

Home, Home on the Feedlot

A Study of the Sustainability of
Grass-Fed and Grain-Fed Beef Production



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ENVS 664 Sustainable Design

The Process

Grain-Fed Beef

- Cow-Calf Operation
- Concentrated Animal Feeding Operation (CAFO)
 - Weaning
 - Corn-Based Feed
 - Corn, Liquefied Fat, Protein Supplement, Liquid Vitamins, Synthetic Hormones, Antibiotics
 - “Finished” at approximately 18-22 months
- Slaughtered and Packaged
- Distribution



The Process

Grass-Fed Beef

- Management Intensive Grazing (MiG)
 - Electrified paddock fence encloses animals
 - Mimics a roaming herd feeding on fresh pasture daily
 - Water Management
 - Gravity-driven irrigation
 - Natural infiltration and uptake by plant roots
 - Slaughtered and Packaged
 - Distribution
 - Directly from farm
 - Local markets and businesses



Environmental Impacts

- **Grain-fed beef** is ecologically expensive and unsustainable
 - Synthetic fertilizer to grow corn in CAFO feed:
 - Requires massive fossil fuel inputs
 - Depletes soil fertility because it has high chemical content and encourages monoculture
 - Leads to overfarming, contaminates water supply
 - Wastes from CAFO accumulate in manure lagoons
 - Slaughtering and packaging are high energy processes
 - Transportation of components of feed occurs daily
 - Transportation of cattle at various stages



Environmental Impacts

- **Grass-fed beef** has unsustainable components in its slaughter, packaging, and sometimes, distribution
- More sustainable because MiG is a closed ecological loop and actually produces biomass
 - Soil health maintained and improved
 - Grazing induces positive feedback loop that produces humus
 - Natural nitrogen fixation – symbiotic relationships
 - Cattle fertilize soil with urine and manure as byproduct of grass digestion

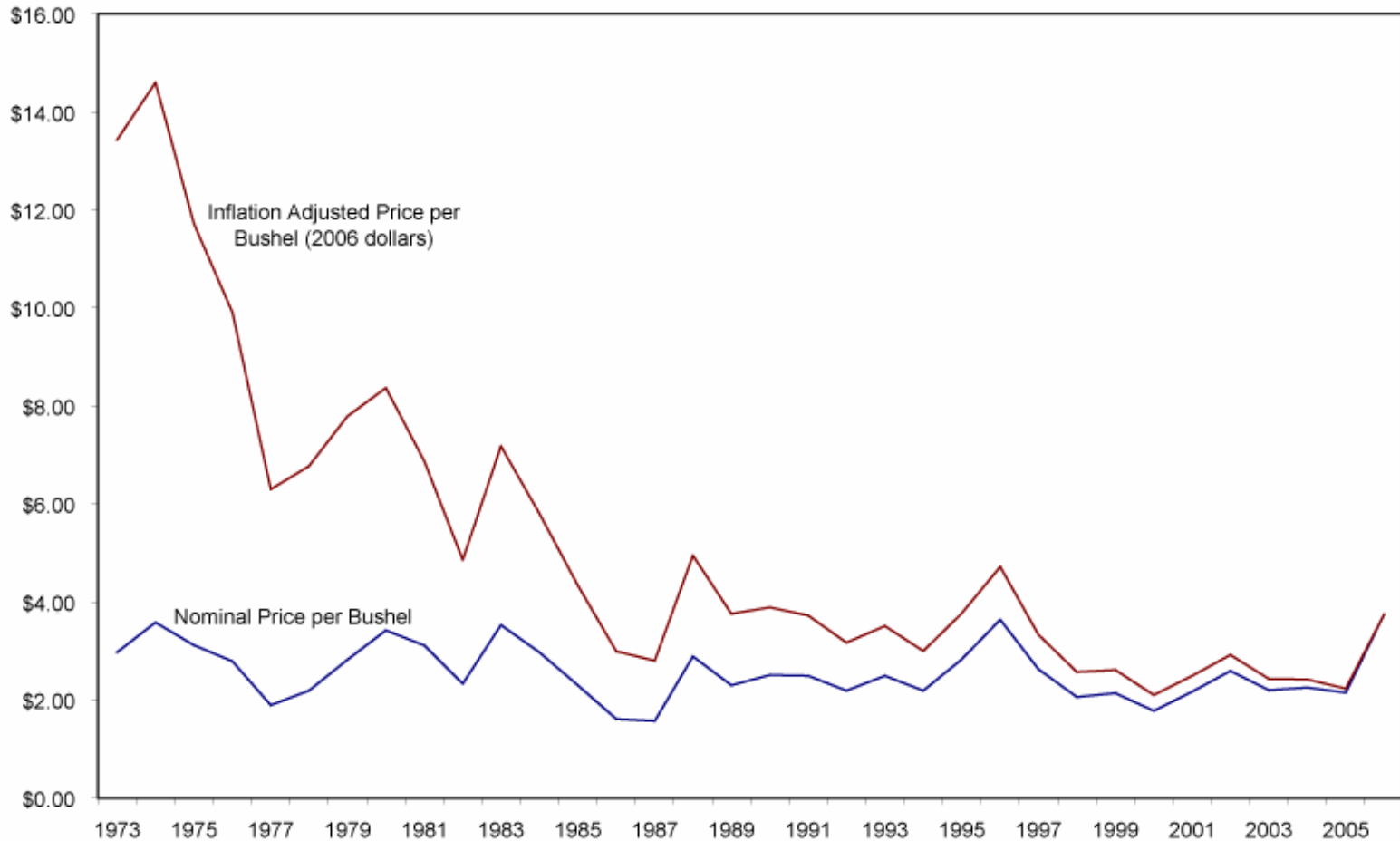


An Economic Perspective

- Grain-fed beef is economically unsustainable because of corn
 - Historically, corn prices have been falling
 - Cycle of overproduction occurs based on microeconomics of “the firm” and laws of supply and demand
 - Current corn prices are sky high due to demand for corn-based biofuels
 - Since corn is the primary ingredient in grain-fed beef, price of all beef products, including dairy, have risen drastically
 - Many hidden costs that fall on taxpayer
 - Federal government has to subsidize corn farmers to make up difference in cost and price
 - Negative externalities in the form of air pollution, water pollution, and additional public health costs
- Grass-fed beef requires price premiums between 60% and 70% higher than conventional grain-fed systems to generate same net present value

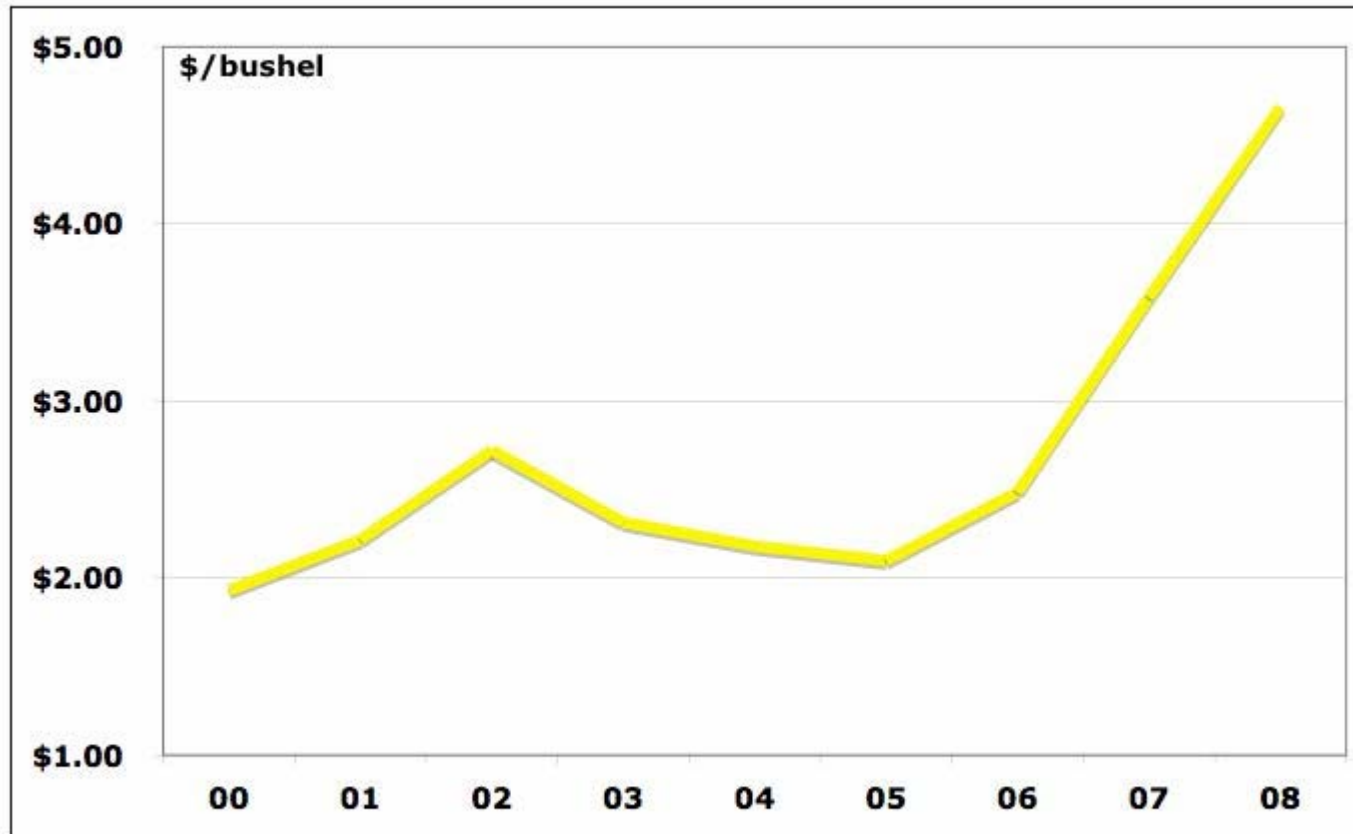
An Economic Perspective

Price of a Bushel of Corn



An Economic Perspective

Corn Prices



Source: U.S. Department of Agriculture

Human Health

- Red meat is an extremely high quality source of protein, vitamins, minerals, and other healthful compounds
 - Vitamin B12 → energy
 - Zinc → essential for growth and repair
 - Carnosine → potent anti-oxidant only in meat
- Corn negatively alters physiology of grain-fed cattle
 - Threatens food security
 - Shift in fatty acids to a higher, unnatural ratio of Omega-6 to Omega-3
- Grass-fed beef is more nutritious and healthful than grain-fed
 - Higher levels of anti-inflammatory Omega-3 fatty acids
 - Lower levels of saturated fat
 - Contains much higher levels of conjugated linolenic acid (CLA), an antioxidant
 - Far richer in Vitamin E
- **YOU ARE WHAT YOU EAT!**

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