, Robert."Corn Balance Sheet", Agricultural Marketing Resource Center, Iowa State University, January, 2015)

As demand for corn shifted the price increased, as the corn price increased the price for competing commodities increased to ensure there would be adequate production of these commodities. Increased commodity prices led to increased profitability which, in turn, led to an increase in the demand for and price of land.

The increased demand for corn and subsequent increases in commodity prices in the United States led to increased demand for land world-wide. Farmers shifted from traditional crops to corn and outside investors increased the demand for land to take advantage of the higher corn prices.

Environmental and water quality concerns are another area increasing the interest in socially responsible farmland investment. The concern is that an absentee owner will not have the same incentives as an owner-operator or someone living in the immediate area. On the other hand, the absentee owner may have the highest expectations of socially responsible management while the tenant-operator cuts corners when it comes to conservation, for example, because they have a shorter term perspective than the landowner. In either case, this line of argument considers the time horizon for land use decisions. If an absentee owner's time horizon is shorter than a tenant-operator, or a tenant-operator's time horizon is shorter that an owner's, then decisions will be made that could have a negative impact on the environment.

The concern over environmental impacts of farming and farmland investment are not new but in recent years they have taken on an added sense of urgency, especially as they relate to water. California and parts of the Southwest United States are experiencing the worst drought in recorded history. Changes in production due to the weather and the change in availability of water for irrigation have led to changes in the demand for land. As the price for, and availability of, water for irrigation change the production on the irrigated land will also change.

A major environmental concern centers on the issue of water quality. Concern over water quality in the Gulf of Mexico is leading to proposals that could affect the amount of land available for crop production in the Midwest. The Midwest is the source of water for the Mississippi River and is associated with much of the decline in water quality in the Gulf of Mexico. Grassed waterways, removing field borders from production, lower fertilizer use, and land retirement have all been proposed as potential solutions to the water quality problems in the Gulf. Removing land from production leads to an increase in the demand for land still in production.

And finally, climate change is a concern altering the demand for farmland, especially a shift in the areas of production. In the U.S., for example, areas of South and North Dakota are now considered in commodity production whereas a few years ago they weren't. New plant varieties and production technologies have led to some of the change and so too has a favorable shift in weather patterns.

This is a partial list of the changes leading to the increased interest in socially responsible farmland investment. The discussions were brief and the relative importance of a particular area depends upon your point of view. Other reasons and greater discussion could be added but these factors have led to an increased interest in farmland investment and the consequences of such investment.

COMMITTED TO WATER QUALITY

The Iowa Water Quality Initiative was established in 2013 to help implement the Nutrient Reduction Strategy, which is a science and technology based approach to achieving a 45 percent reduction in nitrogen and phosphorus losses to our waters. The strategy brings together both point sources, such as municipal wastewater treatment plants and industrial facilities, and nonpoint sources, including farm fields and urban storm water runoff, to address these issues.

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The initiative seeks to harness the collective ability of both private and public resources and organizations to deliver a clear and consistent message to stakeholders to reduce nutrient loss and improve water quality.

The Initiative is seeing some exciting results. More than 1,600 farmers have invested $4.2 million to try a new practice on their farm to better protect water quality over the past two years.

Iowa Secretary of Agriculture Bill Northey when speaking about the practice of cover crops stated, "It's a great water quality practice. Iowa State's research will show about a 30 percent reduction in the amount of phosphorus leaving the farm and another 30 percent in the average amount of nitrogen leaving the farm on an average year with a cover crop planted."

In addition, 13 targeted Water Quality Initiative demonstration watershed projects have been funded to help implement and demonstrate water quality practices. The state has provided $6 million in funding to support these projects and has leveraged an additional $10.3 million in additional funding from partners and landowners. More than 70 organizations are participating in these projects.

Northey, discounting any notion of a one-size-fits-all approach to land management, acknowledged that there is plenty of room for creativity and innovation. Some technologies introduced will work and others won't. "None of these tools are universal," he said. "That's why we need decision-makers. It's not like the government can just say, 'Hey everybody do this.' It needs to be the right thing, in the right place, for the right operation. We are all going to learn from each other as we have field days. We'll target these practices based on the operator, based on the land."

What's best on one farm isn't always the best for another. Whether its cover crops, tiling practices or fertilizer application timing, it all depends on variables such as soil type, slope and location in the state. By collecting and comparing research, we will ultimately allow farmers, managers and landowners to make more informed decisions. We can set benchmarks and evaluate which set of practices is expected to have the greatest net impact on individual farms.

Landowners have never been in a stronger position to leverage technology and information to manage for sustainability; which goes hand-in-hand with profitability and appreciation of productive farmland.

The Water Quality Initiative and the Nutrient Reduction Strategy are an example of a productive public/private initiative to achieve a societal objective. The program fosters cooperation, collaboration, demonstration and data sharing while stressing an approach of farm specific best practices to obtain the desired goal. Just as Iowa is a leader in agricultural production, through the Iowa Water Quality Initiative we are also leading the way in developing and implementing technologies that will improve sustainability and better protect water quality.

DEMOGRAPHIC SHIFTS IN FARMLAND OWNERSHIP AND FARMING

In addition to the aspects of social responsibility discussed above, the changing demographics of farmland ownership, rapidly advancing precision technologies, accelerating developments in seed/plant genetics and the type of farming being developed and adopted world-wide have also increased concerns over who owns the land and how it will be farmed.

The United States continues to move towards a bimodal system of agricultural production. The Census of Agriculture defines a farm as a place that sold or could have sold $1,000 worth of agricultural products. As shown in the figure on the following page for the United States, based on the 2012 Census, 75 percent of the farms had sales less than $50,000 and they accounted for 3 percent of the production. At the other end of the spectrum farms with sales over $500,000 represented 7 percent of the farms and accounted for 80 percent of the production.

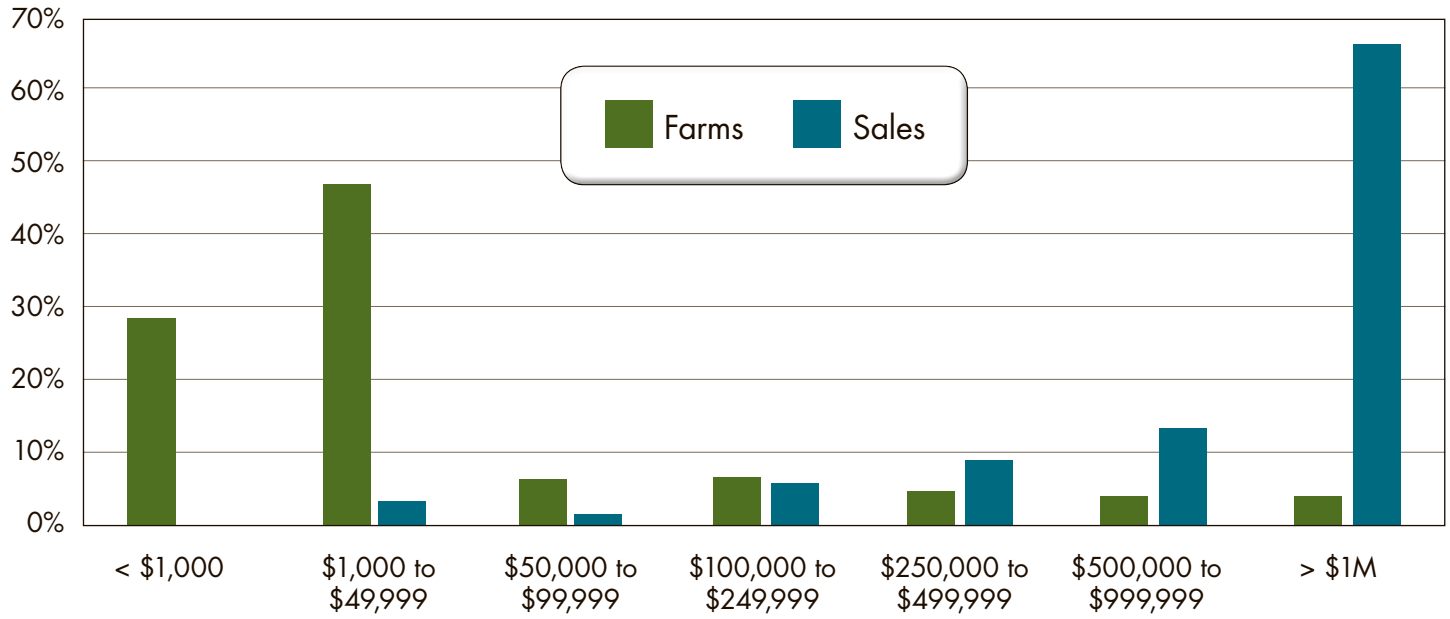
Changes in U.S. farmland leasing practices have influenced the demand for farmland and the need for socially responsible farmland investment. The amount of farmland rented has not changed dramatically in the past several decades. But, the amount of land rented by farmers accounting for the majority of production has changed. Most of the land is farmed by someone who owns some land and rents the rest of the land they farm. For example, in Iowa, in 2012, 70 percent of the land was farmed by operators who owned some of the land they farmed (part owners), 20 percent by operators who owned all the land they farmed (full owners), and 10 percent by tenant farmers owning no land. The part owners rent almost two-thirds of the land they farm. Part owners are 34 percent of the farmers in Iowa yet they account for 67 percent of the sales. Full owners are 56 percent of the farmers and account for 23 percent of the sales.

Because the majority of farmland in production is rented, the need for managing farmland investments in a socially responsible manner is only going to increase over time.

Production technologies being adopted have decreased the labor demands and increased the amount of land any one person can farm. As the amount of labor per acre decreases, the demand for more land increases to fully employ farmer labor.

In addition to changes in production technologies, there have been changes in what is produced. These changes have influenced the demand

Percent of U.S. Farms and Sales by Sales Categories, 2012



for farmland. For example there has been substantial increase in demand for local, fresh, organic or similar types of production that rely on attributes for distinction. This production relies more on management and marketing skills and less on volume for income. The change in resource use changes the demand for land especially in areas adjacent to urban areas. This change in local demand for farmland leads to changes in relative prices.

Changing production techniques and technologies have led to increased demand for farmland.

AGING FARMLAND OWNERS

The age of farmland owner has increased substantially over the past few decades. The USDA/National Agricultural Statistics Service has announced plans to conduct a farmland ownership survey starting in August 2015. But, for now, there are no recent statistics for the entire United States. Individual studies show that in areas with substantial agricultural production the age of the farmland owner has increased. In Iowa, for example, the percent of acres owned by someone over 74 years of age has increased from just 12 percent in 1982 to 30 percent in 2012, and it is the fastest growing ownership segment. Over half, 56 percent, of the farmland in Iowa is owned by someone over the age of 65. This compares to just 29 percent in 1982. Ten percent of the farmland in Iowa, 1 in 10 acres, is owned by a single female over 75 years of age. (Duffy, Michael. "Farmland Ownership and Tenure in Iowa, 2012", Iowa State University Extension, PM 1983, revised January, 2014.

The increasing age of the landowners means there will be a substantial amount of land changing hands. Most landowners indicate they intend to pass the land to the children. This would be either by inheritance, gift or in some cases sale. Currently almost two-thirds, 62 percent, of Iowa farmland is owned by those who do not farm. If this pattern would continue the indications are for an increasing amount of land held as an investment. In 2012, 56 percent, of the farmland owned by investors was owned for current income. The other top reasons for owning farmland were long term investment (19 percent) and sentimental reasons (22 percent).

Current trends in the age of farmland owners and the reasons for owning farmland point to an increasing interest in socially responsible farmland investing. The changes in production technologies and farming practices have led to significant changes in the structure and resource needs for agriculture. The aging of the farmland owners will lead to a change in farmland ownership. Most land passes to the family either through inheritance or sale. And, almost half the land is owned for reasons other than current income. Multiple objectives for owning land point to the increased need for a more diversified approach to farmland investing and the management of the investment.

CHANGING NEED FOR CAPITAL IN THE AGRICULTURAL SECTOR

A major impact of the changes in agriculture has been an increase in the amount of capital required to operate a commercial farming business. At the most basic level, production is a function of land, labor, capital and management. The increase in the amount of capital used in production has led to a decrease in the need for labor and in some cases a change in the management needed for production. The majority of the changes in agricultural technologies involve substituting capital for labor.

Outside capital has become a major source of the capital used in agricultural production. Some people argue that the shift in agricultural production from use of 'internal inputs' to 'external inputs' has led to a decrease in the resiliency and/or sustainability of our production system. Others argue that the use of modern technologies is what has allowed us to feed a growing world population. Regardless of your point of view on the desirability of the changes resulting from the substitution of capital for labor, significant changes have occurred and even more dramatic changes can be seen on the horizon. The demand for outside capital has changed with the changes in production technologies.

The increased use of capital and its impact on farmland investment has been under way for decades. In the 1920s a group of agricultural economists developed a theory for the aspiring young people of that time. The theory was the so-called 'land tenure ladder'. The idea was that to become a landowner the young person had to start at the bottom of

production agriculture. Going from a worker to using rented land, over time a person could gradually save enough money to start an investment in land using outside capital. As their careers progressed they could pay off the loans and become landowners.

The concept of the land tenure ladder depended upon farmland investors. These investors could be parents, relatives or total strangers. Regardless the new farmer had to rely on the outside funds to move up the 'ladder'.

The situation that gave rise to the concept of the land tenure ladder is not unlike the situation today. Higher land prices mean more capital is needed to farm and become a landowner. Higher land prices and rents are generally the result of higher incomes but the ability to own land is still difficult and the use of outside capital is still important.

This reliance on outside capital can be an area where socially responsible investment has a great impact. State and federally sponsored programs target benefits to beginning farmers to assist with access to allocated pools of credit with preferential loan terms. Also, currently there are groups of private investors who pool their funds to buy land that will be used to help beginning farmers start up the 'ladder'. The Iroquois Valley Farms, LLC is an example of such a group. This group is committed to providing land access opportunities to family farmers and has implemented its own Young Farmer Land Access Program. They presently have farms in seven states. Other farmland investors are using crop share leases or flexible cash leases as a means of helping share production risk with the beginning farmers.

Within the limits of the law, how a farmland investor approaches the capital provision aspect of their investment is up to them. Some people will use the capital to assist new farmers, some use the capital control as a means of requiring certain production or tillage practices to maintain and improve the value of their investment. And, still others simply view the farmland as any other investment and seek only to maximize their cash returns.

The need for capital in production agriculture has increased and will likely continue to do so. Precision agriculture, genetically modified seeds, technologically advanced machinery and so on will all require greater amounts of capital. Even local or specialty production and its related marketing expenses will require capital. In general these farms have substituted management for capital, but they will still need capital and their needs will likely increase.

The chart below is a summarized projection of the capital required to farm 5,000 acres under three alternative business models; own all 5,000 acres, own 2,500 acres and lease 2,500 acres, lease all 5,000 acres. The capital needed to own and farm 5,000 acres is more than $46 million with nearly $40 million being land costs while the operator leasing these acres needs $8 million with $1.5 million being land cost. Access to these levels of capital creates a significant hurdle for most farmers. And for a beginning farmer it can be a daunting challenge to take on just 500 acres where the own and operate model is a commitment of $4.6 million, the half-own-half-lease model is more than $2.7 million and the full lease alternative requires access to $800,000 of capital. It is easy to understand why the farm operator that wants to grow their business is eager to access a source of reliable capital that will own land and/or machinery they can then lease.

Capital Required - 5,000 Acres Farm Business - 50% Corn - 50% Soybeans

		Own	5000	Own	2500	Own	0
		Rent	0	Rent	2500	Rent	5000
	Per Acre	**Total**	**5000**	**Total**	**5000**	**Total**	**5000**
Annual Operating Capital Required							
Corn - Variable Costs	$553		$2,765,000		$2,765,000		$2,765,000
Soybeans - Variable Costs	$318		$1,590,000		$1,590,000		$1,590,000
Sub-Total Crop Costs			$4,355,000		$4,355,000		$4,355,000
Machinery	$420		$2,100,000		$2,100,000		$2,100,000
Land Expense							
Rent	$300		$-		$750,000		$1,500,000
Land Owned	$7,943		$39,715,000		$19,857,500		$-
Real Estate Taxes	$25		$125,000		$62,500		$-
Sub-Total Land Cost			$39,840,000		$20,670,000		$1,500,000
TOTAL CAPITAL REQUIRED			**$46,295,000**		**$27,125,000**		**$7,955,000**

Crop Expenses: 2013 Iowa Farm Costs and Returns - Iowa State University
Machinery: 2013 Iowa Farm Costs and Returns - Iowa State University
Rent: Typical 2014 - Peoples Company Land Management;
Land: Iowa average - Iowa State University Survey Dec 2014
Real Estate Taxes: Typical 2014 - Peoples Company Land Management

BEGINNING FARMER PROGRAMS AVAILABLE THROUGH THE IOWA AGRICULTURAL DEVELOPMENT DIVISION

Obtaining enough capital to pursue a career in production agriculture is challenging. But there are many programs available to assist in this challenge ranging from national government programs to private initiatives. One highly successful set of programs are those offered by the Iowa Agricultural Development Division (IADD). The IADD has Iowa Beginning Farmer Loan and Tax Credit Programs to assist new farmers in acquiring access to agricultural property by offering financing at reduced interest rates and Iowa tax credits to landowners who lease to beginning farmers. This is an example of a successful public-private initiative designed to address the social concerns of the aging farm operator and landowner.

IOWA AGRICULTURAL DEVELOPMENT DIVISION

Beginning Farmer Loan Program
The Iowa Beginning Farmer Loan Program (BFLP) was established to assist new farmers in acquiring agricultural property, equipment, breeding livestock or farm improvements. Beginning Farmer Loans are financed by participating lenders or private individual contract sellers with the issuance of federal tax-exempt bonds offered by the IADD. Interest received on contract sales is also exempt from state income taxes. The tax-exempt interest income earned by lenders and contract sellers enables them to charge the beginning farmers a lower interest rate. Beginning farmer loans typically carry interest rates approximately 25 percent below prevailing market rates.

Loan Participation Program
The Loan Participation Program (LPP) was established to assist low-income farmers secure loans and make down payments. IADD's participation can be used to supplement the borrower's down payment, thereby helping a farmer secure a loan. The lender's risk is reduced since the IADD's position for the loan participation is "last-in/last-out". The lender can also arrange an FSA guarantee on the bank's portion of the loan participation. This is a unique arrangement that encourages the lender to take that extra step to support a beginning farmer in their community. The IADD works to collaborate with all programs designed to support beginning farmers.

The LPP interest rate is currently 2.5%. It's set as 1.0% over the FSA Direct Farm Ownership Down Payment Loan Program (which is currently at 1.5%). The rate is fixed for the first five years then re-adjusted to the same index and fixed for the final five years. LPP's can be used with the Beginning Farmer Loan Program.

Beginning Farmer Tax Credit
The Agricultural Assets Transfer Tax Credit is commonly referred to as the Beginning Farmer Tax Credit (BFTC) program and was created as an incentive to encourage agricultural asset owners to lease their agricultural assets to beginning farmers. The program provides tax credits for the leasing of agricultural land, depreciable machinery or equipment, breeding livestock and buildings.

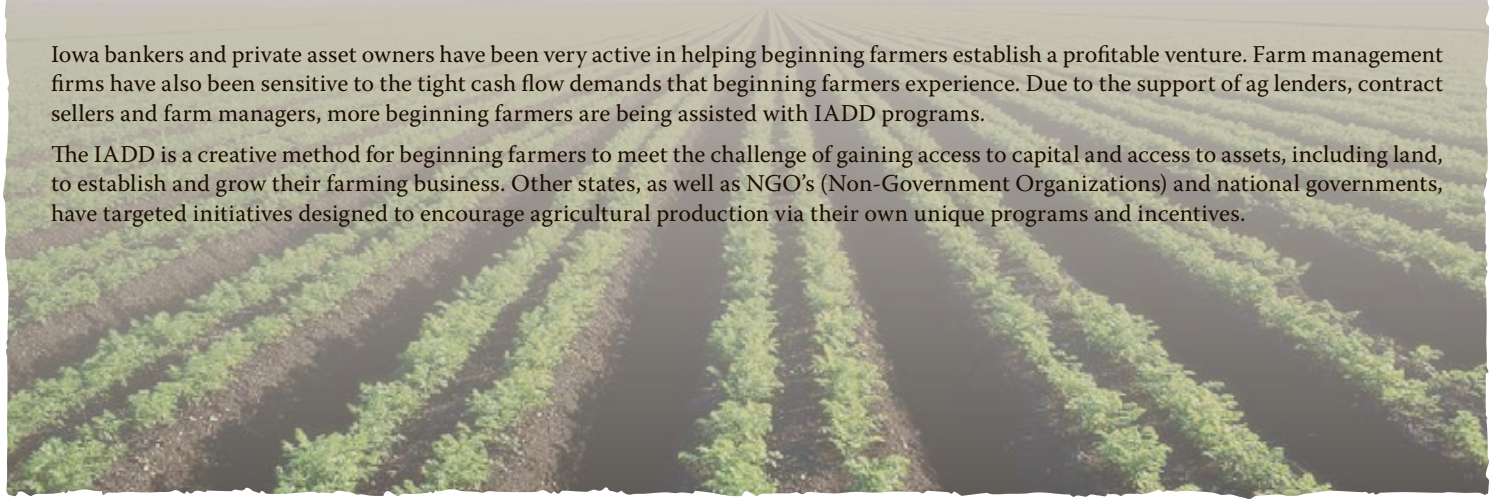
The asset owner receives a 7% tax credit on their Iowa income taxes if the lease is cash rent or a 17% tax credit with a crop-share lease. This program allows parents to lease their agricultural assets to their children and receive a tax credit.

Custom Farming Tax Credit Program
The Custom Hire Tax Credit Program (BFCF) offers a tax credit to anyone hiring a beginning farmer to do agricultural contract work for the production of crops or livestock in Iowa. This program does NOT permit parents to custom hire their children and receive a tax credit. The beginning farmer must provide all of the equipment and labor to complete the custom work.

DNR Lease to Beginning Farmer Program
The DNR Lease to Beginning Farmer Program is an additional opportunity that provides leasing opportunities to beginning farmers. This program is offered and administered by the Iowa Department of Natural Resources (DNR). To be eligible to lease DNR land through this program, a beginning farmer must be certified as eligible by the IADD.

Iowa bankers and private asset owners have been very active in helping beginning farmers establish a profitable venture. Farm management firms have also been sensitive to the tight cash flow demands that beginning farmers experience. Due to the support of ag lenders, contract sellers and farm managers, more beginning farmers are being assisted with IADD programs.

The IADD is a creative method for beginning farmers to meet the challenge of gaining access to capital and access to assets, including land, to establish and grow their farming business. Other states, as well as NGO's (Non-Government Organizations) and national governments, have targeted initiatives designed to encourage agricultural production via their own unique programs and incentives.



THE CASE FOR FARMLAND INVESTMENT

The rapid increases in farmland values throughout most of the United States made investments in farmland attractive. For the reasons discussed earlier farmland investment will likely continue to be an alternative for many people and institutions.

One measure of return that is frequently mentioned in farmland investing is the rent-to-value ratio. This value is simply the cash rent divided by the value. This measure varies widely depending on the state or region of the country. In 2014 rent-to-value measures ranged from .5 percent in New Jersey to 8 percent in Washington. The national average rent-to-value in 2014 was 3.4 percent. (USDA/National Agricultural Statistics Service, "Land Values" and "Cash Rents", various years, Washington, D.C.)

Examining the rent-to-value differences across the nation shows the regional differences that exist in U.S. agriculture. A state like New Jersey has tremendous pressure for conversion of agricultural land to non-farm uses and a majority of fruit and vegetable production. New Jersey has the highest average farmland value in the nation but the cash rents are among the lowest in the nation. California has high land values and high rents while a state like Montana has low land values and low rents. For these two states the rent-to-value in 2014 was 3.1 percent and 3.3 percent, respectively.

The rent-to-value measure does not include costs of ownership such as taxes, a management fee or general maintenance. Including these costs would further lower the rent-to-value ratio or the cash return to the land.

Rent-to-value has been trending lower in many states. In Iowa for example, the 2014 rent-to-value, 3 percent, is the lowest it has ever been. Iowa's rent-to-value peaked at 9.6 percent in 1987 the bottom of the land value decline after the 1980 crash.

Rent-to-value represents the yearly return to farmland. The more important component, and the one most investors consider today, is the increase in value. Land values in the U.S. have increased an average of 4.5 percent per year since 1910. There were 78 years when

BEGINNING FARMERS AND OUTSIDE CAPITAL


Scott and Melissa Cogdill, and family, beginning farmers

Scott Cogdill grew up working alongside his father learning the fundamentals of agronomy, farm operations and weather patterns in the western Iowa farming community of Dunlap in Harrison County.

In 2013, at 34 years of age, he began to unearth new opportunities as a young farmer digging in about 100 miles away from his hometown. That was the year Codgill's father, Sam, was first introduced to seller Harald Lamberts during an auction. Sam, the high bidder on Lambert's 80-acre farm learned that the seller was interested in selling another 120 acres in the vicinity. Lamberts expressed that he was open to the idea of selling the property on a contract-for-deed basis and the focus of the discussion soon turned to the junior farmer's desire to buy.

The Beginning Farmer Loan Program administered by The Iowa Agricultural Development Division of the Iowa Finance Authority gives young farmers an opportunity to purchase ag property at a more competitive interest rate by offering lenders or contract sellers a tax-exempt bond. Talks blossomed into a purchase agreement for Cogdill – who had spent four years planting and harvesting crops on rented ground in the area – to purchase his first farm.

"I wanted to stick around and get a little more established here," Cogdill said. "Buying a farm on contract allows me to make yearly payments and take advantage of some pretty competitive interest rates. It worked for me financially. I didn't have to go get a bunch of money upfront, or go to an auction and try to be the highest bidder. This will put me one step closer to where I'd like to be and to put more of my time and energy into farming."

The agreement between Cogdill and Lamberts allowed a young farmer to replace some rented acres with farmland he his purchasing while positioning his crops in a tighter geographical area. It also set Cogdill, his wife, Missy, and the couple's three children up with a small piece of recreational hunting land as part of the purchase.

Lamberts, a mature investor with multiple land holdings and numerous transactions with which to deal, said this particular sale had been structured with an incremental payment schedule, as opposed a lump sum due on the closing date. That way, as the seller, he could enjoy some tax advantages that, in many ways, aren't just dollar for dollar. For Lamberts, one of the biggest incentives was a flexible buyer and the ability to make mutually agreed upon adjustments down the road.

"We don't know today what two or three years may bring," he said. "That's why I considered it. The program allowed me to spread out capital gains over a longer period of time, and do more in-depth planning as far as tax savings. I've got numerous farms and other properties that I am selling. If you plan things correctly – and things change as you go – the ability to spread it out as opposed to just selling for cash is a big plus. I can transfer some of those tax advantages to the buyer, who can benefit tax wise and from a price standpoint, too."

This is a terrific example of a public-private program for the benefit of beginning farmers that are available in many states. Such programs have encouraged younger buyers to reap the advantage of low interests rates and custom payment schedules to acquire ground. Sellers, on the other hand, can consider the tax advantages of a mutually beneficial contract deal. Sources of outside capital, which has become a major source of the capital being used in today's agricultural production, helps to finance modern farming operations. Farms are getting bigger and a hungry world population is growing larger. As land comes up for sale, farm operators will need greater access to outside capital in order to grow with it.

"I'm very appreciative and thankful that Harald gave me the opportunity to buy the farm in this manner, instead of putting it on the open market for what would have most likely been a higher bid," Cogdill said. "It's a good deal for both of us."

land values increased, 19 years when they decreased and 7 years when they remained the same. For 18 years, land values increased by over 10 percent per year and just 6 years when they decreased by more than 10 percent per year.

Land values in Iowa show a performance similar to the United States. Land values in Iowa have increased an average of 5 percent per year since 1910. They have increased 76 years, decreased 25 years and remained the same in 3 of those years.

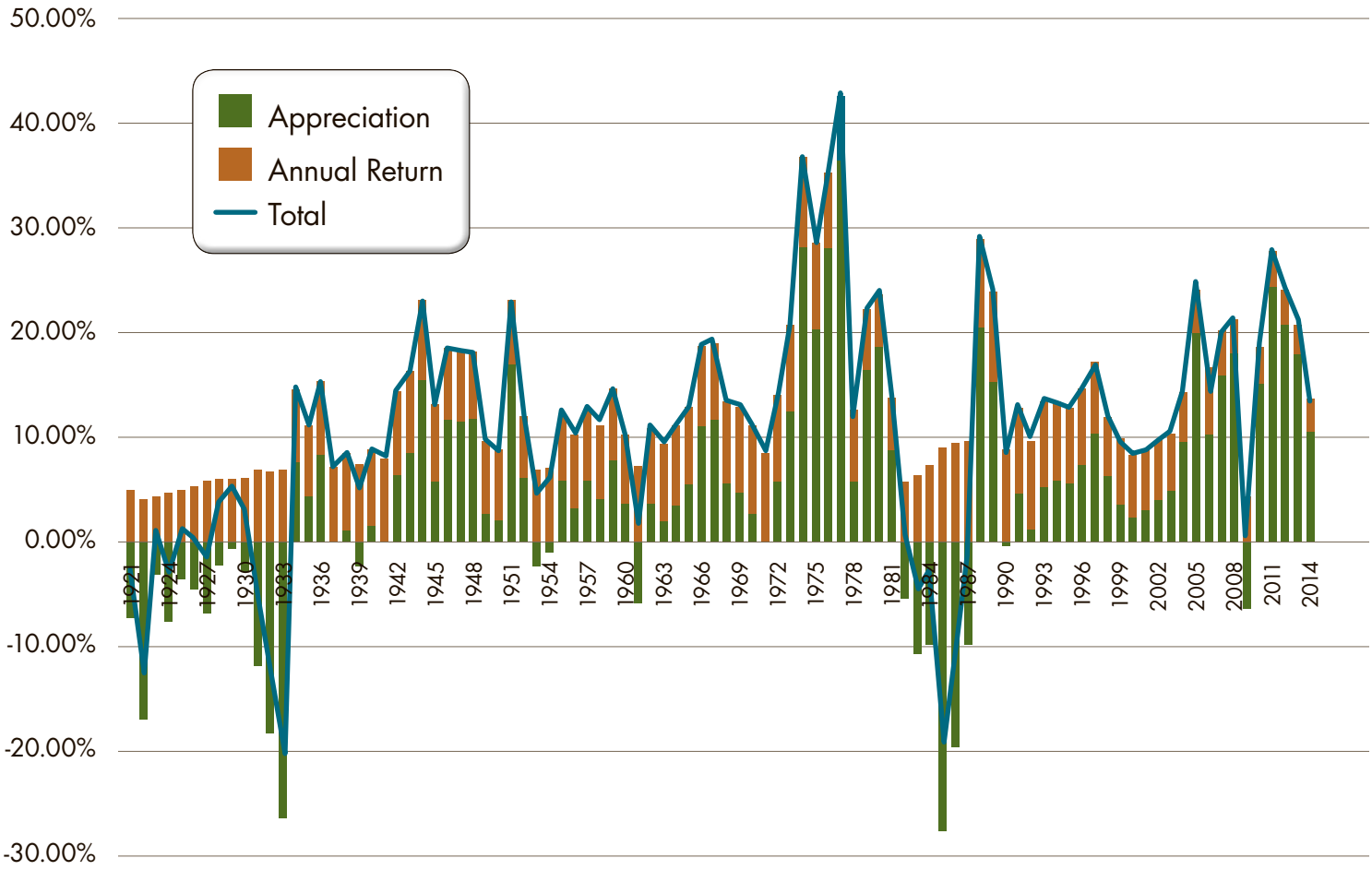
When you combine the increase in value and the rent-to-value, Iowa farmland has returned an average of 11.5 percent since 1921. In 81 years the combined returns were positive and in 13 years there was a negative return.

Another way to consider farmland investment is compared to stocks. An Iowa State University study examined the returns to Iowa farmland versus the returns to the S&P 500. In this study it was assumed the investor put $1,000 into the stock market (S&P 500) or bought farmland at the prevailing price. The yearly returns were assumed to be reinvested at the prevailing price for that year. There were no transactions fees for either investment option. For stocks there were no ownership fees or charges considered. The land investment subtracted real estate taxes, a management fee and a maintenance fee from the rent. The strategy followed was to reinvest the earnings into more of the asset. (Duffy Michael. "Comparing the Stock Market and Iowa Land Values: A Question of Timing", Iowa State University Extension, Agricultural Decision Maker Newsletter, June, 2014)

Following the investment strategy outlined above investing in farmland would have greater value today versus investing in the S&P for 57 of the past 64 years. This was a simple analysis that did not include transaction costs and assumed a person could enter the farmland market as easily and with the same capital investment as the stock market. Regardless of the assumptions in the study it shows including an increase in value as well as the rent-to-value produces favorable returns to farmland as an investment.

As an alternative investment, farmland has attracted investors by: 1) providing consistent annual positive cash income with proven long-term appreciation, 2) being an attractive method for portfolio diversification due to its low correlation to traditional investments of stock and bonds, 3) performing as a hedge against inflation and 4) providing the investor an opportunity to participate in the rising global demand for food, fuel and fiber. In addition, to these financial rewards, there are the social rewards that come from contributing to the preservation, stewardship and conservation of this vital natural resource.

Iowa Farmland Annual Return and Appreciation Nominal Return 1921-2014



Source: USDA National Agricultural Statistics Service

SOCIALLY RESPONSIBLE FARMLAND INVESTMENT – PRACTICAL CONSIDERATIONS

What are some of the practical considerations today's farmland investor can and should examine in the realm of being a socially responsible investor? How can an investor direct their investment and the production level activities taking place on their land so as to: 1) help double food production between now and 2050 to feed the world's 9 billion people, 2) protect the environment from negative consequences of increased production, 3) give appropriate consideration to the impact on other producers and landowners, and 4) accomplish all these goals while providing food, fuel and fiber that's affordable and safe.

The basic returns comparisons for farmland are relatively straightforward. There are risks and uncertainties that are unique to the investment but they are considered similar to other investment risks. Weather, pests, diseases, markets, and other factors can be included in the analysis.

What are more difficult to include are the factors that focus on the social responsibilities of farmland investments. Some of the factors can be quantified but others cannot. They must simply be noted and the relative consideration in the decision will depend upon the individual.

- **Feeding the World**

Feeding the world is not really something that an individual landowner can directly influence. It is an example of an issue that cannot directly be measured for inclusion in an investment analysis. An investor can evaluate returns based on various potential agricultural activities or based on use of existing vs. emerging technologies or based on management technique alternatives; all of which will influence the production capacity of the farm. Existing technologies in grain and oil seed production are experiencing what has been coined ***a yield increase plateau*** at the same time agriculture is being told to double food production during the next 35 years. Most of the production increase must come from yield increases on the existing acres. To add to the challenge, significant amounts of acreage each year are developed for non-farming uses, are going to non-food (i.e. fuel) production and are being converted to specialty production based on models stressing marketing and product trait differentiation (organic, farmers market, community/cooperative farms). The commercial producers of commodity food and feed stuffs are left to carry the weight of feeding the world.

A landowner wanting to contribute to the responsibility of feeding the world has a vast number of methods to consider for the furtherance of this goal. However, some of the most readily available alternatives to increase production will have negative consequences on water quality and soil conservation. So it is a conundrum to search out those emerging technologies that strike the appropriate balance. In the financial modeling of these alternatives the socially responsible land investors must establish certain "non-acceptable" outcomes regardless of return on investment. For example, if a new fertilization program under consideration indicates an increase in return on investment, but at the same time increases nitrogen and phosphorus reaching the watershed then this is an example of a non-acceptable outcome that will be rejected regardless of the financial advantage.

Even though we have experienced the so-called yield increase plateau, technologies in many aspects of crop production are exploding. Advances in genetics, electronics and mechanics have ushered in the dawn of precision farming, seed that takes yields to new heights and equipment that enhances both productivity and conservation within the same field. These new technologies have a financial cost that can be modeled and evaluated against the landowner's return expectations. They also have impacts on the social responsibility goals of the landowner. For example, the new Kinze variable rate, multi-hybrid planter is capable of pushing yields higher based on a combination of genetics and precision farming technologies. But if the planter is used to push production on environmentally sensitive acres then the yield gain has contributed to soil erosion, not helped it. What this technology can accomplish is a balance by increasing output on the most productive acres, conserving the sensitive acres and increasing the profitability of the farm.

FARM SPECIFIC: MULTI-HYBRID PLANTERS AND LAND MANAGEMENT ZONES

Kinze Manufacturing has been enthralled with and participated in the agriculture industry's fascination around introducing state-of-the-art farm technology for more than 50 years.

Today, the view from the Williamsburg-based company's headquarters includes a contemporary look at the future of multi-hybrid planter technology via the production of modern machines and an emphasis on optimizing yields.

Hybrid varieties can grow in numerous soils and adapt well to climate conditions such as drought and cold weather, at the same time demonstrating resistance to pests and disease. The pairing of these high quality seeds with new innovations in the targeted application of fertilizers and pesticides has pushed yield potential to new heights.

Leaders in the high-population corn space have reported yields upwards of 300 bushels per acre on some farms amid a perfect storm of seed genetics, precision equipment and data-driven agronomy that reflects hard numbers.

Kinze, a leading manufacturer of grain equipment and row crop planters, is a pioneer in multi-hybrid technology. The company's first tests of a split hybrid planter took place in 2011, and were based on management zones determined by Atlanta, Indiana-based Beck's Hybrids. The focus was on a statistical and geographical analysis of plant health and other field conditions.

A Kinze planter with center-fill capacity for multi-hybrid planting was first introduced in 2013. Following successful demonstrations of the automatic, on-the-go changing of seed varietals and population on test plots in 2014, the manufacturer announced that it was stepping production of its electric multi-hybrid technology for the 2015 season.

Kinze's 4900 multi-hybrid planters are now available with electric drive meters with high-torque motors that also allow for precise seed rate control by row, as well as consistent seed spacing from the inside row to the outside row – even on tight radius turns and contours.

FARM SPECIFIC: MULTI-HYBRID PLANTERS AND LAND MANAGEMENT ZONES

continued from previous page

The 2014 planting trials took place in Iowa, Indiana and Illinois in association with AgriGold, Beck's Hybrids, Burrus Hybrids and DuPont Pioneer. Hybrid changes were conducted within a single seed drop, and virtually no gaps or overlap when switching from one hybrid to the other.

Independent studies conducted by Beck's in 2012 and 2013 showed fields planted using multi-hybrid technology had average yield increases of 9.5 bushels per acre, and a return on investment of $54.24 per acre across both low productivity zones and high productivity zones.

Kinze, in conjunction with Raven Industries and the partnering seed companies, also demonstrated the creation and application of "prescription maps" for farm fields. Seed spacing can be dependent on factors such as terrain, speed and seed type. The maps, which work to control seed hybrid and population, allow producers to get the most out of their portfolios by optimizing the unique environment or particular landscape of each farm.

Phil Jennings, Kinze's service manager, pointed out that adoption of new technologies is based heavily on advances in location-based GPS systems that allow for on-the-fly maneuvering and near-real time collection of data. He said early adopters – taking into account soil types, fertility zones and areas prone to disease – are getting comfortable experimenting with multi-hybrid planters to prove exactly what the machines can or cannot do.

"Many customers reference a farm as a single piece of property," Jennings said. "We are taking that farm and changing it into much smaller management zones. The new technology offers us a tremendous opportunity to do a number of different things. Once we collect that data, we can account for everything from field elevation and drainage, to fertility or pressure from insects or disease."

Plot data gathered in trials and from the check strips, as an example, can be used to determine the effectiveness of varieties in terms of field totals or yield – and in relation to the management zones staked out on a farm. He expects Kinze's farm customers to adopt the technology at a high rate as long as they can see the potential.

One goal of improving the accuracy of seed spacing and population is to optimize the most productive and the least productive areas of the land. The idea is to conserve environmentally fragile acres while maximizing the potential of prime agricultural land, and the highest-yielding zones. Jennings said a "farm-specific" mentality is essential when considering different soil types, field patterns, tillage practices and other factors.

Kinze's 4900 multi-hybrid planter has superior turning compensation and the latest in row-by-row variable rate planting technology. A big piece of the puzzle, Jennings said, lies in data – and data management. That's because farmers are doing more work on computers or mobile devices than they are necessarily doing in the seat of a tractor.

In addition to helping to determine the appropriate "prescription" at planting time –with the potential of enhancing productivity and increasing yield – the use of new technologies and modern agricultural equipment has also contributed to the preservation of valuable nutrients and long-term sustainability of farm ground.

The K in this field demonstrates the accuracy with which Kinze's multi-hybrid planter can change between hybrids while planting.

The management zones, broken down to draw attention or raise awareness of needs specific to individual farm fields, offer producers an opportunity to gain greater control over their inputs and other applications. "Changing hybrids on the go, changing populations and variable applications of fertilizer are all happening today," said Jennings.

Kinze announced that its fleet of precision farming equipment will grow again in 2016, as the company plans to release its 3660 12-row and 16-row planters with the option of an advanced electric drive. The 3660, though not intended for multiple-hybrids, features an electric drive combined with a vacuum meter to ensure highly accurate spacing and nearly instantaneous changes to the population rate, even when planting on curves.

Frames on the 3660 include standard hydraulic weight transfer to reduce potential soil compaction. Push units on the split row system improve residue flow. The equipment also comes with a split-row option for easy conversion from a 15-inch planter to a 30-inch planter.

"The application of electric drive meter technology and multi-hybrid planting are things that would not have been discussed 10 years ago," Jennings said. "The adoption rate of new technology in the ag industry is just tremendous. The mapping, the equipment, the technology, it saves a lot of time and is allowing for a broader lay of the land."

GMOs (genetically modified organisms) are another technology that can help overcome the yield plateau. However, the topic garners significant emotional responses on both sides - GMOs are either an intolerable threat or they are the solution to world hunger and malnutrition – and this debate has created a barrier to acceptance and implementation of the technology. The purpose of this paper is not to argue the pros or cons, but to look at the practical impact this technology has on the social objective of feeding the world with safe, plentiful and affordable food in a socially and environmentally sustainable manner. In the U.S. today GMOs represent nearly 90% of the soybeans and 80% of the corn marketed. So in the U.S., the issue is, for practical purposes, resolved. GMOs are integrated into our domestic food supply as well as the grain, oil seeds, meat and further processed food we export around the world. Where this technology can do the best at feeding people is where it is still being debated.

In a January 22, 2015 interview with The Verge, Bill Gates laid out a case for agricultural innovations and new technologies being a major critical tool in resolving world hunger, malnutrition and food security. The following two paragraphs are a portion of the article from The Verge.

This year, the Gates Foundation's annual letter points to innovations in farming as a revolution that will transform the lives of the poor over the next 15 years, particularly in Africa. Food is a fundamental human right; nonetheless, people are starving. The UN's World Food Programme estimates over 800 million individuals, or one in nine people on the planet, struggle to find enough food to eat on a regular basis. In places like Sub-Saharan Africa, hunger is a tremendous problem — and an ironic one. The region is home to abundant arable land; 70 percent of the population there farms. But the prevalence of hunger there is also the highest in the world — one in five people are undernourished. Based on a UNICEF study chronic malnutrition has stunted the growth of 25 million (40 percent) of the children under the age of five.

A new generation of highly productive crops, Gates suggests, are part of the solution to address global hunger — seeds that are drought-resistant, disease-resistant, productive, and nutritious could benefit farmers. Some of the crops can be bred through traditional methods, but Gates thinks many African countries will adopt GMOs, or genetically modified organisms. GMOs are an accelerated version of the traditional methods of plant breeding which require raising several generations of plants, improving their yield or drought-tolerance properties over years if not decades. But genetic information lets scientists tweak specific genes — a much faster process.

Rob Saik, CEO of Agri-Trend, founded the company in 1997 on the concept of coaching farmers on how best to allocate their resources without that advice being tied to sales of seed, or fertilizer or other products. Saik has significant experience in evaluating GMOs in production agriculture and challenges societal thinking about the role of GMOs in world food security. *See the article below.*

- **Environmental Protections**

Environmental quality is primarily a function of soil erosion and water quality issues. This is a socially responsible area where the individual farmland investor can have an influence. Or, at a minimum, the impact incurred due to their farmland investment can be directly controlled by the owner. Tillage practices, terraces, crop rotations, planting, and cover crops are just some of the practices the landowner can consider requiring on their land. From the socially responsible perspective decreased erosion means less runoff putting chemicals and fertilizers in the water. Reducing erosion can decrease the need for certain inputs lowering costs and helping to improve the yearly returns. Finally, reducing erosion can save the value of the investment. Studies have shown that erosion leads to a decrease in productivity and that productivity decrease can lead to a decrease in the asset value. (Duffy, Michael. "Value of Soil Erosion to the Land Owner", Iowa State University Extension Agricultural Decision Maker, A1 – A75, August 2012.) In this case we have an example of how a socially responsible investment increases the financial return to the landowner.

GENETIC ENGINEERING AND THE LAND

"The one thing a farmer should leave on this earth when he leaves this earth is more earth" – Robert Saik

Farmers have the dual daunting roles of not only providing food for the planet, but also ensuring that the resource called the soil is stewarded for future generations.

I have never met a farmer who was not intensely passionate about the sustainability of his soil. They are always learning about new techniques to better grow crops and raise livestock as well as integrating technology to ensure they produce food in a safe, reliable and environmental sustainable manner as possible.

Today's farmers are adopting technology at a break-neck pace. From auto-steer, to robotics, to precision farming techniques to data management to integration of bio-tech…many farmers are on the forefront of technology adoption.

The layering or stacking of technology is providing significant gains in productivity while reducing agriculture's environmental foot print.

While Genetic Engineering or GMO's (Genetically Modified Organisms) are often vilified in the media, a closer look and deeper understanding reveals many environmental benefits. Because plants can be bred to be tolerant to herbicides, farmers are able to better control weeds without the need for excess cultivation while simultaneously decreasing the use of harsher, more toxic weed control chemicals.

For example, since the 1996 introduction of Herbicide Tolerant (HT) Canola varieties in Canada there has been a 66% reduction in soil erosion along with a 53% reduction in total herbicide use; a total of reduction of 1.3 Million Kg in Active Ingredients. Worker exposure to pesticides has declined 55% and national average yields have climbed from 21 bu/ac to over 41 bushel per acre!

In crops such as corn, soybeans and cotton the combination of herbicide tolerance together with built in insect resistance through a natural organic toxin, Bacillus thurengensis (Bt) has resulted in dramatic reduction in the total environmental chemical load as well as decreasing worker and non-target insect (e.g. bee) exposure to insecticides such as carbomates and organo-phosphates. In cotton, the total Active Ingredients (AI) used in pest control have declined from highs of 24 lbs/ac down to as low as 4 lbs/ac of AI. Yields of crops continue to climb with a 2014 US farmer setting the world corn yield record at 503 bu/ac utilizing a GE variety.

In tropical and sub-tropical soils such as those in Brazil and Argentina, the integration of biotechnology has enabled farmers to practice zero-tillage preventing the soil from massive erosion and reducing the amount of new land being brought into production.

Stacking Genetic Engineering with other technologies such as variable rate precision application of fertilizers, crop protection products, seed and even water pave a path to even more environmental stewardship.

Simultaneous application of many technologies are helping today's modern farmers increase water use efficiency, improve soils while providing the planet with a safe, affordable and sustainable food supply.

With even more challenges such as wheat rust or citrus greening virus on the rise, agriculture will be looking at all the tools in the toolbox, including Genetic Engineering to ensure global food security.

Other environmental options may involve increased expenses or decreased output. But, many of the more environmentally sound practices have actually been shown to increase profits and increase asset values. Oftentimes an individual operator may not have the time or inclination to change production techniques or practices, but the socially responsible farmland investor can help in this regard by specifically requiring certain responsible operational practices, and making capital improvements when necessary. An example of an emerging production technique is the concept of planting corn at very high populations (seeds per acre) compared to today's norm. Field research and trials conducted using these higher populations have shown increased yield, decreased cost of production and the ability to improve soil conservation efforts.

• Local Impact

Respecting labor and human rights is another guiding principle of socially responsible farmland investment. Primarily this is an issue in less developed countries where the poor subsistence farmers are often displaced when outside farmland investment occurs. These circumstances have their own set of issues and complications. But, labor and human rights issues surrounding farmland investment are not just limited to the international situation.

In many areas of U.S. agriculture immigrant labor is employed. This labor is involved in the planting, tending and/or harvesting of crops, as well as working on livestock farms. The U.S. Department of Labor, indicates that over half (53%) of farm laborers are undocumented immigrants. Questions of salary, working conditions, hours worked and a host of other responsibilities surround this issue. Depending on the business model of the farmland investor, they may or may not have a direct influence on the important responsibilities associated with labor issues. On one end of the spectrum an investor in Midwest row crop land with a cash-rent lease to an area family farmer probably has no immigrant labor involvement. On the other end, the investor who owns and operates an avocado farm in California will likely have direct responsibility to an immigrant labor force. Whether the involvement is one of direct employment by the investor, or the laborers are employed

DATA, FIELD EXPERIENCE REFLECT STINE'S 'SYSTEMS APPROACH' TO HIGH POPULATION CORN


Harry Stine

A "systems approach" is driving renowned seed entrepreneur Harry Stine's outlook on high-population corn as more farm producers consider advanced hybrids and the use of new technologies designed to optimize potential in the field.

Stine is an avid mushroom hunter who since 1999 has carefully documented in a handwritten log his personal discovery of more than 40,000 morels. The 73-year-old is fascinated by both agriculture and plant life. The diligent collection of the mushroom hunting data is emblematic of how Stine approaches just about any issue or challenge.

A laser focus on historical information, and the modern perplexities of feeding a world population with expectations for it to reach 9 billion people by 2050, powers Stine's systems approach to the deliberate collection and analysis of hard data. His logic and love for the land also shine through in the emphasis he places on maximizing the performance of hybrids developed by Adel-based Stine Seed.

Stine Seed began experimenting with soybean genetics in the 1960s, and is today known for its role in building some of the highest-yielding varieties in the world. It was reported in Forbes that Stine Seed boasts more than 900 patents, and generates annual sales of nearly $1 billion with profit margins exceeding 10 percent. Stine and his four children own nearly 100 percent of the operation.

Stine said that the company now collects fees on two-thirds of the soybean genetics planted in the United States. He recently turned more of his attention to corn plant populations, which have increased steadily over the past 80 years as horse-drawn planters gave way to nimbler equipment, and the ability to navigate significantly tighter rows.

In the 1930s, a typical U.S. cornfield may have included 7,000 plants in checked-rows spaced 42 inches apart, compared with the typical 30,000 to 35,000 plants spaced in 30-inch rows today. By Stine's account, 24 bushels was the average per acre yield of all corn produced in the United States for that entire decade.

The latest data from Iowa State University show that Iowa corn growers harvested an average of 168 bushels per acre over the past nine years – from 2005 to 2014 – a sevenfold increase by comparison. A number of Stine Seed's corn plots, with plants-per-acre of 40,000 to 50,000, have under suitable weather conditions – and the proper nutrient-rich irrigation systems – yielded upwards of 300 bushels per acre.

The company's new corn varieties are intended to thrive not only in tighter rows, but also at higher densities. Stine says a specialized plant structure allows the shorter plants to collect sunlight. The harvest index, defined as the relationship between pounds of grain and pounds of above ground biomass, is also improving. Stine said producers are seeing more grain per unit of above ground biomass than at any time in the past.

The self-made businessman said he's now found the right piece of planting technology in the Twin 20 inch planting system, with 12 inches in-between pairs and 8 inches within. Stine, which so far in 2015 has leased nearly 100 of the twin-row, 20-inch machines, said that Midwest growers with 15-inch planters traditionally used in soybean production will also use that equipment to pilot the company's hybrid corn seed in 2015.

The costs associated with preparing the land and harvesting crops, Stine said, remain fixed, for the most part, regardless of yield. So decreasing row widths to allow for the placement of more seeds per acre could be especially beneficial in helping farm producers acclimate their approach based on the quality of the soil, and ground that's being farmed.

DATA, FIELD EXPERIENCE REFLECT STINE'S 'SYSTEMS APPROACH' TO HIGH POPULATION CORN

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"First look at the economic aspect," Stine said. "Most of the time, extra yield is economically advantageous. Obviously, if you go crazy on inputs, that's not true. But in general that's true. You're going to add some fertility. You're going to add a little bit of equipment cost and seed cost." He suggested that the appropriate mix of seed genetics and farming methodologies, in addition to correlating plot data and field experience, could help producers "adapt" and realize the most productive gains.

"The good land with less erosion is where we need to concentrate our row-crop farming," he said. "Under low commodity prices, having these high yields, frequently, even though it's not a lot, will represent 100 percent of the profit from those acres. We are looking at corn in a totally differently manner today than most people are."

Stine said he expects that in 2015 the narrow-row production of corn and soybeans altogether will reach a half-million acres in the Midwest alone. The highest yields will likely be generated in areas where farmers can irrigate on sand, he said, and blend nitrogen directly with irrigation water.

"If you look at this long-term data on populations and yield," Stine said, "what you'll find is 5- to 7-times higher, you'll say, 'Wow, these trends, if they continue, we will obviously need narrower rows, even higher pops and we'll get better yields.'" Citing the research of Donald Duvick, formerly with Pioneer Hi-Bred International, Stine said it has been made perfectly clear, however, that seeding higher populations in narrow rows alone doesn't result in big yields.

Stine said there are many cases in which breaking 300 bushels per acre is quite achievable with the right combination of genetics, technology and application of the fundamentals. Referring back to his systems-based approach, Stine said much of this ability is dependent on weather, and noted that climate conditions have the "most dominate control of our yield."

He said bringing to the forefront issues related to land conservation and stewardship in relation to increasing food production can allow for meaningful discussion among numerous stakeholders, including an evaluation of the challenges and opportunities facing growers amid rising demand for agricultural produce.

"A lot of our water erosion comes from the raindrops hitting the soil and splattering the soil particles back up into the air," he said. "When you've got solid plants all over the place, you reduce that significantly. More importantly, perhaps, if you divide the soil erosion by units of grain that you are harvesting, you've really knocked down the soil erosion rate per bushel of harvested grain. Because we are getting less erosion, and we are getting higher yields."

Stine, whose work has had a tremendous impact on the soybean industry, now views corn as the next big opportunity and his company is determined to help farm producers increase yields in Iowa, throughout the Midwest, and all over the world.

by a farm operator to which the land has been leased, the farmland investor has the opportunity and responsibility to assure the labor force working on the land is treated fairly and humanely and to rectify any existing unacceptable situations.

In recent years, farm operators have reported a rapidly shrinking labor pool. There are multiple reasons for this with one of the primary reasons being the lack of government policy that gives the farm immigrant labor force a reasonable sense of security. In a December 2014 report titled "Employing Agriculture: How the Midwest Farm and Food Sector Relies on Immigrant Labor" published by The Chicago Council on Global Affairs a Michigan grower reported labor shortages of 40 to 50 percent of needs, with growers being forced to make tough choices between picking some of their crops and leaving others in the field based on factors such as ease of harvest and market conditions. The state's asparagus growers lost between 1 and 2 million pounds of product – the market value of which is 75 cents to $1.50 per pound – due to lack of workers to harvest it. In the fruit sector, blueberry growers reported switching to mechanical harvest methods, even as hand-harvesting yield a higher value.

It is not difficult to connect-the-dots and realize that without changes to immigration policy that provides a sense of security and fairness to the labor force farmers will need to change crops and/or production methods on the land. Such changes will likely have an adverse impact on the economics of the return to the land. And as land comes out of high value fruits, vegetables, etc. with the resulting decrease in supply the food cost to American households will rise. Immigration policy is vital to U.S. agriculture yet is an issue over which an individual farmland investor has little if any influence. The consequences of immigration issue are significant and must be recognized and evaluated by farmland investors.

Even in Midwest row cropping, where an investor leases their land to a farm operator, the principle of local impact responsibility still has applications. The principle supports the concept of establishing a lease utilizing methods that consider not only the landowner's economics, but the economics of the farm operator as well. The resulting goal is to develop a set of lease terms that are equitable for both the owner and the operator, thus not taking excessive economic advantage of the farm operator.

- **Abundant, Safe and Affordable Food**

The ultimate goal when addressing these societal challenges, the fourth in our list of social issues, is to create an abundant, safe and affordable food supply. As stated before, this is a 'wicked problem' because alternative solutions have complex interdependencies and the answer to one aspect

of the challenge can create problems in another area. In addition to the incongruent consequences when addressing each goal - providing affordable and safe supplies of food - increasing food security throughout the world - protecting the environment - conserving the soil - protecting water quality - respecting labor and the social fabric of the community - they are all issues that do not fit nicely into a financial spreadsheet model. And, for each land investor the relative importance of each of these social responsibilities is an individual and arbitrary judgment of degree as to what is and is not acceptable. A puritan commitment to any one of these issues can have magnified adverse consequences on one or more of the other factors. For example, if the sole focus is on maximum output then production decisions may result in tillage of environmentally fragile land and use of excessive fertilizers. While the goal of maximized food production has been accomplished the combination of excessive fertilizer and tillage of fragile land will result in magnified soil erosion carrying an even greater amount of fertilizer into the watershed.

Thus, the 'wicked problem' emerges. From our perspective it is a matter of striking a balance, often a delicate balance that provides the landowner, farm operator and society in general the ability to continually improve on this broad set of issues. At the same time recognize that the single issue activists will battle even the slightest compromise of their particular issue in reaching a workable and sustainable balance.

So how does an investor begin to take on the quantitative and qualitative analysis required to navigate through the alternatives? One answer comes from the explosion of precision farming tools and technologies that have become available. Landowners can utilize these tools, in collaboration with their farm operator, to help address this 'wicked problem' and strike a workable balance between the complex interdependencies of these issues of societal responsibilities. Precision farming at its most basic is farming by the foot rather than by the field. Production decisions and crop input resources are applied at variable rates based on detailed analytics that drive prescriptions for seed and fertilizer throughout the field. The ability to overlay a field map of soil types with a map of soil nutrient tests, with fertilization programs, with tillage practices, with seed varieties, with planting dates, with soil temperature, with plant population, with precipitation events, with growing degree days, with input costs, with machinery costs, with land costs, with yield, etc., etc., etc. provides a powerful analytical tool for evaluating the full spectrum of results. The analytics performed on this massive amount of data results in a profit per acre map. Results of the Kinze multi-hybrid planter, for example, can be accurately measured against present technology in use while soil loss calculations can measure the environmental impact. Accurate comparisons can be made between an existing management practice and one that employs variable rate application of fertilizers and chemicals to specific GM crops.

This is one example of how landowners can measure results. They are able to accurately measure the outcomes of various combinations of management decisions, equipment investments, agronomic practices, conservation techniques and capital investment; often learning that socially responsible management practices can very well produce superior income and appreciation. These outcomes can then guide the landowner in making decisions that are aligned with their socially responsible goals.

The concept of "managing for appreciation" - producing more on the productive land while conserving environmentally fragile acres - is more than theory. The following is the case of my own 70 acre farm.

The "present state" column reflects the actual condition prior to any management practice changes. I then implemented three strategies: 1) increased the fertility from "deficit" to "optimal" at a cost of $350 per crop acre; 2) completed tiling, dozing and clearing at a cost of $650 per total acre to increase productivity and enhance conservation; 3) enrolled 3 acres in the Conservation Reserve Program at $225 per acre.

The projected impact of these changes are 3 less crop acres collecting cash rent, 3 acres collecting a CRP payment, crop acres that are 10% more productive due to tiling and optimal fertility resulting in farm operators willing to pay higher rent, and a cap rate that is .5% lower due to the improved condition of the farm (my observation of the farmland market is that a .5% cap rate decrease for "good/great condition farm" vs. "average/below condition farm" is a realistic adjustment).

The "future state" column quantifies the financial costs and benefits of the changes; nearly $100,000 of increased value from investments of $65,000 resulting in a 53% return on investment; and increased annual income despite 3 less productive fragile acres being conserved.

The farm operator saves rent expense by not paying for 3 non-profitable acres that went to CRP, saves input costs by not farming those 3 acres and produces more total bushels on less acres due to the fertilization and tiling investments made by the landowner.

Society wins because the 3 acres of CRP reduces soil erosion and the nutrients that go with the soil when it enters a watershed. At the same time, more is being produced. This is an example of utilizing practical solutions for the benefit of all stakeholders.

MANAGING FOR APPRECIATION - A STEVE BRUERE EXAMPLE

	Present State	Land Management Changes	Future State
Total Acres	70.00		70.00
Crop Acres	58.42	-3.00	55.42
CRP Acres	0.00	3.00	3.00
Crop	Corn		Corn
Yield	166.5	10%	183.1
Price	$4.25		$4.25
Crop Income	$41,333		$43,132
Landowner Share (Rent)	35%		35%
Rent Income	$14,467		$15,096
CRP Income	$-	$225	$675
Gross Income	$14,467		$15,771
Cap Rate	3.75%	-0.50%	3.25%
Total Farm Value	**$385,775**		**$485,263**
Total Value Increase			**$99,488**
Total$/Ac	$5,511		$6,932
Tillable$/Ac	$6,603		$8,756
Rent$/Crop Ac	$248		$272
CSR	67.5		67.5
CSR $/Tillable Ac	$98		$130
Costs of Management Changes			
Fertility program			
Deficient-to-optimal		$350	$19,397
Tile, dozing, clearing		$650	$45,500
Total Costs			**$64,897**
Return (Total Value Increase less Total Costs)			**$34,591**
Return on Investment			**53%**

This is the type of cost-benefit analysis that socially responsible landowners are using as they find practical workable solutions to the challenges stated throughout this paper. This model can be applied to the costs and benefits of any management practice including cover crops, variable rate input technologies, multi-hybrid planters, high population corn and advanced analytical services to understand profitability by each acre, to name a few. With a more complete understanding and analysis of the full cost of soil loss, cost of nutrient loss, differentiation of profit by each acre, etc. landowners recognize today's technological advances - combined with existing best management practices - provide them a real opportunity to align their social and financial goals.

HOW DO YOU INVEST IN A SOCIALLY RESPONSIBLE MANNER?

Socially responsible farmland investment is an easy topic to discuss but it is a harder one to put into practice. First of all the whole term 'farmland investment' and 'farmland investor' is difficult to identify in a cohesive way. A farmland investor can be a farmer, a retired farmer, a widow of a farmer, the children of the farmer, or some other relation to the original landowner. The farmland investor could also be an individual with or without agricultural background or knowledge, an institution, a group of investors or one of a number of nonprofit institutions that own farmland.

Similar to the diversity of investors is the diversity of reasons for the investment. The investment can be for financial security, it can be the legacy, it can be the means of sharing wealth, farmland can be a status symbol, it can be simply a means to make money or it could be a home.

Regardless of whether someone inherits the land or buys the land or whether or not they are actively involved with the management of the land or they have never seen it, there are socially responsible and socially irresponsible ways to manage the farmland.

Social responsibility in farmland investment starts with the notion economists have termed as externalities. The externalities are the costs or benefits the decision maker doesn't have to consider. They represent market failures where the true costs of the actions aren't borne by the decision maker. The consequences can be positive or negative although most of the consequences are negative.

For example, a person could farm in a manner that produced soil erosion. The erosion creates costs for individuals downstream or costs for society. There are many examples of externalities but the point is there

can be costs or benefits that are not incurred by the ones who created them. With socially responsible farmland investment the potential for externalities is recognized and attempts are made to mitigate the costs.

The consequences can be at the individual level or they can be at the societal level. Whether or not enough safe, affordable food will be produced is a societal issue. Whether or not the Gulf of Mexico is polluted or the Ogallala aquifer is depleted are societal problems but with individual consequences.

In some cases there are laws to regulate the externalities. In other cases there are incentives or programs to help alter the behavior. The development of conservation plans, the water quality incentive program and other government or non-government programs are examples of programs trying to encourage farmland investors to farm in a socially responsible manner. Sometimes the impacts are not clear cut and the desirability is determined by your point of view.

Socially responsible farmland investment means considering more than simply the private benefits and costs that accrue to the farmland investment. Will there be enough food, can we reduce agriculturally related pollution, can we produce food at affordable prices, and can we protect workers and displaced farmers' rights. These are all issues and considerations for evaluating socially responsible investment.

The individual investor for the most part is not required to consider the societal implications of their investment. In some cases laws and social norms require consideration but in many situations not the social aspects.

In some cases the questions or implications for socially responsible farmland investment are really a matter of perspective. Some consider moving land out of the hands of impoverished undercapitalized individuals and into the hands of farmers using more modern techniques a good thing and one that can help alleviate hunger. Others view the same actions as appalling and an attempt at a land grab where the rights of the poor and less powerful are totally ignored for the profits of a few.

Other aspects of socially responsible farmland investment focus more on how the farmland will be used. Pollution, water quality and water quantity issues are all important issues. The level of these externalities and the extent and nature of their damage can be debated but the existence cannot be denied.

We have discussed the need for a practical and balanced approach to achieving social goals. Implementation of technologies such as multi-hybrid/variable rate planter, high-population corn, GMO seed along with land-owner commitment to nutrient reduction strategies and credit access programs targeting beginning farmers are examples of how socially responsible goals can be met. This combination of landowner commitment, technology and public/private partnership creates an environment of rapid adoption of best practices. This approach is highly sustainable because not only are social goals enhanced, but landowner total returns are improved because of higher yields driving annual rent and conservation resulting in premium land appreciation.

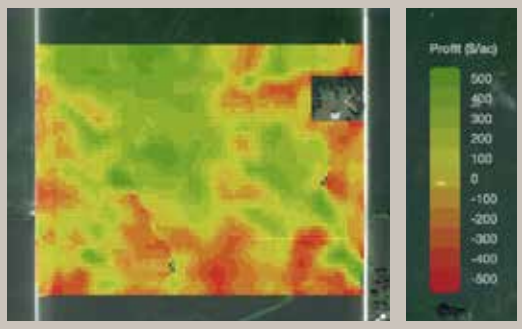
CONSERVATION TALKS BACK *Michelle Jones, Iowa Soybean Association*

Most would argue when commodity prices are low, less focus should be placed on conservation practices. Thanks to new technology, conservation is talking back.

The common perception that agronomic performance and environmental performance are mutually exclusive practices is no longer valid. Many times when profits are high, marginal land is put into production, however, these acres are typically the most environmentally sensitive and least productive areas of a field.

The Iowa Soybean Association, working in conjunction with AgSolver Agronomic Services, a precision ag data and simulation company, is helping farmers take a fresh look at agronomic and environmental performance by using profit to drive decisions.

Through the application of profitability mapping, producers can better understand the performance of their operation by pinpointing the strengths and weaknesses of each field down to the 10 foot subfield scale. Using yield data, input costs and management information, acres are broken into three zones: high performing, reasonably performing and nonperforming. Combined, these acres generate the overall picture of the farm and help farmers identify ways to optimize profit, including adopting conservation practices.



Above is a profitability map of a field. The green areas yield a profit, while the areas shaded red consistently perform at a loss. The field scale had a multiyear average net profit of more than $65 per acre each year. However, a closer look at the subfield profitability, indicates the red areas should be evaluated for alternative management and/or conservation practices.

"When crop prices are low and profits are trending downward, it's important to understand what areas are making profit and which are dragging profits," says Adam Kiel, ISA Environmental Programs and Services state water resources manager. "Once that's understood, investigating alternatives for those loss areas may be an easy solution to increase profits."

Many producers think in terms of yield to maximize profit, but a profitability map offers a different perspective.

Nonperforming areas comprise three-to-15 percent of nearly every field, according to Dave Muth, AgSolver senior vice president of analytics. Historically, these acres result in a net loss and the return on investment (ROI) shows it is cost prohibitive to invest in these acres. Instead, implementing alternative practices or changing land uses can reduce input costs and provide more capitol to invest in high performing areas of the field.

"The first thing is demonstrating environmental and economic performance are not competing," Muth says. "Here is a precision business plan that makes you [the farmer] more profitable and implements environmental practices. Once producers understand how their business improves, they are more willing to put acres in environmental practices."

CONSERVATION TALKS BACK

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It starts a conversation about which conservation practices can boost profitability, such as reduced tillage; nutrient application rates, form and timing; cover crops; Conservation Reserve Program (CRP) alternatives; habitat plantings; and much more.

After reviewing his profitability map, Wayne Fredericks, farmer from Osage and ISA president-elect, determined several alternatives to farming unprofitable acres.

He enrolled specific areas in CRP, using a pollinator habitat practice standard, and added a 60 foot buffer along a waterway. The analysis also enabled him to consider other factors that reduce profitability. For example, a couple farms had areas where equipment didn't fit well and he was unintentionally doubling up on inputs. He decided to remove those acres from production to reduce inputs and enrolled them in continuous CRP instead. Across all farms, he enrolled just under seven acres in CRP, but he was able to improve the profitability of his operation considerably.

"We addressed a whole lot of little areas on different farms, provided some habitat and other environmental benefits and definitely improved the fields overall profitability," Fredericks says.

Thinking long-term, returning sensitive acres to native habitat may provide substantial environmental benefits. A strong correlation exists between unproductive areas and highly erosive acres. ISA believes these may have the biggest impact on water quality, soil erosion and additional factors relating to sustainability and environmental impact. Looking at conservation solutions for those areas may in turn have a disproportionally greater benefit than doing a practice in high performing areas.

"What we might find is a small amount of conservation in those less profitable areas may go a long way in terms of reducing soil loss and nutrient loss," Kiel says.

More sustainable production practices improve both profitability and environmental performance, which leads to greater competitiveness in the market, especially when margins are low.

Fredericks sees this as a win-win situation for farmers and the environment. Land is a grower's major resource, and without protecting the land they lose the ability to generate profits.

"If you can shore up the bottom line for producers that makes them more sustainable in the long run and we're enhancing environmental benefits at the same time," Fredericks says. "The improvement of the bottom line also was something to improve the environment, and most people don't think about it."

For more information, go to **www.iasoybeans.com/environment**

SURVIVOR TIPS:

ONE: Profitability mapping identifies the highly productive, reasonably productive and unproductive areas of a field.

TWO: Implementing conservation practices on unproductive acres can reduce input costs and ultimately improve profit across the whole field.

THREE: Investing in conservation practices promotes long-term environmental sustainability and improves the bottom line.

It is imperative that public policy embrace, support and encourage a balanced approach in collaboration with the important stakeholders. An approach that utilizes science, technology and best practices to achieve continued improvement of all of these issues rather than a policy that frustrates, hinders and creates uncertainty.

Ultimately it is the landowner's responsibility for what takes place on their land. The landowner has the most to gain from productivity increases, soil conservation and management that stresses stewardship. The landowner also has the most to lose if the land is not cared for in a responsible manner. Earlier we spoke of opposing goals between the landowner and farm operator due to conflicting time horizon perspectives. Farm operators are understandably hesitant to make investments in longer term production and management practices necessary to implement socially responsible decisions based on a one-year lease that gets terminated each fall and renegotiated each winter. However, with a multi-year lease commitment farm tenants are typically willing to take a longer-term approach and partner with the socially responsible landowner to improve the productive capacity of the land. Longer-term leases - with terms addressing improvement in soil fertility, soil health, conservation, stewardship and other responsible factors – are a method for land investors to align their priorities with the farm operator. It is widely recognized that existing practices, and those of the recent past, have helped advance food production to new heights. However, a broad consensus within the industry is that many of today's production practices are not sustainable and in fact are contrary to the social goals and responsibilities stated throughout this paper. We believe that addressing the issues of social responsibility, and appropriately resolving negative societal impacts, are not optional.

Finally some aspects of socially responsible farmland investment can actually improve the returns to the investment in both the short and long run. Alternative production techniques or practices can reduce costs and improve yields.

Socially responsible farmland investment is not a set of practices or rules. And, it is not a panacea for the world's problems nor a means to accomplish a social agenda nor is there a "one-size-fits-all" solution. Socially responsible farmland investment is a means by which farmland investors can consider the full consequences of their actions. It lets the investor think beyond simply the immediate dollar returns from the land.

CONCLUSION *by Steve Bruere*

The era of socially responsible land investing has dawned due to societal issues facing agriculture. Throughout this paper we have focused on the challenge of feeding the world's population, soon projected to be 9 billion, with an extra 2 billion of those having moved up to middle class. This means not only do we need to feed more people, but due to improving economic conditions we need to feed more people more food. Of all the societal issues we've covered in this paper I believe there is no higher responsibility than assuring all have enough to eat. And through collaborative initiative we can have world-wide food security at affordable prices, with environmental sustainability and respect for local farmers, landowners and laborers.

Just recently I was privileged to spend some time with Ambassador Quinn, President of The World Food Prize Foundation to learn more about his organization. Over the past couple of years I've become interested in the World Food Prize event that takes place each year here in Des Moines, Iowa. I've become a great admirer of Dr. Norman Borlaug, founder of The World Food Prize and credited with saving a billion people from starvation, and a fellow Iowan. Dr. Borlaug's philosophies of using technology to solve critical world issues fit with how the issues we've discussed in this paper can be addressed. I recently read a lecture given at the Oxford Farming Conference in January 2013 by Mark Lynas. In that lecture, Lynas described the difficult situation facing global food security in the late 1960s-early 1970s, Norman Borlaug's response to it and how the opinions then are similar to the differences being expressed today.

> *In a sense we've been here before. When Paul Ehrlich published the Population Bomb in 1968, he wrote: "The battle to feed all of humanity is over. In the 1970s hundreds of millions of people will starve to death in spite of any crash programs embarked upon now." The advice was explicit – in basket-case countries like India, people might as well starve sooner rather than later, and therefore food aid to them should be eliminated to reduce population growth.*
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> *It was not pre-ordained that Ehrlich would be wrong. In fact, if everyone had heeded his advice hundreds of millions of people might well have died needlessly. But malnutrition was cut dramatically, and India became food self-sufficient, thanks to Norman Borlaug and his Green Revolution.*
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> *It is important to recall that Borlaug was equally as worried about population growth as Ehrlich. He just thought it was worth trying to do something about it. He was a pragmatist because he believed in doing what was possible, but he was also an idealist because he believed that people everywhere deserved to have enough to eat.*
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> *So what did Norman Borlaug do? He turned to science and technology. Humans are a tool-making species – from clothes to ploughs, technology is primarily what distinguishes us from other apes. And much of this work was focused on the genome of major domesticated crops – if wheat, for example, could be shorter and put more effort into seed-making rather than stalks, then yields would improve and grain loss due to lodging would be minimized.*
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> *Before Borlaug died in 2009 he spent many years campaigning against those who for political and ideological reasons oppose modern innovation in agriculture. To quote: "If the naysayers do manage to stop agricultural biotechnology, they might actually precipitate the famines and the crisis of global biodiversity they have been predicting for nearly 40 years."*

But we need to understand that the challenge of increasing food production at such a dramatic scale has led to the real and serious concerns covered in this paper regarding land use, water quality, and the increasing impact on our eco-systems from fertilizers, pesticides, insecticides and some of our existing farming practices. The good news is that similar to the genetic technologies Borlaug championed, there is a pipeline full of technological innovations for solving the array of competing and complex issues facing farmland owners.

While those of us in agriculture sometimes feel that society is unfair or they don't understand the issues we are facing, the reality is we are all interested in the same outcome. I've yet to meet a farmer who likes to see erosion on their farm, or a farmer who likes to see valuable crop inputs wasted on unproductive parts of the farm. I've also never met a person who likes to hear about malnutrition and starving children throughout the world. What's unique

about the societal issues facing agriculture is that everyone can win when we come together to implement workable solutions to solve these 'wicked problems.' The questions become: How do we execute? How do we incorporate socially responsible practices into our current production models? And who pays to farm in a socially responsible manner?

The silver lining with the societal issues facing agriculture is that it is forcing landowners and farmers to come together to find and implement the answers. With modern technology we can answer the call to feed 9 billion people but do so in a manner that protects the environment. We can produce more on fewer acres, spend less money doing it, improve profitability and protect the environment all at the same time. We shouldn't resist this movement - we should embrace it.

The current cash rent arrangement many landowners utilize for return on their investment has allowed both owners and operators to take their eye off the ball when it comes to managing land in a socially responsible manner. When the focus of the owner becomes maximizing rent it creates a misalignment of goals between the farmer and the landowner. Both are thinking short-term and that misses the big picture. Superior appreciation will provide a greater portion of total return for the owner than the portion from higher cash rents. And superior appreciation comes from long-term strategies addressing conservation, soil protection, water quality improvement, fertility increases and other practices associated with sustainability. While the farmer is a benefactor from these practices, the biggest winner is clearly the landowner. By incorporating these practices into their expectations and lease terms the owner and operator can become better aligned.

With the changing demographics in land ownership there is a tremendous opportunity for the next generation of landowners to focus on managing for appreciation and creating sustainability. In my home state of Iowa the market cap of all the cropland is $250 billion. Given the demographics outlined in this paper we expect roughly fifty percent of that $250 billion to change hands in some fashion during the next twenty years. This is an astonishing amount of wealth transfer and it will test the resiliency of agriculture as the level of control by absentee owners expands. It also represents an incredible opportunity for my generation to take the land which the generations before worked so hard to put into production and to now incorporate today's technology into our management practices. This combination of new capital and adoption of new technologies will be instrumental in meeting the challenges of the future. The farmland asset class is maturing and the next generation of landowners will have high expectations for their investment; including sustainability, annual income and appreciation.

I'm excited to be a part of this era of social responsibility in farmland investing. While this topic can be the subject of debate and create awkward conversations; I'm convinced society, farmers and landowners are more in alignment than one might expect. My experience growing up in the midst of an active farming operation and ag-business gave me true appreciation for the land, and an acute understanding that everything starts with it. The issues discussed in this paper are reflective of my own life experiences of growing up and watching the farmland market evolve. I've had the great privilege to interact with farmers, politicians and landowners from all around the world. Whether you are farming in Africa, South America, Ukraine or in the heart of the United States these principles apply.

We started this paper with these questions: How will the world feed nine billion people? How will the world feed nine billion people in a manner that protects or minimizes the environmental damage caused? How will the world feed nine billion people accounting for the impact on local producers and landowners? And, how will the world produce enough food to feed nine billion people at a price everyone can afford?

I hope we provided some food for thought on how we can use science and technology to farm in a sustainable manner and still meet the call to feed 9 billion people. The technology is available. We now need politicians, farmers, landowners, the media and society to work together to take a reasonable approach in addressing these issues. My generation, much like generations before mine, will have an opportunity to hand off some of the most productive and well cared for land in the world - and in a condition that is more productive than it was before.