Animal Feed vs. Human Food: Challenges and Opportunities in Sustaining Animal Agriculture Toward 2050

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1 in 8 Children are Hungry

Source: Created by [Author], 2013; Photo from: [Image URL]; Data from FAO (2012) “The State of Food Insecurity in the World”. FAO, Rome, Italy.
1 in 8 Children are Hungry

Source: Created by Dr. Jude L. Capper, 2013; Photo from Dr. Jude L. Capper; Data from FAO (2012) “The State of Food Insecurity in the World”. FAO, Rome, Italy.
World Beef, Pork, and Poultry Consumption: 1980 - 2050

Sources: Global Insight Demand Analysis to 2050; Bauman and Capper (2011) Southwest Nutrition and Management Conference, Tempe, AZ.
The feed cost of an eight-ounce steak will fill 45 to 50 bowls with cooked cereal grains.

Source: Created by Dr. Jude L. Capper, 2012; Quote from Motavelli (2002) The case against meat: evidence shows that our meat-based diet is bad for the environment aggravates global hunger, brutalizes animals and compromises our health. E: The Environmental Magazine, Jan-Feb 2002.
Are Cows Taking Food out of the Mouths of Hungry Children?

Source: Created by Dr. Jude L. Capper, 2013; Photo from: http://centralasiaonline.com/sharedImages/201509/16PakChildren.jpg
How Do We Define Feed Efficiency?

“Amount of feed required to produce a unit of weight gain, milk production, or dozen eggs.”

But are all “feeds” the same?

Source: Created by Dr. Jude L. Capper, 2013; Photo from Dr. Jude L. Capper
Feed Efficiency Metrics Must Consider Competition for Human-Edible Foods

Non-human-edible proportion

Human-edible proportion

Grasses

Cereals/Pulses

Cereal B-Ps

Soy Bean Meal

Oilseed Meals

Other B-Ps

Vit/Min

Source: Created by Dr. Jude L. Capper, 2012; Data from Wilkinson (2011) Re-defining efficiency of feed use by livestock. Animal
Dairy Has Favorable Human-Edible Energy Input to Output Ratio

Source: Created by Dr. Jude L. Capper, 2012; Data from Wilkinson (2011) Re-defining efficiency of feed use by livestock. Animal.
Dairy and Beef Have Favorable Human-Edible Protein Input to Output Ratios

Source: Created by Dr. Jude L. Capper, 2012; Data from Wilkinson (2011) Re-defining efficiency of feed use by livestock. Animal.
What Do These Industries Have in Common? They All Provide By-Products Fed to Animals

Source: Created by Dr. Jade L. Capper, 2013
If You Can Grow Grass, You Can Grow Corn?

Source: Created by Dr. Jude L. Capper, 2012
Turning Forages and By-Products That We Can’t Eat into Food…That’s Sustainability

Source: Created by Dr. Jude L. Capper, 2013; Photo from: http://centralasianonline.com/shared/images/2010/08/16/PakChildren.jpg
Sustainability Comprises Three Factors: Environmental, Economic, & Social
The Global Livestock Industry Is Under Threat

**Fight Climate Change with Diet Change**

**ALL ANIMALS HAVE THE SAME PARTS**

[http://animals.change.org/blog/view/save_the_animals_save_the_planet_blog_action_day_09_climate_change/](http://animals.change.org/blog/view/save_the_animals_save_the_planet_blog_action_day_09_climate_change/)
[http://www.peta.org/mc/ads/PAMpartsPETA300.jpg](http://www.peta.org/mc/ads/PAMpartsPETA300.jpg)
IF EVERYBODY IN THE USA WENT MEATLESS EVERY MONDAY FOR AN ENTIRE YEAR...

...THE NATIONAL CARBON FOOTPRINT WOULD DECREASE BY LESS THAN 1/3 OF ONE PERCENT

Source: Design, wording and data copyright held by Dr. Jude L. Capper, 2012; Photo credit: svariophoto via http://iStockphoto.com
Without Animal Agriculture, What Would Be the Carbon Cost of Sourcing Product Ingredients?
Animal Agriculture Doesn’t Simply Provide Meat, Milk, and Eggs

- Health
- Income
- Food
- Power
- Security
- Fertilizer

Source: Created by Dr. Jude L. Capper, 2013
What Is Sustainable Food Production?

Efficient use of natural resources; caring for land, air, water, and wildlife; producing safe, affordable food to nourish the human population.

Source: Created by Dr. Jude L. Capper, 2013; Photo from Dr. Jude L. Capper
Modern U.S. Milk Production Has Considerably Lower Resource Use and Carbon Emissions

*All values expressed per gal of milk produced at the farm gate*

The Herbivore’s Dilemma: Is Grass-Fed Beef Better for the Planet?

Pasture-Based Agriculture — Good for You, Good for the Planet

Source: Created by Dr. Jude L. Capper, 2013, photo copyright of the same.
If All U.S. Beef Was Grass-Fed, It Would Increase...

Land use by 131 mil acres = 75% land area of Texas

If All U.S. Beef Was Grass-Fed, It Would Increase…

$\text{CO}_2$ emissions by 134.5 mil t

= Adding 26.6 mil cars to the road annually

If All U.S. Beef Was Grass-Fed, It Would Increase...

Water use by 468 bil gals = Annual use by 53.1 mil U.S. households

Social Example: “Pink Slime” Removed from Food Supply due to Consumer Pressure

Removal of LFTB increased beef retail price by 1.6% and cattle numbers to maintain production by 1.7 million head.

Effective Parasite Control Has a Positive Impact on Social Sustainability

Extra beef produced via effective parasite control in a 40-cow herd supplies 19 families with their annual beef demand.

Source: Created by Dr. Jude L. Capper, 2013
Globally, 33% of Food Is Wasted

Source: Created by Dr. Jude L. Capper, 2013; Photo from Dr. Jude L. Capper; Data from FAO (2013) “Food Wastage Footprint – Impacts on Natural Resources”. FAO, Rome, Italy.
Questions/Discussion

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