

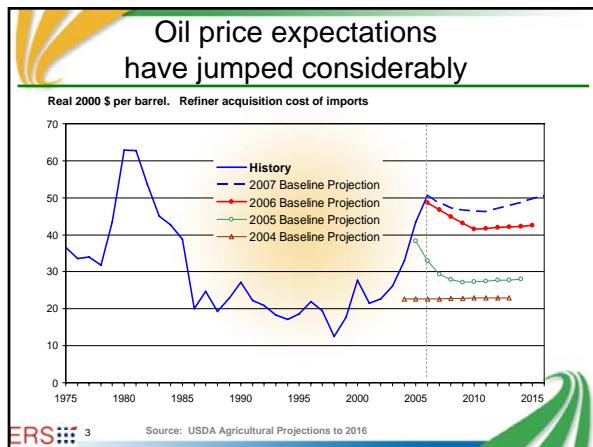


Global Aspects of USDA's Baseline Projections for Biofuels

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Biofuels, Food and Feed Tradeoffs
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ERS 2



Outline

- What is the USDA baseline?
- How we modeled biofuels
- Country assumptions and projections
- "The Story": Impact of expanded biofuel demand

ERS 4

What is the Baseline?

- **10 year annual projections for agriculture**
 - Departmental annual baseline publication in February
- **Projections, not forecasts**
 - Conditional, long-run scenario
 - Neutral assumptions
- **Prepared through an interagency process**
 - Composite of models & judgment-based analysis

ERS 5

U.S. Agricultural Sector Model

- **Food and Agricultural Policy Simulator (FAPSIM)**
 - Annual model
 - Over 700 equations
 - Covers major U.S. agricultural crop and livestock commodities
 - Models major supply and demand categories
 - Incorporates U.S. agricultural policy provisions
 - Solves for prices that clear markets by equilibrating supply and demand

ERS 6

Global Agricultural Trade Model

- **Country-Commodity Linked Modeling System (“Linker”)**
 - 24 commodity markets
 - 39 countries/regions
 - Solves for prices and trade that clear country markets & world commodity markets
 - Equilibrates supply and demand
 - Equilibrates global imports and exports
 - Global trade totals

ERS 7

24 World Commodity Markets

- **Coarse grains**
 - Corn
 - Sorghum
 - Barley
 - Other coarse grains
- **Food grains**
 - Wheat
 - Rice
- **Other crops**
 - Cotton
 - Sugar
- **Animal Products**
 - Beef and veal
 - Pork
 - Poultry meat
 - Eggs

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Country & Regional Coverage

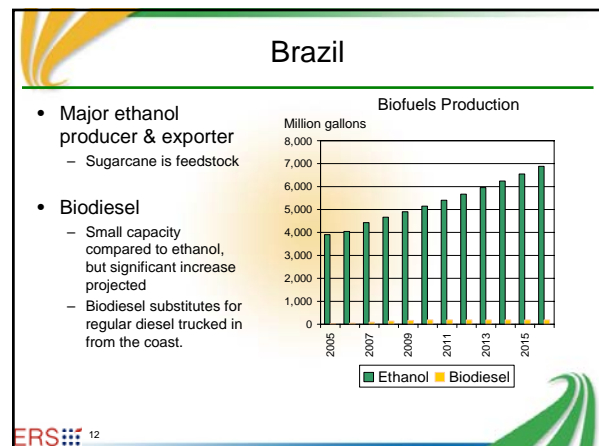
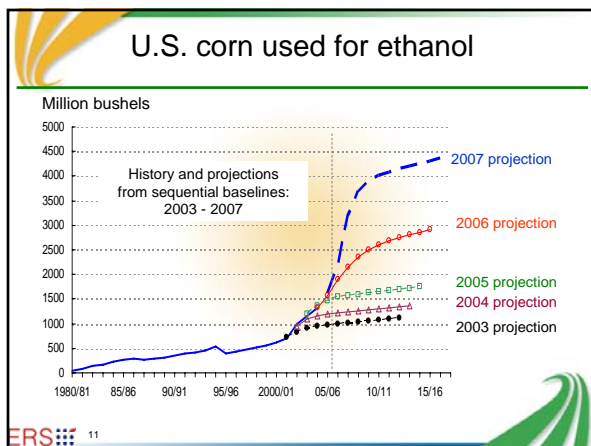
- Algeria
- Argentina
- Australia
- Bangladesh
- Brazil
- Canada
- Cent. Am. & Caribbean
- China
- Egypt
- European Union-25
- Hong Kong
- India
- Indonesia
- Iran
- Iraq
- New Zealand
- Pakistan
- Philippines
- Russia
- Saudi Arabia
- South Africa, (Rep of)
- Japan
- Malaysia
- Mexico
- Morocco
- South Korea
- Taiwan
- Thailand
- Tunisia
- Turkey
- Ukraine
- United States (Fapsim)
- Vietnam
- Rest-of-region models:
 - Other Asia
 - Other Europe
 - Other Former Soviet Union
 - Other N. Africa and Middle East
 - Other South America
 - Other Sub-Saharan Africa
 - Rest of World

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How we modeled biofuels

- Main focus: feedstocks, rather than biofuels
- **Approach # 1** (main countries): Assumptions about growth in biofuels:
 - USA
 - Canada
 - EU
 - Argentina
 - Brazil
 - China
- Assumptions are transparent and easy to modify.

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European Union

- EU biofuels mandate
 - 5.75%
 - Assumed EU does not meet mandate
- Rapeseed oil makes up the 80 percent of bio-diesel oil
- Other oils (tropical) make up the other 20 percent of bio-diesel
- Limited ethanol production (from wheat)

Biofuels Production

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Argentina: Biofuels Production

- Biodiesel from soybean oil
 - Large crushing capacity
 - Export tax structure favors exporting products rather than soybeans
 - Biodiesel plants being built with production destined for exports
- Ethanol
 - Limited capacity being planned.

Biodiesel Production

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Canada

- Biodiesel
 - Rapeseed oil is feedstock in west
 - Vegoil wastes & animal fats feedstocks in east
- Ethanol
 - Produced from corn and wheat

Biofuels Production

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China

- 3rd largest ethanol producer behind Brazil and the US
- Assumed to continue to develop their ethanol sector
 - But constrained by food and feed demands for corn
 - Future growth focused on nongrain feedstocks

Corn used for fuel ethanol

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Other Countries: Indirect Price Impacts

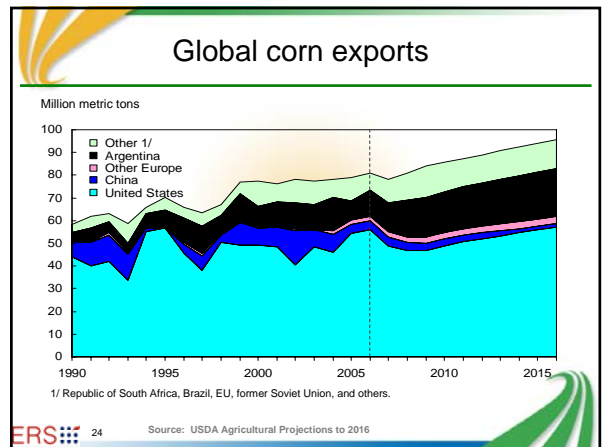
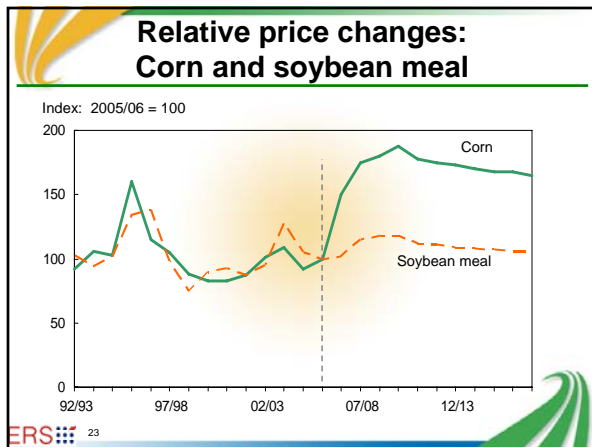
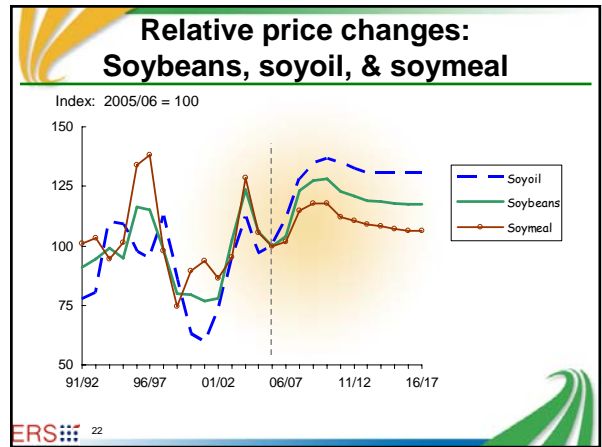
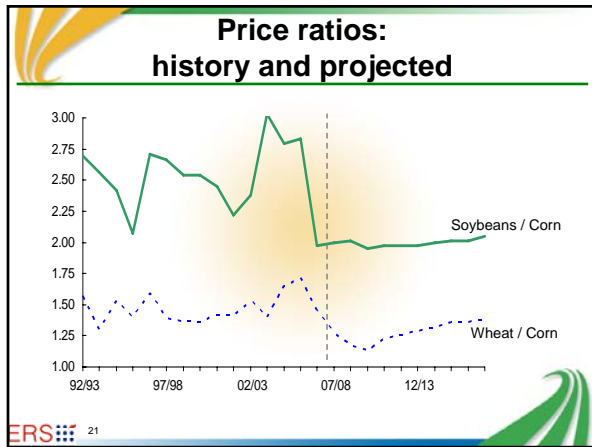
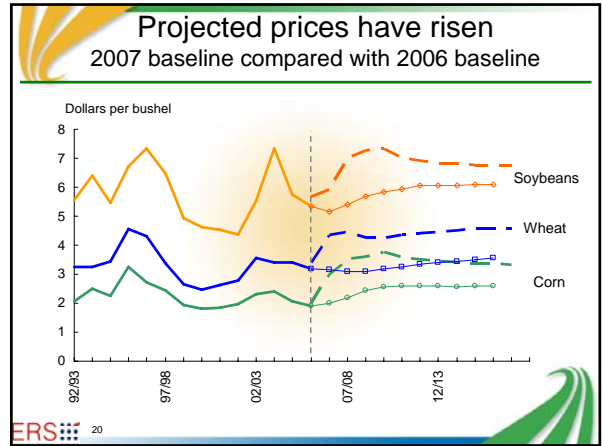
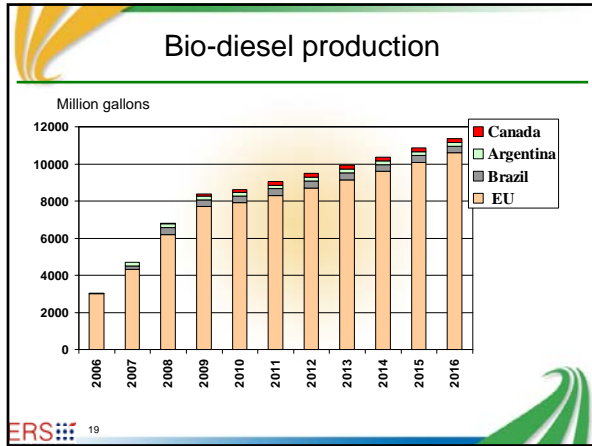
- Approach # 2: Feedstocks affected through changes in world prices:
 - Rapeseed oil production, for EU market
 - Ukraine
 - Romania
 - Russia
 - Bulgaria
 - Palm oil production, for EU market
 - Malaysia
 - Indonesia

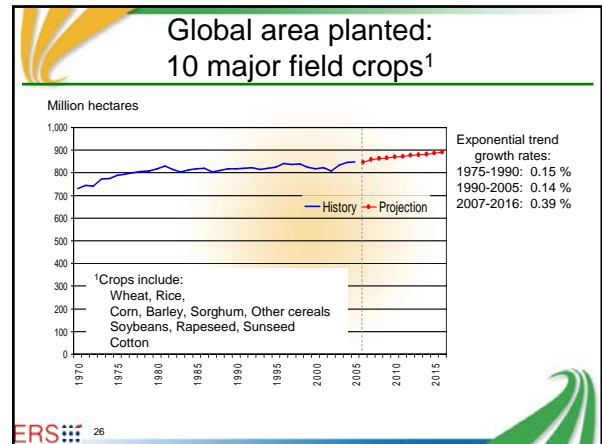
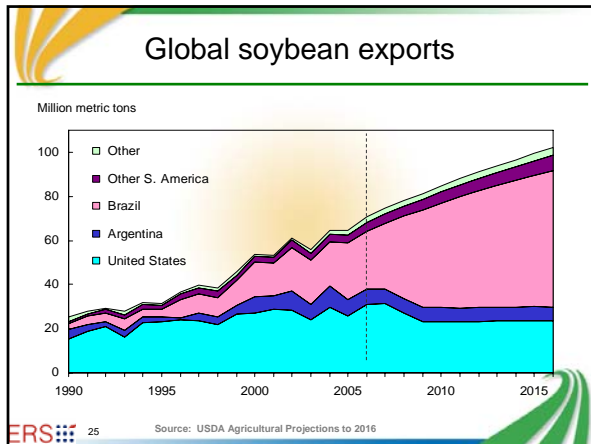
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Ethanol production from grain feed stocks

Million gallons

ERS 18





- ### Other secondary impacts
- **Global Food Aid Donations:**
 - Donor countries may budget fixed amounts for food aid.
 - If food prices rise, fixed budgets buy less food.
 - Then, food aid shipments to low-income, food-deficit countries decline.
 - **Consumption by low-income households:**
 - If cost of food increases,
 - Bigger percentage of income allocated to food, -- or eat less.

- ### Summary
- **Demand:** Biofuels are a new, high value product source of demand. Demand for feedstuffs will be strong.
 - **Supply:** The supply chain will need more resources, and increased efficiency
 - **Trade:** Some countries will increase production and exports of feedstocks. Other countries will become importers of feedstocks. Trade in feedstocks and biofuels will likely increase.
 - **Prices:** Farm output prices rise, and price relationships among crops change from traditional patterns.

- ### Uncertainties
- Energy prices (oil & natural gas)
 - Responsiveness to price changes
 - demand for biofuels vs. petroleum prices
 - supply of feed stocks vs. biofuels prices
 - costs of feedstock production vs. feedstock prices
 - Fertilizer (& natural gas), irrigation, farmland
 - Additional crop land
 - Water availability
 - manufacturing process
 - Increased irrigation
 - New technological developments in biofuels industry
 - manufacturing process
 - new crop varieties: (higher yields; more suitable for biofuels)
 - new byproducts (with high value?)
 - Biofuels policies & funding

Get the full USDA baseline report through the
USDA-ERS baseline briefing room

<http://www.ers.usda.gov/briefing/baseline>

More information on biofuels available at:

<http://www.ers.usda.gov/briefing/bioenergy>

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