Towards Sustainable Food Systems: Metrics and Considerations with Examples from the Dairy Sector

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Bringing to life the dairy community’s shared vision of a healthy, happy, sustainable world, with science as our foundation
The Challenge

- **World Population: 1950-2050**
  - Source: U.S. Census Bureau, International Data Base, December 2008 Update.

- **Food production will need to increase by 70% to feed the world by 2050**

- **Global middle class will triple by 2030**

- **70% of world population will live in cities by 2050**

- **70% of suitable agricultural lands is already in use or under protection**

- **52% of projected world population could be exposed to severe water scarcity by 2050**

Malnutrition in the crosshairs

The world faces a grave nutrition situation...

2 billion people lack key micronutrients like iron and vitamin A
155 million children are stunted
52 million children are wasted
2 billion adults are overweight or obese
41 million children are overweight
88% of countries face a serious burden of either two or three forms of malnutrition

And the world is off track to meet all global nutrition targets
GOAL 2
END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION AND PROMOTE SUSTAINABLE AGRICULTURE
Nutrition and Food Systems

A report by the High Level Panel of Experts (HLPE) on Food Security and Nutrition

http://www.fao.org/3/a-i7846e.pdf
Food Systems: A Conceptual Framework

Biophysical and environmental drivers
- Natural resource capital
- Ecosystem services
- Climate change

Innovation, technology and infrastructure drivers
- Innovation
- Technology
- Infrastructure

Political and economic drivers
- Leadership
- Globalization and trade
- Conflicts and humanitarian crises
- Food prices and volatility
- Land tenure

Socio-cultural drivers
- Culture
- Religions & rituals
- Social traditions
- Women's empowerment

Demographic drivers
- Population growth
- Changing age distribution
- Urbanization
- Migration & forced displacement

Food supply chains
- Farmers, indigenous peoples, agribusiness, land and plantation owners, fisheries, financial entities
- Transporters, agribusiness, distributors
- Packing plants, food and beverage industry, small and medium enterprises
- Retailers, vendors, food outlet owners, traders, restaurateurs, wholesalers

Food environments
- Food availability and physical access (proximity)
- Economic access (affordability)
- Promotion, advertising and information
- Food quality and safety

Consumer behaviour
- Choosing where and what food to acquire, prepare, cook, store and eat

Diets
- Quantity
- Quality
- Diversity
- Safety

Nutrition and health outcomes
- Impacts
  - Social
  - Economic
  - Environmental

Political, programme and institutional actions

Sustainable Development Goals

Availability
Access
Utilization
Sustainable diets as defined by FAO

“Sustainable Diets are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources.”

FAO and Biodiversity International 2012


Gustafson et al. Sustainability. 2016
Metrics to evaluate sustainability of food systems need to assess the multiple aspects.
To arrive at a decision whose benefits outweigh its risks, decision makers must carefully consider a broad range of effects and interactions across the health, environmental, social, and economic domains.

See more at:
http://iom.nationalacademies.org/Reports/2015/Food-System.aspx#sthash.mbeljiym.dpuf
Dairy Sector commitment to sustainable production
We commit to being leaders in sustainability, ensuring the health and well-being of our planet, communities, consumers and the industry.
Environment: Grounded in science

• Life cycle science establishes baseline environmental footprint for U.S. Dairy
• Peer-reviewed, published, and contributed to open-source National Agricultural Library
• Greenhouse gas emissions of milk = 17.6 lbs. CO2 per gallon
• Goal to reduce GHGe by 25% by 2020

U.S. Dairy is ~2% of U.S. GHGe, 5% total water withdrawal and <4% farmland occupation

https://dairygood.org/content/2017/2016-us-dairy-sustainability-report
Environment: Reducing use of resources and lowering our impact

• American farmers have succeeded in improving efficiency while caring for the environment.

• Compared with 1944, the U.S. dairy industry now produces a gallon of milk using:
  
  90% less land  
  65% less water  

And producing:

  75% less manure  
  63% smaller carbon footprint

~98% of U.S. milk comes from farms participating in the FARM Program
Social: Dairy’s role in cardiovascular and metabolic health recognized by Dietary Guidelines for Americans Advisory Committees 2010 and 2015

“Moderate evidence also indicates that intake of milk and milk products is associated with a reduced risk of cardiovascular disease and type 2 diabetes and with lower blood pressure in adults.”

2010 Dietary Guidelines Advisory Committee Report

“Consumption of dairy foods provides numerous health benefits, including lower risk of diabetes, metabolic syndrome, cardiovascular disease and obesity.”

2015 Dietary Guidelines Advisory Committee Report
Economic: Milk and milk products are an economical source of nutrition

- Meat, poultry, fish: $0.63
- Fruit: $0.40
- Vegetables: $0.29
- Dry beans, legumes nuts: $0.26
- Milk, milk products: $0.26
- Eggs: $0.24
- Grains: $0.23
- Sugars, sweets, beverages: $0.23
- Fats, oils, salad dressing: $0.09

Systematic approach to evaluating nutrition and food systems sustainability is required

Need to think systemically!
- Across different domains of a food system
- Farm to consumer to farm
- Multiple food and nutrition systems (not one diet nor one farm system!)

Nascent research
- Limited number of studies
- Inconsistent or nuanced
- Trade-offs among the domains of sustainability will likely have to be made.
- Focusing on the environmental footprint of food as the sole standard for sustainable food patterns may run counter to human nutritional needs.
Thank you

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