

U.S. GRAIN ETHANOL INDUSTRY OUTLOOK

Hosein Shapouri
USDA/Office of Energy Policy & New Uses

EIA Energy Forecasting Conference

Washington, DC, March 27, 2006



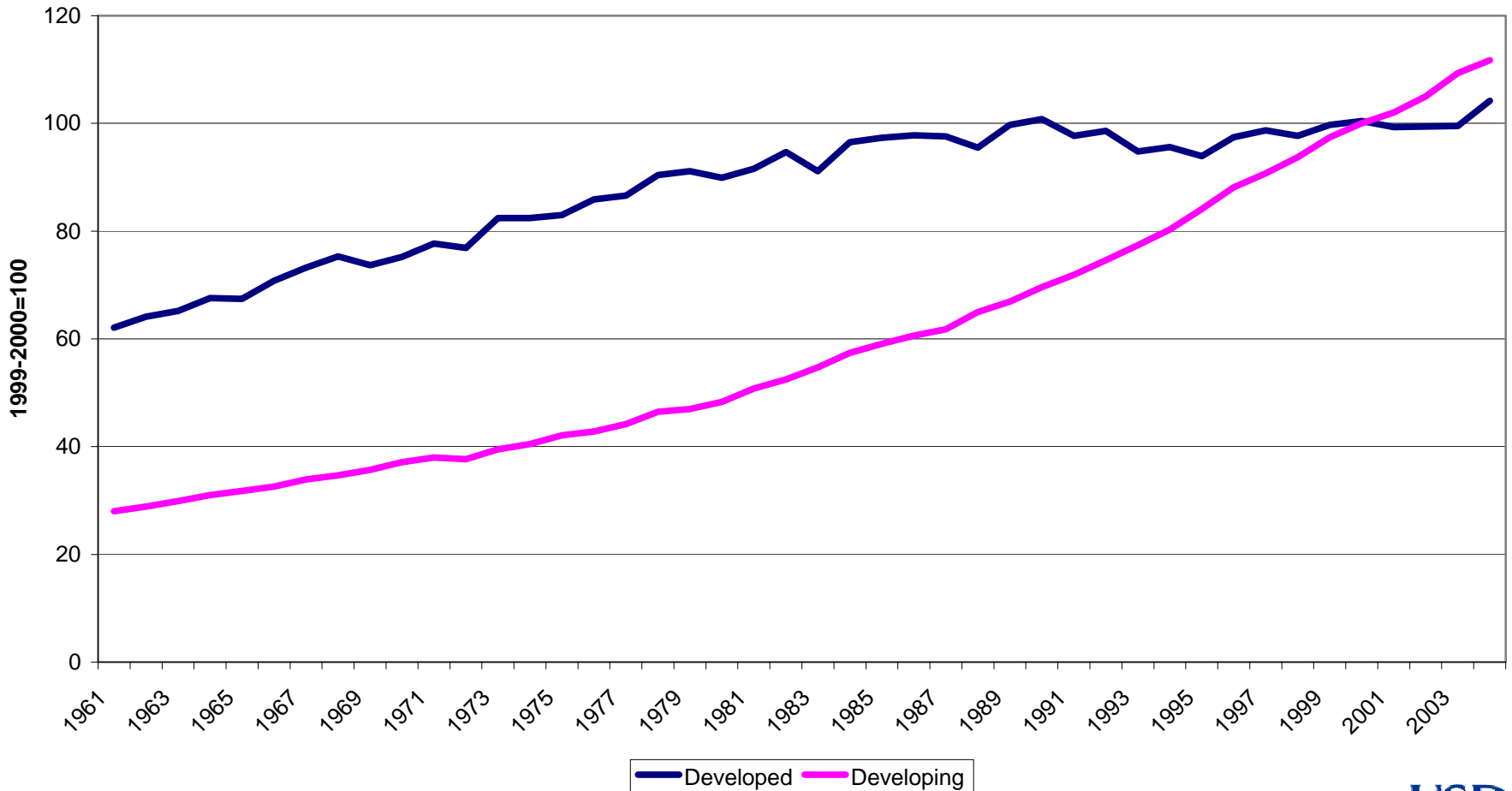
OVERVIEW

- **Current agriculture system**
- **Resource base**
- **Major use of cropland**
- **Major crops-coarse grains, wheat, soybeans, and all hay**
- **World's current agricultural problems**
- **Conclusions**

Current Agriculture System

- **Large farm size**
- **Highly capital intensive**
- **High tech, hybrid and genetically modified seeds, precision farming and variable rate technology, yield mapping, center pivot irrigation systems, etc.**
- **High yield**
- **Provide food, fiber, and nonfood for domestic and export markets**
- **Creates excess production and declining prices**

Agriculture Production Index, 1960-2004



Source: FAO/UN



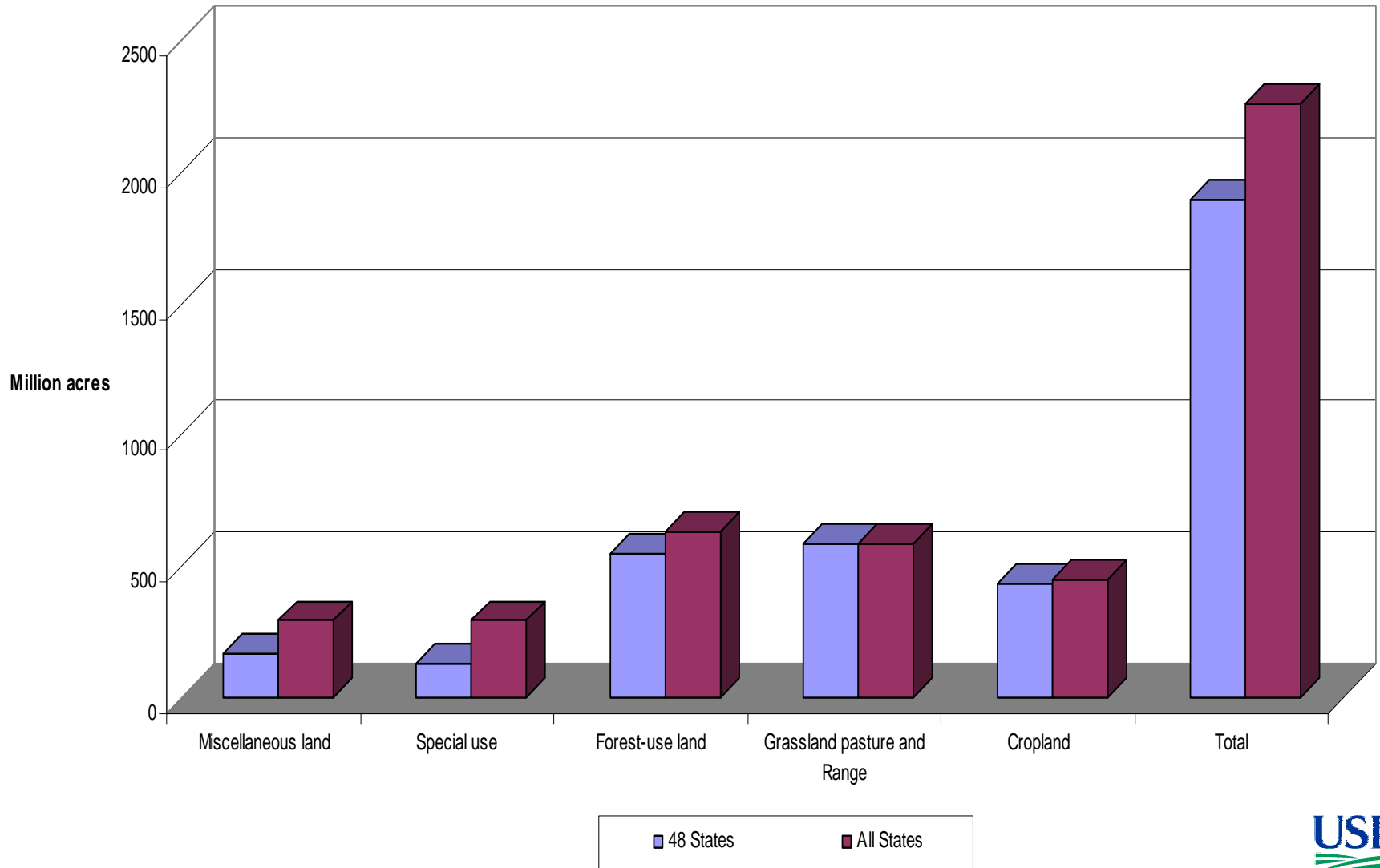
Biomass Feedstocks

- **Crops containing:**
 - Starch--grains, roots, etc.
 - Sugar--sugar beets, sugar cane, sweet sorghum, etc.
 - Oil--soybeans, rapeseed, peanuts oil, etc.
 - Energy crops
- **Byproducts--molasses, cheese whey, etc.**
- **Animal fats--tallow, lard, etc.**
- **Agriculture and forestry residues**
- **Organic wastes--waste sugar and starch, sorted municipal solid waste, etc.**

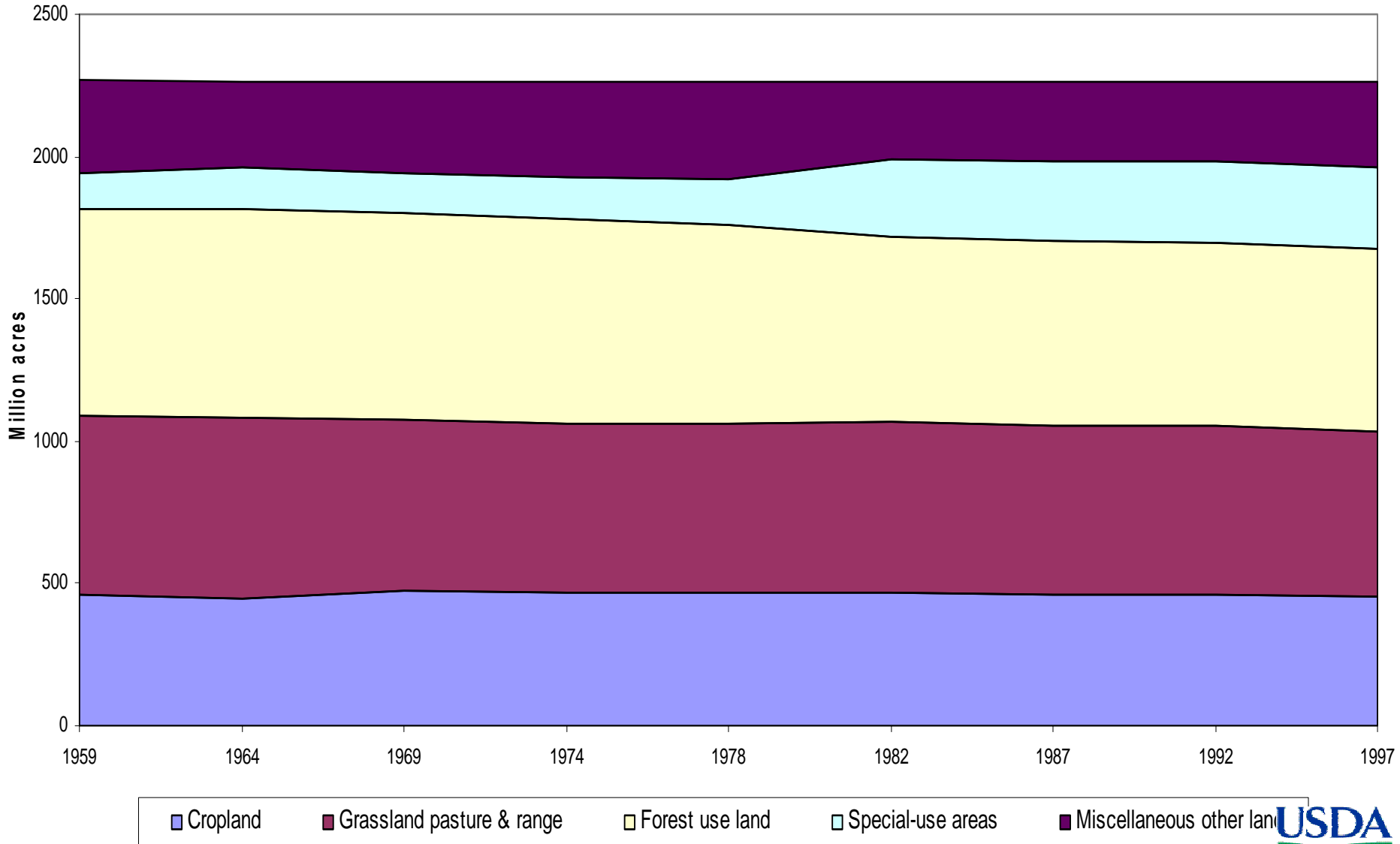
Resource Base

- **Total land:**
 - Forest
 - Pasture and range
 - Cropland
 - Others

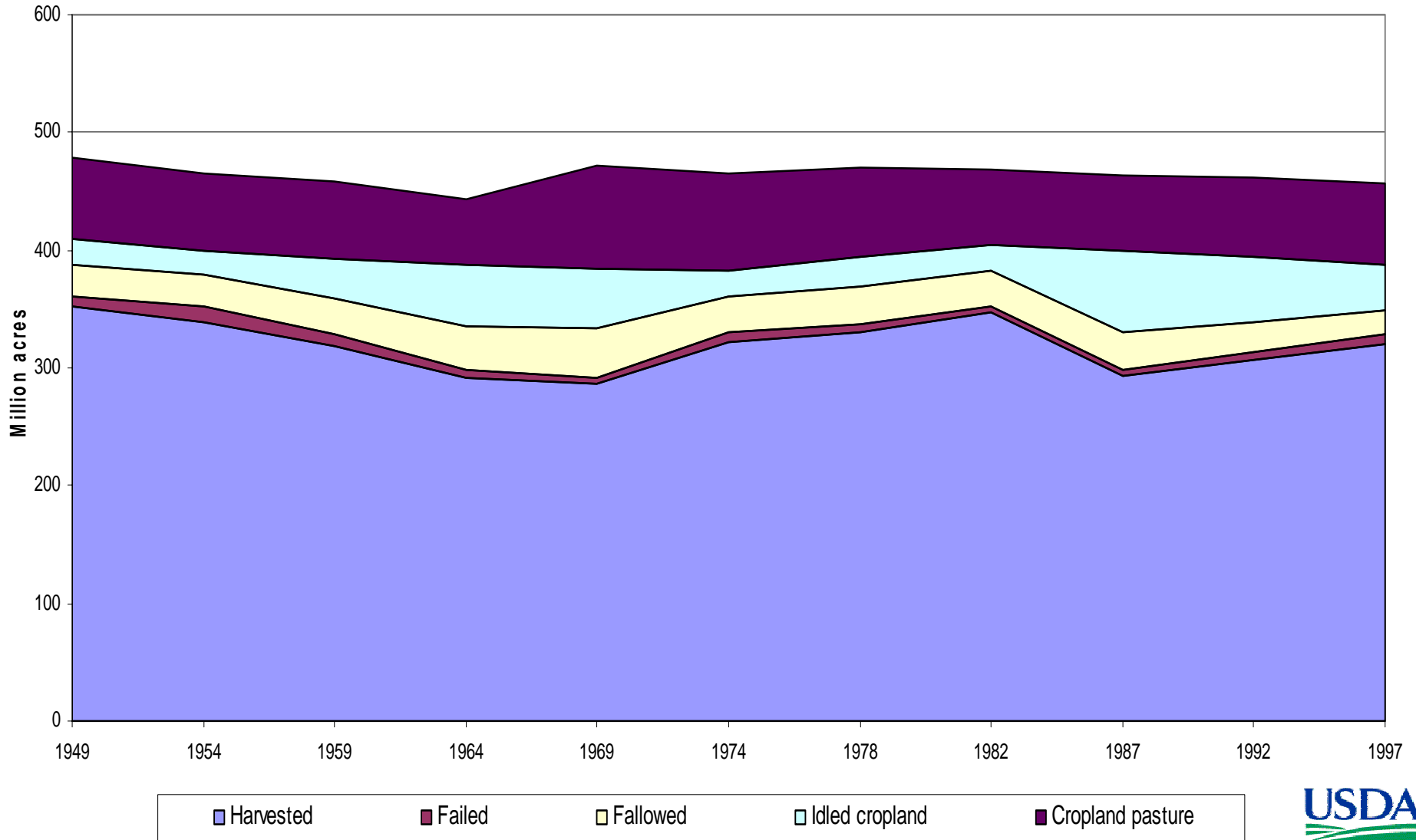
Major Uses of Land, 1997



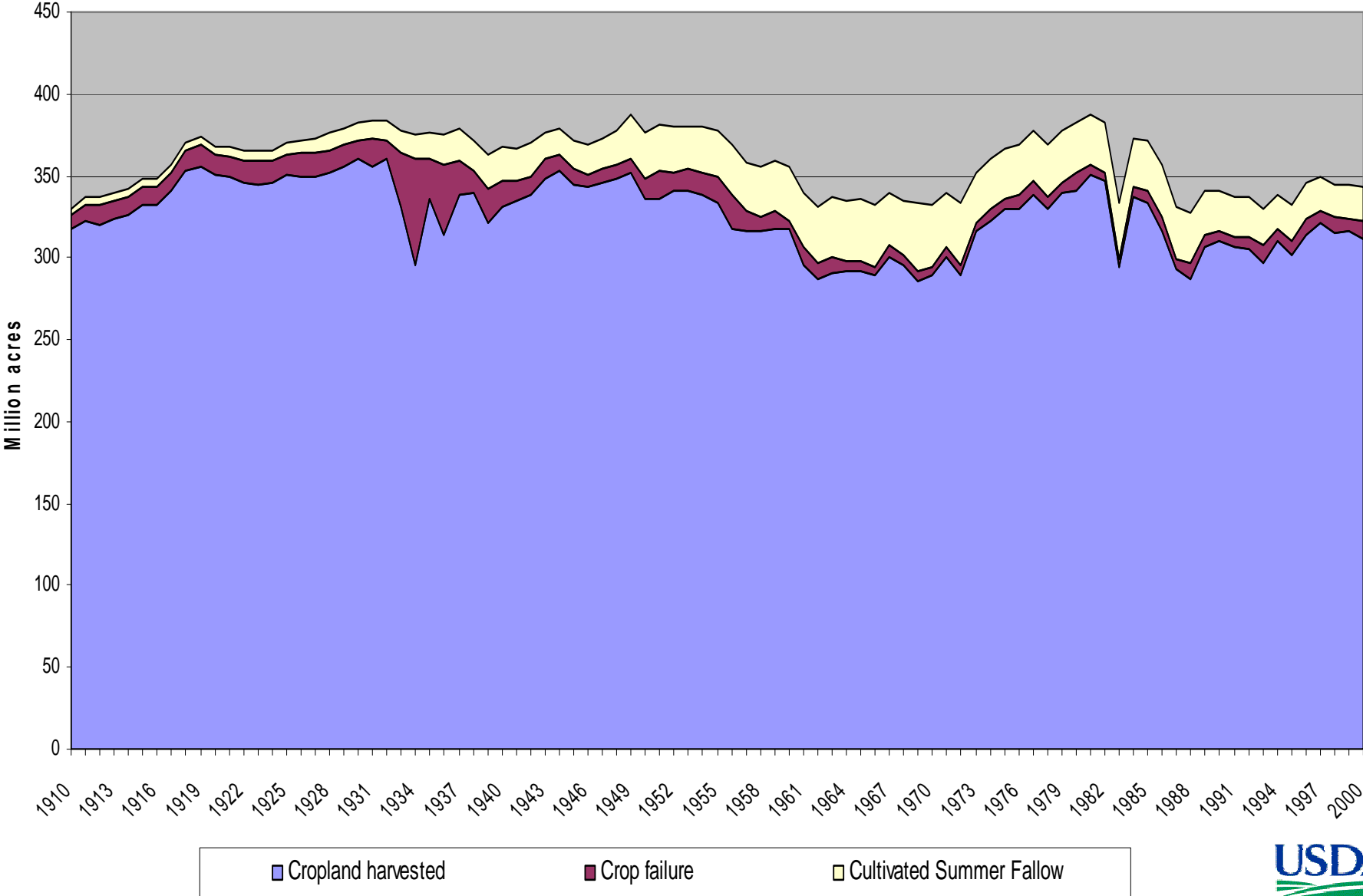
Major Use of Land, United States, 1959-97



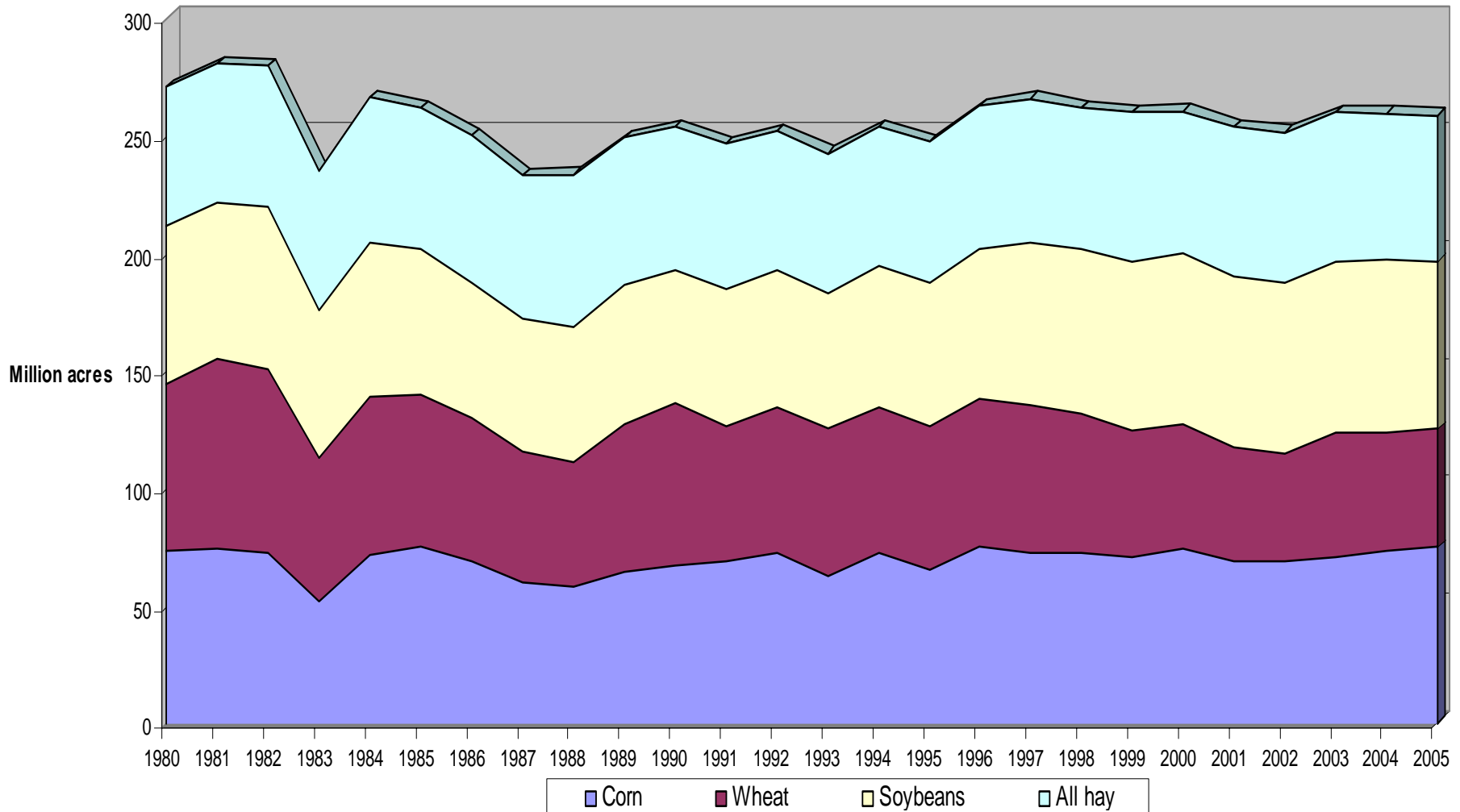
Major Use of Croplands, 1949-97



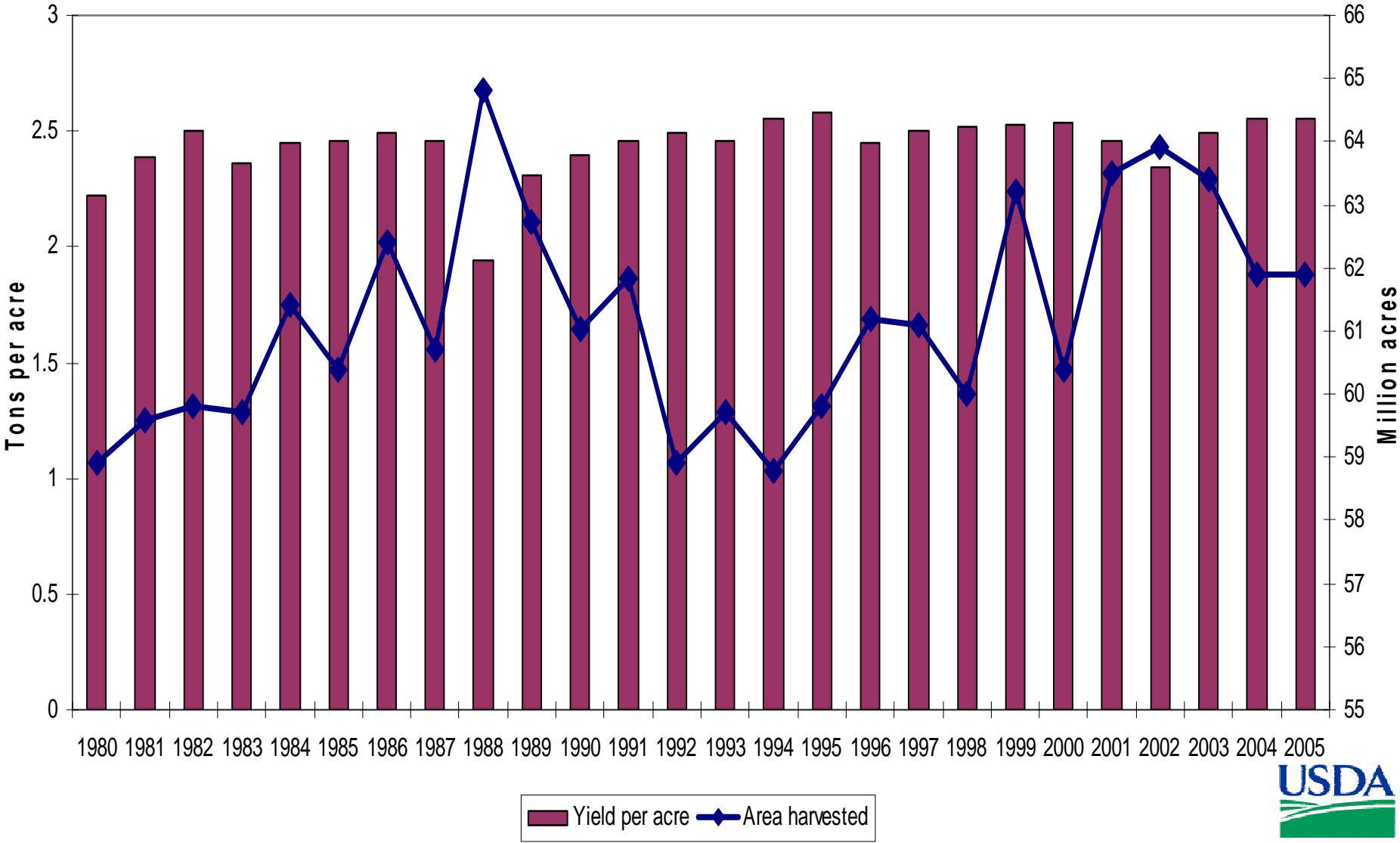
Cropland Used for Crop Production, 48 States, 1910-2000



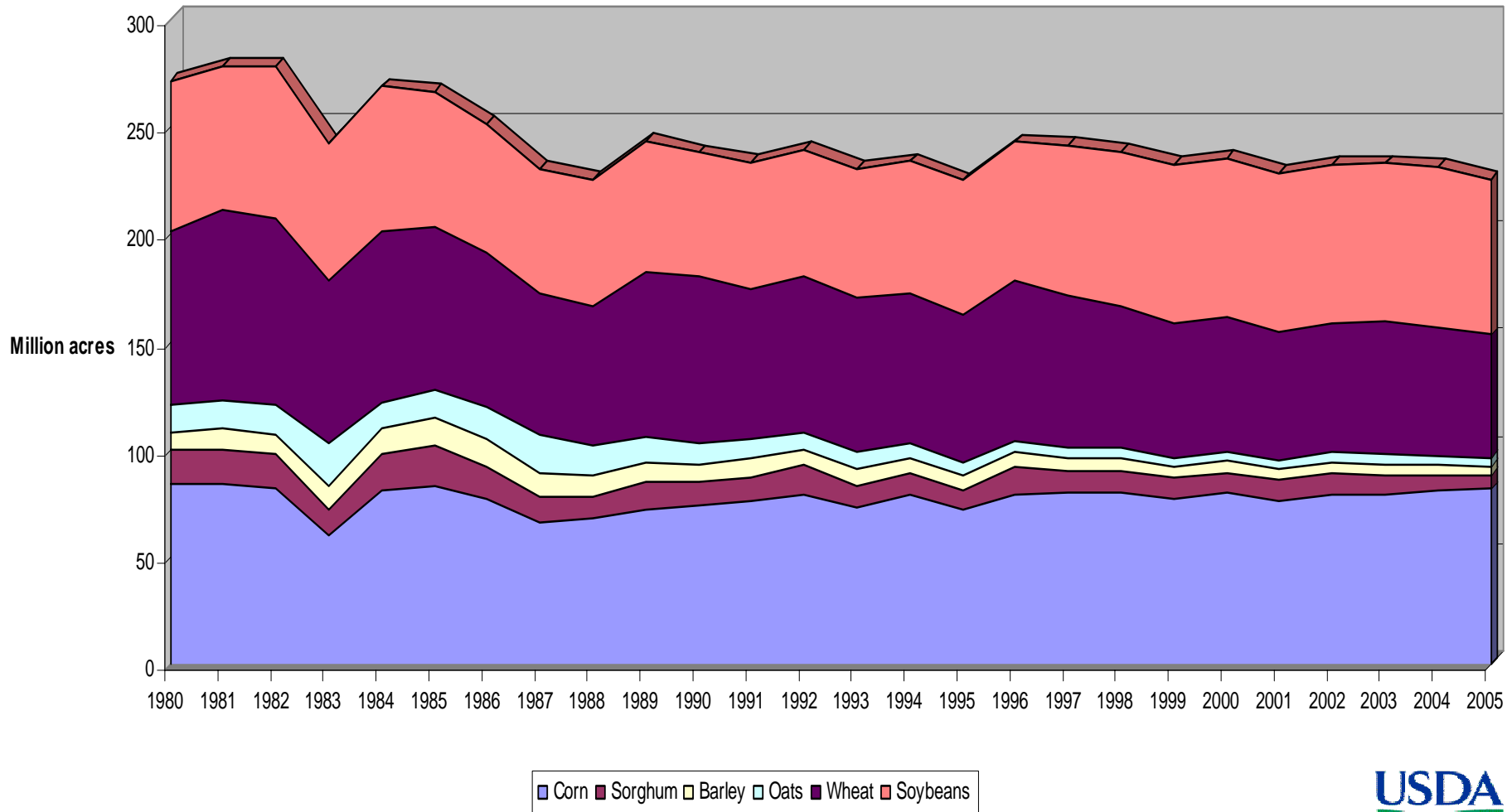
Major Crops: Area Harvested



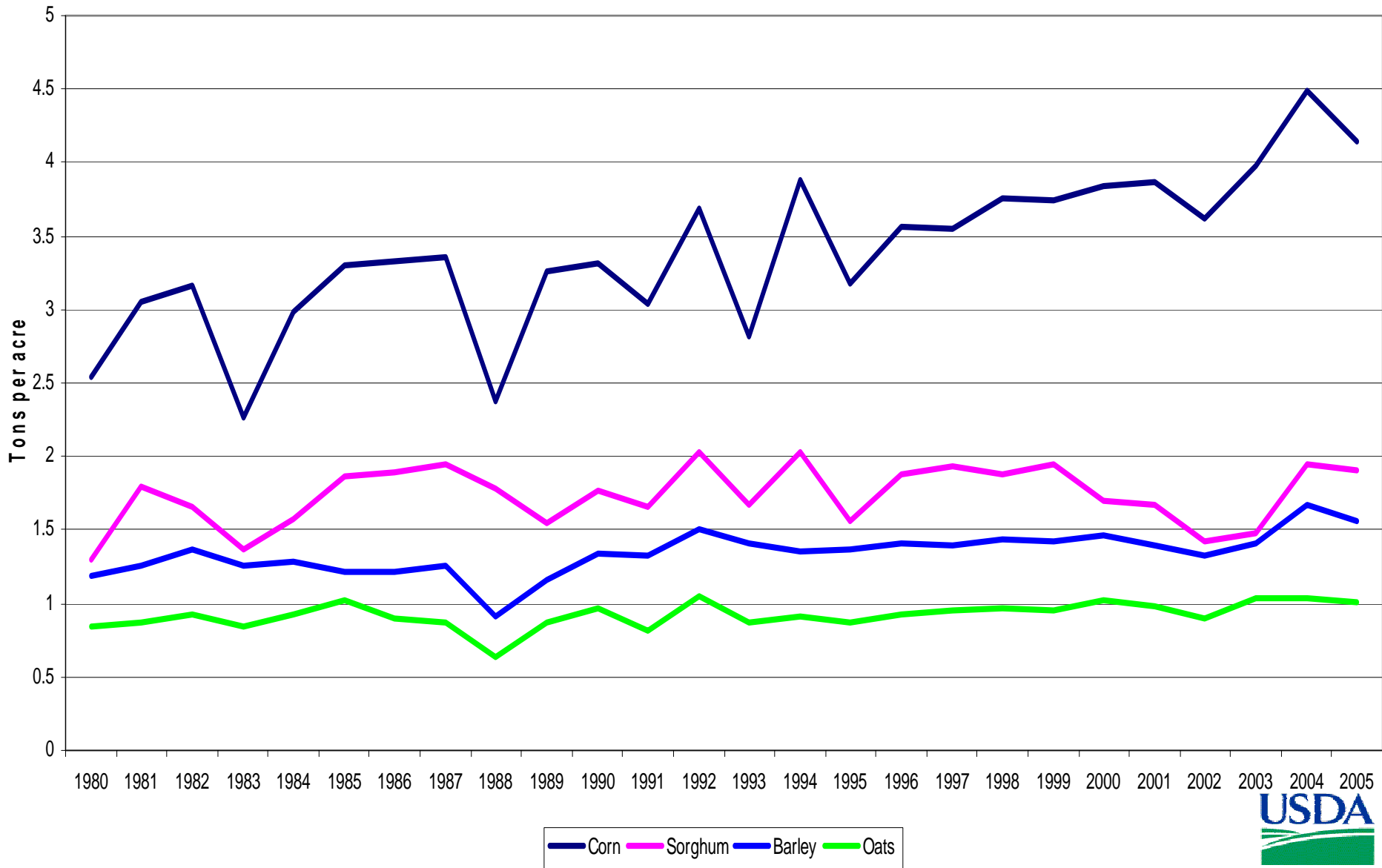
All Hay: Area Harvested and Yield



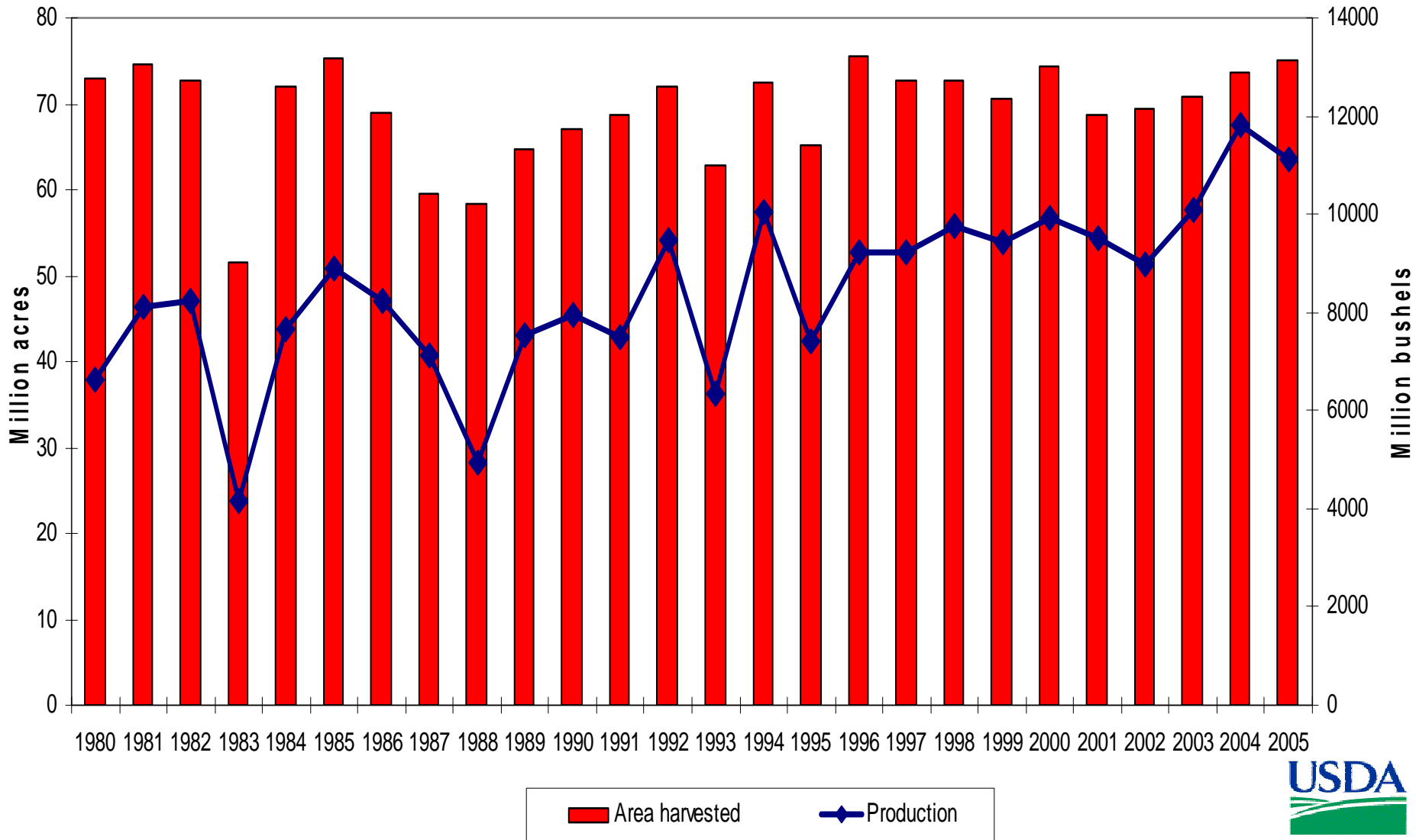
Coarse Grains, Soybeans, and wheat Areas Harvested, 1980-2005



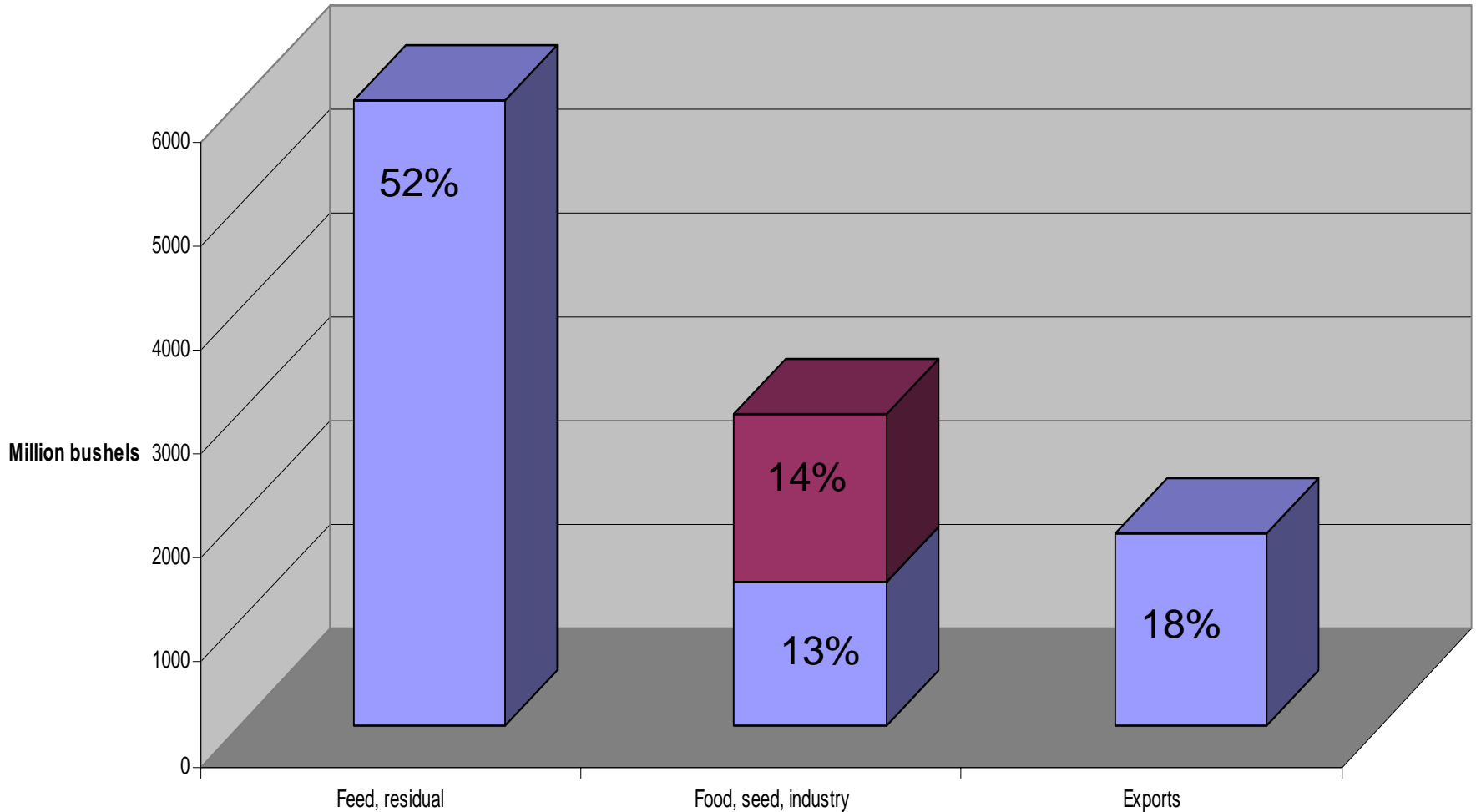
Coarse Grains Yield Per Acre, 1980-2005



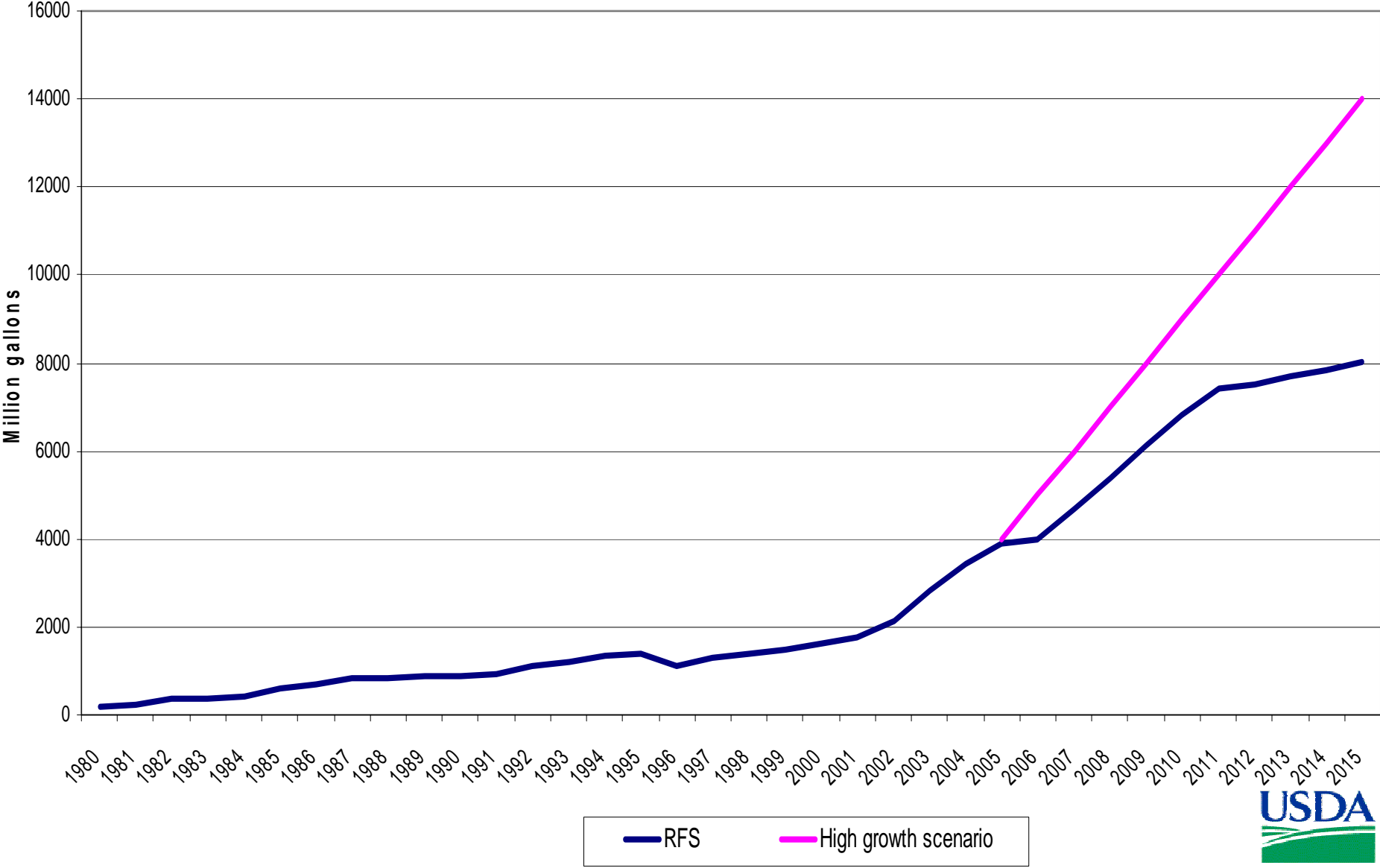
Corn: Area Harvested and Production



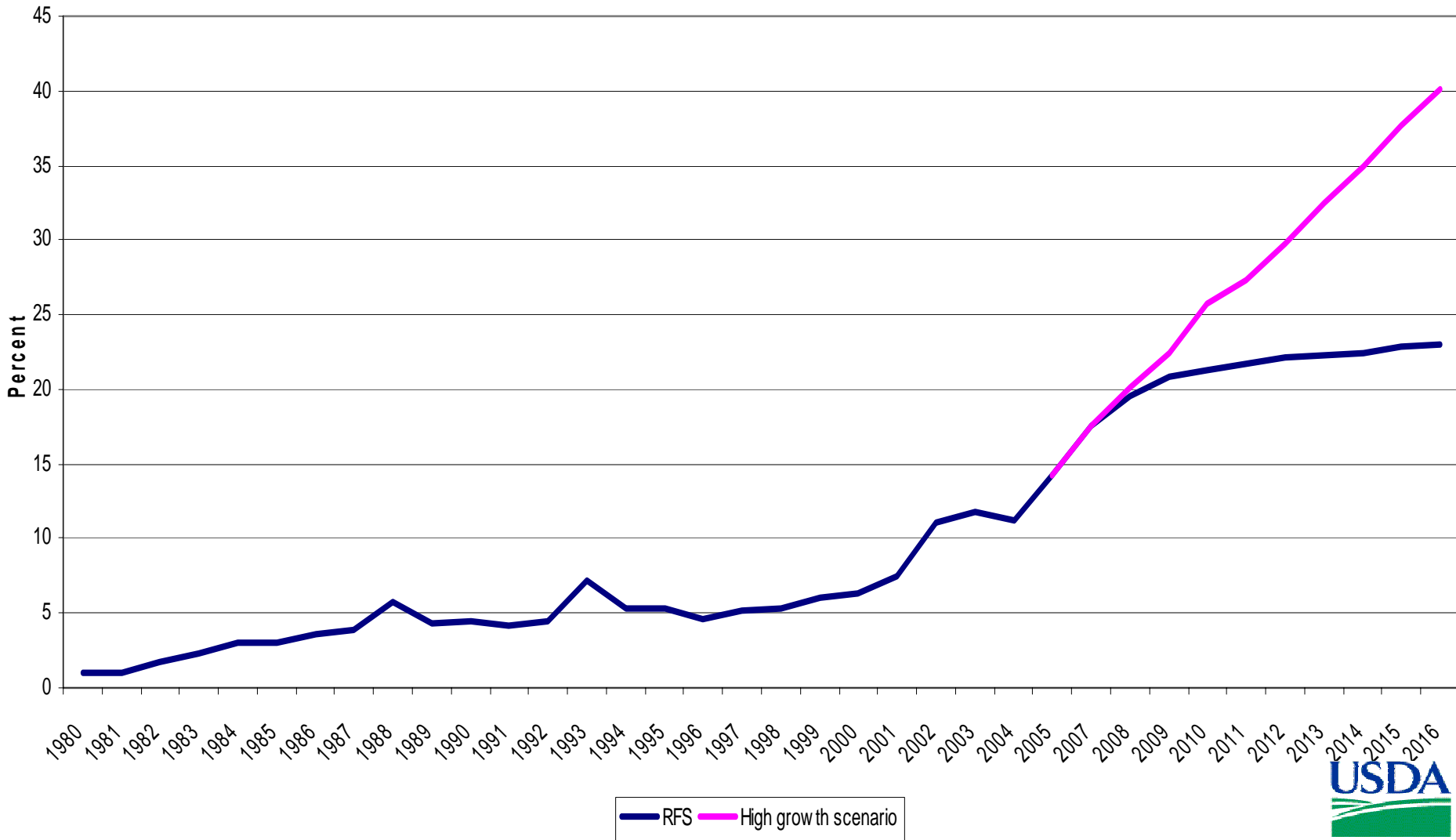
Corn Use, 2005



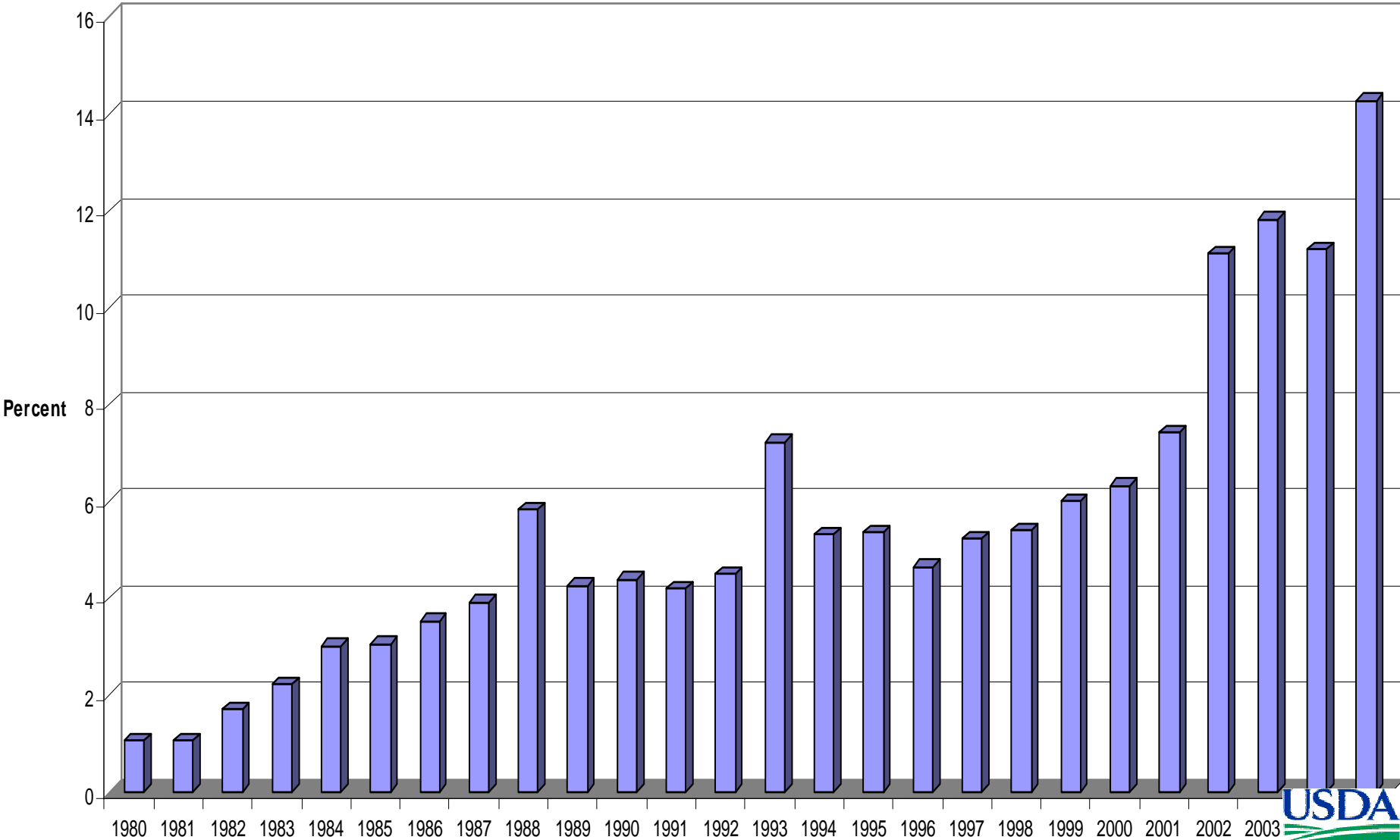
Historical and Projected Ethanol Use



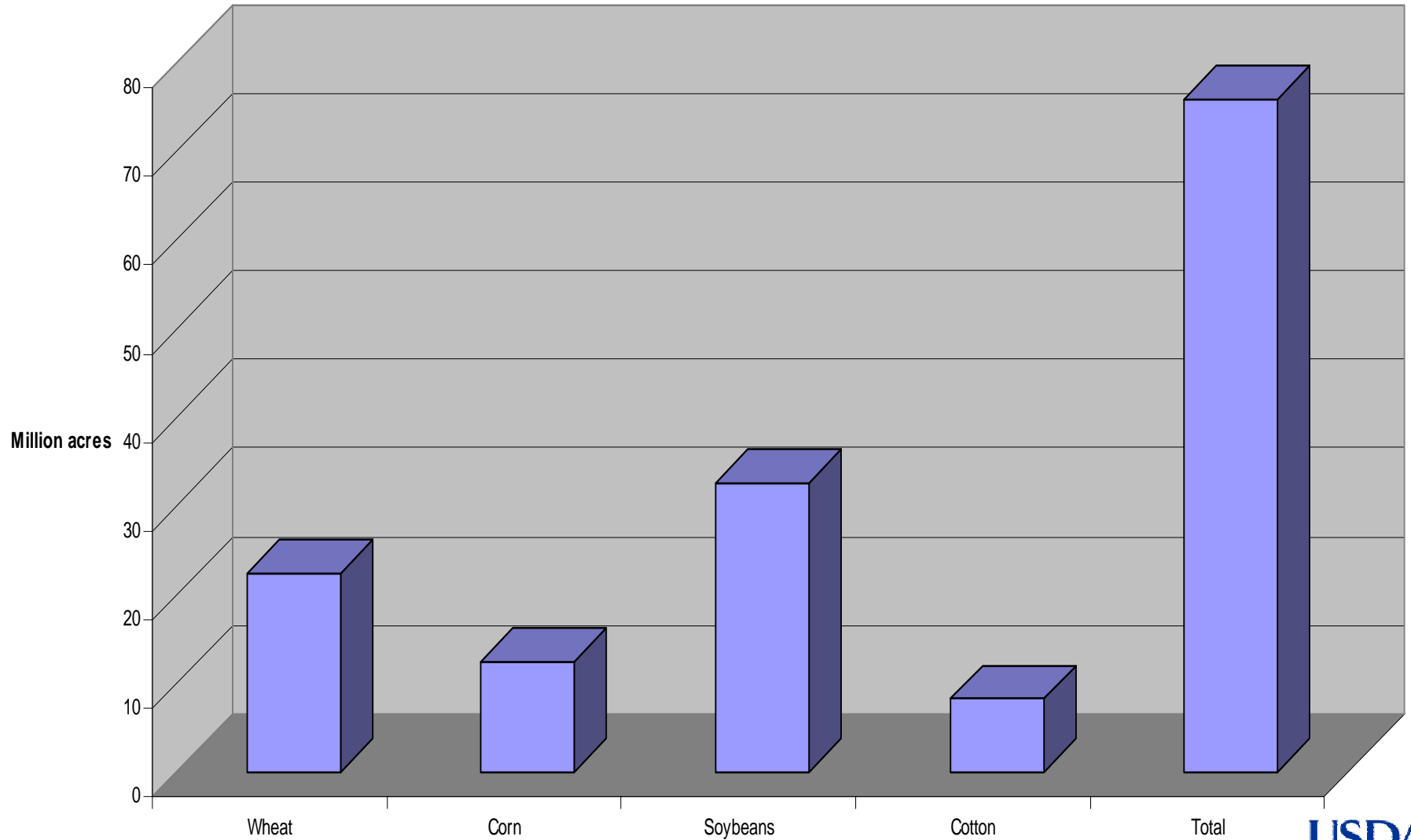
Historical and Projected Corn Use for Ethanol as % of Total Production



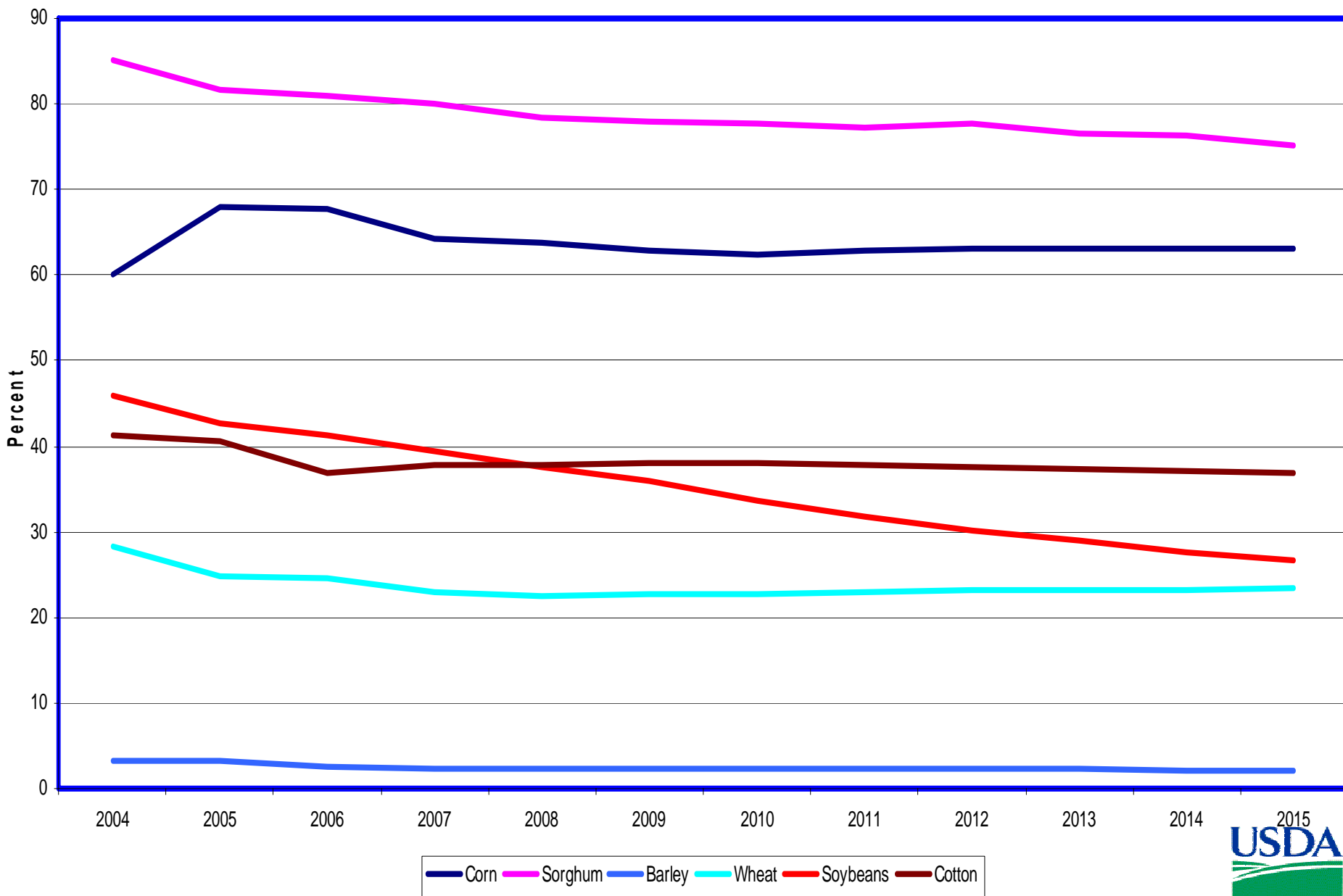
Corn Used in Ethanol as Share of Corn Production



Acre of Cropland Exported 2001/02-05/06 Average

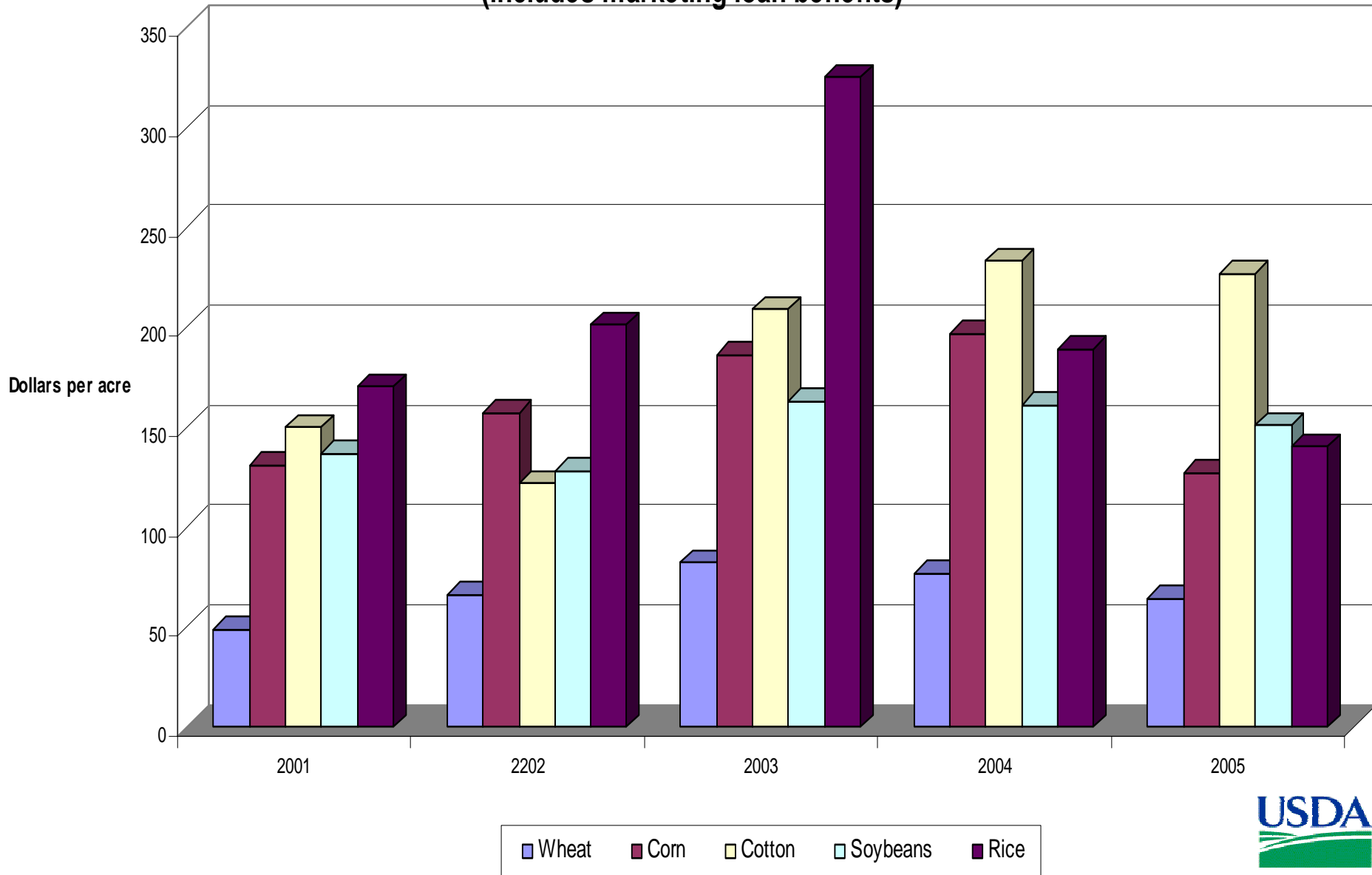


Project U.S. Trade Share, Major Commodities, 2004-2015



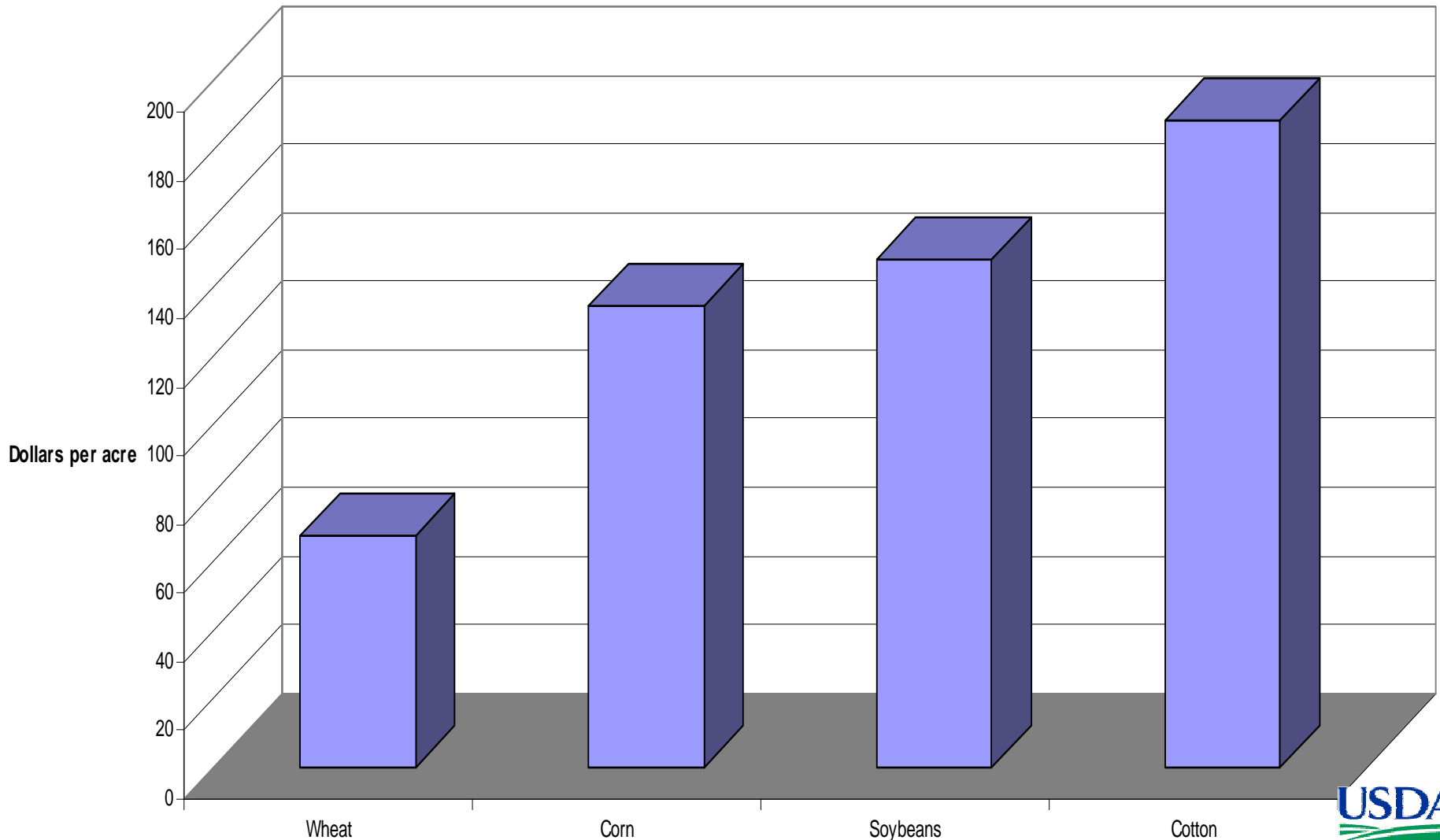
Net Returns Over Variable Costs

(includes marketing loan benefits)



Net Returns Over Variable Costs, 2001/02-05/06 Average

(includes marketing loan benefits)



World's Current Agricultural Problems

- **Growing subsidy, increasing production incentives, and trade barriers**
- **Major R&DD breakthrough leading to excess production**
- **Exceptional production growth in developing countries adds pressure on production incentives**
- **Stagnated food demand in mature markets**
- **Aggressive competition in exports market**

Agriculture Beyond Food

- **Food:**
 - Products differentiation
 - Boutique commodities
 - High-value products, organic food, and GM free food products
- **Nonfood:**
 - Biobased products, biofuels, solvents, adhesives, plastics, hydraulic fluid, pharmaceutical, panels, foam, light weight cement, nutraceutical, etc.

Conclusions

- **Currently, corn is the lowest feedstock for production of ethanol in the U.S.**
- **Corn use for production of ethanol will continue to increase**
- **Existing cropland and cropland idled by Government programs (CRP) could be used to grow corn and other feedstock for production of biofuels, biopwer and biobased products**