

# The World Food Prize

Norman E. Borlaug International Symposium

October 18, 2007



An aerial photograph of a vast, green agricultural field, likely corn, with a red tractor visible in the lower-left quadrant. The field is divided into curved rows, and the overall scene is bright and clear.

# **Biofoods/Biofuels**

## **Challenge, Opportunity, Optimism**

**Chris Policinski**

President & CEO

Land O'Lakes, Inc.



# Dr. Norman Borlaug



# Dr. Borlaug and the “Green Revolution”



Our success will  
depend on taking a  
reasoned, rational  
and science-based  
approach.





LAND O'LAKES  
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# Land O'Lakes Foundation







# Land O'Lakes

INTERNATIONAL DEVELOPMENT





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INTERNATIONAL DEVELOPMENT



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# Land O'Lakes

INTERNATIONAL DEVELOPMENT



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**We must maintain a sense of urgency in dealing with the issue of global hunger.**





The ability to meet demands related to biofuels is just one challenge in the fight against hunger.



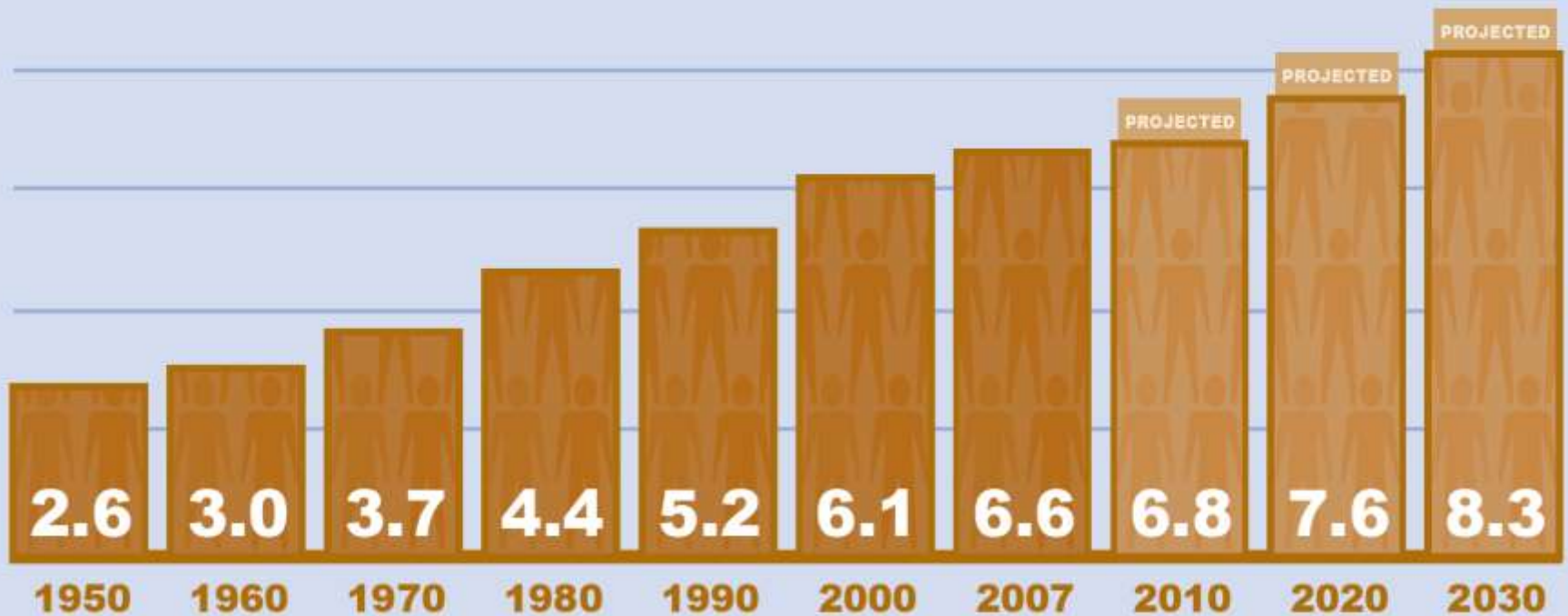
# Topics

- Current situation
- Reasons for optimism
- Importance of influencing public opinion



# World Population Growth

GROWTH EXPRESSED IN BILLIONS OF PEOPLE PER YEAR



Source: U.S. Census Bureau

“Agricultural  
biotechnology is one  
tool that holds great  
promise for alleviating  
hunger and poverty.”

- *National Academies*





# New Uses for Agricultural Production

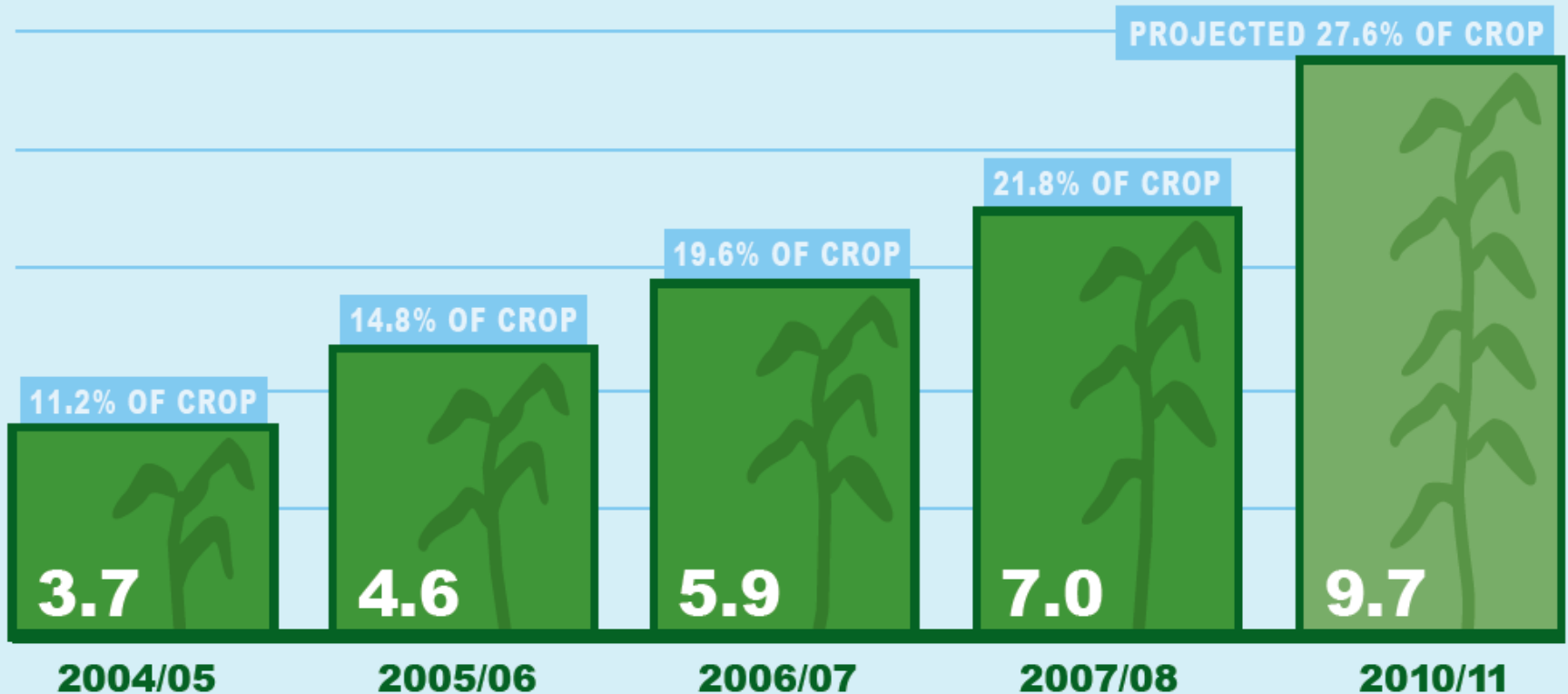


# Dramatic Increase in Demand for Biofuels



# Ethanol Production/Corn Use

PRODUCTION EXPRESSED IN BILLIONS OF GALLONS PER YEAR



Source: FAPRI 2006



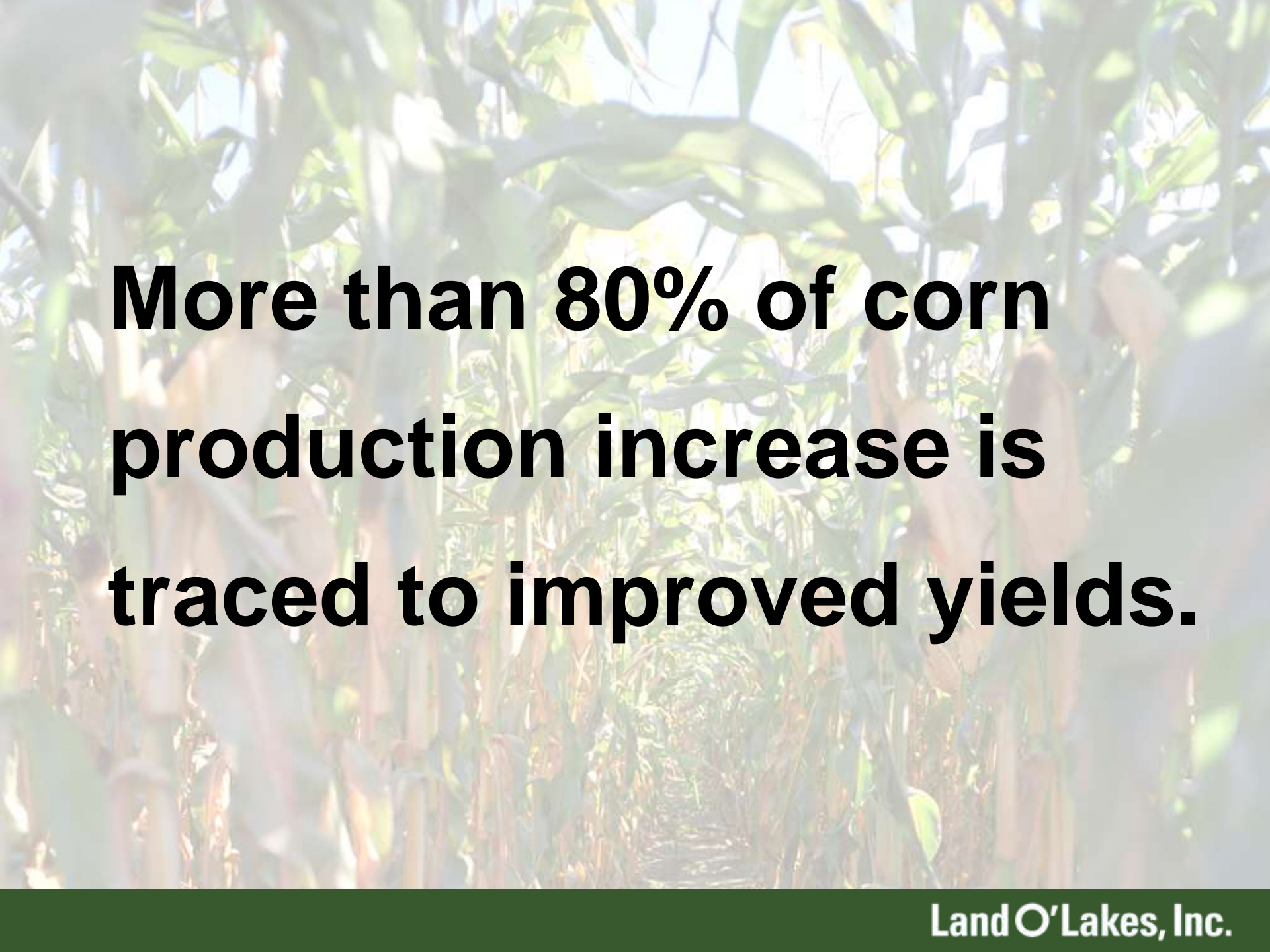
# U.S. Corn Production



1966 – 4.2 billion bushels

2005 – 11 billion bushels

2007 – 13 billion bushels (est.)



**More than 80% of corn  
production increase is  
traced to improved yields.**





**U.S. producers have a long history of developing and embracing safe, proven science and technology.**

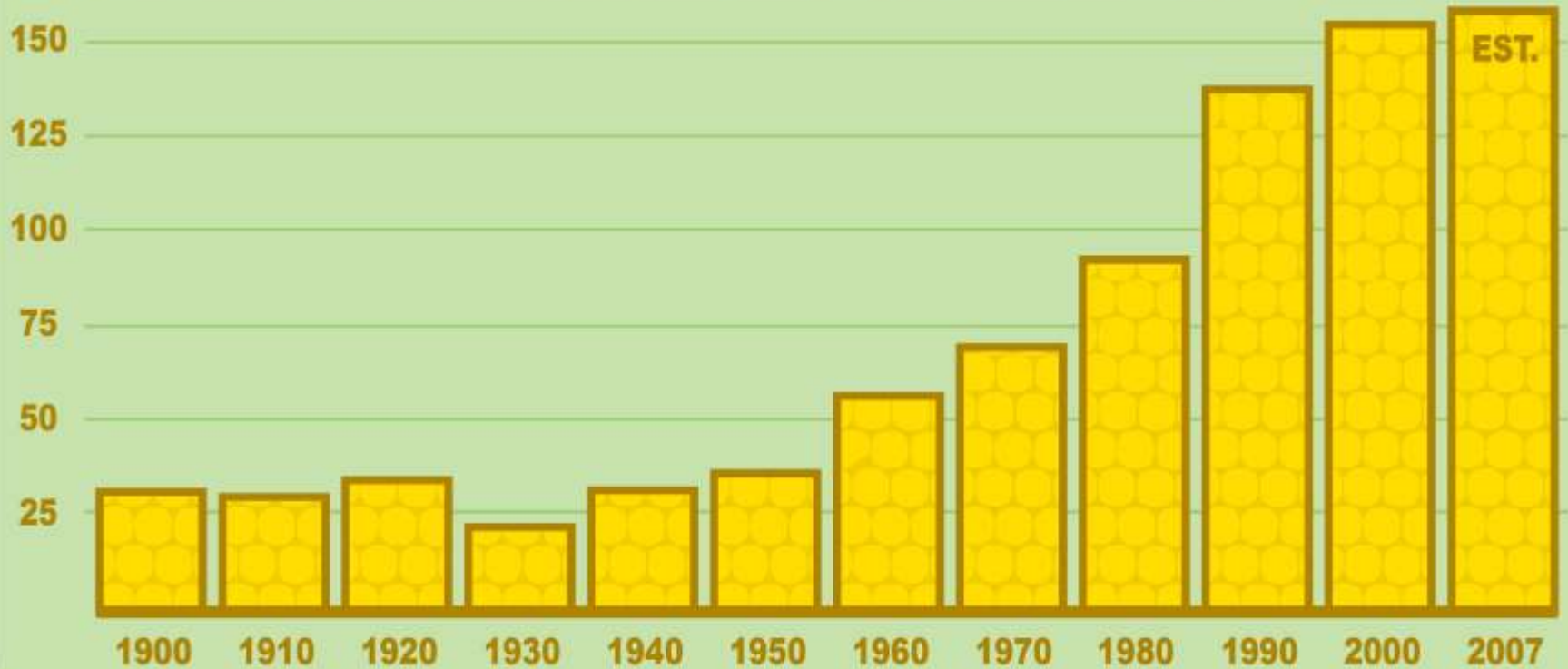
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# Growth in Corn Yields

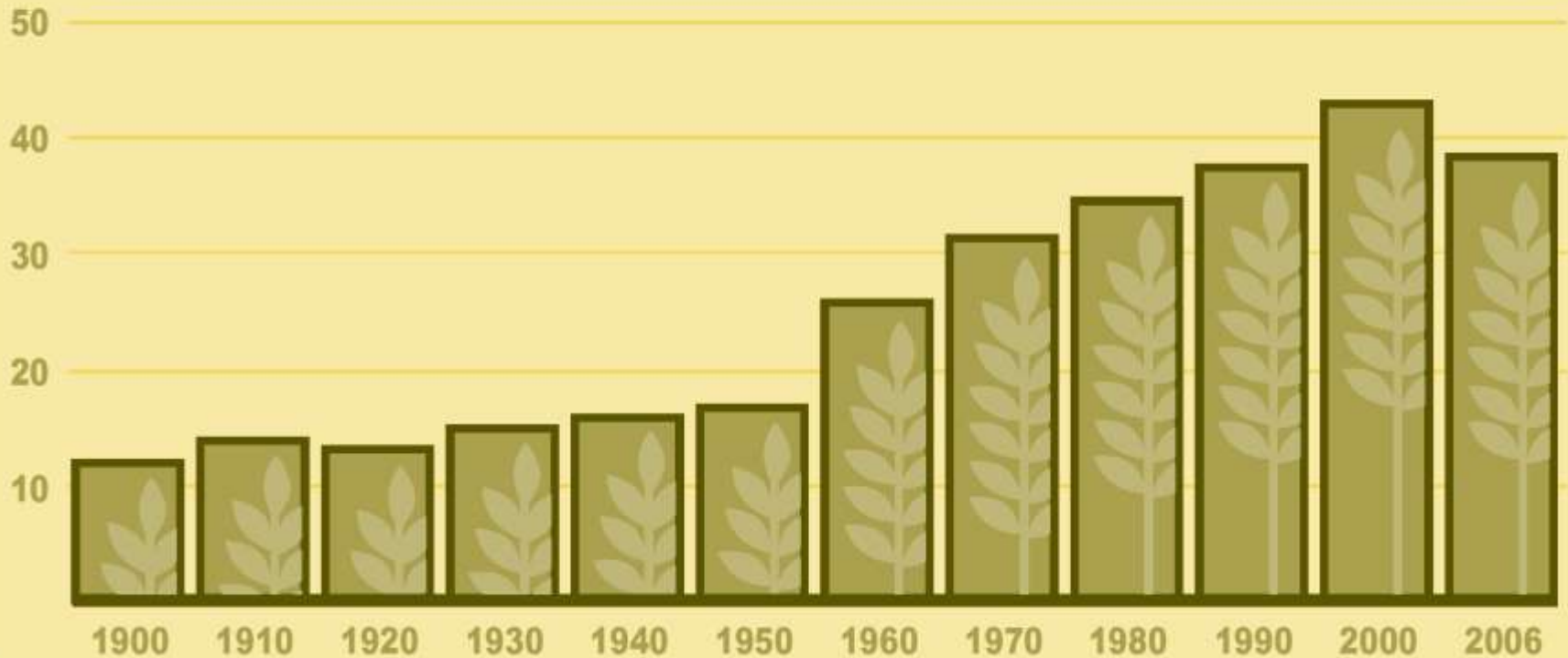
GROWTH EXPRESSED IN BUSHEL PER ACRE PER YEAR



Source: USDA National Agricultural Statistics Service

# Growth in Wheat Yields

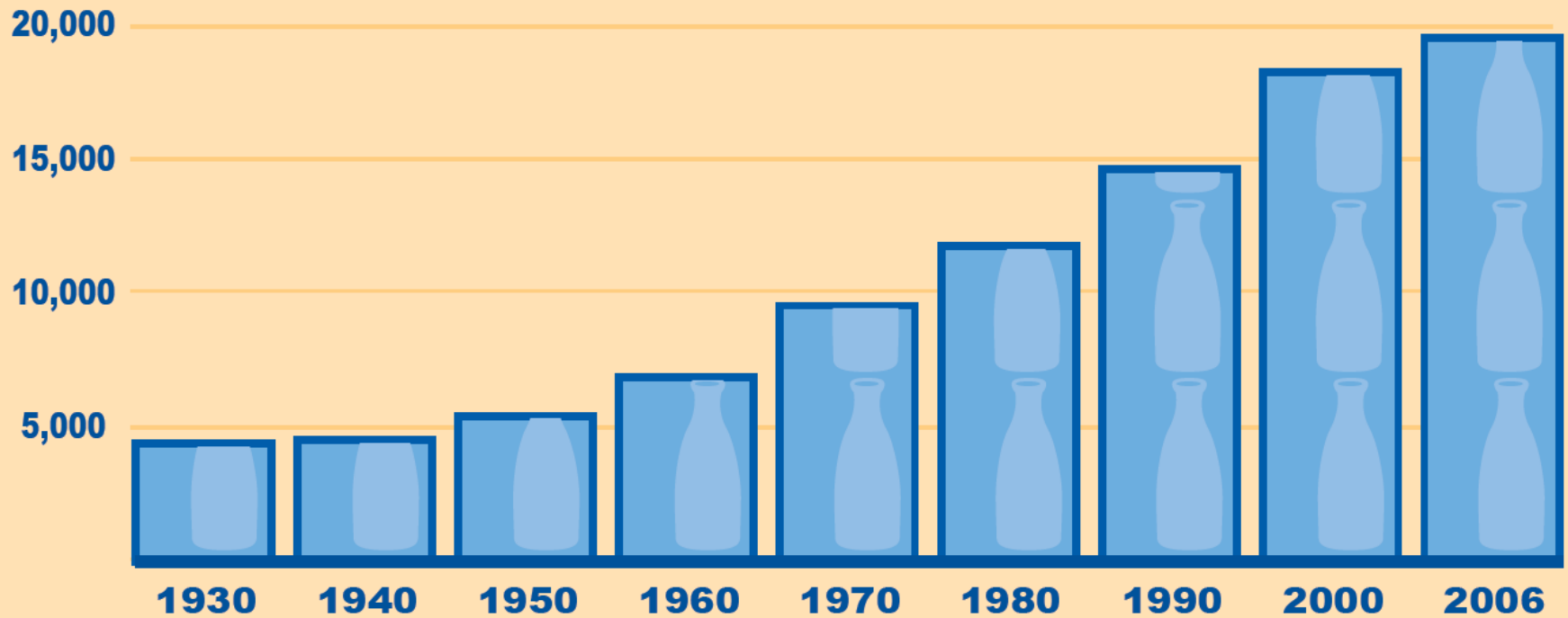
GROWTH EXPRESSED IN BUSHEL PER ACRE PER YEAR



Source: USDA National Agricultural Statistics Service

# Growth in Milk Production

GROWTH EXPRESSED IN POUNDS PER COW PER YEAR

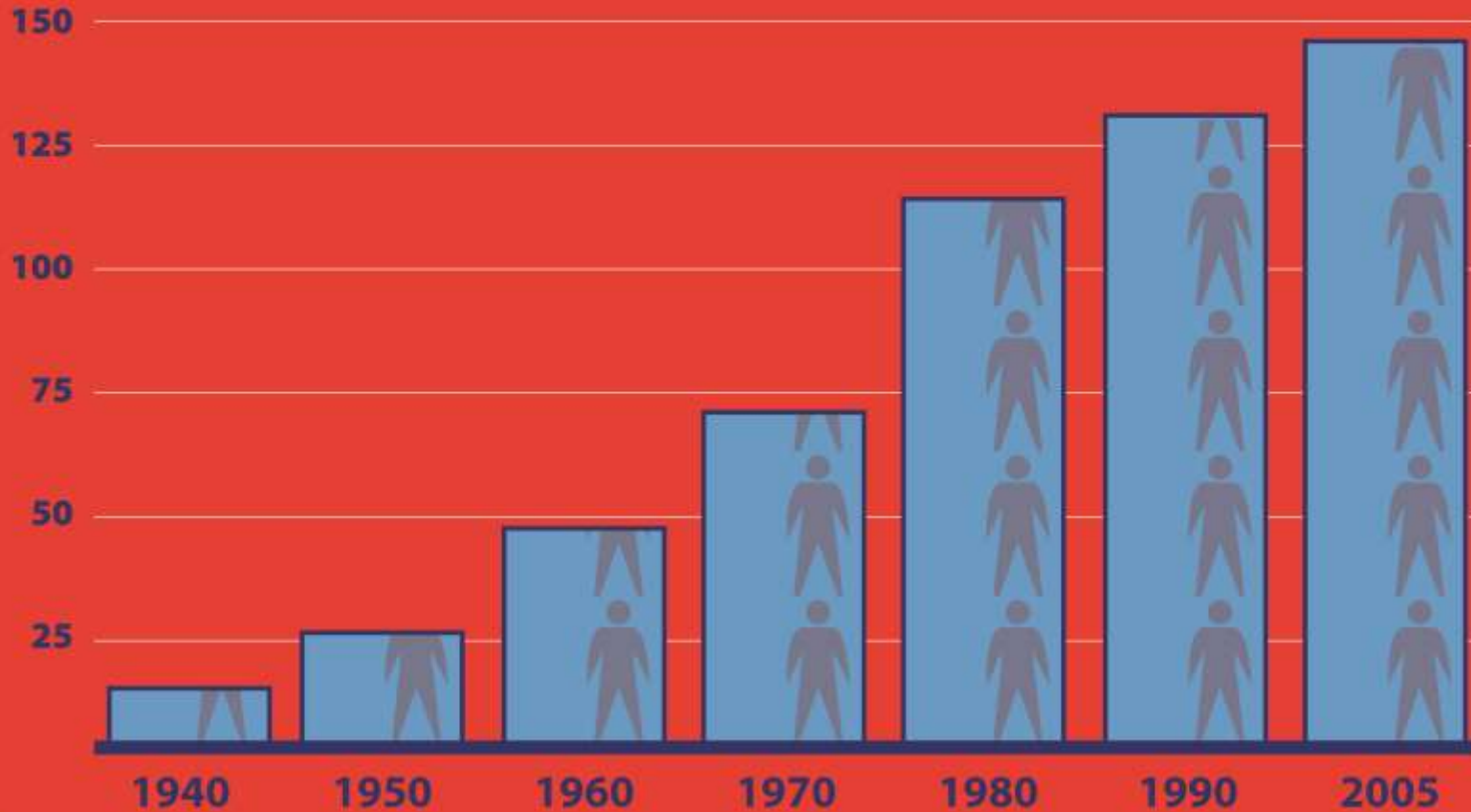


Source: USDA National Agricultural Statistics Service



# People Fed per U.S. Farmer

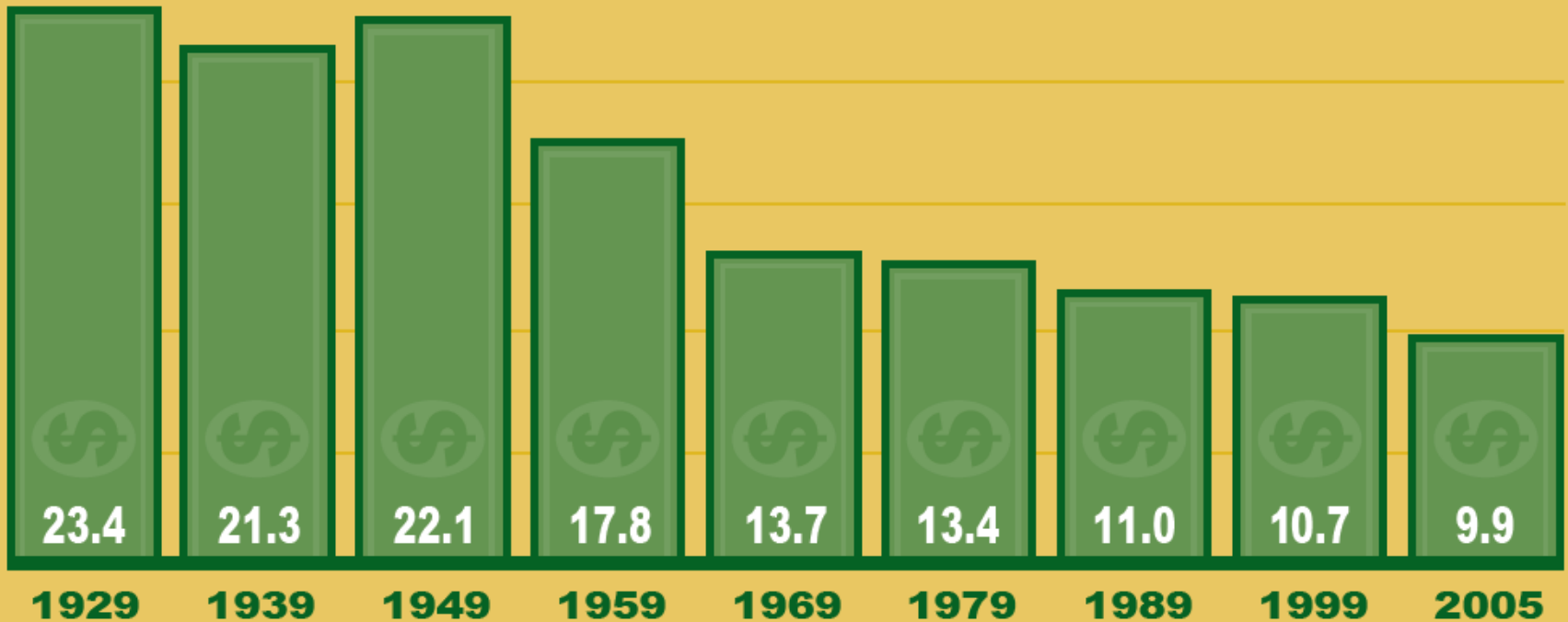
GROWTH EXPRESSED IN PEOPLE PER AVERAGE FARMER PER YEAR



Source: American Farm Bureau Federation

# Income % Spent on Food (U.S.)

AMOUNT EXPRESSED IN PERCENTAGE OF DISPOSABLE INCOME PER YEAR



Source: USDA Economic Research Service

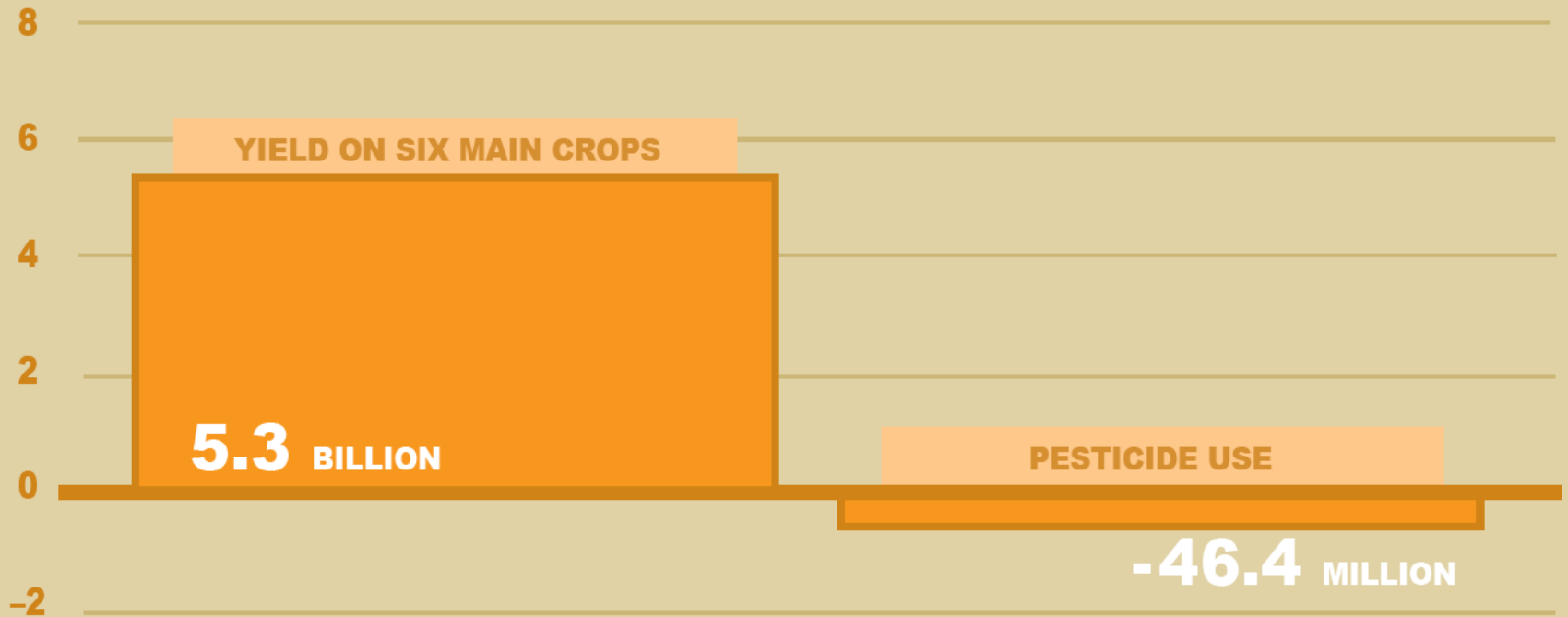


Science and technology  
have made agriculture  
more productive,  
sustainable and  
environmentally friendly.



# U.S. Biotech Results (2003)

YIELD EXPRESSED IN POUNDS PER YEAR



Source: National Center for Food and Agriculture Policy

# Biotech Crops

- Increase yields
- Reduce pesticide use
- Enable use of more benign herbicides
- Allow expansion of conservation tillage
- Make U.S. commodity crops cheaper for developing nations
- Promote food safety

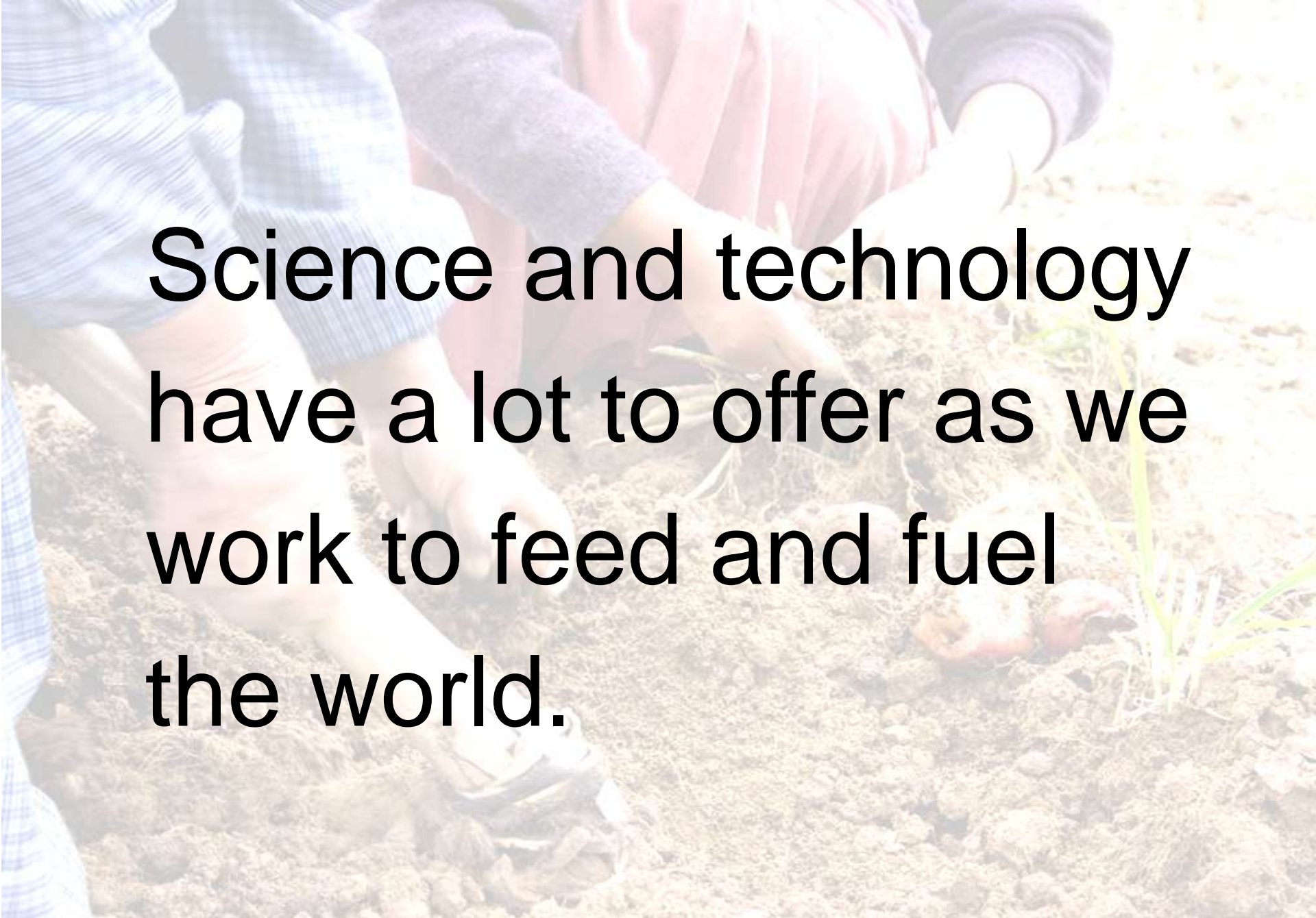


# Precision Agriculture

- Reduced risk
- Improved yields
- More efficient equipment/energy use
- Enhanced environmental stewardship







**Science and technology  
have a lot to offer as we  
work to feed and fuel  
the world.**



# Meeting the Food, Feed & Fuel Challenge

1. Develop genetics that:
  - Increase yields
  - Add characteristics with specific food, feed and fuel value
2. Improve biofuel production/efficiency
3. Develop additional renewable energy sources



**U.S. agriculture  
has the resources,  
record of success,  
the will and  
the obligation to  
lead the way.**

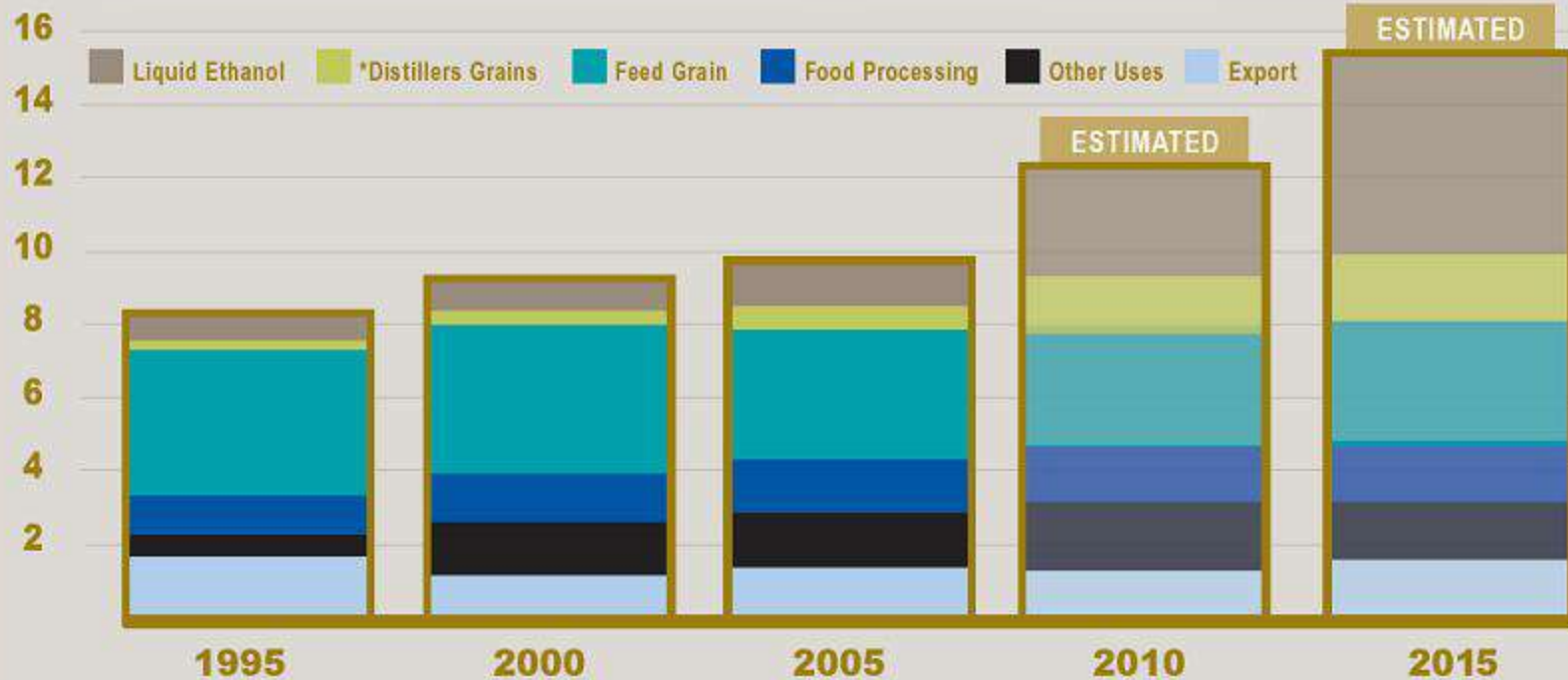


Develop genetics  
that improve yields  
and deliver specific  
food, feed and fuel  
value.



# Future Corn Grain Production

Production Expressed in Billions of Bushels Per Year



Source: USDA-ERS, USDA-NASS, NCGA, [www.ethanolrfa.org](http://www.ethanolrfa.org), and internal sources

## Assumptions:

- \*One-third of corn for ethanol currently converted to Distillers Grains
- Two-thirds converted to Liquid Ethanol and CO<sub>2</sub> gas – conversion rates will improve
- U.S. corn acres planted stabilize at 90M acres
- Corn yields follow the past 10 years' trend line
- 5B bushels of grain will produce approximately 15B gallons of ethanol



# **Improve the Efficiency of Biofuel Production**



# E3 BioFuels: Mead, Nebraska

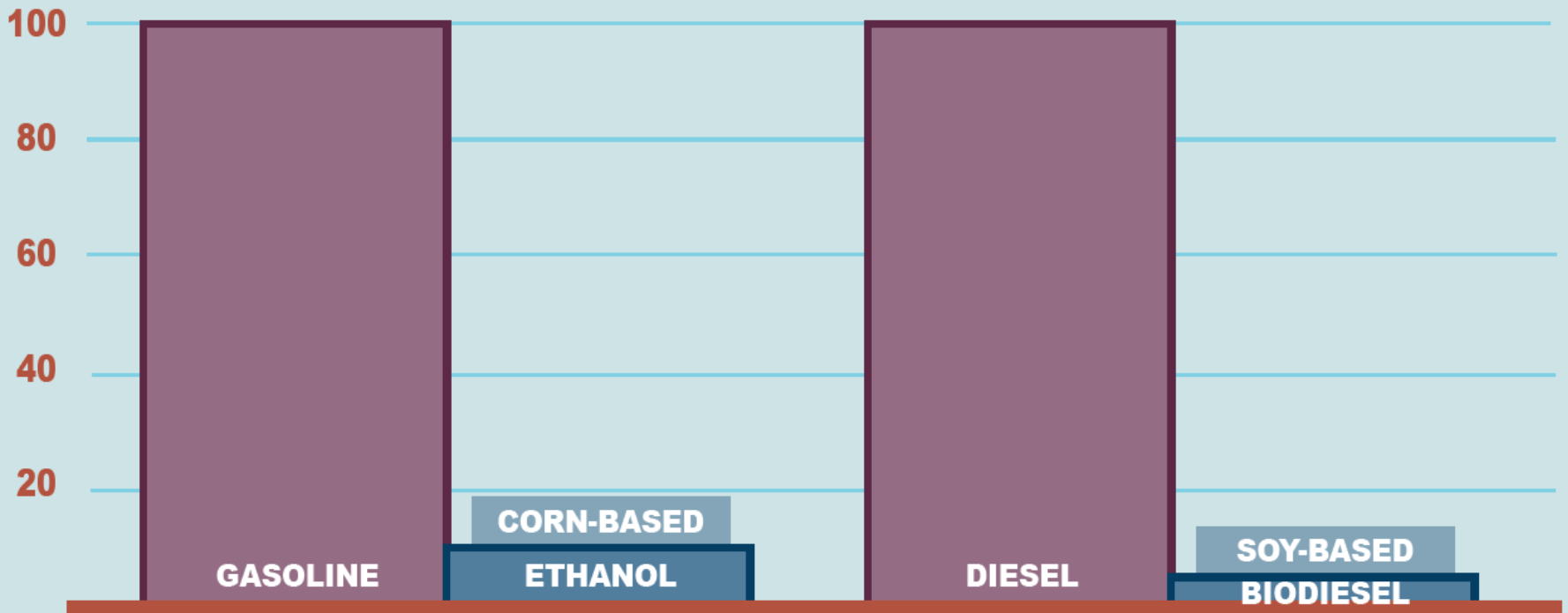


# Develop Additional Sources of Renewable Energy



# U.S. Needs vs. Corn/Soybean Potential

% OF NEED FULFILLED BY GAS/DIESEL VS. BIOFUELS



Source: National Geographic, October 2007



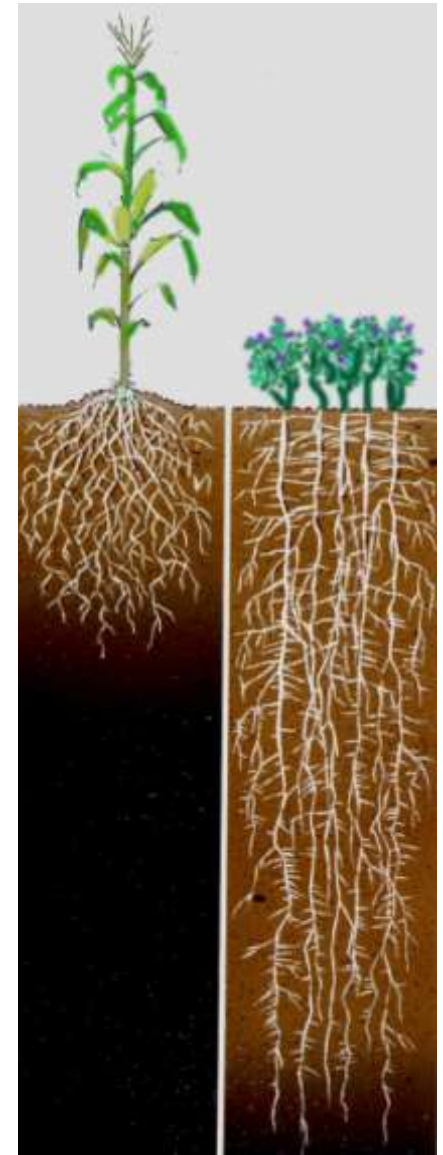
# Alfalfa for Biofuels

## *Environmental benefits*

- Deep rooted, perennial legume
- Net nitrogen contribution to rotation
- Net carbon credits in rotation
- Soil erosion benefits versus row crops
- Improved soil tilth

## *Rotational benefits*

- Nitrogen credits to following crop
- Yield benefits to following crop
- Corn stover available October-May, alfalfa stems available May-October



Corn

Alfalfa



We need to be serious about generating energy from:

- Crop waste/byproducts
- Non-food crops
- Other renewable, non-agricultural sources

# Meeting the Food, Feed & Fuel Challenge

1. Develop genetics that:
  - Increase yields
  - Add characteristics with specific food, feed and fuel value
2. Improve biofuel production efficiency
3. Develop additional renewable energy sources



# Remain Focused on Feeding a Hungry World

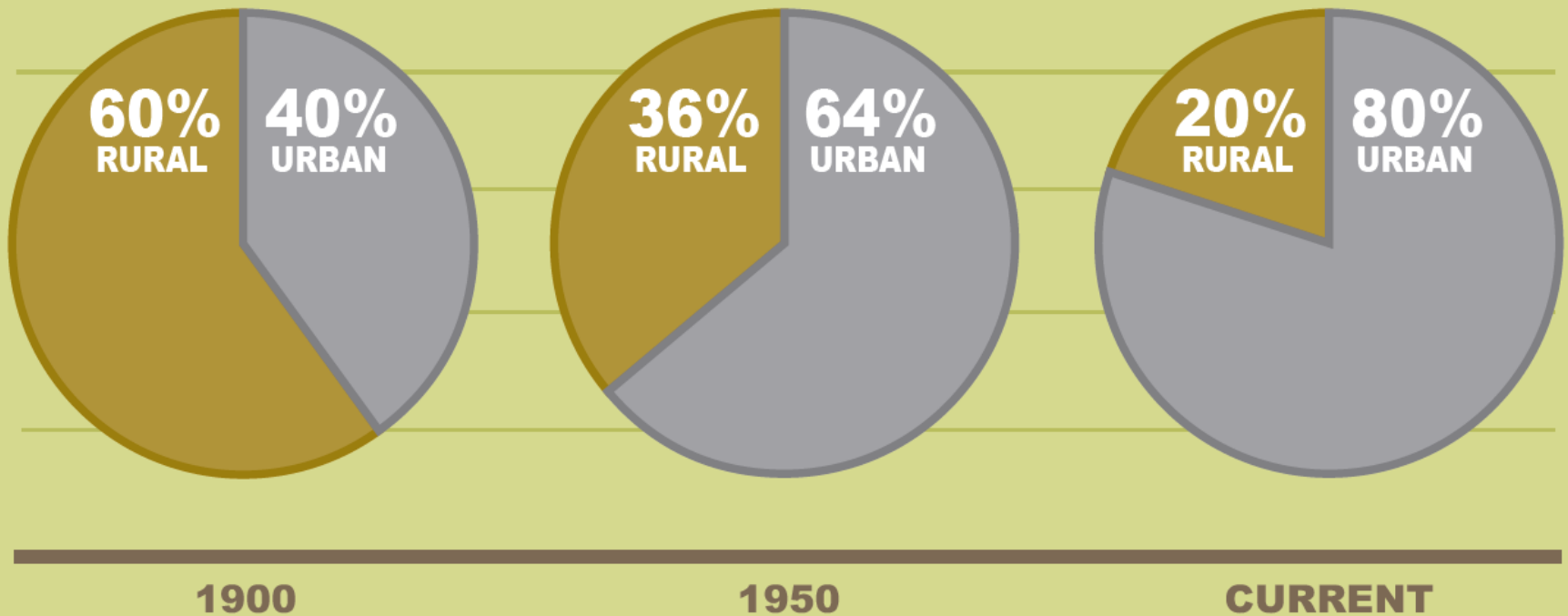
- Better delivery of nutrition
- Expand production in nutrition-deficit regions
- Reduce poverty

# Meeting the Challenge



- A rational, data- and science-based approach
- Address policy, public opinion and “production” issues

# U.S. Population



Source: USDA Food Review, Jan. 2000



A close-up photograph of two hands shaking in a firm grip. The hand on the left is wearing a blue and white checkered shirt, while the hand on the right is wearing a white shirt. The background is a soft-focus green, suggesting an outdoor setting with trees. The text is overlaid on the image in a bold, black, sans-serif font.

**We have an obligation to lead  
debate and discussion...  
and shape opinion and policy.**

“The majority of agricultural scientists, myself included, anticipate great benefits from biotechnology in the coming decades to help meet our future needs for food, feed, fiber and biofuels.”

- Dr. Norman Borlaug

