Feeding 9 Billion People – Michigan’s Role in the 21st Century Global Food System

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The Tale of Two Centuries: Social and Economic Pathways for the Future

- **20th Century** – reliance on singular, godfather industries (i.e. textiles, automotive manufacturing, etc.) - linear models based on self-interest - segregation of resources

- **21st Century** – reliance on a diverse economy driven by creativity and innovation - seeking green and sustainable outcomes – networked and connected models relevant to global issues – with an emphasis on diversity and resiliency
Assumptions for 21\textsuperscript{st} Century Communities

- People and communities act locally, but are linked to global issues for learning and economic development.
- Resilient communities have economies linked to global issues.
- Renewable Natural Resources are drivers of social and economic opportunity.
- Greening and sustainability metrics are common indicators of success.
- Innovation platforms and creative solution finding are widely accepted approaches to difficult issues.
- New knowledge comes from the connections of known knowledge systems as well as from new discovery.
Major Challenges of the 21st Century

Food

- Food Demand will double by 2050
  - Currently - 70% of global energy
  - Currently - 70% of global water
  - Significant impacts on climate change and water quality/quantity
- Michigan is well-positioned – 2nd most diverse agricultural state
Major Challenges of the 21st Century

Water

- Global water shortages
- Michigan is well-positioned
  - Surrounded by fresh water
  - Longest coastline in the U.S.
  - Water technology centers
    - MSU
    - UM
    - WSU
Agriculture and Water Supply

- Food production, processing and transportation account for 70% of world’s water use
- 47% of the world’s population will experience severe water stress by 2050
- Farming will have greater competition for water from urbanization and industrialization
- Climate change will continue to affect world’s water supply
Major Challenges of the 21st Century

Energy

- 2005 Peak Oil Year
- Michigan is well-positioned
  - Off-shore wind
  - Solar technology
  - Bio-fuels research and production
Food and Energy Use

U.S. – 20% of energy use is for food

- 20 percent of energy for our food system is for farming
- 80 percent of energy for our food system is for transport, processing, packaging, marketing, food preparation and storage
2050 Global Scenario:

- 9.5 billion people
- 70% live in cities
- Must double food production
- Must use less energy and less water than today
The 2050 Scenario

This might mean:

• Calories from global agriculture
• Nutrition from local agriculture/food systems
• Reliance on food, water, energy integration
• Reliance on indoor food growing systems
• Reliance on the reuse of blighted and abandoned assets
The Tragedy of Food Waste

- 1.3 billion tons of food are wasted every year
- Worldwide, one third of all food produced totaling around US$1 trillion is going down the drain into the trash can and into landfills due to inefficient food production and consumption systems (FAO)
Health and Nutrition Implications

✔ Food-Related Public Health
  ➢ Diabetes
  ➢ Cardio
  ➢ Obesity
  ➢ Hypertension
  ➢ Cancer

✔ Food Safety

✔ Water Quality
Underpinning Assumption

How we choose to grow, process, transport and consume our food will have the most dramatic impact on the quality of life for you, me -- and future generations of the 21st Century......
Michigan’s Future Food and Agriculture Framework

- Rural and Urban (Metro) based production
- Outdoor and indoor production systems
- Reliance on production technology that includes water and energy efficiencies
- Production of food, energy and pharmaceuticals
- Vertical integration for added value, job creation and export markets
- Focused on local, regional and global markets
On-Farm Energy Enterprises

Energy as an on-farm enterprise for both production input and as a market commodity
- Back to the Grid
  - Bio-gas
  - Bio-mass
  - Geo-thermal
  - Wind
  - Solar
On-Farm Water Management and Production Efficiencies

New genetic research advances in:

- Genome mapping
- Drought resistance
- Nitrogen fixation
- Insect and disease resistance
- Increased/improved photosynthesis
- Higher production yields
On-Farm Water Management and Production Efficiencies (cont.)

- New water saving technologies
- Water management and conservation
- Water quality improvement
- Water as an economic attractant
- Water policy regulation and monitoring
Metro/Urban Food Production

Food production in, around and between the cities –

➢ Implications for Food Systems in the U.S.?
  • Basis for re-development of social and economic structures and systems
  • Source of innovation and design
  • Basis for sustainability and green outcomes

➢ Implications for Food in Developing Countries?
  • Huge impact on future food supply and sustainability
Our U.S. Post-Industrial Cities

Post-industrial cities are characterized by:

- Abandonment
- Blight
- Toxic soils
- Declining natural areas
- Declining public health
- Poor food access and availability
- Chronic unemployment/under-employment
- Low land values
- Poor housing conditions
Detroit

- Auto-Technology capital of the world
- 139 square miles
- Built for 2,000,000 people
- Today = less than 700,000 people
- 35,000 empty acres – 1/3 of the city
- Minority majority city
- Low-wealth, marginalized citizens
- Great distrust and suspicion
The Future of Michigan’s Green Economy

- Metropolitan agriculture and community food, energy and water systems
- Aquaculture industry unique to the Great Lakes Region
- Alternative energy (wind, solar, bio-fuels, bio-gas, etc.) becoming more prominent
- Fresh water as an economic attractant for clean industry
- Natural Resource enterprises, recreation and tourism become a greater part of the economy
Can We Help Bring Our City Agendas Strategically Together?

Social and Cultural
Economic Growth and Development
Educational Reform (K-16)
Public and Regulatory Policy
Health and Wellness
Can We Involve The Anchor Institutions Of Detroit?

- Community Leaders
- Detroit Public Schools
- Henry Ford Health System
- Influential Business People
- Local and State Government Cooperation
- Higher Education and Knowledge Institutions
- Non-profits and Foundations
MetroFood Options and Alternatives

- Land-based food and energy production (gardens, commercial operations, etc.)
- Indoor, expanded seasons’ technologies (hoop houses, greenhouses, etc.)
- Repurposed buildings resulting in new indoor growing structures
- New, vertical, high-tech growing structures
Farming Grows Up
MetroFoodPlus
Innovation Cluster @ Detroit

Multi-stakeholder coalition

Business partners
Society community stakeholder partners
Government partners
Knowledge institutions

Portfolio of action projects
Global Innoversity @ MSU

- Detroit USA
- Mexico City Mexico
- Sao Paulo Brazil
- Hyderabad India
- Netherlands
- Johannesburg South Africa
- Others, including China & Africa
- Copenhagen Denmark
Feeding 9 Billion by 2050: The Michigan Opportunity

- Michigan’s post-industrial cities become models of healthy, green, sustainable and resilient cities focused on real issues facing the world

- Michigan becomes a globally recognized knowledge resource for the integration of Food, Water and Renewable Energy

- Michigan food and agriculture systems become food growing innovation and technology leader among states and nations of the world

- MSU and Michigan are at the forefront of knowledge generation and transfer through research and innovation
Is it too late?

No – but we have to start making the changes right now.....

Thank you