PROJECT 2025

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There is universal agreement that agriculture is changing and growing. In Michigan, it is apparent that those changes will impact every crop grown here, the livestock, dairy and poultry sectors and every business that helps with production or handles what is produced. For those who doubt this, history of the past few years is evidence of profound change in how animals are raised, crops are grown and the challenges facing grain handlers, agronomy suppliers and others.

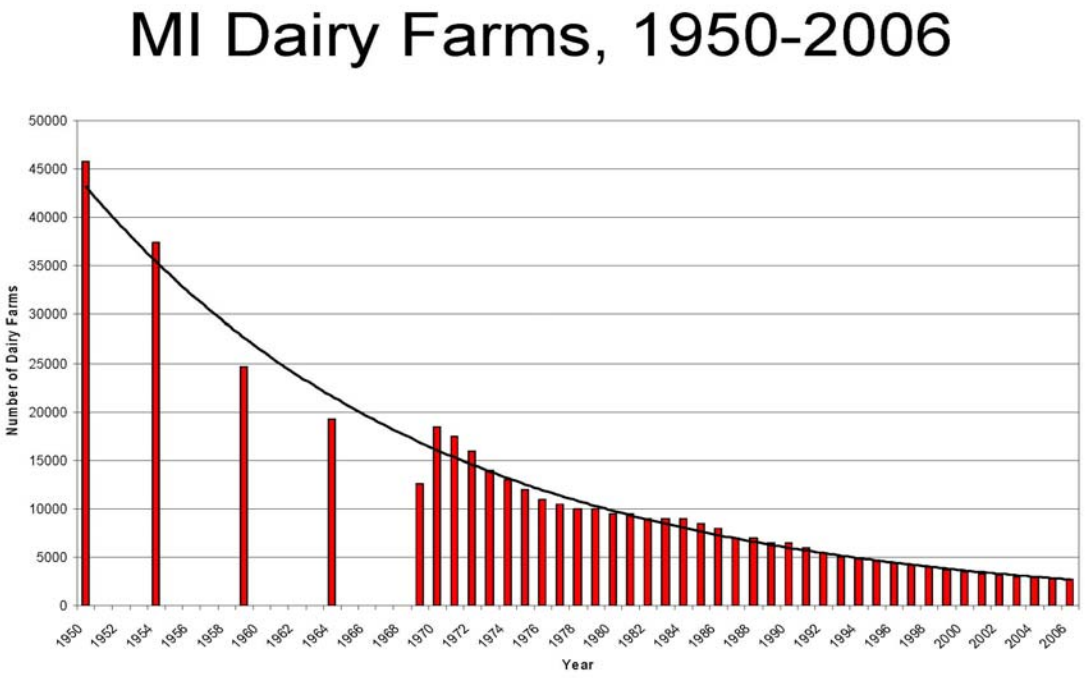
Change is here to stay, and if one is to believe technology leaders in agriculture, it will only accelerate. With this in mind, the Michigan Agri-Business Association embarked on an ambitious and wide-ranging analysis of Michigan agriculture, including trends in the industry and how that direction will impact both farmers and agri-businesses. This analysis, dubbed Project 2025, also attempts to project what will happen in terms of production, yields, and the infrastructure necessary to manage these developments, as well as the policy action to help make this growth happen.

For perspective, it is necessary to look at a bit of history.

CONCENTRATION AND THE LIVESTOCK INDUSTRY

There have been several major developments in Michigan agriculture, many mirrored in other states in the United States. In Michigan, the shift from a state of small livestock and dairy producers to larger operations happened much more quickly than in other states. The global reasons for this included more complex nutrition strategies, less land for feed production -- in particular forages -- and basic economies of scale. As the need for expensive cooling tanks in the dairy industry surfaced, some farmers with small operations exited the business. As economies of scale in the broader livestock and poultry industries became more and more evident, even more left, spurred by buyout programs, etc.

These factors existed in all states, but in Michigan, another tragic development forced many animal producers, especially small operations, out of business through no fault of their own.



Graph provided by: Wendy Powers, Michigan State University

The PBB (polybrominated biphenyl) debacle in the late 1960s and through the mid-1970s where this fire retardant was mixed by mistake with livestock, dairy and poultry feed by the major feed supplier in the state at the time, ruined many livestock and dairy producers, many never to surface as farmers again.

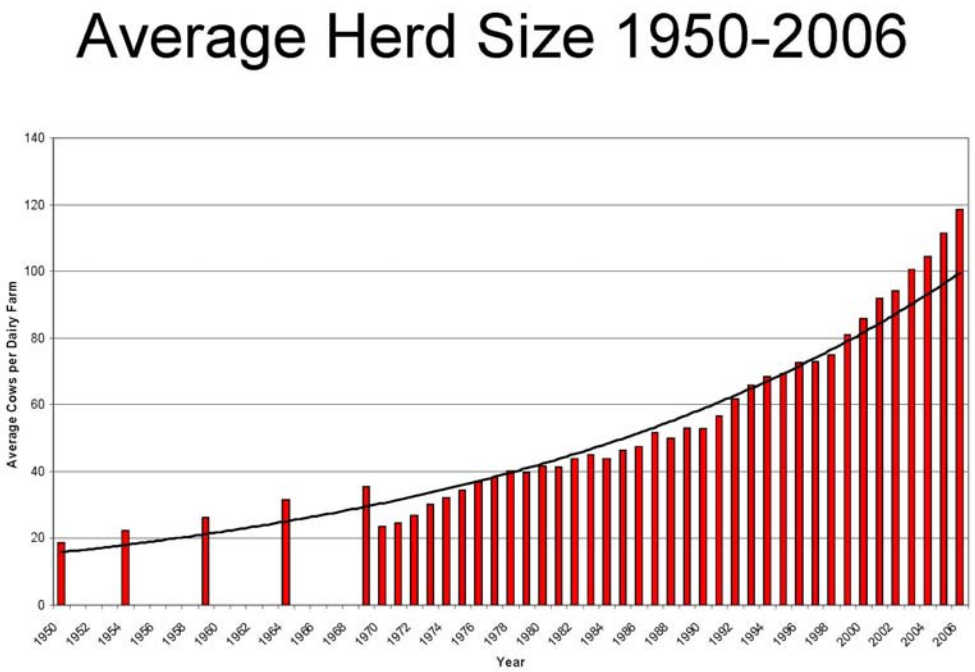
This development also led to the demise of several smaller grain, agronomy and feed cooperatives in the state, many that consolidated with privately held agri-businesses. While there are several strong cooperatives operating in Michigan today, as a percentage of the overall business, cooperatives are a much smaller factor here than in many other states. In addition, not only did the major feed supplier leave the market, so did the major agronomy supplier and grain handler, as all had operated under the same umbrella, which had become tattered and torn by PBB.

Cooperatives in towns such as Leslie, Williamston, Howell, Fowlerville, Chesaning, St. Johns, Hemlock and others passed from the scene, either to be purchased by other businesses, or farmers to operate for their own use. There was also the natural impact of poor business decisions, and urbanization on some of these cooperatives, as well as other small agri-businesses, but the fact is that dozens no longer exist.

The age of consolidation in agriculture at both the farmer and business level began early in Michigan!

Coupled with this, a significant development in the broader industry was that larger dairies meant less pasture-based dairying, meaning that pasture land was either converted to crops or left idle. While cow numbers also fell during this cycle, production

technology drove milk production per cow to such a level that overall milk production kept pace with historic levels. Milk production per cow soared in Michigan!



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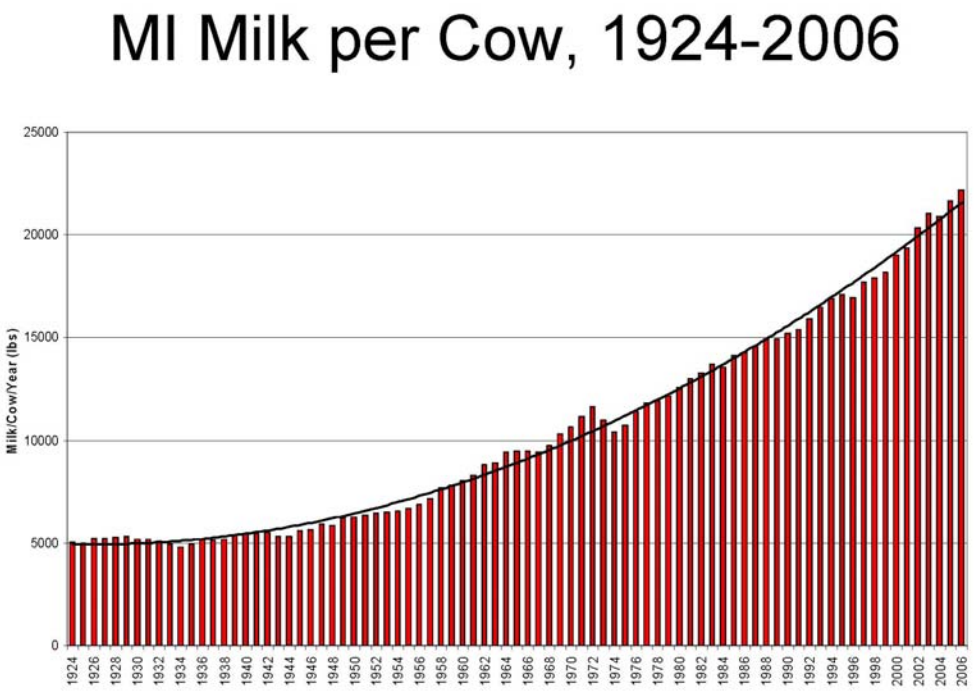


Graph provided by: Wendy Powers, Michigan State University

This also meant that as smaller dairies fell by the wayside, so did production agriculture in some parts of the state, especially in the northern part of the Lower Peninsula. As dairy went away, so did agriculture. The Northern Michigan countryside is littered with abandoned farmsteads that sport silos used for dairying and livestock production in days gone by, but as forage-based agriculture and smaller dairies passed, so did those farms.

Hundreds of thousands of acres, again particularly in the northern part of the state, have laid idle for a generation or two as crop production technology missed the opportunity.

In other parts of Michigan, as forage-based agriculture left the scene, other crops filled those acres. Sanilac County serves as a great example of this changing face of agriculture. In 1960, there were 89,000 acres of hay in the county, but only 47,500 acres by 2004. Those former hay and pasture acres are now planted with corn, soybeans, sugar beets and other crops.

THE EVOLUTION OF DIVERSIFICATION

A second major trend over the past several decades has been the move away from diversification on several farms in Michigan.

An example from Central Michigan involves dry beans. A hundred years ago, a few acres of dry beans were grown on almost every farm. Through the winter months, dry beans were commonly "hand-picked" by a workforce usually made up of women who ran treadle machines in grain elevators and cooperatives from Leslie to Pigeon and Sandusky to Ionia to sort good beans from bad.

Just in this industry, the consolidation – and decrease - in acreage over the past 50 years has been profound. Though the production area for dry beans largely moved further west, generally to the Red River Valley of North Dakota and Minnesota, and even now is continuing to move further north, this time to the Manitoba and Saskatchewan provinces of Canada, the reasons for this trend are very telling and instructive.

Genetic advances (and this is a term that will be widely used in the following pages) especially in corn, soybeans, and more recently in sugar beets, have rendered dry beans an "also ran" in the race for acres in Michigan's Thumb and Saginaw Valley.

A critical occurrence about 50 years ago regarding the development of new seed varieties was the commitment by private companies to fund seed research. DeKalb, Pioneer, GLH, Garst and hundreds more created their own seed research and development programs, based on traditional crop breeding techniques. These programs moved the bar much higher than had ever been established by old-line "public" breeding efforts. The creation of private seed lines, and enforcing patents and other protections against infringing on that new seed meant companies had created a "profit center" where none had existed previously. As that seed performed better than public varieties, these companies thrived!

The intensity of the race or competition for acres is a relatively new phenomenon in Michigan agriculture, but has become especially important in the last decade or two. Simply put, farmers make cropping decisions based on just a few major factors, including the potential or "guaranteed" profit per acre (assuming normal weather, etc.), ability to manage or mitigate risk, ease or simplicity of management and upside market potential. Crop rotation is also an important factor in a farmers cropping decision, but more and more often, rotation is less of a factor.

Bottom line, in the case of dry beans, there has been incremental yield advances, but no advanced genetic improvement on other production issues such as weed, insect or disease control, or in a broad sense the ability of the crop to withstand extreme weather (risk management). In many operations, dry beans, as with some other crops, are less attractive as an option than corn or soybeans.

One of the great success stories in Michigan in terms of crops is soybeans. The growth in acreage in the past 50 years is nothing short of phenomenal. Genetic advances which facilitated superior weed control (Roundup Ready® technology) created a big advantage for soybeans over some other crops.

Michigan Historic Soybean Acreage and Yields by Year*

Year	1970	1980	1990	2000	2010
Acreage	515,000	980,000	1,150,000	2,050,000	2,050,000
Yield	26.5	33	38	36	43.5

*Source USDA-NAAS

Michigan has also seen other crops, in particular specialty crops, challenged as the risk associated with their production exceeds the potential profit.

YIELD

Yields for major field crops, especially in the past several decades, have been steadily increasing with no indication of slowing in the future. Many factors have contributed to these yield increases, including the change from open-pollinated to hybrid corn, advanced genetic developments, improved crop nutrition (fertilizer) strategies, targeted pest management and increased plants per acre.

The introduction of commercial corn hybrids dates back to the 1930s. Since then, corn yields in the United States have trended upward significantly. Additionally, yield advances can also be traced to the increased use of inputs such as fertilizer and pest control. Since the 1980s, corn yields have continued to increase while fertilizer application rates have actually declined because of site specific agriculture and other crop nutrition advances.

New crop varieties today are primarily accomplished through highly technical breeding programs and the use of biotechnology. Germplasm is the basic genetic information in a seed that influences the growth and development of the plant.

Germplasm for different varieties and types of crops may vary in pest and disease resistance, drought tolerance, color, size, yield potential, and many other characteristics. Long before modern biotechnology, plant breeders worked to improve germplasm to create seeds with the best combination of characteristics to deliver the best yield possible for the soil and climatic conditions where they would be grown, but that was done just through observation and physical selection.

No longer!

The methods used today are much more sophisticated. Marker-assisted breeding, for example, allows breeders to use a blueprint of the genome to select seed with the most desirable properties to be introduced into a plant. This method is much faster than traditional breeding and has nearly doubled the rate of yield gain, when compared to traditional breeding alone.

Biotechnology is an even more direct approach than breeding. Biotechnology allows scientists to incorporate desirable genetic material or traits directly into the germplasm. This in turn allows for the creation of plants with traits that would be difficult, if not impossible, to achieve through traditional breeding programs.

In some genetically modified (GM) crops, the genetic material originates from a totally different plant species. The most common traits in GM crops are herbicide tolerance and insect resistance. These new plants contain genetic material either from common soil bacteria or a bacterium that attacks certain insects. GM crops are also credited with decreasing pesticide and fuel use, facilitating conservation tillage practices that reduce soil erosion, improving carbon retention, and reducing greenhouse gas emissions. Not only do GM crops reduce inputs, but they are better for the environment.

Every year, agricultural technology companies continue to improve germplasm and develop GM traits designed to directly increase yield, and more.

With all of this being said, the rate of increase in yields for corn and soybeans in major production areas is predicted to increase even faster than they have in the past 50 years. Since the 1970s, corn yields in Michigan have increased from 81 bushels per acre to 153 bushels in 2011. As scientists continue to improve on plant breeding and biotechnology, yields will rise substantially, and potentially reach 250 bushels per acre by 2025. This means an extra quarter-billion bushels of corn produced annually in Michigan on just the acres used for production in 2010.

Another major factor impacting corn and soybean production is the development of shorter-season (faster maturing) varieties that also have solid yield performance. Historically, shorter-season varieties were poor performers. In order to achieve yield, farmers often pushed the envelope by trying to grow longer maturing varieties, but often suffered frost and freeze damage, rendering the crop unsuccessful.

That is the major reason why those acres in Northern Michigan abandoned during the small livestock exodus did not shift to other crop production. Crop varieties that would mature consistently in the shorter growing season of Northern Michigan with a reasonable yield simply were not available, until recently.

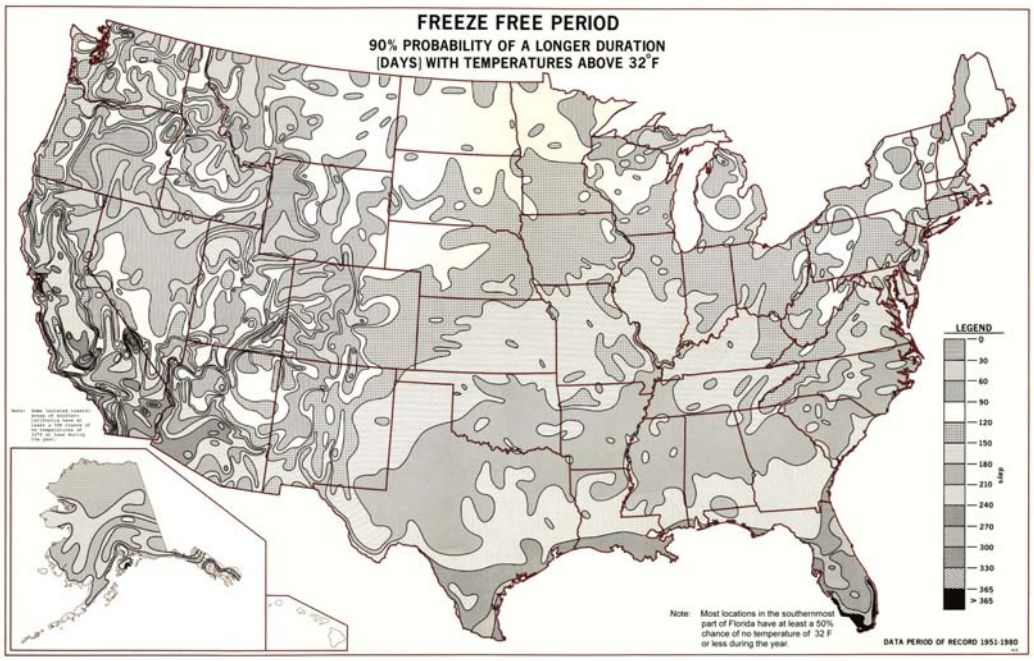
That has all changed today with biotechnology and advanced breeding programs, and that fact will have a significant impact on Michigan agriculture in the future.

CLIMATE AND WEATHER

The amount of greenhouse gases in the atmosphere has increased in the past 200 years, and the majority of scientists agree that the increases in greenhouse gas levels are causing the Earth's average temperature to rise. Increases in CO2 concentrations in the atmosphere are an important factor that can lead to increased yields for certain crops.

Michigan crops such as wheat, soybeans, and corn use one of two types of photosynthesis: C3 or C4. The difference between these two classifications of plants is the way in which the plants use carbon dioxide in their growth process. C3 crops such as soybeans and wheat respond more aggressively to increased CO2 levels, resulting in increased yields. C4 crops such as corn, however, are less responsive to increases in CO2 levels.

In recent decades, Michigan has experienced a noticeable increase in average temperature, extreme weather, and above average variations in both summer and winter precipitation. All of these factors have a direct impact on Michigan agriculture. Crop yields are highly sensitive to changes in temperature, carbon dioxide (CO2), water availability, and the frequency and intensity of extreme weather.



Source: National Climatic Data Center, National Oceanic And Atmospheric Administration

Michigan's growing seasons vary in length due to the Great Lakes, and different latitudes and topographical elevations. In turn, the length of the growing season in the northern part of the state is considerably shorter compared with that of the southern part, but there are even dramatic differences in temperatures in areas just a few miles apart, as shown below between Posen and Gaylord, Michigan.

One of the most important effects of an increase in temperature is a longer growing season. This is especially true in northern Michigan, where there are relatively cool spring and fall temperatures. A longer growing season allows for management flexibility, reduces the risk of early frost, and allows for longer-season crop varieties to be planted. This general warming trend, coupled with improved short-season varieties, will allow crops typically planted in more southern areas to be planted farther north, including corn and soybeans.

Posen, MI Temperature by Month*

Month	Avg. High	Avg. Low	Mean	Avg. Precip.	Record High	Record Low
Jan	28°F	13°F	21°F	1.81 in.	55°F (2005)	-24°F (1982)
Feb	31°F	13°F	22°F	1.49 in.	60°F (2000)	-37°F (1979)
Mar	38°F	20°F	29°F	1.68 in.	75°F (1990)	-14°F (2003)
Apr	52°F	31°F	42°F	2.38 in.	93°F (2002)	2°F (2003)
May	64°F	40°F	52°F	2.81 in.	95°F (2006)	25°F (2005)
Jun	74°F	51°F	63°F	3.02 in.	100°F (2006)	30°F (1983)
Jul	79°F	57°F	68°F	3.02 in.	100°F (1999)	41°F (2000)
Aug	78°F	56°F	67°F	3.80 in.	100°F (1988)	33°F (1982)
Sep	70°F	49°F	60°F	3.04 in.	95°F (1999)	29°F (2000)
Oct	57°F	39°F	48°F	2.90 in.	87°F (2002)	20°F (1992)
Nov	44°F	30°F	37°F	2.26 in.	76°F (1990)	4°F (1995)
Dec	33°F	20°F	27°F	2.06 in.	63°F (2001)	-22°F (1983)

*Source: The Weather Channel, LLC

Gaylord, MI Temperature by Month*

Month	Avg. High	Avg. Low	Mean	Avg. Precip.	Record High	Record Low
Jan	25°F	10°F	18°F	2.91 in.	53°F (1996)	-32°F (1982)
Feb	27°F	10°F	19°F	2.09 in.	58°F (1984)	-37°F (1979)
Mar	38°F	18°F	28°F	2.28 in.	76°F (2000)	-27°F (1984)
Apr	53°F	31°F	42°F	2.52 in.	88°F (1980)	-4°F (1982)
May	65°F	42°F	54°F	3.08 in.	92°F (1977)	18°F (1955)
Jun	75°F	52°F	64°F	2.87 in.	95°F (1971)	22°F (1958)
Jul	79°F	57°F	68°F	3.02 in.	97°F (1977)	33°F (1983)
Aug	76°F	55°F	66°F	3.65 in.	99°F (1955)	26°F (1982)
Sep	68°F	48°F	58°F	3.77 in.	96°F (1953)	22°F (1957)
Oct	55°F	36°F	46°F	3.70 in.	85°F (2007)	10°F (1969)
Nov	41°F	26°F	34°F	3.28 in.	75°F (1978)	-7°F (1951)
Dec	29°F	17°F	23°F	3.11 in.	65°F (1951)	-27°F (1983)

*Source: The Weather Channel, LLC

TRENDS AND PREDICTIONS

So what does all this mean?

Yields:

Most agricultural experts predict that genetic advantages and advances will continue, especially in corn and soybeans, likely at an even more rapid pace than during the past decade. Wheat and other crops will also benefit. Every year there are more companies involved in this space, and as success from their work comes to market, farmers and the industry will benefit in a variety of ways.

These advances will deliver traits that provide deliverables in crop growth and production that are currently either in the first generation, or may not even be understood. Nitrogen fixation and more efficient crop nutrient use (potentially less fertilizer use), drought tolerance and better water utilization, yield increases, crop maturation characteristics (maturity and crop dry down) and others can be expected in the next decade.

Specifically, the two major corn and soybean genetic (seed) companies, along with most other companies that provide seed, predict that by 2025, Michigan may well see an average corn yield of 250 bushels per acre. In addition, soybean yields will increase during that time frame, along with wheat, with that industry now accepting genetic enhancement as a tool for new variety development.

Interestingly, in the wheat sector, several major companies, including Bayer and BASF, in addition to the two traditional leaders in genetics, Monsanto and DuPont, and others have created significant programs for trait and variety development.

The point of all of this is that with biotechnology advances, especially with shorter-season crop varieties, climate change and accompanying longer growing seasons make farming in northern Michigan a more significant opportunity. This trend will allow for production on thousands of acres in the years to come. As the acreage expands, and yields increase, this development will become a major driver of the economy and rural development in northern Michigan.

The Quest for Farmland:

Historically, nearly 80 percent of Michigan's farms have been located in the southern half of the Lower Peninsula because of advantageous soil and climatic conditions, and a solid agricultural infrastructure. As yields, demand, and farmland prices continue to increase and farmers want more land, experts in the industry anticipate production to expand farther north.

Farmers have little or no control over climate and topography, and the wide range in the length of the growing season across the state plays an important role in determining production areas and land values.

Soil is also a very important factor in determining the type of agricultural production in an area, as well as the productivity and value of farmland. Michigan soils vary not only chemically and physically, but also in topography, drainage and the accessibility of water for irrigation. Land in the ancient lake beds range from 580 to 800 feet above sea level to about 2,000 feet above sea level in the Upper Peninsula. Topography is an important factor in determining the best of crops to produce, as air drainage (to avoid freeze and frost), water drainage, soil erosion, and often the size and type of equipment that can be used efficiently on the land.

As agriculture in Michigan has changed, and the demand for land increases, farmers have tended to adjust to different climates and weather conditions. Clearly genetic advances and climate change will benefit the state's agricultural sector in many ways.

The most obvious impact involves Northern Lower Peninsular (NLP) farmland prices. The value of farmland in most parts of the state is influenced by both the agriculture and non-agricultural sectors. Except for certain areas of the NLP (Traverse City, lake-front property, etc.) there is little impact on land values from urbanization, though there is considerable interest in land in that region for recreational uses such as hunting, etc.

Both farmland prices and lease rates for agricultural land in traditional production areas of Michigan, particularly in the Southern Lower Peninsula (SLP) in the past five years have increased dramatically. Several attributes, including soil type and topography, drainage (tile) water availability for irrigation, proximity to other land owned by an individual farmer and other factors influence those rates, but in some situations, farmland prices have increased as much as 100 percent or more, depending on the area and the competition among area farmers for that land.

Michigan Farmland Values Per Acre in Dollars*

Region	2000	2005	2011
Southern Lower Peninsula	1,839	2,864	3,764
Northern Lower Peninsula	1,143	1,719	1,847
High Production Areas	1,800	2,700	4,300

Michigan Farmland Rental Rates Per Acre in Dollars*

Region	2000	2005	2011
Southern Lower Peninsula	83	87	126
Northern Lower Peninsula	34	44	58
High Production Areas	90	100	135

* Tiled land, Source, Michigan State University

The irony is that over the past several decades in the SLP, until the global economic downturn of the past few years, urbanization and development pressure were the most significant drivers of land prices. Today, some of that land purchased by developers for speculation has been returned to production agriculture.

There is no question that the single most significant impact on land prices today is production agriculture.

As prices of farmland in the SLP have increased, farmers and others have looked north to find farmland for production and investment (for use as agricultural land, not development or recreation). Traditional production hot spots in the NLP have seen farmland prices increase even more dramatically.

Areas such as Hillman/Posen/Long River, Falmouth, Gaylord, etc., have been "found" by farmers, particularly from the SLP. As these areas have been found – that in reality were never lost - land prices have increased, though not to the levels seen in the SLP. Five years ago, land in these areas would tend to sell in the range of $1,000 - $1,500 per acre, and today those values have risen to between $2,000 – 3,000 per acre, depending on all the factors previously discussed.

Specialty Crops:

With more than 200 different commodities produced in Michigan, we are the second most diverse state in terms of agricultural production in the United States. Much of this diversity has been driven by Michigan's soils, topography, drainage (air and water) and climate, especially microclimates.

Microclimates exist because of proximity to the Great Lakes, in particular Lake Michigan and the Saginaw Bay, and have led to the development of a vibrant fruit (apples, cherries, etc.) and other crop sectors on the western edge of the state's Lower Peninsula, and a major sugar beet and dry bean production area surrounding the Saginaw Bay.

While the list of major commodities produced here is led by dairy, prices for corn, wheat and soybeans play an important role in determining the value of farmland, along with some specialty crops and particular production systems.

Specialty crops face serious challenges because many, particularly fruit and some vegetable crops face more risk in terms of production than commodity crops, coupled with the fact that there has been little if any attention paid to these crops by companies involved in the genetics industry. The new price paradigm for corn, soybeans and wheat presents the greatest challenge to specialty crop acres, however.

Because genetic advances of the past decade have been largely void in the specialty crop sector – often because companies involved in those businesses have not wanted to be

"tainted" with biotechnology – specialty crops have not seen the gains in yield, risk aversion, production advances and other improvements the way commodity crops have.

One specialty crop sector that has embraced biotechnology, the sugar beet industry, has thrived with new varieties, production technology and yield. Producers have benefitted with a reliable market and solid industry.

By contrast, the dry bean business has resisted biotechnology, and the impact caused by increasing commodity crop yields, reduced production risk and higher prices for commodity crops have put dry beans at a considerable production disadvantage. This has meant that the industry has had to raise prices significantly per production unit (hundredweight) in order to encourage farmers to grow dry beans.

In the future, this seems to be an unsustainable trend for the industry, as foreign competition where producers are less sophisticated and commodity crops are less of a factor, may become a dominant force in crop supply.

In addition, dry beans are essentially a "free market" crop, meaning that there is no futures or exchange market where farmers can sell dry beans every day, forward contract, or hedge their exposure. They can only contract beans if the handler offers a contract, which is usually backed by an end user. This means that there is considerable inherent risk in dry bean production – and pricing - if a farmer decides to plant without a contract. This is an increasing problem as farmers engage in more sophisticated risk and pricing management strategies.

This situation is mirrored with many other, smaller acreage specialty crops that will likely face challenges similar to those facing the dry bean sector.

In addition, because of significant climate events, some specialty crops are facing the pressure of land owners – farmers – wanting more certainty with their crops. Frost and freeze damage in recent years, in particular on tree and other fruit crops and some vegetables, are causing farmers to take a look at commodity crops (corn, soybeans and wheat) as an option.

Also, labor requirements for some specialty crops are an important factor. As Congress continues to struggle with immigration and migrant worker issues, farmers who rely on that labor to plant, care for and harvest their crops are in limbo. They can't raise those crops without labor, but zealots on the issue won't allow a solution. In addition, with the freeze in 2012, most farmers who produce apples or cherries didn't need their traditional labor source, so those workers who usually work for Michigan farmers went elsewhere or stayed home. There are questions about what may happen next year, 2013, when farmers expect a more normal crop, and they will need that labor. Will they come back, or will they even be able to?

Though not a stampede, every year some farmers question their cropping decisions based on labor issues. Absent a comprehensive solution on the migrant labor issue,

or additional mechanization, labor dependent specialty crop production will leave the state.

Michigan's Unique Issues:

With the foregoing being said, there are few states in the Midwest that can claim these same set of circumstances. All states will experience some change in production patterns and their level of production. All will benefit from enhanced genetics, new traits delivered to the producer, and improved agronomy technology, both product and delivery – and all states will see production increases.

We argue though that no state will see the fundamental changes we expect to see in Michigan agriculture. Significant developments for Michigan agricultural growth include:

- **New or previously abandoned acreage returning to production**
- **Challenges to specialty crop production, including the return of some of those acres to commodity production**
- **An enhanced and longer growing season because of climate change**
- **Farmers looking to manage their risk more effectively with commodity crop production**

In addition, labor issues do not affect many farmers in other states. Only in Michigan will that issue drive a change in acreage and crop production patterns.

Perhaps the most important attribute that defines Michigan agriculture however is the entrepreneurialism embodied in the industry. From leadership in diversity of the business to innovation and investment, Michigan is indeed unique, and in the future, that spirit will drive our continued success.

SO WHAT'S GOING TO HAPPEN?

Yields

The first premise is that as we look toward 2025, crop yields will increase. In 1970, the average corn yield in Michigan was just 81 bushels per acre, and there were just 1.73 million acres grown in the state. Over the intervening 40 years, that yield increased to an average of 150 bushels per acre, on about 40 percent more acres.

Historic Michigan Corn Yields*

Year	1970	1980	1990	2000	2010	2012
Yield	81	95	115	124	150	153

* Bushels per Acre, Source: USDA-NAAS

As previously stated, improved seed, better agronomic strategies and new technology drove that increase. Looking forward, we expect the average corn yield

in Michigan to jump even higher, and we predict that by 2025, the average corn yield in Michigan will reach 250 bushels per acre.

In addition to genetics, advances in how farmers "farm," will help boost yields. Both from an equipment and crop management perspective, technology beyond the seed will help jumpstart yields. Increasing plant populations, efficient and sustainable soil management and precision-based fertility and crop planting decisions will maximize yield on every soil type. Better ways to manage crop residue will help soil structure, and farmers can limit weather risks by adding more irrigation and tile, as well as even more strategic variety selection based on soil type and soil water-holding capacity.

Placing the proper genetics in the best situation is the focus of DuPont Pioneer's "Right Product, Right Acre" approach and Monsanto also has an Integrated Farming Program with similar goals. Basically these programs call for variable rate populations and even changing crop varieties based on soil type in a field.

There are caveats here, as there is with any prediction, including the fact that we will be bringing land into production during the same period that may be less productive than land currently being farmed, and that the transition of land from idle to production itself presents special challenges. There will also be other advances such as more irrigation, double-cropping (soybeans planted following wheat harvest) and more.

Irrigation in itself is a major opportunity that is expanding very rapidly across the state. Both pivots and travelers are popping up in increasing numbers. Water availability is now a significant factor when farmers consider purchasing land. This will become even more important as we approach 2025.

The projected increase in yield, as shown below will certainly see challenging years, as was the case with the drought in 2012, but the fact is that even in 2012, the corn crop exhibited tolerance to that drought, and serves as yet another example of the benefits of improved genetics.

Projected Michigan Corn Yields*

Year	1970	1990	2010	2015	2020	2025
Yield	81	115	150	180	230	250

* Bushels per Acre, Source of historical data: USDA-NAAS

More challenging than corn over the years has been the effort to increase soybean yields. While there have been gains, they have come more slowly than in corn.

Historic Michigan Soybean Yields*

Year	1970	1980	1990	2000	2010
Yield	26.5	33	38	36	43.5

* Bushels per Acre, Source: USDA-NAAS

We do believe that soybean yields will increase as we advance toward 2025, though as a percentage, much more slowly than corn. It should also be noted that soybean varietal

development has also recently focused on good yielding, shorter-maturing varieties. This means that we will likely see more soybean acreage further north as the future unfolds.

Projected Michigan Soybean Yields*

Year	1970	1990	2010	2015	2020	2025
Yield	27	38	45	48	57	65

* Bushels per Acre, Source of historical data: USDA-NAAS

Wheat has demonstrated significant yield improvements in the past 40 years, and with the investments currently being made in biotechnology, more significant increases can be expected in the future.

Historic Michigan Wheat Yields*

Year	1970	1980	1990	2000	2010	2012
Yield	39	44	55	72	70	74

* Bushels per Acre, Source: USDA-NAAS

Projected Michigan Wheat Yield*

Year	1970	1990	2010	2015	2020	2025
Yield	39	55	70	85	90	110

* Bushels per Acre, Source of historical data: USDA-NAAS

Considering the yield projections above, it is interesting to put them together, and analyze what that could mean to overall bushels of commodity production

Projected Crop Yield Increase by Year*

Crop	2010	2015	2020	2025
Corn	150	180	230	250
Soybeans	45	50	57	65
Wheat	70	85	95	110

* Bushels per Acre

It gets even more interesting when analyzing the impact on production, just using the 2010 crop acreage ratio for each crop.

Projected Production Increases*[1]

Crop	2010 Acreage*[2]	2015 Production	2020 Production	2025 Production
Corn	2,450,000	441,000,000	563,500,000	612,500,000
Soybeans	2,100,000	100,800,000	119,700,000	136,500,000
Wheat	510,000	43,350,000	48,450,000	56,100,000
Total Crop Production		585,150,000	731,650,000	805,100,000

*[1] Production Based on 2010 Acreage for Each Crop

*[2] Source: USDA-NAAS

This increase in bushels is significant enough, but with increased acreage, it becomes even more staggering.

Acreage

While yield increase itself will dramatically impact total commodity crop production in Michigan, acreage is also a critical consideration, as shown below from 1970-2010.

Michigan Corn Acres, Yield, and Production

Year	Acres	Yield*[1]	Production*[2]
1970	1,730,000	81	140,130,000
2010	2,450,000	150	367,500,000

Michigan Soybeans Acres, Yield, and Production

Year	Acres	Yield*[1]	Production*[2]
1970	515,000	26	13,390,000
2010	2,100,000	45	94,500,000

Michigan Wheat Acres, Yield, and Production

Year	Acres	Yield*[1]	Production*[2]
1970	495,000	39	19,305,000
2010	510,000	70	37,700,000

Michigan Corn, Soybeans, and Wheat Total Commodity Crop Production

Year	Total Commodity Crop Production
1970	172,825,000
2010	497,700,000

*1 Bushels per Acre
*2 Source: USDA-NAAS

It is interesting to note the change in corn, soybean and wheat planted acreage in Michigan in just the past 20 years. We have seen more than 650,000 additional planted acres of these crops in just this period.

Planted Acres of Michigan Commodity Crops*

Year	Corn	Soybeans	Wheat	Total
1990	2,400,000	1,150,000	770,000	4,320,000
1995	2,450,000	1,500,000	630,000	4,580,000
2000	2,200,000	2,050,000	530,000	4,780,000
2005	2,250,000	2,000,000	600,000	4,850,000
2010	2,400,000	2,050,000	530,000	4,980,000

*Source: USDA-NAAS

The question of projecting future crop acreage is in reality the most difficult to make. The easiest gains in acreage will come as owners of existing farms take out fencerows, clear woodlots and expand fields, but the larger area of acreage growth will occur in two different areas.

First, specialty crop production in Michigan is under serious pressure, especially those crops that require hand labor for planting, caring or harvesting. Coupled with the greater risk and management associated with these specialty crops and recent dramatic climatic events, there will be acres leaving production. In just the 10-year period from 1997 to 2007, almost 50,000 acres of production of the following crops were lost.

Acres of Production of Michigan Specialty Crops*

Commodity	1997	2002	2007
Apples	73,251	50,539	44,189
Tart Cherries	39,131	34,386	37,799
Sweet Cherries	11,345	10,082	9,295
Peaches	7,287	6,326	5,400
Asparagus	18,266	16,157	12,127
Onions	5,067	4,409	4,592
Celery	2,513	2,323	1,968
Carrots	7,080	6,047	5,499
Potatoes	46,105	48,840	42,267
Total Acreage	210,045	179,109	163,136

*Source: USDA-NAAS

When it comes to dry beans, the trend was even more devastating.

Michigan Dry Beans Planted Acreage*

Year	Acres
1990	350,000
2000	285,000
2010	236,000
2012	198,000

*Source: USDA-NAAS

In just the last 20 years, more than 150,000 acres have shifted away from dry beans, and the pressure on that crop is not abating.

So, in just specialty crops in the past ten years, 200,000 acres have moved to other crops, or been abandoned in the case of some tree crops. The point is that acreage is changing in Michigan, even in traditional production areas.

The second major area of acreage growth will happen in the NLP.

One of the conundrums in this scenario is that over the past several decades, the State of Michigan and federal government have acquired, under a variety of programs, hundreds of thousands, of acres of land that could be farmed all across the state. While restrictions have recently been placed on the state ownership of land, the impact of government

control of land is a major issue when determining how many acres might be farmed, especially in the NLP.

There have been several positive discussions with the State of Michigan regarding possibly using some state land for agriculture, but there are challenges as to the available land, and what restrictions might be placed on that opportunity.

In addition, how the land was acquired is also an issue. There are certain programs that facilitated land purchase by the government that will not allow agriculture or similar uses on those particular acres. The challenge is to identify the land that is available, and evaluate the potential for agricultural production. The Michigan Department of Natural Resources and Governor's office have pledged to help with this endeavor.

Bottom line: the land cultivated for agricultural purposes in the NLP –mostly on privately owned lands, but also on some state owned land -- will increase.

Considering all these factors, we make the following prediction regarding commodity (corn, soybean and wheat) acreage in Michigan.

Predicted Commodity Acreage in Michigan for Corn, Soybeans, and Wheat

Year	2010	2015	2020	2025
Acreage (Corn, Soybeans, Wheat)	5,060,000	5,225,000	5,350,000	5,500,000

Increasing cultivated land by 440,000 acres in the state, or almost 9 percent by 2025 seems to be a very reasonable prediction, given the situations and opportunities identified previously. Considering this suggested acreage increase, using yield numbers also projected previously, and the same acreage split (percentage planted to each crop) that existed in 2010, following is what that production estimate looks like:

Predicted Corn Acreage, Yield, and Production in Michigan

Year	**2010**	**2015**	**2020**	**2025**
Acreage	2,450,000	2,529,000	2,589,500	2,662,000
Yield*[1]	150	180	230	250
Production*[2]	367,500,000	455,202,000	595,562,000	666,500,000

*1 Bushels per Acre
*2 Bushels

Predicted Soybean Acreage, Yield, and Production in Michigan

Year	**2010**	**2015**	**2020**	**2025**
Acreage	2,100,000	2,170,000	2,220,250	2,282,500
Yield*[1]	45	50	57	65
Production*[2]	94,500,000	108,500,000	126,554,250	148,362,500

*1 Bushels per Acre
*2 Bushels

Predicted Wheat Acreage, Yield, and Production in Michigan

Year	2010	2015	2020	2025
Acreage	510,000	526,000	540,250	555,500
Yield*[1]	70	85	95	110
Production*[2]	35,700,000	44,710,000	51,323,750	61,105,000

*1 Bushels per Acre
*2 Bushels

Predicted Total Acreage and Production for Corn, Soybeans, and Wheat in Michigan

Year	2010	2015	2020	2025
Total Acreage	5,060,000	5,225,000	5,350,000	5,500,000
Total Production*[2]	497,700,000	608,412,000	773,440,000	874,967,500

*1 Bushels per Acre
*2 Bushels

This equates to more than a 75-percent increase in total grain production from 2010 until 2025, with the most gain coming in corn yields, 67-percent, and the lowest in soybeans at 45-percent, where as we mentioned earlier yields have been traditionally difficult. Wheat production also increases dramatically with most of that in out-years as the impact of biotechnology arrives in the wheat complex.

There are several things that will help increase production beyond just acreage and biotechnology, as well. These factors include more irrigation, better pest management and improved crop nutrition strategies, such as materials, timing of applications, micronutrients, and other practices.

We have seen in recent years the benefits of split and foliar applications of crop nutrients, as well as later season applications of fungicides and insect control plans. These strategies will continue to be refined as time passes, and more is learned about the genome of the corn, soybean and wheat plants.

In our attempt to evaluate the impact of these changes, we considered the following issues:

- Impact on Grain storage and handling
- Impact on agronomy supply
- Infrastructure
    - Transportation
        - Rail
        - Roads and bridges
        - Water transportation
    - Broadband
    - Utilities
        - Electrical service
        - Natural gas
    - Talent

IMPACT ON GRAIN STORAGE AND HANDLING

As grain production has increased in Michigan over the past four decades, added storage capacity has usually been built where there is already infrastructure for transportation, often along railroad tracks. As grain production continues to increase, the demand for storage space and grain handling capacity also will increase.

There will continue to be expansion of existing facilities in traditional production areas, as well as the potential for new plants in the SLP, but new facilities in the NLP must be built.

The irony is that some of that new capacity will be built where previously there may only have been a small railroad elevator built in the 1900s. These new facilities, in particular in the NLP, will likely be green field sites, and will all be built along railroads.

One of the impediments to past agricultural expansion in the NLP has been transportation and the fact that to get a load of fertilizer or deliver a load of grain is a half-day job.

The first brand new, grain handling facility in the NLP has already been announced, and is being built by Auburn Bean and Grain (ABG) in Standish, about 35 miles north of Bay City. Plans call for construction to start in fall 2012, and will initially include 2 million bushels of grain storage, with room to grow significantly as business increases. High-speed grain receiving and handling will be integral to the operation. The goal is to help get farmers back to their fields more quickly, rather than waiting in line to unload grain.

A major consideration in locating the ABG facility was railroad access. This new plant will be able to load 90-car unit trains with a 40,000-bushel-per-hour load out capability. They plan to receive wheat in summer 2013, and corn and soybeans that fall.

There are other plans on the drawing boards for grain facilities across the NLP, and some may also start construction in fall 2012. Beyond that, plans will take a bit longer to develop, but the trend is clear.

The greatest challenge for the traditional grain trade is that if they don't meet the challenge of expanding production both in the emerging NLP and in traditional production areas, farmers will build their own capacity, and probably create some new competition.

It is estimated that in the 12-state Corn Belt region, an additional 2.3 billion bushels of storage will be constructed by 2025. Prior to 2005, grain companies across most of the Midwest reported little growth, but the experience in Michigan has been much different. The benefits of biotechnology hit Michigan and the upper Midwest long before the "I" states saw significant yield benefit at least in terms of the dramatic percentage growth in yields. That meant that the building craze in Michigan never abated from the mid-80s and just slowed a bit in the early 90s. But since 2000, there has been a construction boom in Michigan's countryside for grain storage and handling capacity.

Perhaps the best example of that are the MAC facilities in Breckenridge. When these plants were constructed in the 1970s and 1980s, they were cutting-edge plants. The irony is today after several expansion projects, the capacity of those plants is more than double what was originally constructed, now close to 15 million bushels.

Even smaller elevators like those in the Brown Milling system in Rosebush and Shepherd have quadrupled their storage capacity in the past few years.

Michigan Licensed Grain Storage Capacity[*1]

Year	1990	1995	2005	2010	2012
Storage Capacity[*2]	156,102,193	147,442,329	150,000,000[*3]	169,167,934	225,830,492
Number of Facilities	349	326	228	221	228

*1 Source Michigan Department of Agriculture and Rural Development
*2 Bushels
*3 Estimate

The construction of storage space in Michigan will continue, but there are several questions about how much to build and where and how to build it.

Much of that decision will be determined by what others and other industries do. A significant driver will be the five producing ethanol plants in Michigan. With the Energy Act in 2005, which included a Renewable Fuel Standard (RFS) blending mandate, the race for ethanol production was underway. The RFS said that 7.5 billion gallons of ethanol was needed for blending in 2012, and by 2015, that number would increase to 15 billion gallons. This demand for ethanol resulted in a scramble to build ethanol production infrastructure.

Construction on Michigan's first ethanol plant began in 2001, as a stand-alone facility. One other plant was co-located with a major grain terminal when it was initially built (The Anderson's in Albion). Two others, POET Biorefining in Caro and Carbon Green in Woodbury, were initially built with little storage capacity. They have since built considerable grain storage, but nowhere near enough to handle their total annual usage. They, along with The Anderson's, still need to buy most of the corn they use throughout the year from commercial grain handlers and farmers. The remaining plants, Global Ethanol in Riga and Marysville Ethanol in Marysville, both still have very limited storage when compared to their daily usage, but if history is any indication, they both will build additional storage.

Since 2004, the U.S. ethanol industry annually uses roughly 30 percent of the corn crop for their production. In Michigan, the five plants use about 100 million bushels of corn annually and in reality only remove about 15 percent of the total corn production from

the feed market because they produce dried distiller grain, which is then used to replace corn in many livestock rations.

While we mainly focus on the ethanol plants in Michigan, the fact is that as a peninsula, we are very self-sufficient, and we see little grain moving north into the state (except near the border, to the Albion and Riga ethanol plants, or the White Pigeon Anderson's rail terminal), and mostly south by truck to The Anderson's in Maumee, facilities in northern Indiana on Lake Michigan, or more likely by rail to the southeast United States for feed use there.

The feed industry is also a major factor in the question of grain capacity. Livestock dairy and poultry production has been on the rise here in the last decade.

Large farms such as Sietsema Farms, Herbruck's Poultry Ranch (which just dedicated a brand new $11-million feed plant at its main production facility), VandeBunte's (Konos) and Schippers, along with several other large feeding operations, have built sophisticated grain facilities for their own use. Active Feed, Vita-Plus and other commercial feed suppliers are also very interested in controlling at least a part of their annual grain usage.

Another factor driving more grain production here is that Michigan historically had a wide basis, meaning that farmers usually sold their grain considerably below the Chicago price. With a more robust feed market and the new ethanol production, prices here are much more advantageous for the producer than they were 10 years ago. That has led to more corn production.

Another interesting twist in the need for grain handling and storage capacity is the fact that farmers have been building additional capacity at a faster rate than the commercial trade. On-farm storage works well for individual farmers to supply ethanol plants, as well as meet feed demand throughout the year. High commodity prices have also resulted in a more solid economic base in the producer community, which has enabled them to justify these facilities both operationally and economically.

Just as has always been the case with loading vessels on the lakes or at ocean ports, barges on the river system or unit trains at inland terminals, large commercial grain handlers still "move the crop." They facilitate the transfer of large quantities to distant users, whereas individual farmers cannot generally access that infrastructure.

As farmers get larger, and their needs greater, it is also more difficult for them to handle their own grain. This puts considerable pressure on commercial grain handlers at harvest as these large farmers deliver grain at a frightening pace. Multiple combines, grain carts in the field and several semis (often doubles these days) delivering to elevators has required grain handlers to step up their game.

One of the ironies centered on grain storage and handling is that with the dynamic ethanol industry and feed demand in the state, we need to keep more bushels here – in Michigan - than ever before. What that means is that the in-state use of corn in particular

is much stronger than in the past, and as the feed demand grows, which we are confident it will, we will need to keep grain here to meet season-long demand, rather than shipping the larger share of the production to other states to be fed to their livestock and poultry.

It is a vicious cycle for grain elevators: Build storage, add wet grain bins, expand dryer capacity, enhance receiving speed, and in which order. The irony is that the battle is never won. There is never enough storage as yields and production grow and farmers harvest faster and faster. Receiving is never fast enough and it does no good to receive grain if you can't get it through a dryer fast enough.

These are however, good problems to have. It means that we are a growing and thriving industry!

So what's ahead for grain storage? Facilities that are not located on a reliable transportation hub, usually meaning rail, will be the loser as investments are made in new facilities. Later in this document the entire matter of infrastructure and transportation will be explored.

Facilities located on reliable rail and have room to expand their sidings to handle 90-car unit trains will thrive, especially if the rail line itself can handle the newer jumbo cars.

Plants not so fortunately located may suffer a bit as car-size is moving larger and that is the same direction that owned car fleets (unit trains are often owned by the grain buyer from the other end of the transaction) are moving as well. If rail beds can't handle them, that will ultimately put the shipper/grain handler at a significant disadvantage.

It will not be uncommon to see facilities double in capacity in the next 13 years as larger crops hit every year. This will be especially true in the central part of the state where northern production will swell the grain handle, as well as existing local production continues to grow.

IMPACT ON AGRONOMY SUPPLY

There are really four parts of the agronomy world: fertilizer, seed, crop protection and application.

On the fertilizer side, the situation is fairly clear. More acres means more demand and more demand means more tons and more tons challenges the capacity to get fertilizer where it needs to be, when it needs to be there. With commodity acreage projected to grow 440,000 acres in Michigan, about 9 percent over current levels, tonnage will be an issue. It should be noted however, that a percentage of these acres, probably in the range of 10-15 percent of the increase, will come from specialty crop acres, so there really won't be much of an increase in use – if any - on those acres. Nevertheless, the projected acreage increase is still close to 400,000 acres, and much of that will be in the NLP, where there is minimal fertilizer capacity.

The more difficult issue than tonnage is having distribution where the demand is. It seems reasonable and highly probable that there will be at least one new agronomy plant built somewhere in the NLP in the next year or two, and likely that there will be satellite plants located in the north to make sure product is where it needs to be during season.

The irony is that this strategy will be contrary to the overall direction of major agronomy companies to build "super" farm stores, and rely on trucks to move the product. The problem in the NLP in particular, where the expansion in agronomy facilities will be necessary, is that the mileage is considerable. There will be major commodity production areas across the north centered generally near Lincoln, Alpena, Gaylord, Pellston, Falmouth/McBain and even in the Upper Peninsula on the Garden Peninsula and near Escanaba.

It is likely that the western UP business will be handled from Wisconsin, but tonnage for the Garden and eastern Upper Peninsula will come from the Lower Peninsula. The distances between these areas are considerable, and often in the past, have been handled by suppliers from the lower part of the state, sometimes even hauling application equipment north to get work done.

Obviously, some of the business in the NLP can be handled from existing retail locations in southern Michigan, but demand in the far north is difficult to service from 100 miles away!

It seems logical that with growing demand in the NLP that it will make sense sooner than later for a retail supplier to at least position fertilizer somewhere in the area. Sales and marketing will be the easiest issue as many farmers who will be active in the NLP are already there, or will come from the southern part of the state and they both already have existing relationships with retailers.

Application will be a struggle in the NLP, except for early season applications where an application rig could be hauled to the area. It seems likely that farmers themselves will have to handle in season applications, especially pest management materials, unless a retailer chooses to locate a piece of equipment in the area.

INFRASTRUCTURE

For Michigan's agricultural industry to continue growing at the pace it has been, and as we project, policy leaders and the Legislature must pay close attention to infrastructure issues that limit growth in some areas, threaten investments already in place and restrict our ability to compete in the global economy.

These issues cover a wide range from utilities, broadband access and transportation, especially rail issues, roads and bridges, and the opportunity to use water for both transportation and irrigation.

A recent study conducted by Informa Economics for the United Soybean Board says: "Decaying roads, bridges, railroads and transit systems cost the United States economy $129 billion annually." We have our share of problems in Michigan.

RAIL

Unlike some industries that can relocate, agriculture is tied to the land, and once a business is dependent on railroads for transporting their goods, they are captive, as well.

According to the USDA, Michigan grain handlers ship 15-30 percent of our annual grain production by rail. In the future, that will likely increase with the projected growth in production. Railroads are usually an efficient mode for transporting grain, especially as compared to trucks, but there are challenges on the horizon in some areas.

In order to completely understand the rail system in Michigan, it is necessary to examine history. Local, state and the federal government supported the development of railroads during the 19th century as they believed railroads were critical to attract business and help communities flourish. Railroads were very important for the early development of cities all across the United States. However, due primarily to competition in the mid-1870s, many local rail lines consolidated into larger rail systems.

Given the market power of railroads, they were the first industry to be regulated by the federal government under the Interstate Commerce Act of 1887. The Interstate Commerce Commission (ICC) imposed several regulations such as prohibiting price discrimination by location, commodity or distance. The Hepburn Act allowed the ICC to establish maximum rail rates, extended price discrimination regulation and suspended rate-change proposals for 120 days. Many of the regulations put in place by the ICC, including the control of entry and exit in the industry, resulted in railroads' inability to compete with new forms of transportation, in particular trucks.

In addition, many labor contracts those railroads agreed to with their unions created staffing and operational requirements that made sense for steam locomotives, but had little relevance in the emerging age of diesel or electric power units. This meant that even with a diesel power unit, a "fireman" was still required on board, and other arcane labor requirements and government regulations challenged the railroad's ability to compete with emerging competitive pressure.

Starting about 70 years ago, while operating under this myriad of regulations and agreements, and with the completion of the basic interstate highway system, railroads as we knew them were doomed. Larger and more efficient trucks that offered customers point-to-point pickup and deliveries exacerbated the railroads' problems. Trucks now provided a faster way to get from point "A" to point "B" than a train.

As a result many railroad companies during the period from 1970 through the 1990s went bankrupt, or teetered on the edge!

This brought about a second wave of consolidation, leading to various configurations of state or federally owned rail lines such as Conrail and Amtrak. Also, several railroad companies simply left the business, leaving miles of tracks abandoned.

During this period, hundreds of miles of railroad lines across Michigan, and thousands of miles of railroad in the United States for that matter, were abandoned and "harvested," meaning the rails were sold for scrap, ties sold for secondary uses and even the rock ballast, where there was some, was resold.

Before the Class One railroads sold those lines to the state or short-line railroad operators however, they often chopped off the end of the line so the buyer could not connect to any other railroad lines other than the seller. Then the right-of-way was often converted to a trail, which traversed farmer fields and factory sites.

Examples of this are rampant across the state, but none better than in the Thumb of Michigan where some lines run to within 20 miles of Port Huron from Saginaw and end, rather than continuing to Port Huron, which would make the line a through-line and connect with other railroads. Every line in Michigan's Thumb is a dead end! Trains run up and back on a single line to handle traffic, rather than from point to point. The same is true for lines that run up the central part of the state, with one ending in Alpena, another ending in Gaylord and a third ending in Petoskey, with a spur to Traverse City and yet another ending in Manistee.

It is also important to note that with the sale of the CSXT line that used to run to Midland from Flint, there are no Class One railroads operating in the state north of Flint, Lansing or Grand Rapids. In fact, the sale by Norfolk Southern (NS) of the lines from Jackson to Lansing to the Adrian and Blissfield Railroad, and the Michigan Main, from Detroit to Kalamazoo to the State of Michigan, essentially eliminates yet another Class One railroad from the state (NS), except for one line running south from Detroit to Toledo.

Short-line railroads generally do an excellent job for shippers, except for the limitations they have in making rates, which are captive to the Class One railroad where they connect and equipment (railroad car) moves, including unit trains where power connections are necessary.

Often because of the nature of their operations, their revenue opportunities are limited, and therefore they are not as profitable as necessary to maintain or improve lines as shippers or the railroads themselves would like. Short-line railroads do invest heavily in their railroads, but revenue to support major projects such as upgrading to accommodate jumbo hopper cars, improve track and rail to allow higher speeds, and more simply isn't available. As a result, many miles of some of the most critical railroads in agricultural areas now only allow very low speeds on their line, and the prospect for improvement to jumbo car status and higher speeds is not very good.

Class One railroads have been replacing traditional 263,000-pound (loaded weight) covered hopper cars capable of handling 100 tons of grain with 286,000-pound covered

hopper cars that can handle 111 tons. While these heavier cars provide a decrease in railroad cost per ton-mile for the larger railroads, they will cause a significant increase in operating and maintenance costs for the short-line railroads. While exact figures are hard to pinpoint, it is safe to estimate that the majority of short-line railroads in the state need significant upgrades in order to efficiently and safely handle the 286,000-pound cars.

Railroad bridges are another matter. Many if not most of those would also need to be upgraded for heavier cars. In a Kansas study, officials in that state estimated the cost of necessary upgrades to the lines and bridges would amount to $308.7 million, a sum that Kansas admits short-lines are unlikely to invest. We have reason to believe that Michigan short-line railroads are in a similar situation.

Source: Michigan Department of Technology, Management & Budget www.michigan.gov

Today, Michigan has approximately 3,900 miles of railroad tracks remaining, including three Class One railroads; Norfolk Southern, CSXT and Canadian National, two regional railroads, and 15 short-lines. The longest rail line still owned by the state runs through the middle of the state from Durand to northwest Michigan.

Access to rail is especially important for bulk commodities both inbound and outbound, including fertilizer to help grow crops and grain outbound. Simply put, if a location does not have rail service, it is the rare exception that an existing facility would see much expansion, or even less likely that a new grain or agronomy facility would be built there.

Examples of new or expanded facilities built on short line railroads today include Auburn Bean and Grain's two Oakley grain plants, their Hemlock facility and their new plant in Standish; Michigan Agriculture Commodities (MAC) facilities in Breckenridge, Brown City, Marlette, Newaygo and Middleton; virtually every location of the Cooperative Elevator Co. (CEC), including Pigeon, Akron, Elkton, Ruth, Sebewaing; and others.

These new or expanded facilities are designed to take full advantage of rail service, and many are expanding their car loading capacity in order to be able to handle 90-car unit trains, rather than the former industry standard of 65-car trains.

Other locales and grain plants that are also expanding were built 30 to 40 years ago at Grand Ledge (ADM), Webberville (ADM), White Pigeon (The Anderson's), and Albion (The Anderson's, collocated with an ethanol plant). These facilities were built with the same objective, taking advantage of rail transportation and they are all located on Class One railroads, except the Albion plant. That plant is located on the Michigan Main that was just sold to the state with plans to upgrade it for fast passenger rail service.

While rail access is a key determinant in the location of new or expanded grain and fertilizer facilities, another major consideration is the ongoing economic viability of that existing railroad infrastructure. A classic example of this dilemma is the CEC and its locations across the Thumb, as well as the MAC plants in Marlette and Brown City. These are the largest grain facilities in Michigan's Thumb and annually handle tens of millions of bushels of corn, soybeans, wheat, and dry beans. The economic importance of rail to businesses like the CEC and MAC is crucial.

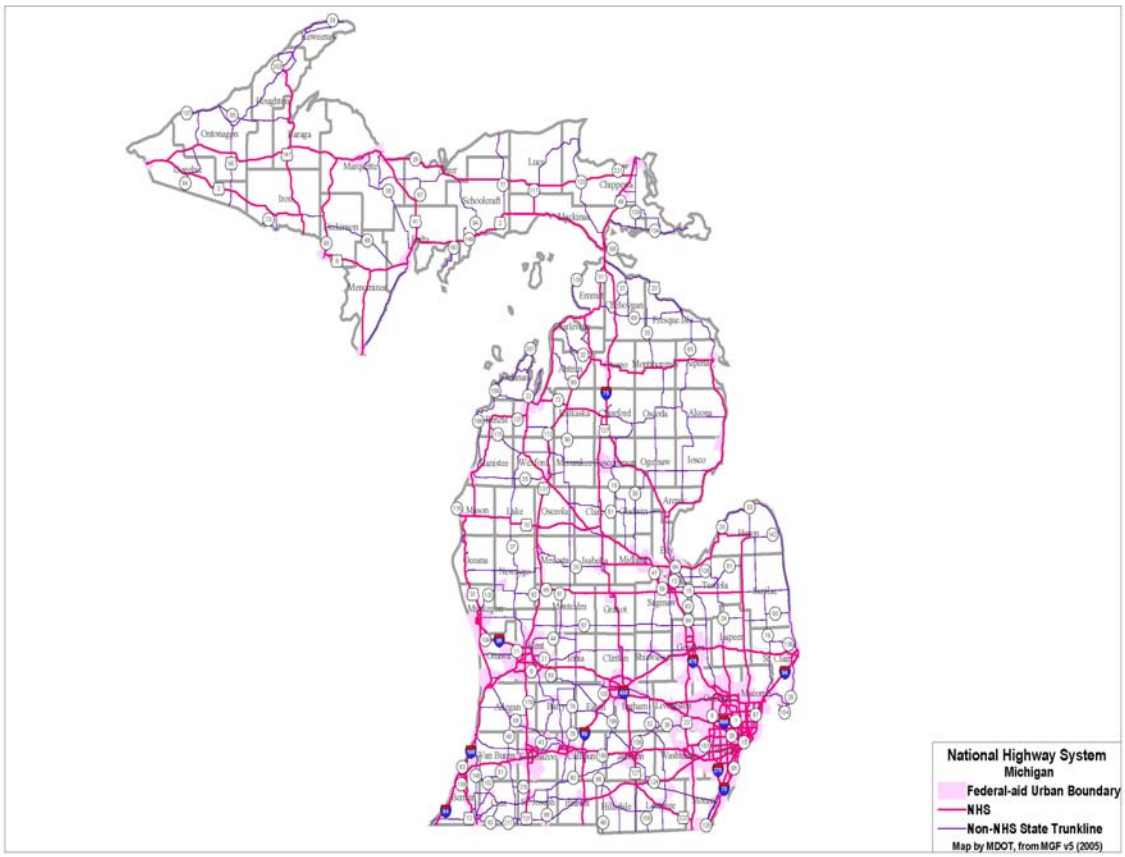
In addition, inbound fertilizer to the CEC, Crop Production Services and Star of the West Milling locations is also very important. Trucking all the fertilizer to those locations where they sell to area farmers would raise the price of that material considerably.

In order to handle the projected growth of Michigan agriculture and support the continued viability of rural, primarily agricultural communities, consistent and reliable railroad service is absolutely critical.

There must be an unflinching commitment from local, state and federal governments to support railroads and related infrastructure.

ROADS AND BRIDGES

While the need for a solid rail infrastructure has been well documented, the more obvious infrastructure need and perhaps the more critical in rural Michigan is roads. This is not just an issue on state highways, but also local county roads, the so-called "farm to market" roads.



Source: MDOT Michigan Department of Transportation

Michigan's overall road and highway infrastructure investments have been largely focused on urban areas for the past several decades. With the majority of rural roads still being used way beyond their projected life span, and carrying more and heavier traffic, the damage and deterioration are profound.

The Michigan Department of Transportation (M-DOT) and County Road Commissions have been forced to focus on repairing rather than replacing deteriorating roads, while plans for new highways, especially in rural areas, are put on hold. This creates a vicious cycle. As roads start to "alligator" with surface cracks, traffic, weather, freezing and thawing and water in these cracks cause pavement to break apart. Patching, even with the best job, is only a stop gap until the road itself becomes little more than a series of patches.

It is a major cost for drivers forced to travel poor roads. Reduced speeds and equipment damage is common. This causes some haulers to avoid certain roads because of their poor quality and slow-moving traffic, which is damaging to vehicles and more exhausting for drivers.

Roads however are not the only issue. Rural bridges falling victim to age, weather, and other enemies are a more burdensome problem. It is a rare farmer, agri-business, milk hauler, fire department or even ambulance driver that is not aware of bridges on country roads that they simply cannot cross because of weight limits. In some cases, even empty trucks cannot use some of these rural bridges that were often built in the 1930s and '40s. With no other option than to detour around aging and crumbling bridges, drivers are forced to add miles to their trips.

A recent example of how critical this issue has become occurred recently when U.S. 127 south of Mason was closed because of an accident and subsequent material spill. It required the highway to be closed for several days, and the detour extended to six miles, even though there was a road paralleling the highway that would have only been a ½-mile detour. The parallel road could not be used for the detour because of weight limits on a bridge.

The greatest challenge is that there is no end in sight or easy solution to the problems with deteriorating rural roads and bridges. State political power has not been based in the rural parts of Michigan for decades, and political decisions often determine where road improvements will be made. As a result, rural roads and bridges have suffered.

As fuel tax revenues have shrunk over the years, the need for more money has become acute. With higher mileage cars on the road (which reduces fuel tax revenue), vehicles replaced less frequently (which reduces vehicle tax and registration revenue), and fewer people residing in the state, it is easy to see why traditional sources of revenue for repairs and new structures have been on the decline. Michigan has even left federal road and highway money "on the table" in recent years because the state was not able to access enough matching dollars to secure those funds. Furthermore, if Michigan is unable to match federal funding, the federal gas tax collected in Michigan it will go to other states. Limited funding means that M-DOT will not be able to adequately maintain roads and bridges to meet public and commercial standards.

The bottom line is that there needs to be more money for rural roads and bridges. Whatever the method, whether it be increasing vehicle registration rates, adjusting motor fuel tax, public-private partnerships, or directing a portion of sales tax on fuels to the Michigan Transportation Fund, investment needs to be equitable and fair, and there must be an earmark of any revenue enhancement program that dedicates a percentage of those funds to rural roads and bridges. Absent investment in this area, rural development will continue to be threatened, as transportation – both rail and roads – play a key role in determining how businesses make location decisions.

In addition, there needs to be a comprehensive solution to the transportation issues in Michigan. Just improving roads and not enhancing railroads to reduce freight traffic on highways, or even assisting water transportation for the same reason, is missing the whole picture.

WATER TRANSPORTATION

Michigan claims to be home to more than 40 commercial ports, more than any Great Lakes state, yet, according to the Michigan Department of Agriculture and Rural Development (MDARD), only a handful of those ports are actively dealing with commercial traffic. This is a huge opportunity for Michigan's economy and Michigan agriculture that is being squandered.

Source: Michigan Economic Development Corporation

In Michigan, four major issues are holding back the water transportation industry. The lack of regular dredging necessary for several ports, the most restrictive ballast water discharge legislation of any state or province on the Great Lakes, Coast Guard regulations limiting barge traffic on the Great Lakes, and the age and availability of vessels and barges operating on the Lakes.

Ensuring that ports are deep enough to accommodate commercial shipping vessels requires a regular schedule of dredging to remove accumulated sediment and debris, especially with lower lake levels. Without adequate dredging, ports can become impassable for large ships. Michigan, however, does not receive adequate funding to dredge these commercial ports each year, and often recreational harbors receive more attention because of public pressure.

This inconsistency has led to a situation where many of the state's ports either are not available for commercial vessels, or the loads on those ships must be "lightened," meaning that they cannot fill the boat to the most competitive load because of draft issues, or that they must pursue novel navigation strategies such as backing out of ports because there is nowhere to turn the vessel around. This limits our ability to move product through ports, both inbound and outbound.

The second issue is Michigan's ballast water discharge law. Michigan's current ballast water law effectively makes it impossible for any exports to leave Michigan ports as it is significantly more cumbersome and unprecedented in its restrictiveness than regulations in any other state or Canadian province located on the Great lakes.

While well-meaning in its intent to protect the Great Lakes from invasive species, the ballast water law is naïve in its action. Without every state and province on the Great Lakes employing similar protections, the goal is worthless. By definition, aquatic species move through the water and obviously do not respect state or international boundaries. They swim or move with currents and waves, and several miles of Michigan's coast is separated from other governmental jurisdictions by less than a few hundred yards. All this law does is force vessels in the Great Lakes to dock in locations other than in Michigan.

For empty ships to move safely, they load water (ballast water) in tanks to keep the ship level, and also help maintain a lower center of gravity to avoid capsizing. As ships are loaded with product, ballast water is discharged from the onboard tanks to maintain the stability of the ship.

In order to do business in Michigan, ships would have to install special equipment to treat ballast water before it is discharged in Michigan waters. Ship owners realize it is not profitable to install that equipment for just one state. As a result, they bypass Michigan, and take their business to other ports. This means that in order for Michigan grain to be moved by ship, it would go through ports in Ohio, Indiana, Illinois or elsewhere.

Michigan agribusinesses, farmers and the broader economy are losing business and income because of Michigan's ballast water discharge law, which is creating job opportunities and economic activity in other states, at our expense. If our state is serious about boosting exports, supporting economic growth and job creation based on ports and water transportation – the most cost effective means of bulk commodity transportation available – fixing this law must be a top priority.

Finally, the potential for the transportation of fertilizer and grain on barges, connecting with the Midwest River System and the Illinois and Mississippi rivers, or even through the St. Lawrence Seaway, is restricted because of special requirements for barges operating in the lower Great lakes. These restrictions, including the need for an ABS Certification and load-lined barges to move across the lakes, eliminate that water transportation option for most Michigan ports. The certification process means barges are inspected to ensure they can handle water conditions that exist when moving across the lake. In a private sector survey of the four largest barge lines, representing 90 percent of the barge fleet operating on the river system, none have this certification.

The final point limiting water transportation options involves the availability of equipment and age of the fleet operating in the Great lakes. Many vessels were built before the Second World War, and in terms of barges able to operate on the Great lakes, they simply aren't available.

Water is only a resource if we use it, and when it comes to water transportation, federal and state regulations and actions tell us today that we cannot!

BROADBAND

While urban areas across the United States have focused on increasing access to broadband, most rural areas have been left behind. A historic analogy can be seen with the electrification of the country, where some rural areas lagged as much as 30 years behind urban areas with ready access to electricity. Improving broadband access is not dependent on hard wires or expensive networks of poles, but rather towers. It is clear that development will be much faster with broadband than electricity, but Michigan agriculture is increasingly dependent on fast, reliable broadband access.

The irony with broadband and 4G connectivity is that most people in rural areas do not know what they are missing in terms of accessibility, speed, and flexibility, because they have grown accustomed to slow, sporadic and unreliable connections.

Entrepreneurs and progressive, growing companies view broadband access as a necessity and the lack of access is viewed as an impediment to development and growth. For today's agriculture, access to broadband is required to successfully manage a farm or business and communicate with suppliers, customers, and markets.

From global positioning-driven fertilizer application and auto-steer technology for farm and commercial agricultural equipment, to online food safety programs for customers around the country and the world, broadband technology is what makes them all work.

In regard to food safety, traceability is a critical process in the event that there is a problem with a food item. Broadband technology enables tracing to happen very quickly, and in some cases to the individual animal, field or certainly the processor that may be involved.

Another example of this technology involves identifying insects, weeds, plant diseases, nutrient deficiencies, and other plant and animal maladies. In the past, plants with uncommon problems were pulled from the field and driven to an expert who searched pictures and other records to make the identification of the bug, weed, or disease. Today, agronomy professionals can take a picture using a smart phone and upload it to one of several websites for virtually instant identification.

That means problems can be solved faster, and technology can determine the correct practice or product to solve the issue, minimizing losses to yield and productivity, while protecting farmer and business incomes.

High-speed broadband is not only important to farmers but the hundreds of thousands of people in the industry that depend on getting access to new information, new technology, and new markets. As farmers and food processors continue to compete in a global economy, high-speed broadband accessibility will help empower their businesses and grow their markets.

Another opportunity being missed in rural Michigan because of the lack of reliable broadband access is distance learning. This holds great potential for rural communities, but again, absent broadband, young people and others are forced to travel to other areas to access information and education that could and should be readily available in their own home or place of business.

Without 4G, the technology slows or does not work at all.

Simply put, without wireless broadband, rural Michigan will be left behind in the race for trade, information, businesses, and jobs. If rural Michigan is going to grow, both in terms of economic activity and employment, the entire state must have broadband access and the most advanced electronic communication technology available. Absent that, rural development will fall behind other areas where the technology is available.

In order to accomplish this, Michigan can either support hard-wire options, most of which seek millions in federal support in the form of grants or loans, or let the private sector get the job done. Whichever approach -- and both are necessary – Michigan must fully optimize the state's electronic communication sector.

UTILITIES

As surprising as it seems, in many parts of rural Michigan, especially where agriculture is growing, power and the types of power necessary to run many of today's agri-businesses and even new or expanded farmer-owned facilities are in short supply. This dilemma is not the result of a shortage of electric generation capacity, or gas reserves, but the ability to get it to rural areas where many agri-businesses are located and expanding.

As grain handling facilities have grown in capacity and handling speed, so has the demand for electricity to run these operations. From aeration of grain storage to legs to elevate the grain from the delivery pit to storage and other handling equipment, the electricity demand for these growing grain facilities has surged. The challenge for utility companies is that these plants are often located at the end, or close to the end, of their distribution grid, and adding significant capacity is difficult.

Awareness or attention to this growth, and planning for the increased demand is often not well known to the utility, and companies have been forced to write checks for new transmission lines, added capacity or three-phase power. As a result, many of our member companies have had to fund significant upgrades in local power grids to facilitate their continued growth and the expansion of their business.

There are recent examples where agri-business companies have had to invest $100,000 to $500,000 or more just to facilitate their growth. There are also examples where power or natural gas might be close by, but simply not available to the business. A clear example is Falmouth Cooperative, which had planned for a new grain facility, but both required utilities are out of reach physically and economically.

We have also heard of newly constructed farmer-owned grain facilities and even irrigation systems that have been unable to operate because of the same problem. As demand for power increases, especially in good grain production areas of the state and even in newly developing areas, these problems will continue to surface unless there is a conscious and direct effort by utilities and state regulators to plan for rural power demand.

There are several things that should be done to help alleviate these problems, and minimize costs to business. First, and most importantly, utilities need to recognize and focus on the growth trajectory of agricultural operations. They often are taken for granted and have not received as much attention as a large manufacturing facility might. Today, with the continued growth in agriculture, these businesses are also often the life-blood of rural communities.

Utilities must work with agricultural businesses to forecast their future power demand and ensure that this demand is considered as they make changes to their grid.

At the same time, many local agricultural companies have not been open with utilities to proactively engage them in future growth and expansion plans. The road runs both ways,

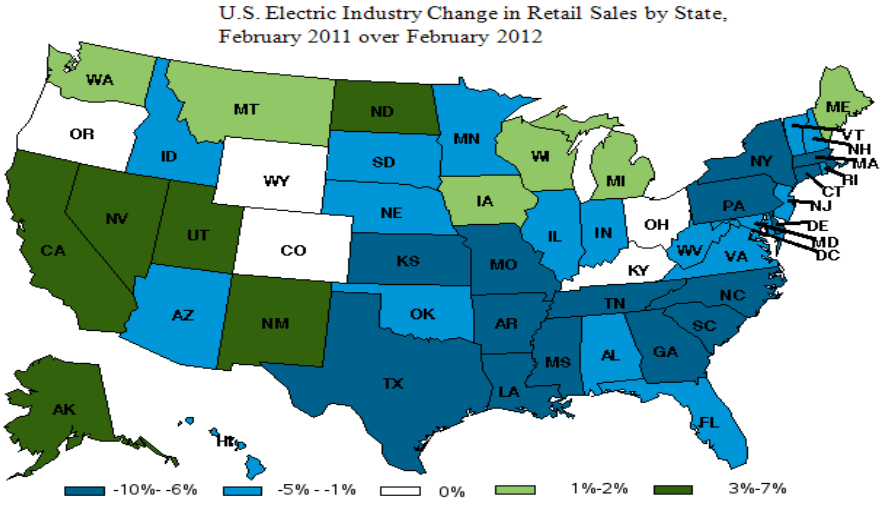
but as the expansion plans themselves are larger, so is the need for both parties to recognize they need to work together.

Another major issue for any company doing business in Michigan is the cost of electricity. A report just released documents the fact that a 2008 state law intended to lower rates has resulted in just the opposite. In fact, when compared to the 10 largest states, Michigan has the third-highest rates for commercial customers and the fifth-highest rates for industrial customers, the report said.

The report from the Energy Choice Now coalition (which includes the Michigan Agri-Business Association among other groups) says that between 2008 and 2012 electric rates for small commercial customers increased 30 percent for Consumers customers and 20 percent for DTE customers, and industrial rates jumped 35 percent for CMS customers and 18 percent for DTE customers.

In fact, just this summer the Michigan Public Service Commission approved a 13.5-percent increase in DTE electric rates. The utility says the higher rates are justified because they are paying more to get coal to their plants, and DTE is primarily a coal-fired electric generating company. At the same time, Consumers Energy customers will see a 1.3-percent increase in their rates. Coal accounts for 60 percent of Michigan's electric power generation, and it is mostly all delivered to the state by rail, which as we all know is getting to be a more expensive mode of transportation. The full MPSC report can be found at http://www.dleg.state.mi.us/mpsc/reports/energy/12summer/ea-summer12.pdf.

The 2008 law also capped competition in the electric supply market at 10 percent that could be purchased competitively. Business aggressively competed to qualify under the cap, and the quota was filled within a year. Currently, more than 9,600 businesses are on a waiting list to buy their electricity competitively, and are frustrated that those lucky enough to be eligible to buy electricity from the open market have saved in excess of $350 million compared to what they would have paid CMS, DTE or another electric generation company.



In addition to power, natural gas is not widely available in rural areas, forcing the use of propane to fuel grain-drying operations. This is a far more cumbersome and expensive supply situation than just accessing a natural gas pipe that passes beside the road. Propane is a more price-volatile commodity than natural gas for a variety of reasons, and this fact makes some grain operations less competitive than others.

Rural Michigan is also the site for some of the most innovative renewable energy projects in the country, but that power is often diverted from those areas, where it is sorely needed. Methane digesters, wind farms, even solar development present great opportunities for rural communities to create new businesses and economic activity.

In 2007, Michigan spent $37 billion on petroleum, coal, natural gas and nuclear fuel, and of that $26 billion left the state. A focus on developing renewable energy and helping keep energy dollars here in Michigan is an opportunity that needs more attention and development. As part of the 2008 energy legislation, a new Renewable Portfolio Standard (RPS) was established, requiring utilities to source at least 10 percent of their energy from renewable sources by 2015, which they will easily meet.

Since that time, Michigan jumped from a capacity of 2.6 megawatts of wind power in 2007 to 364 megawatts in 2012. One of the benefits of wind is that this generating capacity is generally located near existing electrical grids.

Wood as well as some animal and agricultural waste from farms is another source of renewable energy. A 2003 report from the USDA and Department of Energy (DOE) suggests that Michigan could generate 666 megawatts of power from agricultural waste, 248 megawatts from forest and mill residues, and 203 megawatts from urban wood waste for a total of 1,117 megawatts of energy per year.

Michigan also ranks among the top 10 states in potential for biogas – methane - production from dairy operations. Michigan's dairy operations produce more than 26 million tons of methane emissions each year from livestock waste, and turning some of that into electricity would reduce waste and be profitable for at least 107 of the state's dairies, according to the EPA's AgStar program.

There are currently six bio-digesters operating in Michigan that produce nearly 17,000 megawatt-hours of power. If we maximized this resource, Michigan's dairy industry could reduce waste and potentially produce 246,000 megawatt-hours of power annually from a renewable resource that is located right here in the state.

Renewable energy is also, by definition, rural development!

The facts are that while there is great interest in rural development, and resurrecting the energy, relevance and commerce of small towns across Michigan, the likelihood of many towns recapturing their past glory or thriving economically

in today's world is slim without a solid infrastructure base. While railroads are neither glitzy nor "hip," unless the conversation is about passenger rail, they are critical to the success of agricultural production, whether they are hauling inbound fertilizer or outbound grain. Water transportation is a resource and mode of transportation that could alleviate some of the stress on railroads and highways, but we don't use it at all.

Broadband, solid electrical service, and natural gas availability are not luxuries, they are necessities. These infrastructure resources are the foundation for the success of rural communities. Location decisions for a variety of industries, including many agriculturally based companies, will be influenced by the availability of these basics.

TALENT

Michigan's agricultural sector is open for business and looking to hire. One of our greatest challenges today and in the years ahead will be filling a significant talent and workforce vacuum.

We hear various themes on this issue: keeping kids in rural communities, helping kids from rural schools find higher education that fits their future plans, and finding people to fill both skilled and unskilled positions who have the work ethic necessary to meet the rigorous demands of agricultural occupations.

Many have lamented the challenges of helping young people from rural areas find jobs and a quality of life sufficient to keep them in these rural towns, or to draw them back to rural areas after pursuing advanced education.

It is also a matter of the quality of life, including entertainment, socialization with peers of a similar background and experience, fast and reliable internet access (broadband), proximity to cultural activities, and more.

The agricultural industry has done a poor job of explaining the "new" agricultural industry, and the jobs available at all skill levels, primarily in rural Michigan. Stereotypical ag jobs highlighted by low pay, dust, long hours, little demand for skills and poor working conditions have long been replaced by job opportunities driven by technology, highly skilled positions, and competitive wages and benefits.

It is true that during spring planting and fall harvest seasons, many jobs in agri-business require long hours, but the equipment and technology used today is much different than in the past. Site-specific agriculture, driven by satellite technology and auto-steer, make these jobs much easier than they used to be in one context – working conditions – but far more advanced with the addition of technology to the cab. A high school education isn't enough anymore for many of the jobs available in agri-business.

Decades ago, ag sales positions used to be relatively low-tech, but with constant changes in technology, from crops and crop varieties to new soil fertility products and application methods and timing, it is a much different environment today.

When it comes to management, our industry is struggling to find people to manage complex grain and agronomy facilities. The generation that "grew with the growth" of the facilities is at or nearing retirement. It is estimated that a full 50 percent of the managers of these facilities will retire within the next 10 years. Many of the existing managers in these positions have watched and directed the growth of plants over time; and as they leave the ranks, finding their replacements will not be easy.

New managers will need a stronger educational background, experience across the industry, leadership skills and the ability to provide vision for the next level of operation. They need strong people skills to communicate with both employees and customers, and at least a general understanding of the equipment under their care.

Internal operations managers, whether inside a grain, agronomy or dry bean processing plant, are also running large businesses in their own right. The technology advances inside these plants are as dramatic as those in the field.

Again, education and experience, as well as communications and people skills are critical. There are almost no candidates available for grain merchandising or trading positions, and people for these positions are in increasing demand.

The next part of this equation is compensation and benefits packages. Long gone are low pay scales and poor benefits. While it is difficult to provide specific wage ranges, it can be said that these jobs command great packages and security, depending on the individual candidates and their backgrounds.

There are hundreds of jobs requiring a lesser skill set available in agriculture, particularly on farms. The dairy, pork, poultry, fruit and vegetable industries in Michigan need people to harvest their crops and care for their animals. While many of these positions are filled by immigrant or migrant populations, it is not because they are low-wage positions with poor benefits. Many of these positions offer health care and other benefits, while paying well above the minimum wage. It has simply been very difficult, if not impossible, to find workers locally to do these jobs on a reliable basis.

We have lost crop production because of the lack of labor, and lose quality because of delayed harvest. Producers are increasingly frustrated, and their expansion plans stymied because of labor issues.

There are opportunities for young people to find great and rewarding jobs and careers in rural Michigan, but advanced education is necessary for most positions, which leads to the next major quandary.

Finding ways for high school graduates from rural areas to secure advanced education, especially in agriculture, is getting more and more difficult.

The logical college choice for rural high school graduates who want careers in agriculture is Michigan State University, and many rural young people are accepted at MSU each year. With admittance requirements and the demand for freshmen slots increasing every year, it is getting tougher for any student to gain access to MSU, however.

It is increasingly apparent that there is demand and a need for an alternative approach to accessing Michigan State University, or perhaps another institution of higher education.

Community colleges have long provided a feeder program for young people to access higher education by providing the first two years of a college experience nearby, and the next two years of advanced classes on the campus of a four-year institution. For agriculture and our efforts to find people to do key jobs, this arrangement faces a considerable hurdle as few community colleges offer any agricultural courses that would interest young people considering careers in our industry.

In order to access these rural high school graduates who have an interest in agriculture, we believe that MSU or another college must create a program with community colleges to offer the first two years of a college experience locally, including some basic classes in agriculture to help maintain the students' interest in the industry. Credits for all classes must also be transferable to the four-year institution.

Many agri-businesses would also provide jobs and internships for these students to provide exposure to ag careers while they are pursuing an education.

The Agricultural Technology program at MSU provides another avenue for advanced education, and is a solid choice. Nevertheless, we need to expand our options.

Finally, in many respects, beyond specialized agricultural knowledge, our industry needs people who can work with others, have strong communications skills and have a great work ethic, just like every other industry. While these criteria seem basic, it is getting more and more difficult to find people with these skills.

POLICY

In order to support Michigan's growing agricultural economy, and enhance rural development across Michigan, there are several policy initiatives that we embrace.

General

- Maintain a separate and well-funded Michigan Department of Agriculture and Rural Development
    - Enhance and reestablish the policy role of the Commission on Agriculture

- Create a vibrant economic development arm within the MDARD with funding and joint responsibilities with the Michigan Development Economic Corp.
- Maintain the strong public/private partnership on problem solving and regulation and enforcement

- Identify state-owned land that can be farmed and create a program for innovative and progressive farmers to access that land
  - Maintain conservation interests and objectives
  - Create revenue for the state
  - Expand commercial activity in rural areas
- Eliminate the punitive Michigan personal property tax
- Conduct a comprehensive stakeholder-based review of Michigan State University's College of Agriculture programs and future direction and organization
  - Support the need for solid, professional and accessible university-based experts in most areas of agricultural production
  - De-emphasize "county-based" expertise in preference for higher level campus-based researchers and educators readily available to industry and farmers
  - Enhance university-created communications by using private sector dissemination whenever practical
  - Enhance private sector relationships across the College of Agriculture

Infrastructure

- Create a comprehensive transportation revenue stream
  - Sales tax on gasoline, diesel, electric vehicle power stations, etc.
  - Increased vehicle registration fees
  - Increase sales tax on vehicle purchases,
  - Increase annual vehicle registration fees
- Create a comprehensive, dedicated funding stream to support the following:
  - Highways, roads and bridges
  - Railroad track maintenance, improvement and enhancements
  - Commercial harbor dredging
  - Port development

We believe it is imperative that transportation funds be spent on rail and water transportation development and maintenance. Both modes of transportation keep freight off highways and roads, and that improves safety, reduces traffic and is much more efficient.

- Rail
  - State funding for railroad grade crossing improvements must continue
  - The MiRLAP (Michigan Rail Loan Assistance Program) state program for loans to businesses to enhance their railroad infrastructure has been very helpful to our industry. The application process and requirements must be streamlined to facilitate even more use of this program.

- Rolling tax incentives and depreciation for railroad improvements
- Dedicate a percentage of any transportation revenue increase for freight railroad improvements through a public/private relationship
- Define a transportation-based credit for companies that move freight by rail
    - Based on volume and miles traveled in the state
    - Take trucks off the road
    - Reduce traffic
    - Improve safety

- Water
    - Create a state-wide Port Authority
        - State-wide representation
        - Bonding authority for projects either on the water or not
        - Create a strong link to transportation support, both rail and water
    - Resolution of the ballast water discharge issue to allow freight movement from Michigan ports
    - A renewed emphasis on seeking federal funds to dredge commercial ports on a regular basis
    - Dedicate a percentage of any transportation revenue increase for freight water transportation improvements through a public/private relationship
    - Define a transportation based credit for companies that move freight by water
        - Based on volume and miles traveled in the state
        - Take trucks off the road
        - Reduce traffic
        - Improve safety
    - Gain a better understanding of barge requirements for their operation on the Great lakes
    - Through the MEDC and other sources, provide incentives for barge operators to meet Coast Guard requirements for operation on the Great lakes
    - Analyze the water transportation vessels operating on the Great Lakes and help improve that equipment as well as aiding the development of a fleet of lake-enabled barges for operations in the Lakes

- Utilities
    - Expand the RPS (renewable portfolio standard) requirement and create a net-metering standard that provides an incentive for bio-based electricity generation, as well as a reasonable power purchase agreement for renewable electricity providers
    - Expand the choice option for business and residential customers in Michigan from 10 percent to at least 40 percent
    - Continue to require energy conservation programs through either utilities or the private sector

Talent

- While recognizing the need for more agricultural education opportunities in K-12 educational systems, do not minimize the need for advanced education for most jobs in agriculture
    - Agricultural employees need a strong math, science, information technology and interpersonal skills foundation
    - Many employees in agriculture find a second language imperative to function in today's economy
    - Training for the least-skilled job opportunities in agriculture is a quandary as many of those jobs will be eliminated with mechanization in the future
    - More colleges in Michigan need to engage in agricultural education
        - Community colleges to feed four-year institutions
        - More four-year institutions offer at least an "emphasis area" in agriculture, if not a full major
        - Seek potential employees in non-ag majors from other institutions
    - Create innovative programs to encourage young people to consider careers in agriculture

Michigan agriculture is going to continue to grow. The most important policy perspective for leaders to consider – in addition to seizing these new opportunities in the years ahead – is doing no harm!