

ProductCentral

News and advice from the MSU Product Center.

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RECENT ACHIEVEMENTS:

MSU Product Center for Agriculture and Natural Resources under the direction of MSU's Bio-economy Network presents the following newly released series: STATUS OF MICHIGAN'S BIO-ECONOMY: PROGRESS & EVOLVING POTENTIAL:

- Advancing Michigan's Bioeconomy: Overview of Michigan's Progress [CLICK HERE](#)
- Michigan's Position in the U.S. Biofuel and Bio-Economy Market [CLICK HERE](#)
- Potential Future Scenarios of Michigan's Bio-Economy [CLICK HERE](#)

BIOECONOMY LEADERSHIP

Chris Peterson

Director, MSU Product Center



Michigan's combination of legislative support, strong research institutes and diverse agriculture and forestry, as well as avoiding pitfalls experienced by other states, has allowed the state to become a bioeconomy leader. The Product Center has recently developed a series of white papers in collaboration with Shepherd Consulting which supports this finding.

One key factor for the strong position is that the state didn't overinvesting in corn-based ethanol and biodiesel plants. Part of what the white papers demonstrate are how Michigan has geographic advantages over other states, in terms of diverse feedstocks, underutilized forestry resources and vast water resources. While a thriving bioeconomy is not a certainty, Michigan does have the ability to shape its own future and has significant opportunities to expand its bioeconomy and advance its position on the global bioeconomy market.

An inventory of alternative-fuel business reveals that Michigan has more than 100 biofuels, bioenergy and biomaterials companies. In Flint, through a public-private partnership, the city is developing and operating a biogas facility that will provide heat for the city and methane for its bus fleet. Other positive initiatives involve Dow Chemical, Ford Motor and KTM industries, which are growing their biomaterials and biochemical businesses.

In addition, the state has five ethanol plants, and its first commercial-scale cellulosic ethanol plant, one of only seven in the country, is under construction. There also are several agriculture and industrial anaerobic digester facilities and ten wood-fired electrical generating facilities with more in the planning stages.

In terms of resources, Michigan ranks in the top third of states in total acres harvested of ethanol- and biodiesel-eligible crops and net growth of timberland stock trees. The state also ranks in the top 20 percent in ethanol consumption and electricity production from biomass.

Michigan also harbors large swaths of forest land, which are expanding. The state has more than 19 million acres of forests, and that has increased by 6 percent since 1980. These resources can be used to generate bioenergy and biomaterials, fuels already being used to generate electricity. In fact, more than 1.7 million megawatt hours are being produced from the combustion of woody biomass at 10 facilities. There are other states that are more competitive with respect to corn biomass, but Michigan's diverse crop mix and strong timberland resources puts the state in an excellent position if cellulosic ethanol becomes commercially viable.

Yet even with all of these positive aspects, there are many factors that will ultimately decide how Michigan's future in this realm plays out. To help us better understand what Michigan's bioeconomy might look like in the future we have developed a series of scenarios of possible pathways Michigan's bioeconomy might take. The scenarios we describe are more or less guidelines to help Michigan's decision makers plot a path for the future. By quantifying the state's bioeconomy assets and providing a handful of plausible scenarios, we have created a framework to help the state prepare for a range of possibilities.

We urge all of you to use the links above and read the series *Status of Michigan's Bio-Economy: Progress & Evolving Potential*. If any of you have venture ideas in the arena, please be in touch with Ruben Derderian. We now need to turn our State's potential into reality.

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NEW PRODUCT DEVELOPMENT TRENDS IN 2011

Recent Mintel report shows that about 250,000 new consumer food and non-food products are entering the global marketplace on an annual basis. More than 50% of these are in the food and drink category. Europe leads in terms of new product introductions followed by the Asia/Pacific region. North America takes the third place and its share is declining from yearly.

Mintel predicts that wellness, convenience, indulgence, environment and demographics will continue to drive the food and drinks market in 2011.

In the wellness market, consumers would see a continuous reduction of some key ingredients including sodium, sugar and high fructose corn syrup. Mintel also predicts that the term “natural” will remain ill-defined and “no additives” will become the norm in different countries.

Convenience will drive the introduction of food products that help the consumer create meals more quickly and better at home. Concentrates and simplified forms of food products will appear in different categories.

With regard to indulgence, Mintel predicts that, food and drink products that are simple, result-driven with “elevated” and “instant” benefits, and position themselves as “small treats” will perform better.

Companies’ environment/green related approach will continue to focus on the basics such as reducing, reusing and recycling of materials.

Demographic-oriented products will become more focused on simple, realistic results and clear benefits to meet older consumers’ especially baby boomers needs. Despite these trends, product categories would remain blurred affecting shifts in product labeling and branding. Mintel also predicts that there will be expansion of positioning, variety, and package formats across regions and categories.

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ECONOMIC OUTLOOKS FOR 2011

While it appears that economy is improving; it also appears that the recovery will be slow and the unemployment rate will continue to be high. Much of the economic data is contradictory which makes forecasting difficult. One thing that appears to be true is that 2011 will be a good year for crop agriculture. Corn, wheat, and soybean prices remain high. This in turn may make it difficult for livestock producers who depend on purchased feed for their animals.

This paper will analyze the factors that may drive economic growth and then those factors that may retard economic growth. Impacts on the agri-food system will also be considered.

Factors that May Drive Economic Growth

There are several factors that may promote economic growth. Many firms have rising profit levels. The cash position of many banks and firms is also quite strong. This has the potential to increase the level of investment and other types of spending. Inflation remains low which will keep interest rates low. Low interest rates have the potential to promote borrowing and the spending that result from increased borrowing.

These factors help explain the increase in the value of most stocks. Higher stock prices raise wealth, which in turn generally increase consumption. Economic growth in other countries especially China and India could also increase the level of growth in the U.S. as the demand for U.S. exports increase. U.S. agricultural products will likely benefit from this as increasing affluence in other countries change consumer behavior. Many consumers in developing countries adopt more western style eating habits as their standards of living increase.

One issue of particular importance to Michigan is the state of the auto industry. In the past few years consumers have held off on purchasing new autos. The

end of GM as a ward of the government coupled with low interest rates and a pent up demand for autos should bode well for an improved year for auto sales. However, sales are still likely to be well below 16 million units in the U.S. which is the standard for a good year.

Factors that May Retard Economic Growth

There are several factors that may retard economic growth. Home sales will remain low as the housing crisis grinds on. Many homes still need to go through foreclosure. Consumer confidence remains weak which will curb consumption.

State and local governments will face extreme difficulty in 2011. In 2009 and 2010, state and local governments used funds from the Stimulus Bill to balance their budgets. It's unlikely that that this funding will exist in 2011. State and local governments will cut their budgets dramatically which will reduce spending and will likely mean layoffs of school and government personnel throughout the country.



ECONOMIC OUTLOOKS FOR 2011

(Continued from page 3)

Another issue that will put downward pressure on economic growth is rising commodity prices. Oil, metals and other commodities will rise in value, increasing the cost of production for firms and reducing the level of discretionary income for households.

To summarize, the economy is likely to grow somewhat in 2011, but not by enough to cause a dramatic reduction in unemployment. GDP is likely to grow 2 to 3 percent in 2011, and the national unemployment rate will likely remain above 9 percent throughout the year. The unemployment rate in Michigan will likely remain higher than the national average, but will likely decline more than most other states.

Impact on the Agri-Food System

Agricultural commodities will benefit from the strong global demand for commodities. This will be particularly true for food grains such as wheat, as well as feed grains and oilseeds. Milk prices are likely to rise in the second half of the

year although the dairy sector will face continued difficulty resulting from high feed prices. High feed prices will also adversely affect the beef, hog and poultry sectors.

Low interest rates and an increased interest in lending may make access to credit easier for entrepreneurs. 2011 has the potential to be a good year for people who want to start a business in the agri-food sector, interest rates and property values will remain low. Input costs, with the exception of commodity prices will remain under control, and export opportunities are likely to expand. It appears that the agri-food sector will continue to grow at a faster rate than the economy as a whole.

In the next few years as the economic slowdown drags on, value will be an important demand driver. However, longer term, food products that address the needs of overweight and older consumers will find a large and growing market.

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ANTIOXIDANTS IN FOODS- KEEP YOUR PRODUCTS FRESHER LONGER

Antioxidants are ingredients or food components that prevent or slow down deleterious reactions with oxygen. These reactions are called "lipid" or "fat oxidation" and result in off odor or flavor production in foods. The result of these reactions in many stored low moisture foods can result in the end of the shelf life of your product.

Fat containing foods are sensitive to lipid oxidation which causes off odors and flavors. Food products especially susceptible to lipid oxidation are oils, fats and dehydrated products. Fats and oils are made up of triglyceride units that contain 3 fatty acids (FA) that may be saturated or unsaturated. In general, unsaturated fatty acids are more sensitive to oxidation than saturated fatty acids. Fatty acids found in fish oils (omega-3) are very susceptible to these reactions.

Exposure to high temperatures or long term storage at room temperature can increase the amount of fat break down products due to oxidation resulting in off odors and flavors. Some examples of these low moisture products that are more susceptible to oxidation are meats such as jerky, dried cheeses, whole grains, dehydrated whole milk, or eggs.

Oxidation in these products is initiated by oxygen, heat, light, metal, and the presence of free radicals. Over time, off flavors and aromas develop as free radical products form and are broken down. These foods are often described as painty, cardboard-like, fishy, etc. The rate of oxidation depends on the presence of initiators or inhibitors, temperature, and the type of fats present.

Antioxidants offer a protective effect in foods and are derived from a variety of sources both synthetic and natural. Antioxidants are often added to food products or packaging liners to interfere with oxidation steps and delay the production of the unappealing aromas and flavors caused by lipid oxidation. Examples of popular synthetic antioxidants include butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), propyl gallate (PG), and tertiary butylhydroquinone (TBHQ). The concentration of these food additives are controlled by the FDA. Details on regulations controlling these additives can be found in the Federal Code of Regulations, Title 21 (**21 CFR Ch. I (4–1–09 Edition) Part 172.**

Nevertheless, recent trends and consumer requests for natural products have increased the need to replace these highly effective artificial antioxidants with equally efficient natural alternatives. The next newsletter will discuss natural antioxidant options.

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PRODUCT DEVELOPMENT: HOW SHOULD MY FOOD PRODUCT BE EVALUATED BEFORE THE LAUNCH??

During the product development phase of moving your food product to standardization, there are a number of important evaluations you should have on your product development check-list. These tasks not only are important, but the sequence in which you do them will result in your plan working smarter and not harder. The evaluations that should be included on your food product check-list are standardization and food safety at the minimum with nutrition analysis and sensory testing as possible additions.

As mentioned in previous newsletter articles, the recipe is key to product development for commercialization. And with the standardization of the recipe, comes the conversion of your favorite kitchen recipe to a commercial formula. In some instances, the final product may be a bit different than what you had before, but this is only news to you and not the anticipated customer. The main objective to this evaluation of standardization is ability to make your food product using ingredients in weight, as the unit of measure, and increasing batch yield to larger quantities for production efficiencies. This evaluation should always be your first task on your product development check-list.

Upon satisfaction of your commercial formula for the food product, food safety evaluation should be next. This evaluation will involve determining if the process for the commercial formula is acceptable and if the package and place of storage will maintain its food safety status and continue to be safe for human consumption. For some products, food safety expiration is also a part of this process, if the food product is not shelf-stable. Examples of these food products include refrigerated and bakery products. This task on the product development check-list often requires assistance from professionals who are familiar with the food product's processing, regulatory laws from either FDA or USDA and supporting analytical testing for proper food safety evaluation.

With the changes that may have occurred along the way, the food product is now becoming a standard in which replication can now be addressed, hence commercial production. Upon testing of the many batches and storing, final product status can be achieved.

With quality checks and satisfactory outcomes, nutritional analysis should be considered due to the commercial formula being "set". It is only now with ingredients, product yields and process established, that the best reflective nutrition facts label can be created. This would be your third task on your product development check-list.

If satisfaction is not being achieved upon commercial formula replication, a sensory evaluation might be necessary. The sensory work would evaluate how the ingredients are interacting and if the process which is required is complimentary to the ingredients. Additionally, sensory can also include evaluating the final product for its organoleptic qualities and if the trained panel subjects find the product acceptable for consumption.

Selling a food product and having your own business is an attractive proposition, but learning to love all the details of getting this done is a big part of the challenge. The product development part of getting your product ready for launch can be a time of new discovery through the series of evaluations described within. This effort and those results fold nicely into the business planning development part of the process, to reach your goal of a Michigan food product "for sale".

To obtain assistance with the development of your preliminary Ingredient Statement, contact the Product Center. However to ensure your product's final Ingredient Statement is accurate and consistent with legal regulations of the CFR, request a review from your local MDA food safety inspector. Label approval is not required by law before distribution and review by MDA is available only as resources allow for such assistance.

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AQUACULTURE IN MICHIGAN?

The Product Center is receiving an ever increasing number of inquiries about the feasibility of utilizing idle urban buildings for aquaculture with the goal of revitalizing communities, creating jobs and providing fresh food to the local community. While endeavors of this nature may represent a potential solution to urban blight the feasibility of such a project needs to be understood before “move forward” decisions are undertaken. Utilizing vacant buildings may be good for the community but it may not be economically feasible to renovate the building into an optimal environment for aquaculture. Another consideration is Michigan's climate is not supportive of aquaculture during the winter months so for continuous year around operation, light and heat must be supplied during the winter months.

What is Aquaculture?

The broad term aquaculture refers to the breeding, rearing, and harvesting of plants and animals in all types

of water environments, including tanks, ponds, rivers, lakes, and the ocean. Similar to agriculture, aquaculture can take place in the natural environment or in a manmade environment.

Michigan's Department of Agriculture recognizes aquaculture as a legitimate form of agriculture.

Most aquaculture operations in Michigan focus on bait fish, stocking fish, aquatic plants or trout that are grown in open ponds. The output of these operations is consumed primar-

ily by the sport fishing enthusiast and to a lesser extent the local fresh food (trout) industry. This fledgling industry is a minor contributor to Michigan's agriculture economy today, but has the potential to expand into growing fish for food and becoming a significant contributor to Michigan's agriculture economy. To accomplish this will require a break from traditional open outdoor ponds that raise primarily bait and game fish to manmade controlled environments capable of raising large numbers of fast growing fish.

Fish farming sounds a lot easier than it is. It involves close



monitoring of the water chemistry and fish health, along with the daily work of feeding the fish, transporting them, and finding a viable market. Besides the challenge of physical labor, aquaculture systems are also expensive. The controlled environment required to grow fish in tanks includes an aerated water circulating system, carbon filters to clean water, fish feed, transporting tanks, and equipment for

monitoring the water's chemical composition.

Assuming that the facility and energy (heat & light) issues are resolved the next challenge is to select a breed of fish that can be raised economically that the local community will buy. Most Michigan game fish, while quite taste, are too slow growing and do not do well in crowded environments. Therefore the aquaculturist needs to consider other breeds of fish such as tilapia.

AQUACULTURE IN MICHIGAN? (Continued from page 6)

Studies show the tilapia to be a hardy, prolific, fast-growing breed of fish. Tilapia contract less diseases, mature quickly and can grow in environments where other species are unable to survive. Tilapia is the fastest growing fish in the market. Ten years ago, most Americans had never heard of Tilapia, but it has grown to become the 3rd most popular US fish.

About Tilapia

Tilapia is a freshwater fish from the Upper Nile. Named by Aristotle, it means “distant fish”, as it was one of the first fish to be internationally imported. It is a member of the “Chichlid” family, which includes many aquarium species. Hieroglyphics date it as “raised” as far back as 2500 BC. It is nicknamed “St Peter’s Fish”, as it is known as the fish that Jesus fed to the multitudes. It is one of the most forgiving (easiest) fish to raise; after carp, the 2nd most cultured fish in world.

As a “Green” Farmed Fish, Its Many Qualities Include: It’s an Herbivore/omnivore, low-trophic level feeder. In the wild, algae, bacteria & detritus are important food sources. Prepared feeds are mostly grains and agricultural by-products. It naturally grows, reared in high densities, and requires low water exchange. It’s more disease resistant than other fish, and tolerant of water quality. Antibiotics and chemicals are rarely needed or used. It does not prey on other species.

At this time the Product Center has several clients who are very committed to raising tilapia in Michigan and are aggressively working to resolve the issues of appropriate facilities associated with low cost energy. Anaerobic digestion and gasification of waste material are being evaluated as low cost sources of energy and rearing tanks that will fit into available urban buildings are under design. They have the strong support of the communities involved and commitments for financing and should be in business of raising tilapia within a year at locations in southeast Michigan.

Ultimately their business model moves into a aquaculture franchising business.

Initially the tilapia will be sold live, to primarily ethnic communities, to consumers who will pay a premium to select live fish. Once the volume of tilapia reaches 4,000 (+) lbs/wk it will become economically feasible to establish a processing operation that will produce fresh and fresh frozen tilapia flays. The design of the processing facility will be scalable to a volume of 20,000 lbs/wk. The initial aquaculture operation will employ 6-8 people and scale up to about 15 at full capacity. The processing operation will begin operation with 6 employees and equally grow to about 15 at full capacity. Plans also call for a hydroponic greenhouse to be co-located with the aquaculture operation where the fish enriched water will serve as a growing media that may allow the hydroponically grown vegetables to be sold as organic.

As this aquaculture project comes fully online it will address the urban blight community issues, provide fresh tilapia fish and vegetables to the local and extended communities, and create jobs, including indirect jobs such as construction, transportation, providing fish food, etc. It will also help address the disposal of local organic waste material that will feed the anaerobic digester or gasification system that will provide the low cost energy necessary to make the project economically feasible.

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ANOTHER PRODUCT CENTER SUCCESS STORY: HERKNER'S FOODS, LLC

Sisters Judy, Lynda and Sue describe themselves as three grandmas who are trying to improve the economy one batch of cherry topping at a time. They started with a dream, some cherries and their parent's 50+ year old recipe to do just that. In 2009 they received the Product Center's Start Up to Watch award so we thought we would visit the sisters to see how they have progressed.

When they received the award in 2009 they were working with two major companies to distribute their products and were preparing to move from the Starting Block, the kitchen incubator in Oceana County where they launched their business, to a larger packing operation to keep up with demand. Today, Herkner's Homemade Cherry Topping is distributed to locations in Michigan and Illinois. Through their website at <http://www.herknersisters.com/> they are shipping product to Alaska as well as all over the U.S., Australia, France, and the Netherlands. The sisters have a large co-packer in the Detroit area that can duplicate their family recipe. They are changing their packaging to a more consumer friendly jar. They are investigating new product formulations, such as a sugar free cherry topping, a cherry liqueur nut topping, and a cherry jalapeno topping.

But the big news is they are starting to ship to China!

Sue Keegstra, President of Herkner's LLC and one of the three sisters who founded the business, says she was demonstrating the product at a specialty products store in the Lansing area. One of the people sampling the product was a business commerce lawyer who also owns an international trading company in mid-Michigan. He immediately became interested in the potential for the product in China and offered to act as the sisters' broker/distributor.



"We had to make some changes in the label. Everything will be in English except we will add the phrase 'cherry topping' in Chinese," says Sue. "We also introduced a smaller 12-ounce jar that is identical in shape to our 16-ounce jar but allows us to reduce the price point. This was important not only for the China market but for our US customers. We are also applying for a Federal Trademark as well as a Chinese Trademark."

Sue says it is important to find a good broker when exporting products. "We need a broker who is interested in protecting our product as much as we are," she says. This is important

ANOTHER PRODUCT CENTER SUCCESS STORY: (Continued from Page 9)

to avoid someone in a foreign country from copying the product, thus losing business for the exporter as well as the broker. "We checked him out very carefully," she says.

But the really scary part of exporting is the cash flow, according to Sue. She says after the first shipment is sent to China, orders will be sent through the broker. The money to pay for the order is deposited in an escrow account in the US but the money is not available to the Herkner sisters until the product is manufactured and shipped. "Therefore we need to finance the production of the product and can't get any money until it is shipped," says Sue. "We can use a Letter of Credit based on the money in escrow to obtain a line of credit but we really have to watch our cash flow."

While the volume of sales will be small when they start shipping in January 2011, their goal is to ship in 5,000 case lots – the amount in one container. In addition, their broker is investigating markets in Japan and Taiwan.

"I can't tell you the help we have received from the MSU Product Center. Without them I don't think we would be doing this. They have walked us through the whole process of forming our company, marketing our company, and dealing with situations that arise," Sue says.

To learn more about Herkner's LLC and find a store near you where you can buy their product, go to <http://www.herknersisters.com/>.



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BUILDING YOUR BRAND

For Product Center clients the successful launch of new products into the marketplace and embarking down the road to independence, it has always been the 'passion' that has driven the return on innovation and ultimately profitability. This 'passion' is still a vital part of the equation and should never be forgotten, but it would now seem that 'passion' has been trumped by brand recognition. Branding is more than just a business buzzword. It has become the crux of selling in the new economy. If the old marketing mantra was, "nothing happens until somebody sells something," the new philosophy could be "nothing happens until somebody brands something." That is to say, the passion of the product has got to be reconciled with the brand, and building that brand forces us to create the business needed to sell the product. In its simplest form, a brand is a noun. It is the name attached to a product or service. However, upon closer inspection, a brand represents many more intangible aspects of a product or service: a collection of feelings and perceptions about quality, image, lifestyle and status. It creates in the mind of customers and prospects the perception that there is no product or service on the market that is quite like yours. In short, a brand offers the customer a guarantee and then delivers on it.

You might infer, then, that if you build a powerful brand, you will in turn be able to create a powerful marketing program. However, if you can't convince customers that your product is worthy of purchasing, no amount of advertising dollars, fancy packaging, or public relations will help you achieve your sales goals. Therefore, successful branding programs begin with superior products and services, backed by excellent customer service that permeates an entire organization. One of the truths of modern business is that there is almost nothing that your competitors can't duplicate in a matter of weeks or months. If you have a great idea, you can be

certain that somebody will copy it before long. Not only will they follow your lead, but they may also be able to do it better, at a lower price.

The question then becomes, "What competitive edge do I have to offer that cannot be copied by anyone else?" The answer- your brand.

Creating a strong brand identity will build mind share - one of the strongest competitive advantages imaginable. As a result, customers will think of your business first when they think of your product category. For example, when you think of tissues, more likely than not, you think of the Kleenex brand and when you're looking for tape to wrap a present, Scotch is the brand that springs to mind. The reason behind these strong brand-product associations is that these companies have built rock solid brand identities. As the winter continues and we think of the business strategy for 2011, let's take time to focus on developing the business and building the brand that will ultimately sell the products.

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UPCOMING EVENTS

- March 7-9 - MSU Better Processing Control School- Two day: Acidified Foods, Better Processing Control
March 7-11 Four day: Acidified Foods and Low Acid Canned Foods, Better Process Control School.
For more information [CLICK HERE](#). To register go to <http://web2.msue.msu.edu/bfp/>

- March 17, 2011 - Ag Day at the Capitol. Organizations representing Michigan's agricultural commodities, will gather at the State Capitol on Thursday, March 17 to offer state lawmakers real food for thought by filling the Capitol with food and information about the importance of agriculture in Michigan.

- October 19, 2011 -- MSU Product Center will be holding their Making It In Michigan conference and Marketplace trade show at the Lansing Center. Please telephone Greta McKinney at 517-353-7185 for additional information on this event or go to www.makingitinmichigan.msu.edu for further details.



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