Leadership in Sustainable Nutrition

Towards a Sustainable Dairy Sector

Autumn Conference 2012

University College Cork

Greg Miller, Ph.D./ Nancy Austad

September 12, 2012

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What is sustainable nutrition?

- ‘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.’

Dairy sustainability goals

- To dairy industry stakeholders, sustainability means providing consumers with the nutritious dairy products they want, in a way that makes the industry, people and the earth economically, environmentally and socially better – now and for future generations.





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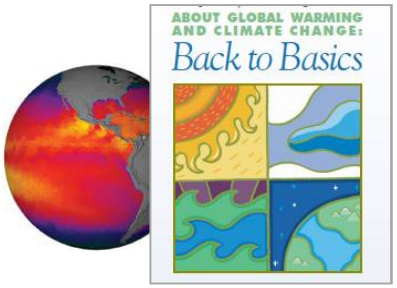
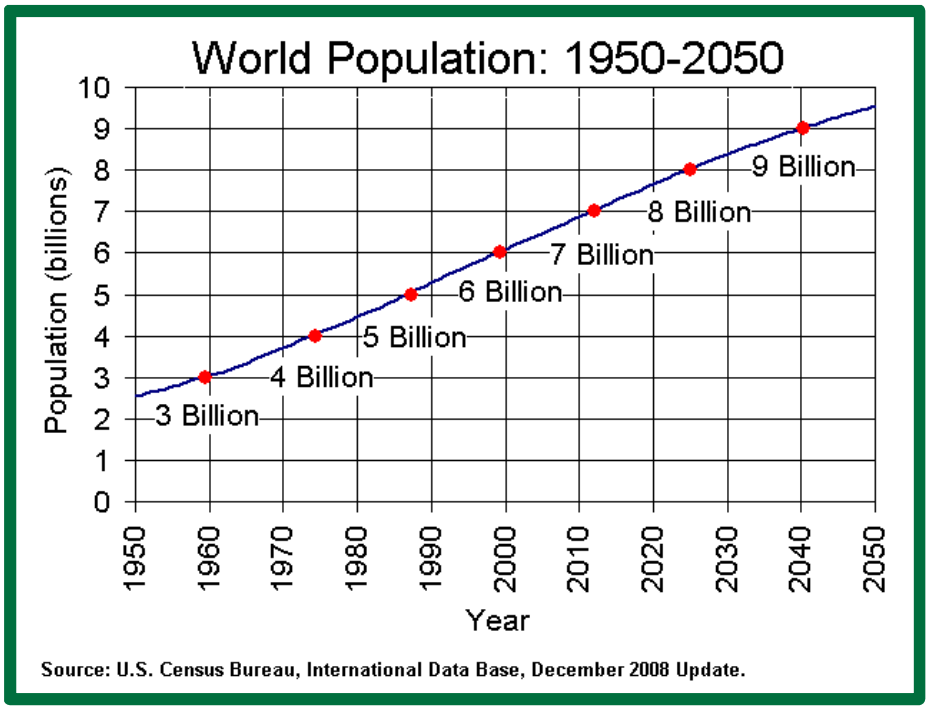
Global challenges in the 21st century

Climate Change



The Earth's climate is changing. In most places, average temperatures are rising.

Population Growth



***US Population** expected to increase from 310 million in 2000 to 420 million in 2050*

http://www.census.gov/ipc/www/idb/worldpopgraph.html

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2009, FAO's Director-General on How to Feed the World in 2050. Population and Development Review, 35: 837–839.

Nutrition and health issues across diverse populations

- Underweight and undernourished
  - Nearly 850 million people globally are food insecure
  - Communicable disease risk an issue
- Overweight and undernourished
  - Increased risk for non-communicable chronic diseases
  - Impact on health care systems a concern

http://www.ers.usda.gov/topics/international-markets-trade/global-food-security.aspx
http://www.cdc.gov/globalhealth/ncd/overview.htm

Not only is more food needed, a high quality diet with dairy is important for a healthy population

2012 Today's Diet Patterns

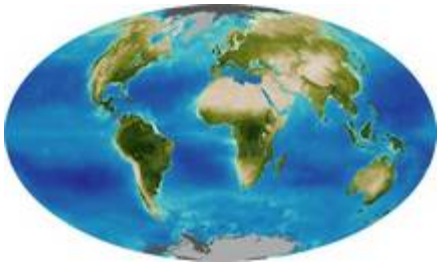
U.S.Population
310 Million

Recommendations Dietary Guidelines for Americans

2050 More food for more people

U.S. Population
420 Million

7 Billion



9 + Billion

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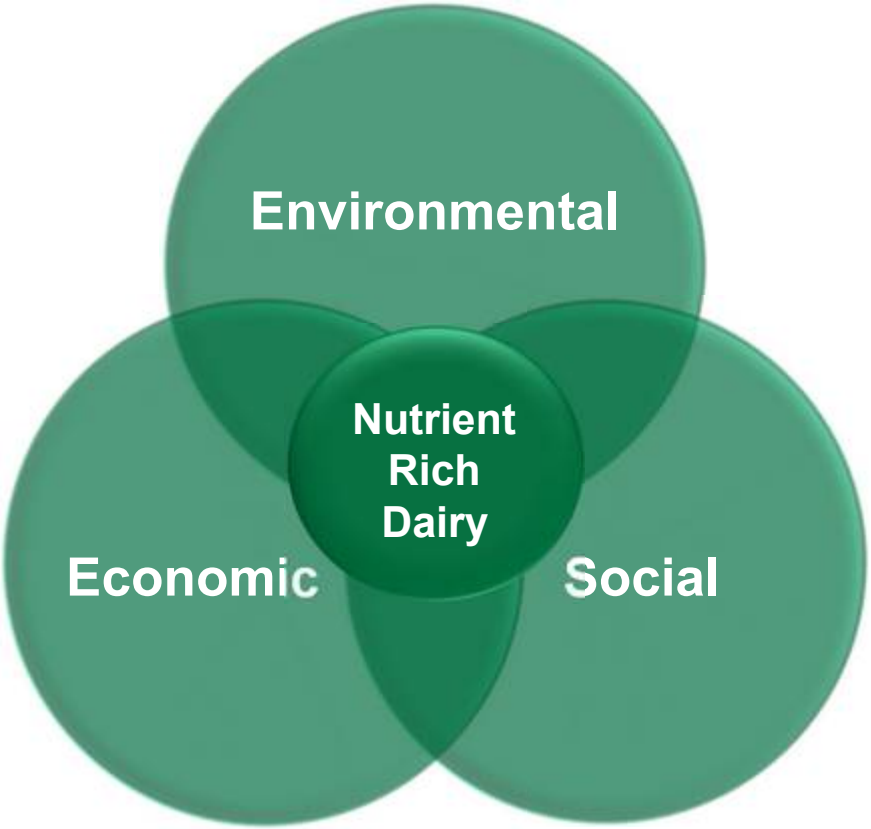
U.S. Census Bureau. Population Projections of the U.S. and World Population, International Database.

Nutrient-rich dairy intersects across the three pillars of sustainability



Dairy is a vital component of a healthy, sustainable diet

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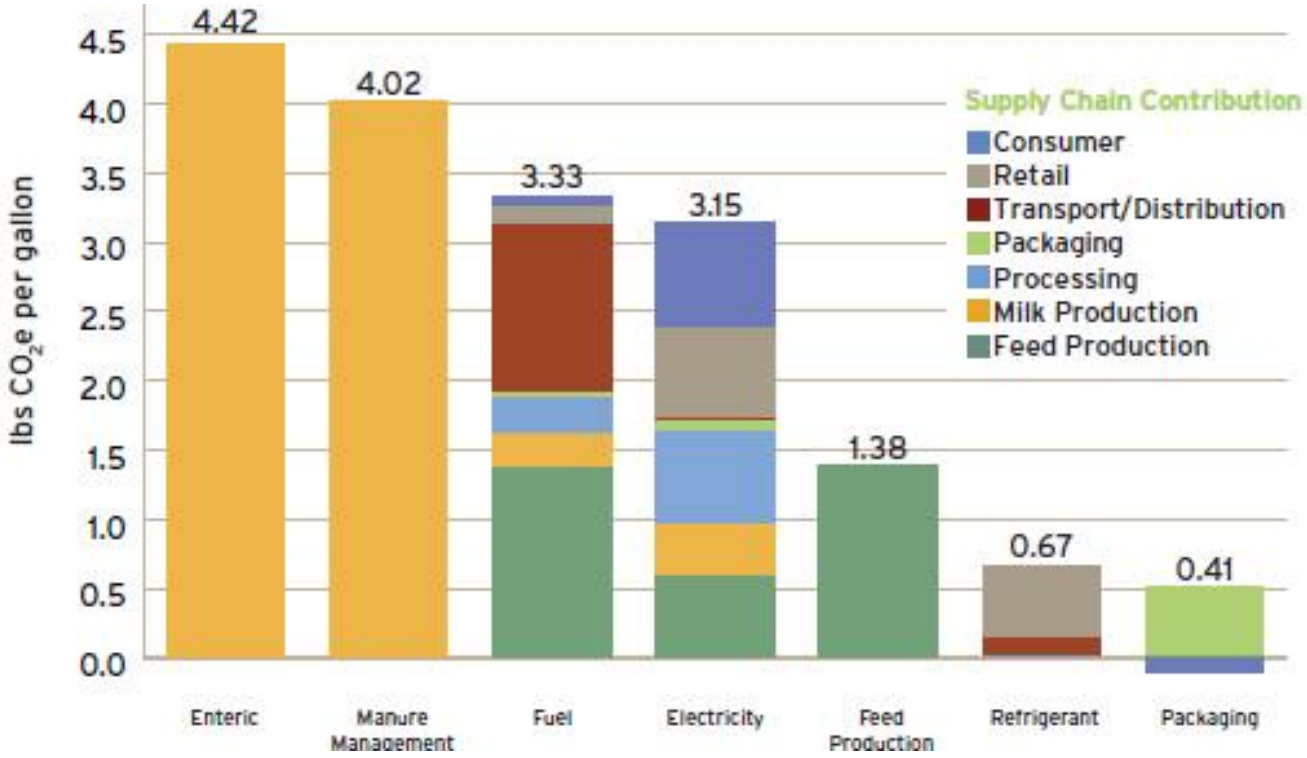
Measure: Understanding and owning our footprint

Carbon footprint of 1 gallon of milk= 17.6 lbs CO_2e/gallon fluid milk consumed[2]



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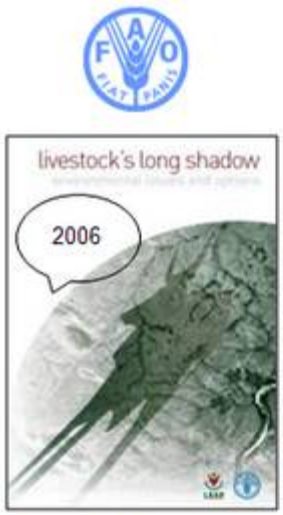
[1] Does not include sources related to waste.

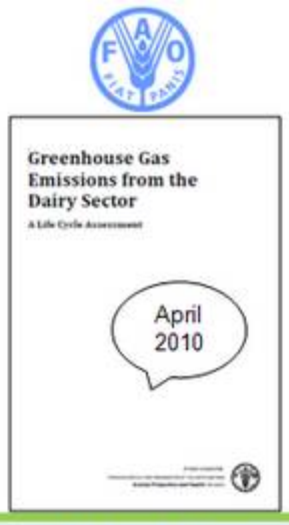
[2] 2010. "Greenhouse Gas Emissions of Fluid Milk in the U.S." University of Arkansas. Based on environment and consumption data from 2007-2008, the total fluid milk carbon footprint is approximately 35 million metric tons, with a 95% confidence range from 30 to 45 million metric tons. Natural variability in data ranges from 15.3 to 20.7 lbs. CO_2e per gallon.

Science Base

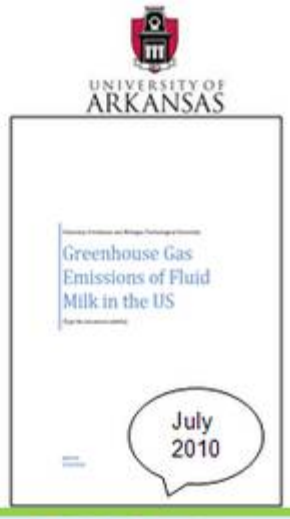
- The results of the **greenhouse gas life cycle assessment (LCA) for fluid milk** were presented to scientists and academics in September 2010.



Global Livestock
is 18%
of global emissions



Global Dairy
is 2.7%
of global emissions



U.S. Dairy
is ~2%
of U.S. emissions

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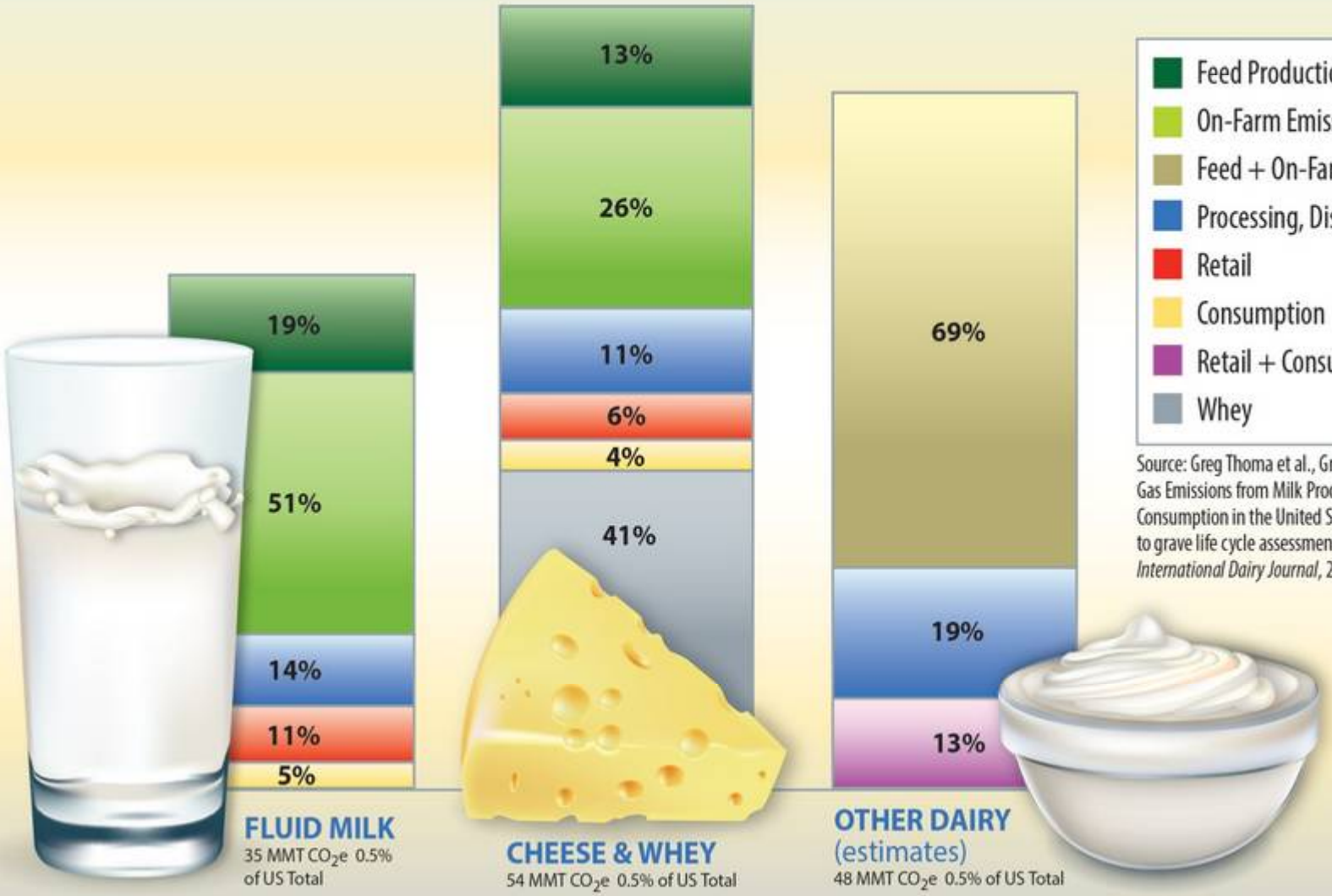
U.S. Dairy Carbon Footprint — All Products

Total emissions = 137 MMT (2% of total U.S. GHG emissions)

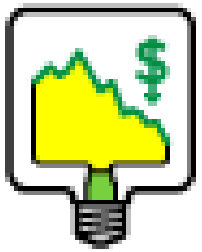


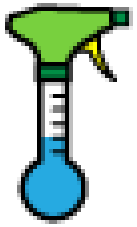
Source: Greg Thoma et al., Greenhouse Gas Emissions from Milk Production and Consumption in the United States, A cradle to grave life cycle assessment, 2008. *International Dairy Journal*, 2012, accepted.

Innovate: Roadmap projects to mitigate GHG emissions

Energy Management Best Practices

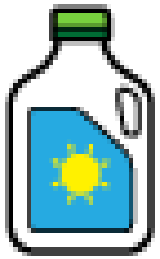
- Farm Energy Efficiency
- Dairy Plant Smart





Energy Management Next Practices

- Next Generation Processing: UV
- Next Generation Cleaning



Dairy Distribution Best Practices:

- Dairy Fleet Smart
- Processing and Packaging LCA

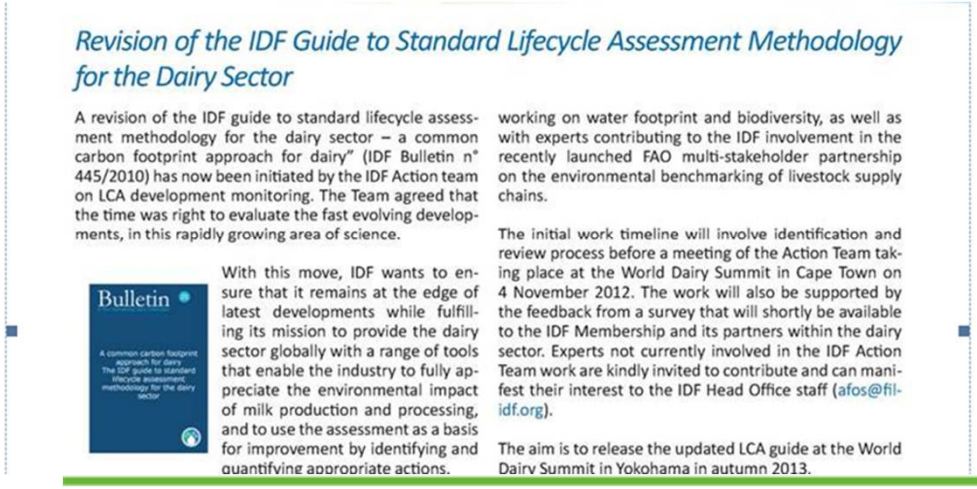
Enteric and Manure Management Next Practices

- Dairy Power
- Cow of the Future

International efforts

Worldwide Dairy Industry signed *Global Dairy Agenda for Action* Sept 24,2009

Industry pledges to reduce carbon emissions to help address global warming - builds on past performance to address climate change



Revision of the IDF Guide to Standard Lifecycle Assessment Methodology for the Dairy Sector

A revision of the IDF guide to standard lifecycle assessment methodology for the dairy sector – a common carbon footprint approach for dairy" (IDF Bulletin n° 445/2010) has now been initiated by the IDF Action team on LCA development monitoring. The Team agreed that the time was right to evaluate the fast evolving developments, in this rapidly growing area of science.

Bulletin

With this move, IDF wants to ensure that it remains at the edge of latest developments while fulfilling its mission to provide the dairy sector globally with a range of tools that enable the industry to fully appreciate the environmental impact of milk production and processing, and to use the assessment as a basis for improvement by identifying and quantifying appropriate actions.

working on water footprint and biodiversity, as well as with experts contributing to the IDF involvement in the recently launched FAO multi-stakeholder partnership on the environmental benchmarking of livestock supply chains.

The initial work timeline will involve identification and review process before a meeting of the Action Team taking place at the World Dairy Summit in Cape Town on 4 November 2012. The work will also be supported by the feedback from a survey that will shortly be available to the IDF Membership and its partners within the dairy sector. Experts not currently involved in the IDF Action Team work are kindly invited to contribute and can manifest their interest to the IDF Head Office staff (afos@fil-idf.org).

The aim is to release the updated LCA guide at the World Dairy Summit in Yokohama in autumn 2013.

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Projected milk demand in the global food supply system

Global dairy demand (excluding butter) projected to reach 2 trillion lbs. of fresh milk equivalents

Planet would need 83 million additional cows at current global productivity rate gains applying greater stress on planet's limited resources

A sustainable solution depends on innovation

Per capita dairy source: FAO 2006. World Agriculture: towards 2030/2050. Global Perspective Studies Unit. Food and Agriculture Organization. Rome, June 2006
Historical Data from: FAO n,d. Livestock Primary. Production. FAOSTAT. Food and Agriculture Organization. Accessed on August 18th, 2011. Website: http://faostat.fao.org/site/569/default.aspx#ancor

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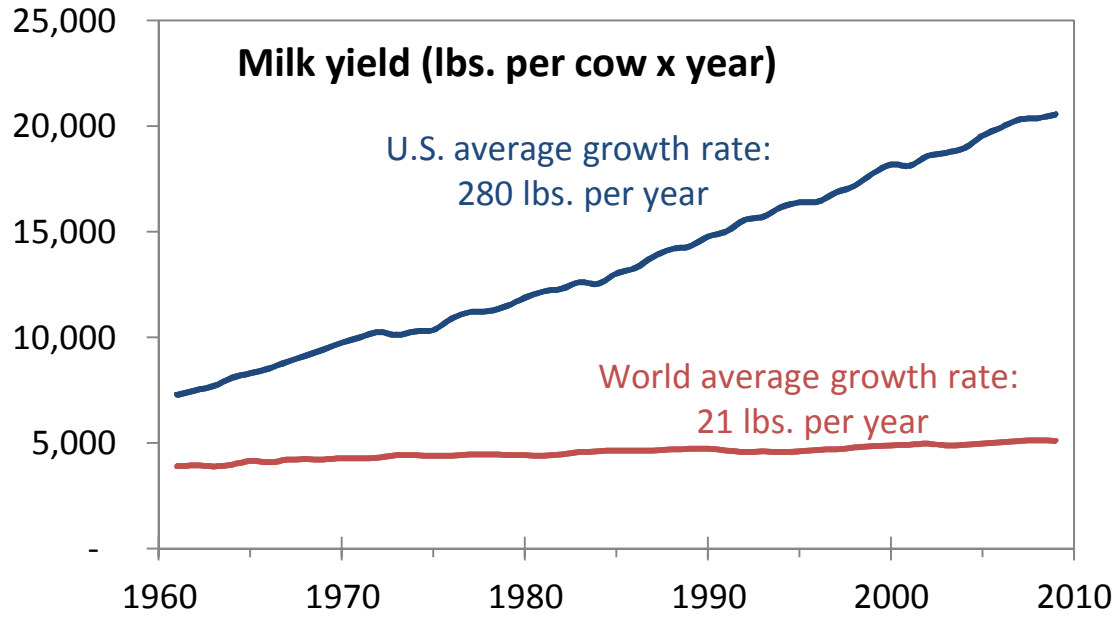
Innovation: 3-fold increase milk production since 1960

- Since 1960, milk production per cow in the U.S. has increased 280 lbs. per year - almost a 3 fold increase
- Without adopting innovations similar to the U.S., the world's average milk production per cow grew only 21 lbs. per year



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Data from: FAO n,d. Livestock Primary. Production. FAOSTAT. Food and Agriculture Organization. Accessed on August 18th, 2011. Website: http://faostat.fao.org/site/569/default.aspx#ancor

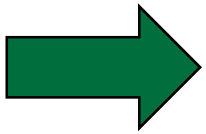
Innovation: historical driver of productivity

- 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
  - 75% less manure
  - 63% smaller carbon footprint

USDA-NASS, http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats_1.0/index.asp, Last accessed 25OCT10
USDA-ARS-AIPL, http://aipl.arsusda.gov/eval/summary/trend.cfm, Last accessed 26,OCT10
Capper J. Cady A. Bauman D. 2009. The environmental impact of dairy production; 1944 compared with 2007. Journal of Animal Science. 87:2160-2167

The Perception:
Animal foods = inefficient use of resources

"The production of meat and dairy forms the biggest food related burden. This is because of the inefficient production: the production of a single kilo of meat protein requires six kilos of vegetable protein"*



**Guidelines for a healthy diet: the ecological perspective*. Health Council of The Netherlands. 2011

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The Facts:
Dairy cow is efficient at feed to food protein conversion

- The human-edible fraction in cow's feed is small and typically less than 10%
- For high yielding farm systems the average conversion rate (input/output) for total energy is about 4.5 and for total protein between 3 and 4
- Therefore the return on the human-edible fraction ranges from 100 to 360% for energy and 180 to 430% for protein
- The quality of both the non human-edible and the human-edible feed protein is increased by the cow by at least a factor of 1.4

Personal communication:Toon C. M. van Hooijdonk

Healthy people, essential for a sustainable future

Social sustainability

- Protect mental wellbeing of all stakeholders
- **Protect the physical health of all stakeholders**
- Encourage community
- Treat all stakeholders fairly
- Essential services for all stakeholders

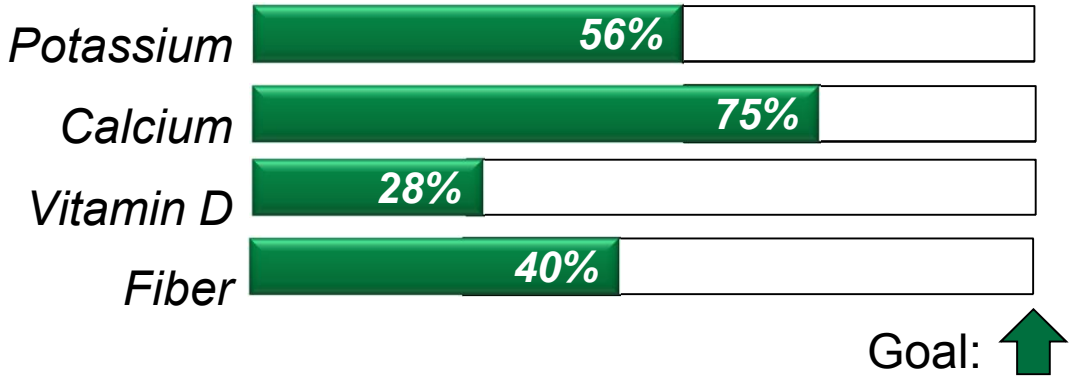
Core premise of dietary guidance recommendations globally

"… a healthy society cannot be developed and maintained if the population are in poor health"

Adapted from UNEP Guidelines for Social Life Cycle Assessment of Products; Social Sustainability, Sustainable Design Guide (http://www.espdesign.org/sustainability-definition/social-sustainability)

Americans, like many populations globally, fall short on dairy recommendations

Nutrients with intakes low enough to be of public health concern are:



***Low-fat or fat-free milk, cheese or yogurt**: *ages 9+ y, 3 servings; 4-8 y, 2.5 servings; 2-3 y, 2 servings. Milk, yogurt: 1 cup; natural cheese, 1.5 oz.; processed cheese, 2.0 oz.*

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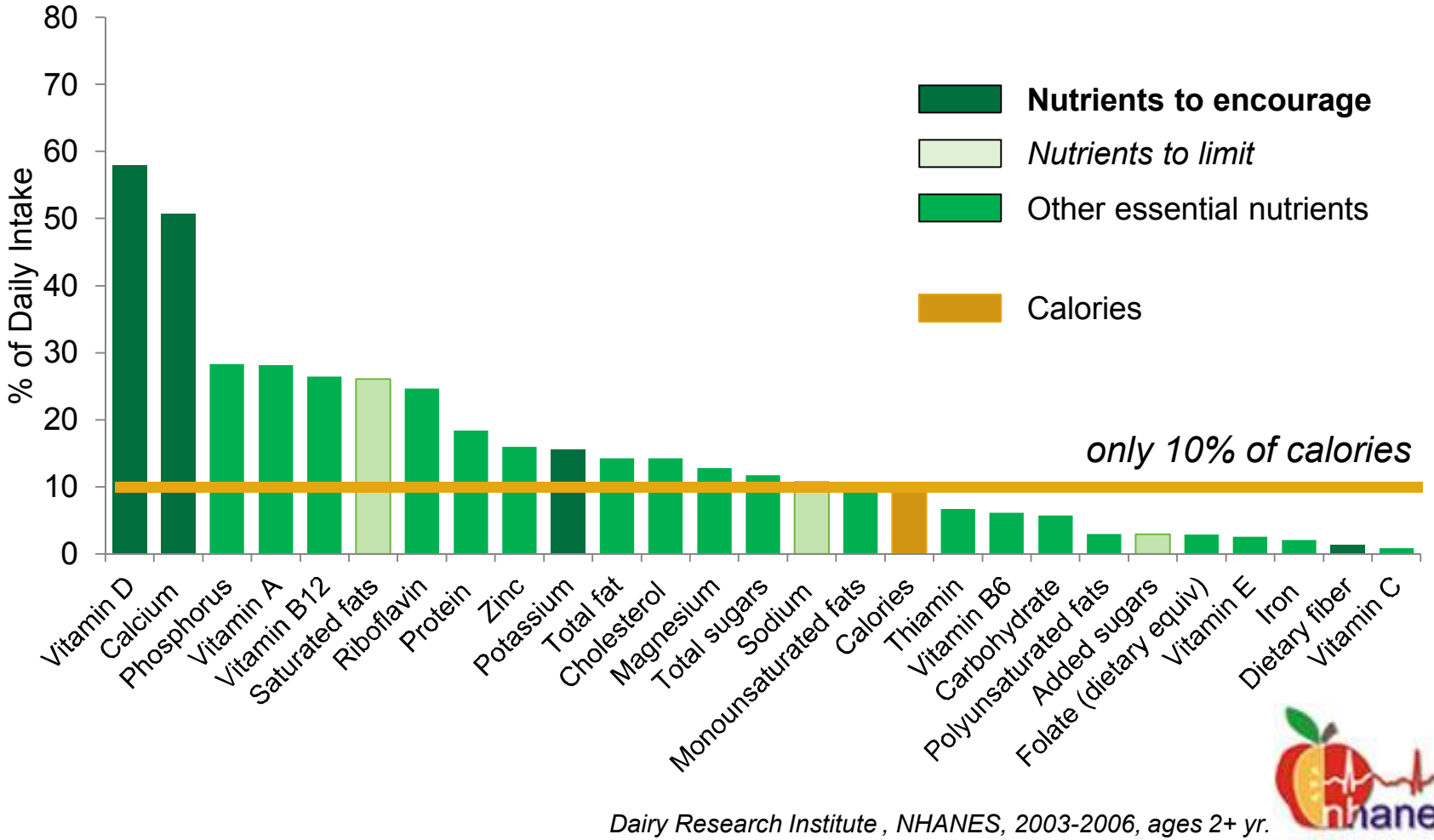
Even at today's intakes, dairy is a key source of nutrients



Dairy Research Institute , NHANES, 2003-2006, ages 2+ yr.

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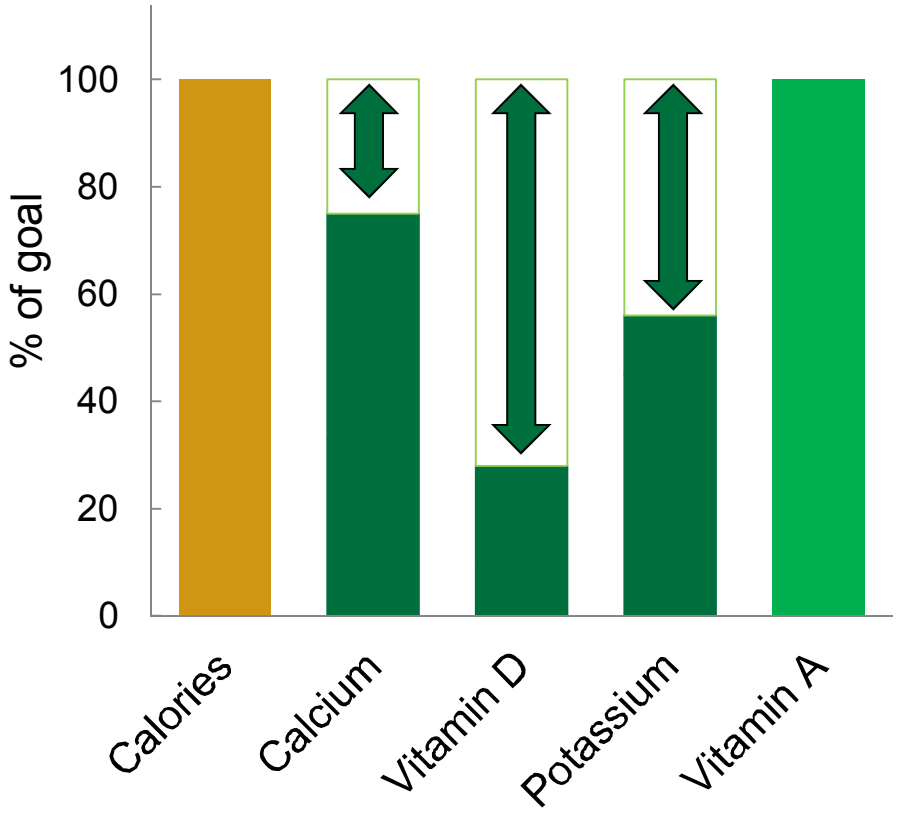
Today, American diets come up short on key nutrients

1.7 dairy servings



Dietary Guidelines recommends

Ages 9+ years: 3 servings

Ages 4-8 years: 2½ servings

Ages 2-3 years: 2 servings

Dairy Research Institute
NHANES, 2003-2006, ages 2+ yr

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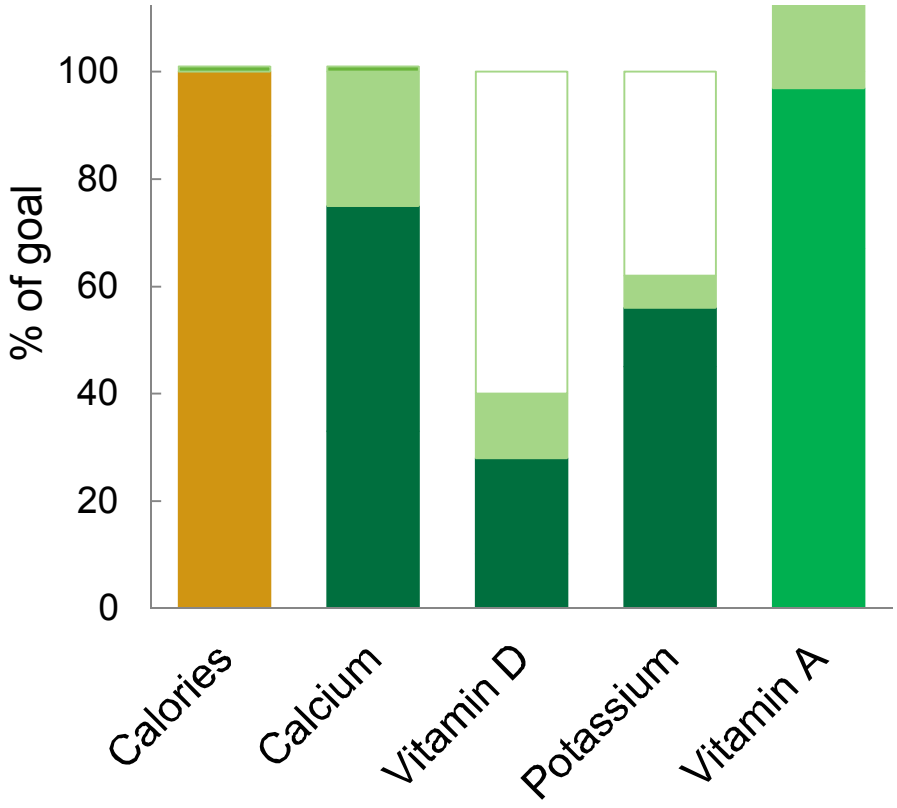
Adding a dairy serving will help close nutrient gaps!

Add one dairy serving



One more serving of dairy:

- Close the calcium gap
- 44% higher vitamin D intake
- 11% higher potassium intake

Dairy Research Institute
NHANES, 2003-2006, ages 2+ yr

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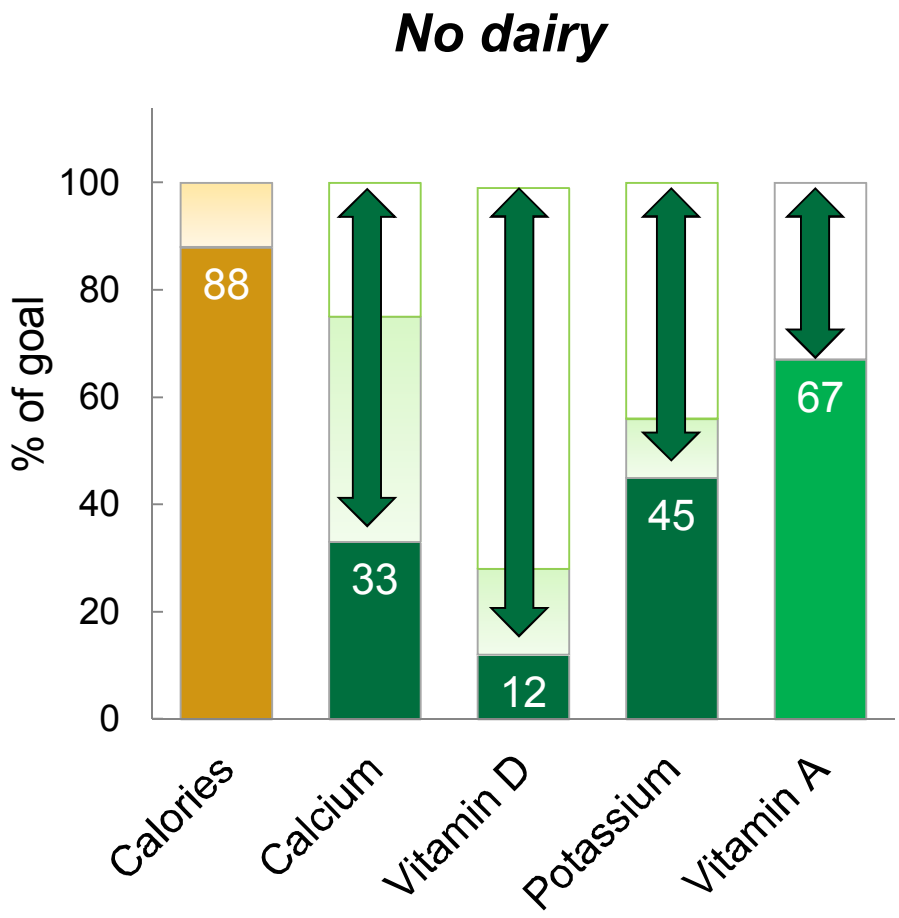
But without dairy, nutrient gaps will widen!



Wrong direction!

Dairy Research Institute
NHANES, 2003-2006, ages 2+ yr

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Recommended dairy substitutes ≠ dairy calcium

- Not widely consumed, therefore contribute only small amounts of calcium to the American diet

Food	% of dietary calcium
Milk, cheese, yogurt	50 %
Juice group	3 %
Soy beverage	<1 %
Fish and shellfish	<1 %
Broccoli, spinach, greens	<1 %

Ages, 2 and older, NHANES 2003-2006

Dairy Research Institute
NHANES, 2003-2006, ages 2+ yr

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Recommended dairy substitutes are not practical

"… the **amount** of many potential alternatives to provide sufficient calcium would provide **too many calories** and/or **be a large amount to consume daily**."

calcium fortified

"…**bioavailability** of the calcium in vegetable products has not been addressed and **could pose a concern**."

… and not widely consumed

2010 Dietary Guidelines Advisory Committee Report. Appendix E3.6

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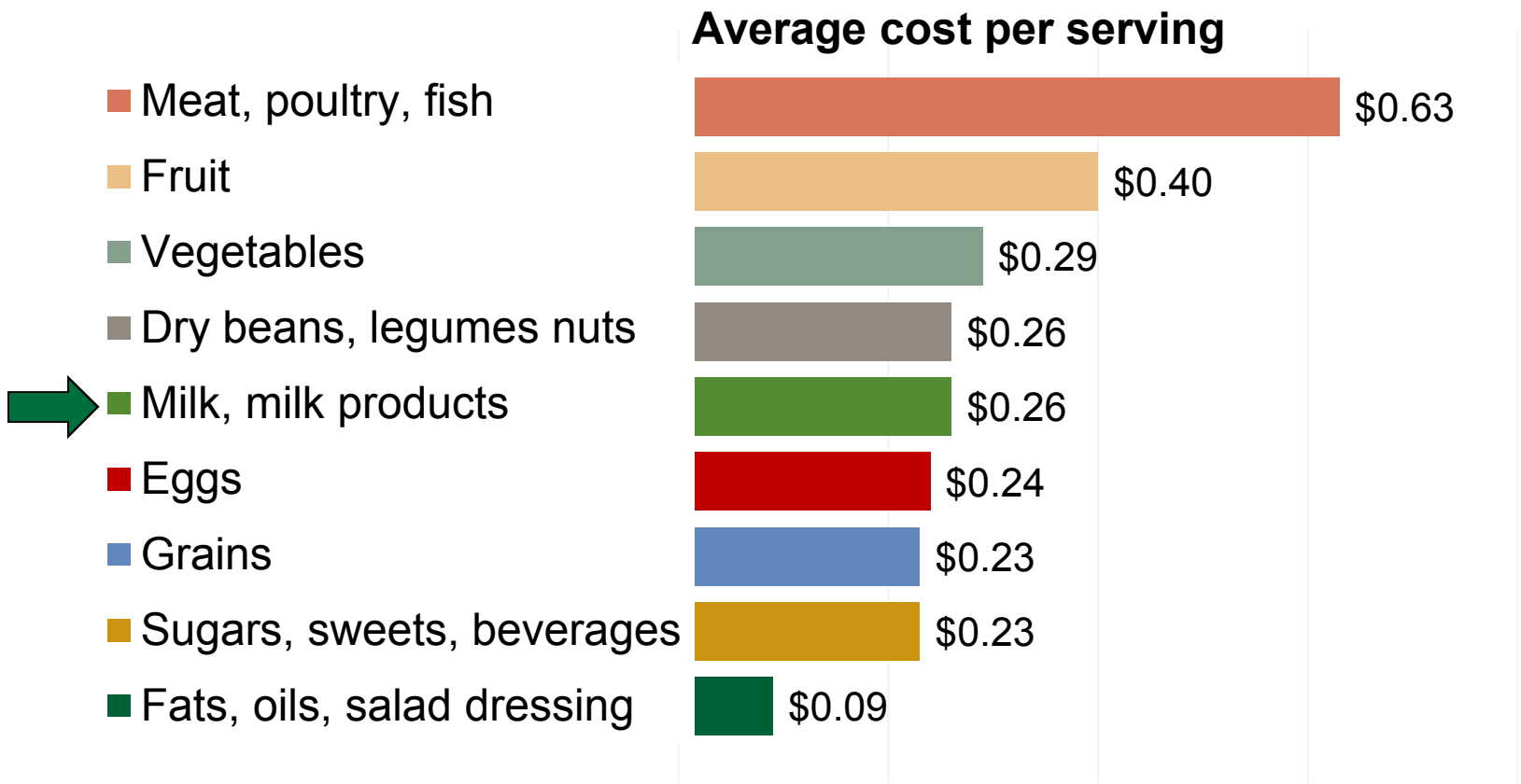
Each serving of dairy is affordable - easy on the wallet!



Values, 2001-2002 USDA CNPP database, Serving size, Reference Amount Customarily Consumed. Drewnowski, 2010

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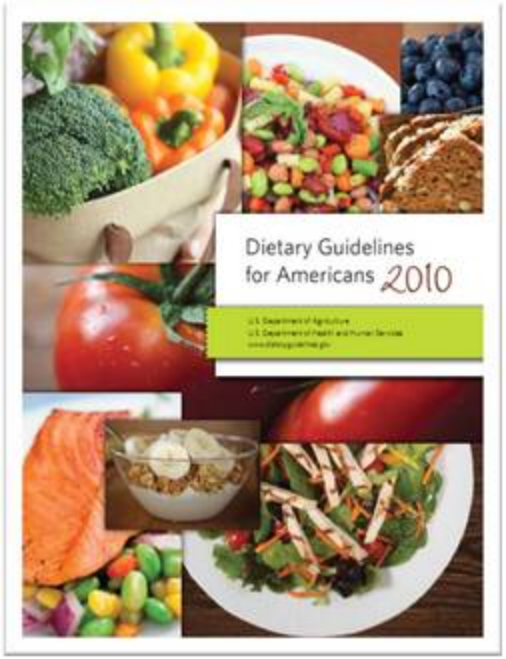
Higher dairy intake translates to better bone health and lower chronic disease risk

- “Moderate evidence shows that intake of milk and milk products is linked to improved bone health, especially in children and adolescents.”
- “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.”



Adequate dairy intake projected to reduce health care costs

- U.S.

  Potential for more than $214 U.S. billion in health care cost savings over 5 years by increasing dairy to 3 to 4 servings per day *(McCarron & Heaney 2004)*

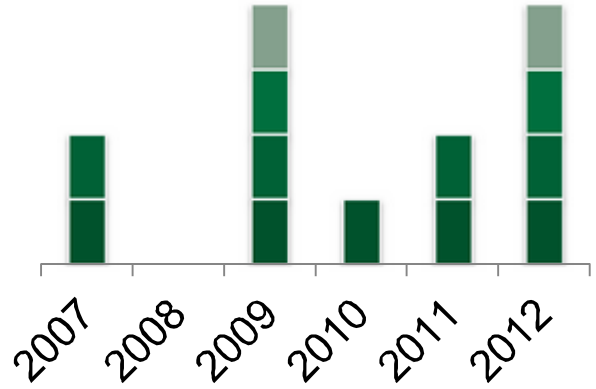
- Australia

  Estimated cost of direct health care spending attributable to low dairy product consumption in 2010–2011 was AUD$2.0 billion [U.S. equivalent of $2.1 billion] *(Doidge et al 2012)*

McCarron and Heaney. Am J Hypertension 2004; 17:88-97
Doidge et al. J Nutr 2012: doe:10.3945/jn.111.154161

Diet and the environment

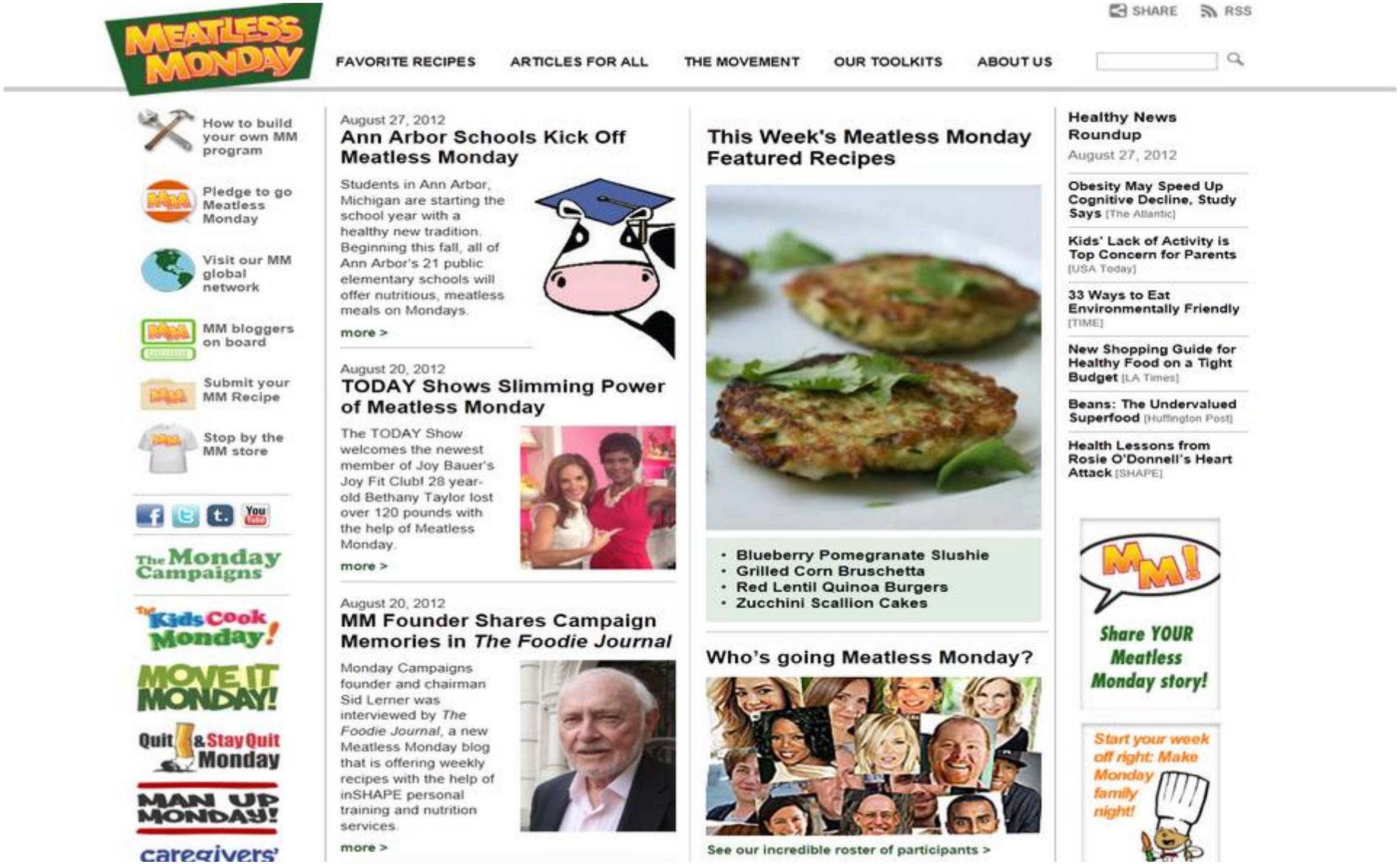
- 13 published studies



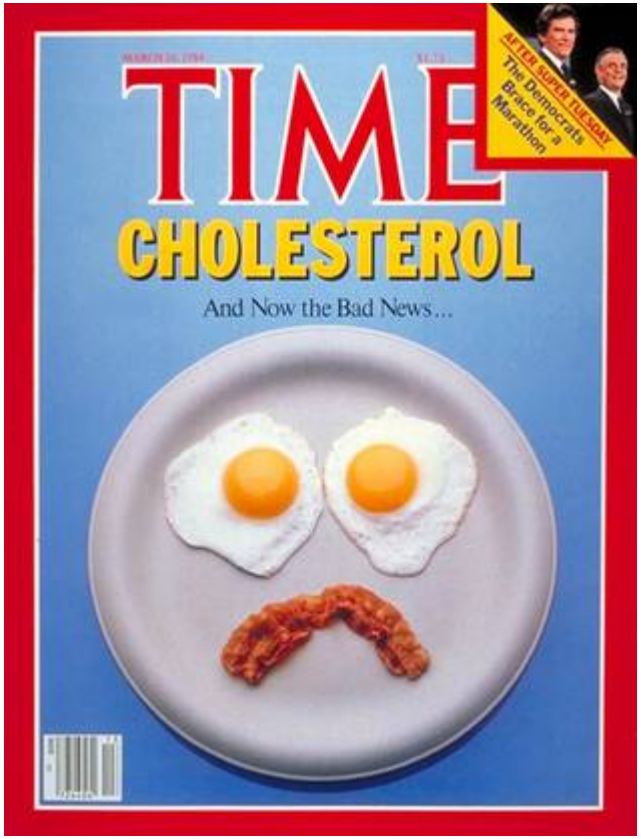
Limited data, mixed results

- Variety of approaches
  - 1 Nutrient density / climate impact
  - 4 Vegetarian v non-vegetarian
  - 6 Diet modeling
    - Reduce livestock (meat and dairy)
    - Lower meat, increase fruits/veg
    - Recommended diets
    - Cut back on calories
  - 2 Land vs. dietary recommendations
- Non-standardized methods
  - GHG emissions
    - No standard databases available
    - Hybrid input-output LCA method
    - Partial LCAs (e.g. farm to retail)
  - Land
- No studies: water, biodiversity

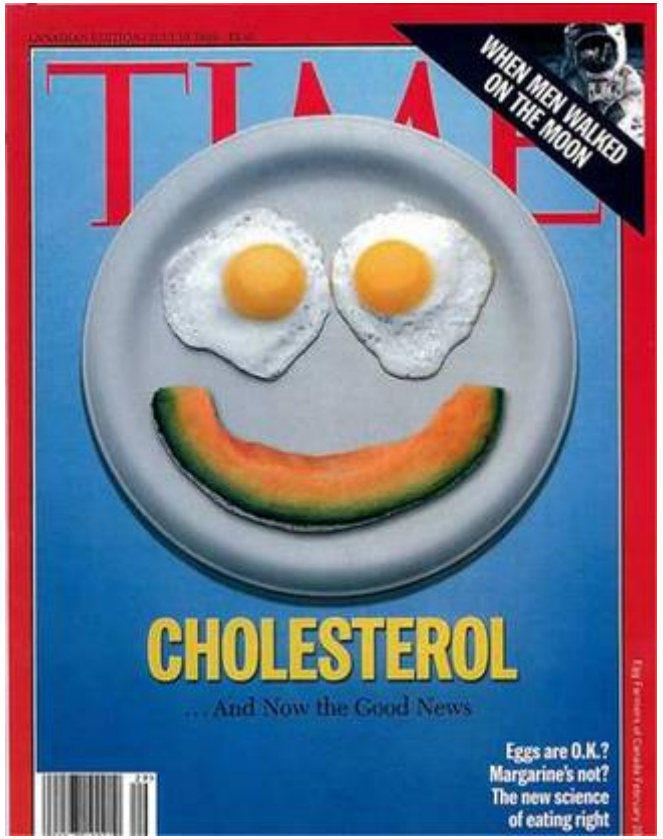
Can we define a sustainable diet?



Unintended consequences



1984



1999

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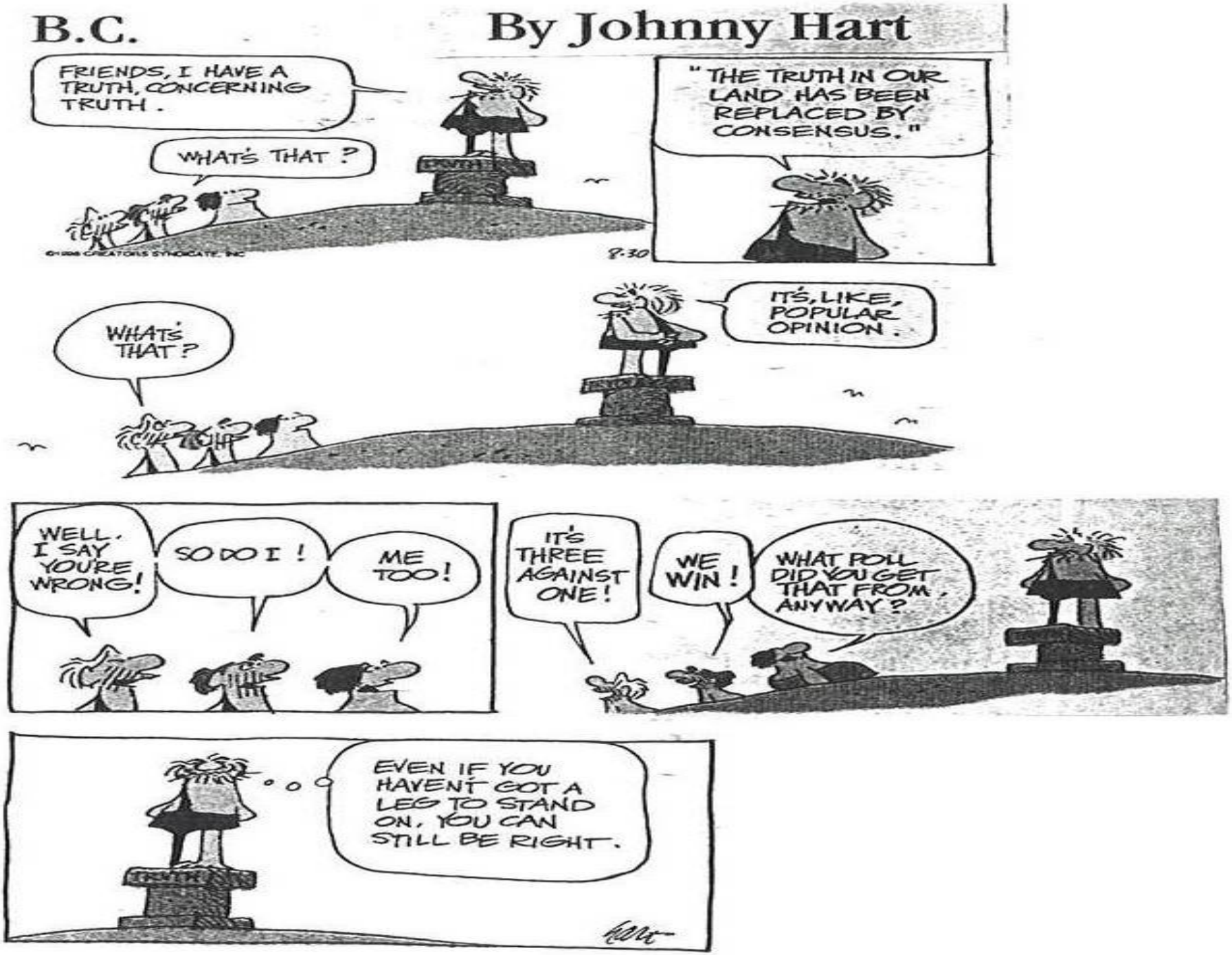
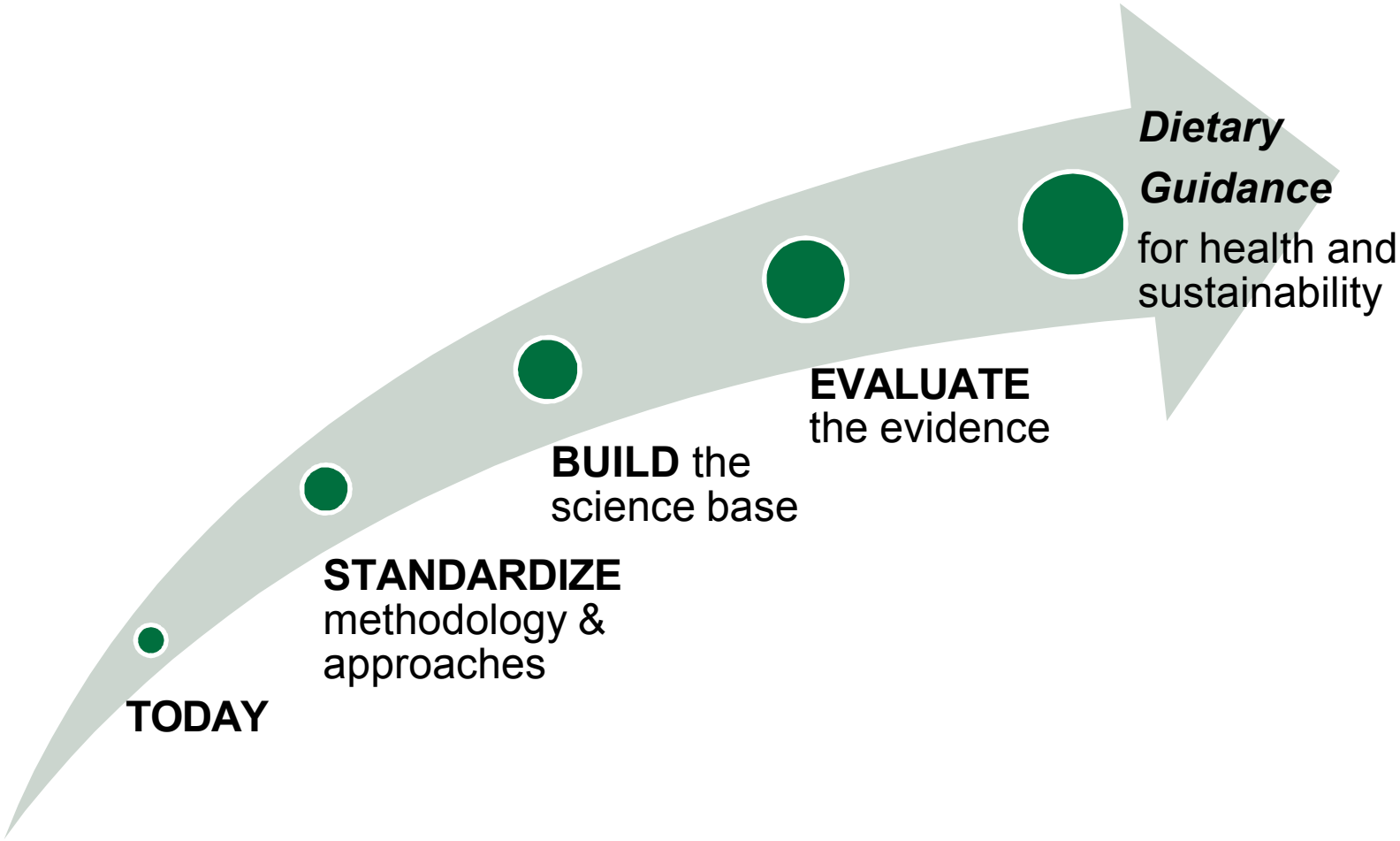

B.C.
By Johnny Hart
FRIENDS, I HAVE A TRUTH, CONCERNING TRUTH.
WHAT'S THAT?
TRUTH
"THE TRUTH IN OUR LAND HAS BEEN REPLACED BY CONSENSUS."
8-30
WHAT'S THAT?
IT'S, LIKE, POPULAR OPINION.
WELL, I SAY YOU'RE WRONG!
SO DO I!
ME TOO!
IT'S THREE AGAINST ONE!
WE WIN!
WHAT POLL DID YOU GET THAT FROM, ANYWAY?
EVEN IF YOU HAVEN'T GOT A LEG TO STAND ON, YOU CAN STILL BE RIGHT.

The road map: science must precede policy



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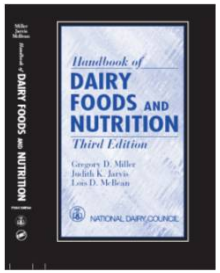
Questions?



www.usdairy.com
www.dairygood.org