Sustainable Soy

PREPARED BY THE SOYFOODS ASSOCIATION OF NORTH AMERICA

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Usage Guidance

This deck was prepared by the Soyfoods Association of North America (SANA) based on a review of the available literature. The information included is intended for the use of SANA members and in their communication efforts. Members shall give credit to SANA for slides in this deck, and shall make reference to only the original research which is identified on each slide. Full references can be found on the final slide.

Sustainable Soy

- In comparison to livestock production, soybeans have been proven to be a more favorable and environmentally sustainable source of protein because of their ability to meet global protein requirements and have key advantages that include:

  - High Protein Quality and Nutritional Value
  - Land Use
  - Water Use
  - Energy Efficiency

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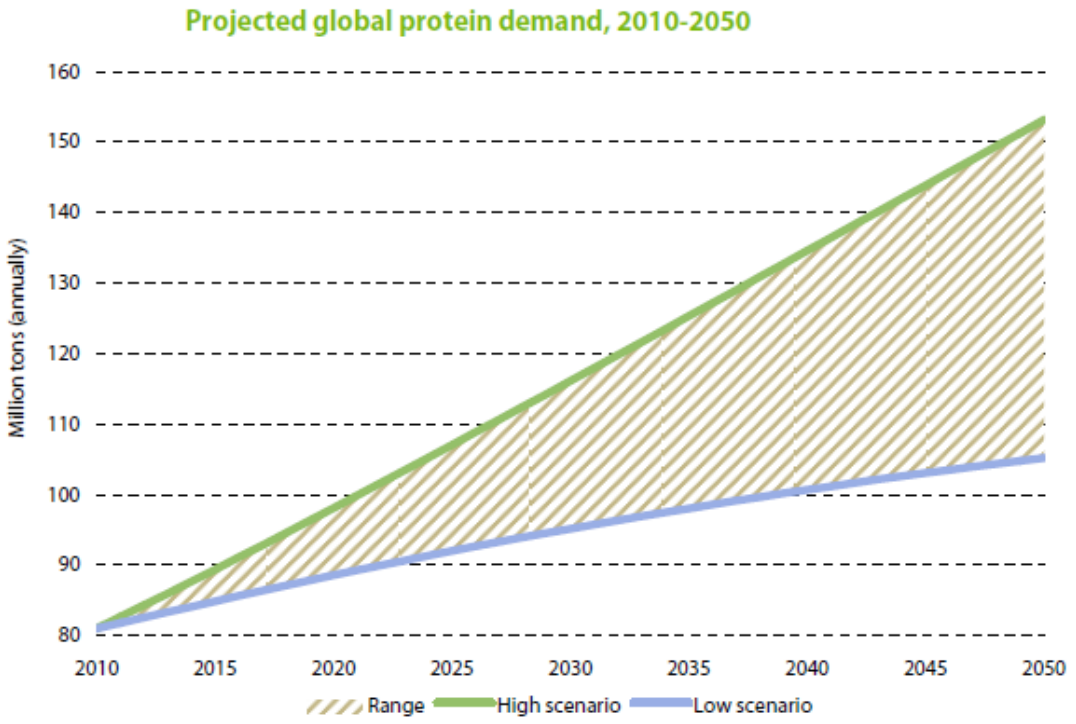
HIGH PROTEIN QUALITY AND NUTRITIONAL VALUE

Global Protein Demand

As the demand for protein increases and water and land resources decrease, the environmental sustainability of protein sources, such as soyfoods, intensifies.

Soy protein is valued for its unique position as the only widely available plant-based complete protein.

Source: Beer 1989



Source: LMC estimates
Population growth estimates based off of US Census Bureau projections
Low scenario assumes population growth in developing countries continues to consume protein at RDA minimum of 25 grams per person per day; high-end scenario assumes a gradual shift toward protein requirement of 50 grams per day, the average among developed countries.

Soyfoods are the only plant-based, sustainable source of complete protein.

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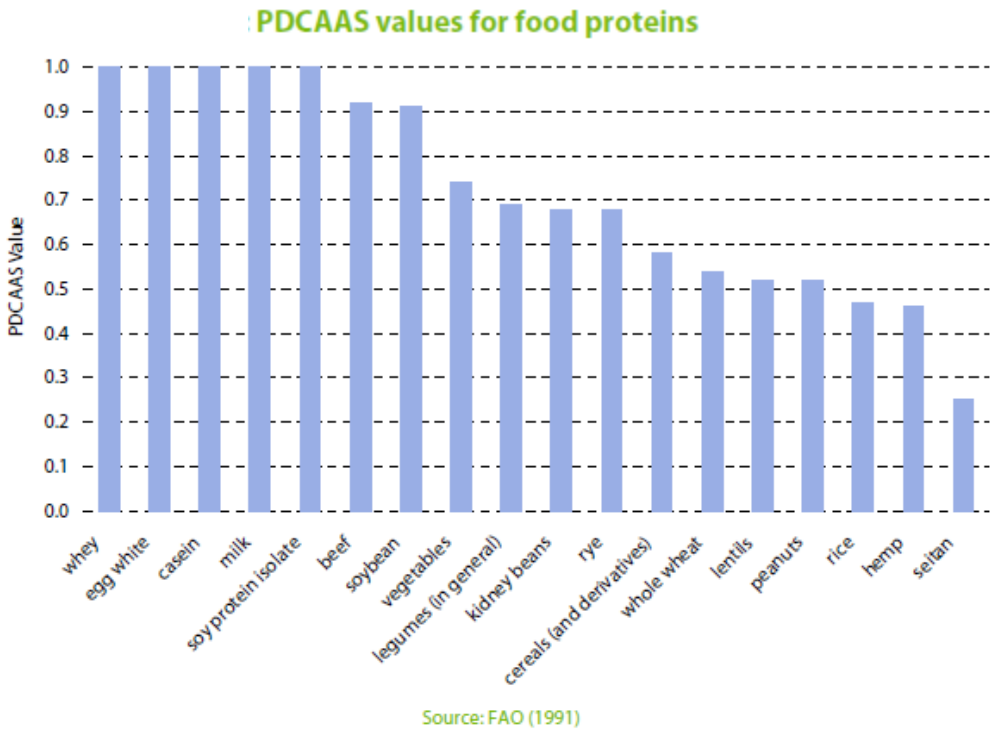
High Protein Quality

The preferred method to calculate protein quality is via the Protein Digestibility Corrected Amino Acid Score (PDCAAS).

The PDCASS for isolated soy proteins is 1.0, indicating a complete protein on par with egg, whey and milk proteins.

Soybean and beef have a comparable PDCASS score of just over 0.90.

Source: FAO/WHO 1991



Soyfoods and soy proteins have been identified as high quality sources of complete proteins.

Nutritional Value

Several countries, including the U.S., have approved health claims for the cardiovascular benefits of consuming soy proteins and soyfoods.

Soybeans are an excellent source of iron and magnesium and a good source of folic acid. *Source: USDA National Nutrient Database*

The *Dietary Guidelines for Americans, 2010* recommendations recognize soy products separate from the nuts, seeds and beans category and identify soy beverages as an alternative to dairy.

In addition to being a complete protein, soy based products offer additional nutritional benefits.

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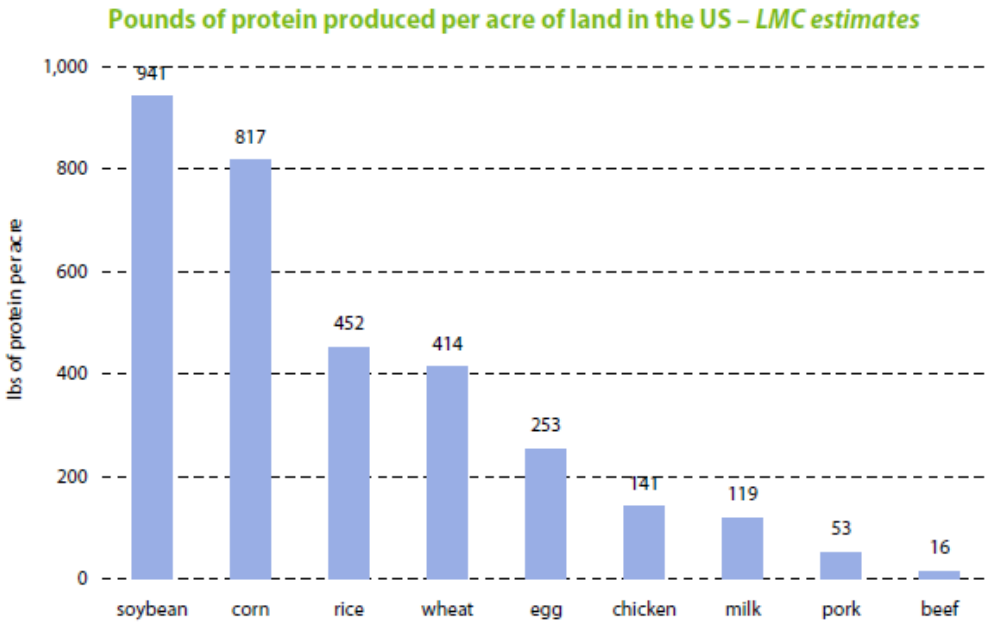
LAND USE

Land Use

Demand for land is set to increase significantly, thereby inherently increasing the value placed upon food output on a per acre basis.



Source: LMC estimates based on USDA reported yields and conversations with USDA subject specialists.
Protein contents were derived by LMC from the ARS nutrient database —
http://www.ars.usda.gov/main/site_main.htm?modecode=12-35-45-00
Note: Livestock efficiencies vary drastically in accordance with production practices.

Soy delivers 941 pounds of protein per acre of U.S. land.

Land Use

Land is a precious global resource and soybean based foods are proven to be an environmentally sustainable source of complete protein.

- Livestock is the primary user of arable land accounting for 78% of agricultural land. *Source: Juzti et al., 2006*
- As much as 33% of cropland is used to produce animal feed. *Source: Juzti et al., 2006*
- Some estimates suggest that in 2010 cattle will graze 24 million hectares of land that was forest in 2000. *Source: Wassenaar et al., 2007*

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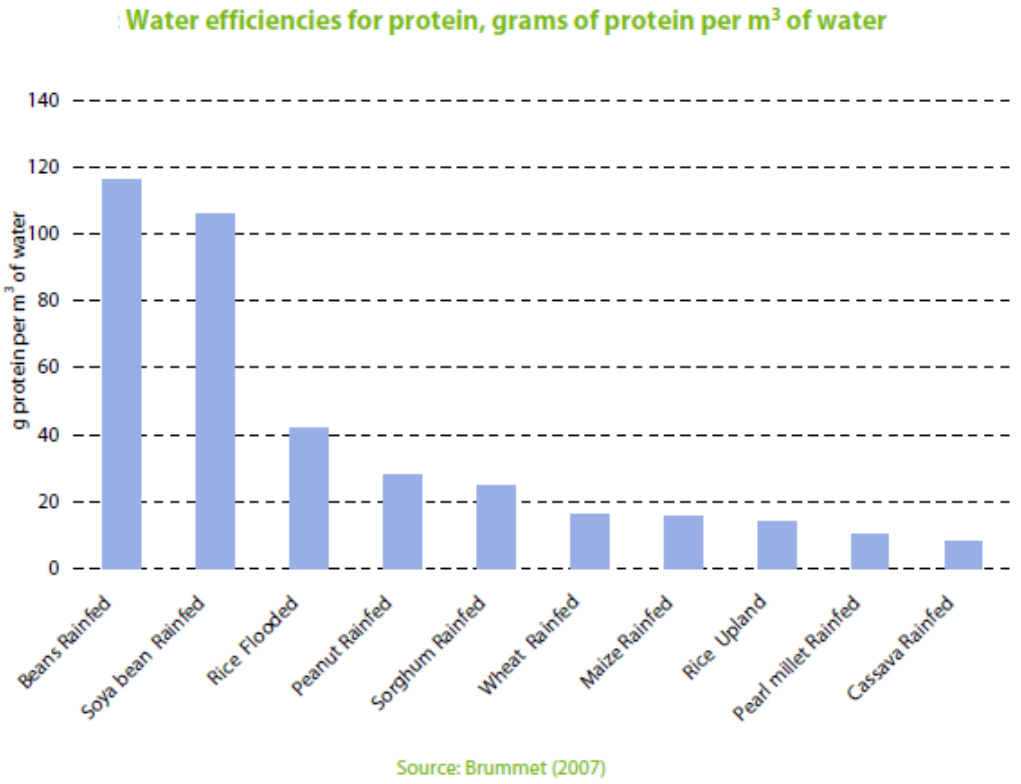
WATER USE

Water Use

- As freshwater resources become strained and food production is impacted, one measure of food production efficiency will be the amount of protein produced for each unit of water.
- Rain-fed soybeans deliver about 106 grams of protein per cubic meter of water; compared to rice that delivers just over 40 grams of protein per cubic meter of water.

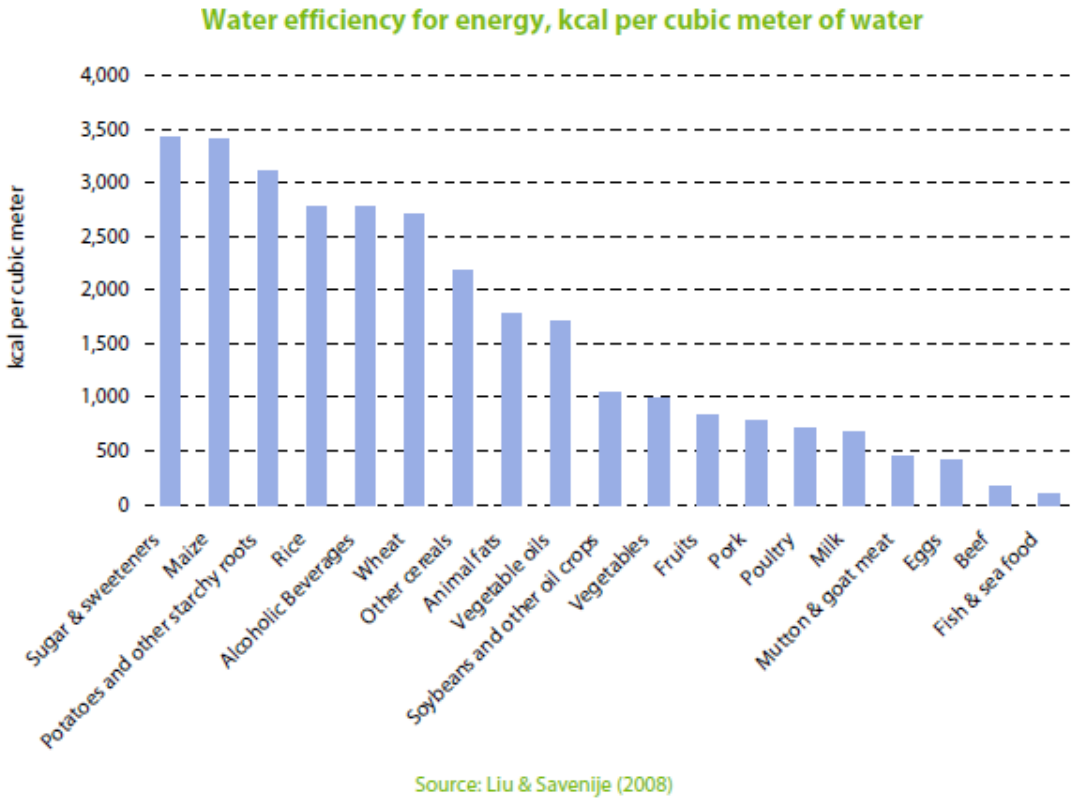


Soybeans are one of the most water efficient protein sources based on production.

Water Use

- This chart measures water efficiency by determining the number of calories produced per cubic meter of water.
- It is estimated that by 2025, water scarcity could cause the loss of up to 350 million metric tons of food.

Source: Rosegrant 2002



Among sources of high quality protein, soybeans use water more efficiently.

Source: Brummett 2007 and Liu & Savenije 2008

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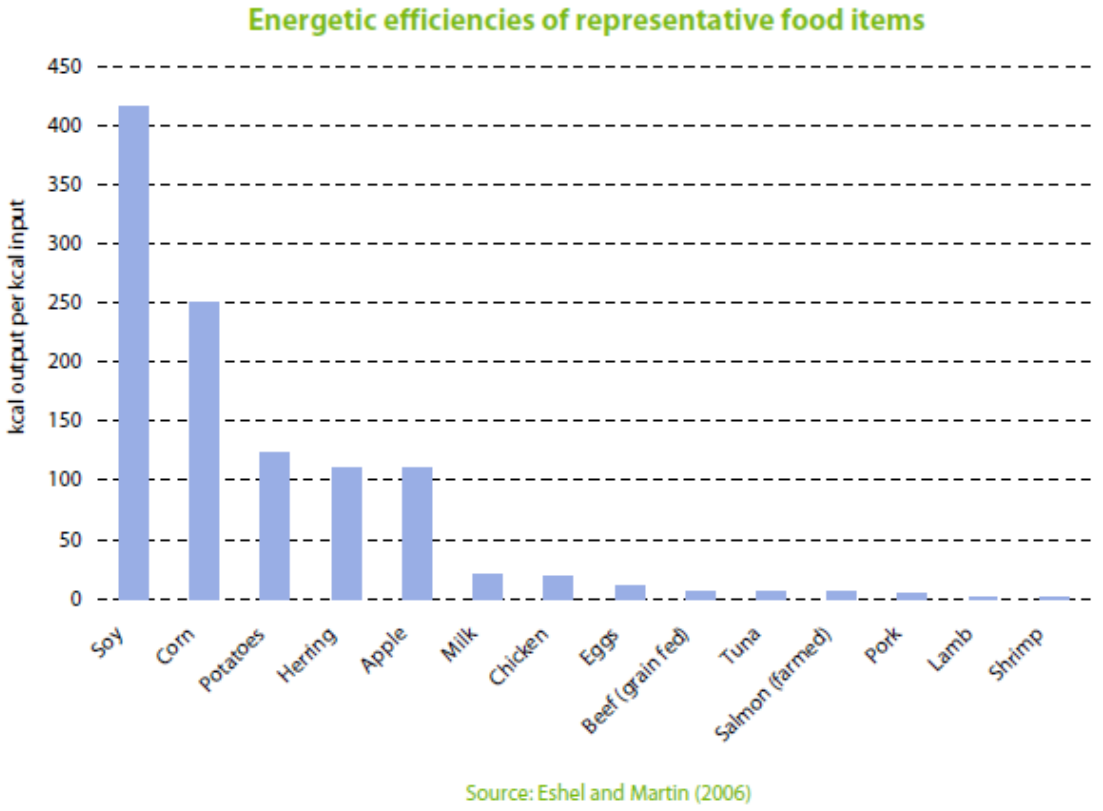
ENERGY EFFICIENCY

Energy Efficiencies

This chart measures the amount of energy (calories) produced from specific crops and animals against the fossil energy inputs used to produce that crop or animal.

Fossil energy includes:

- Fuel
- Pesticides
- Fertilizer
- Transportation

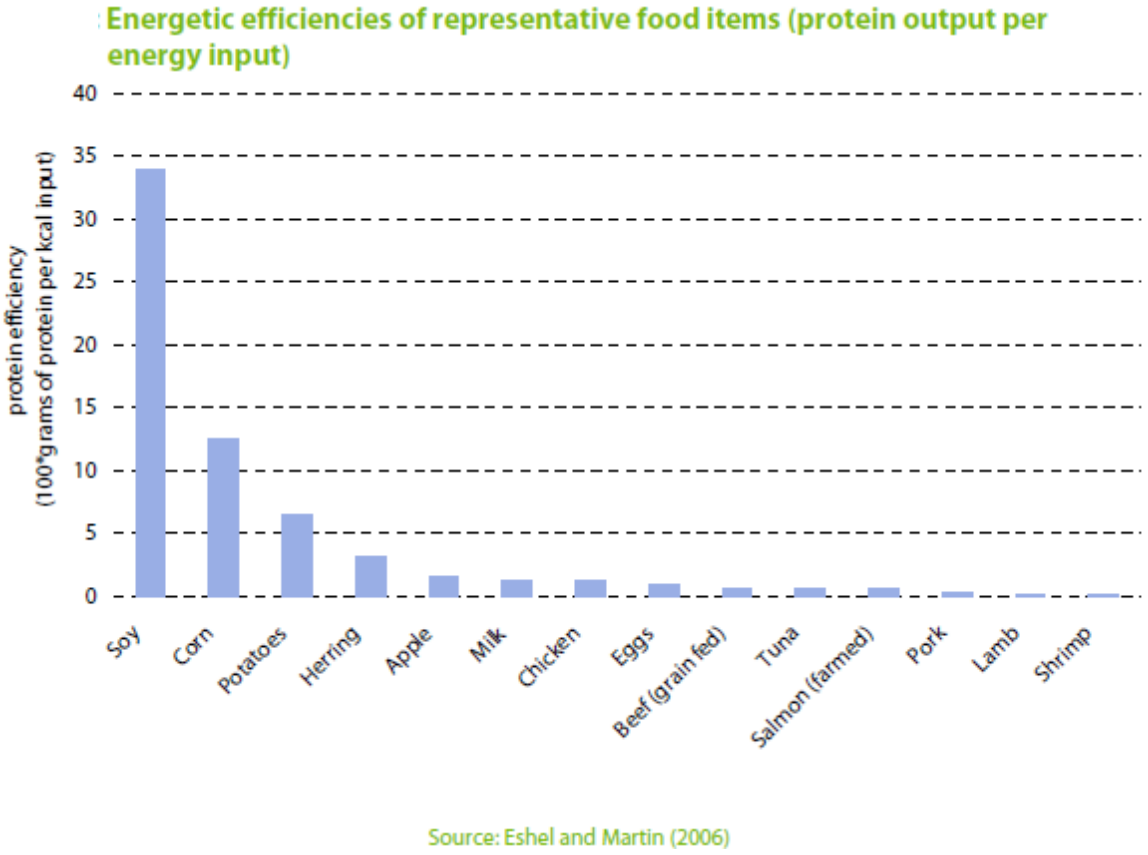


Soy-based foods deliver the largest number of calories per the amount of fossil energy inputs.

Energy Efficiencies

Energy inputs are rising in cost because they are becoming more scarce .

High energy costs are being priced into the cost of agricultural production.



Source: Eshel and Martin (2006)

Soy-based foods deliver the highest protein density for human consumption per amount of fossil energy inputs.

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