

Opportunities and Challenges of Biofuels for the Agricultural Sector and Food Security of Developing Countries

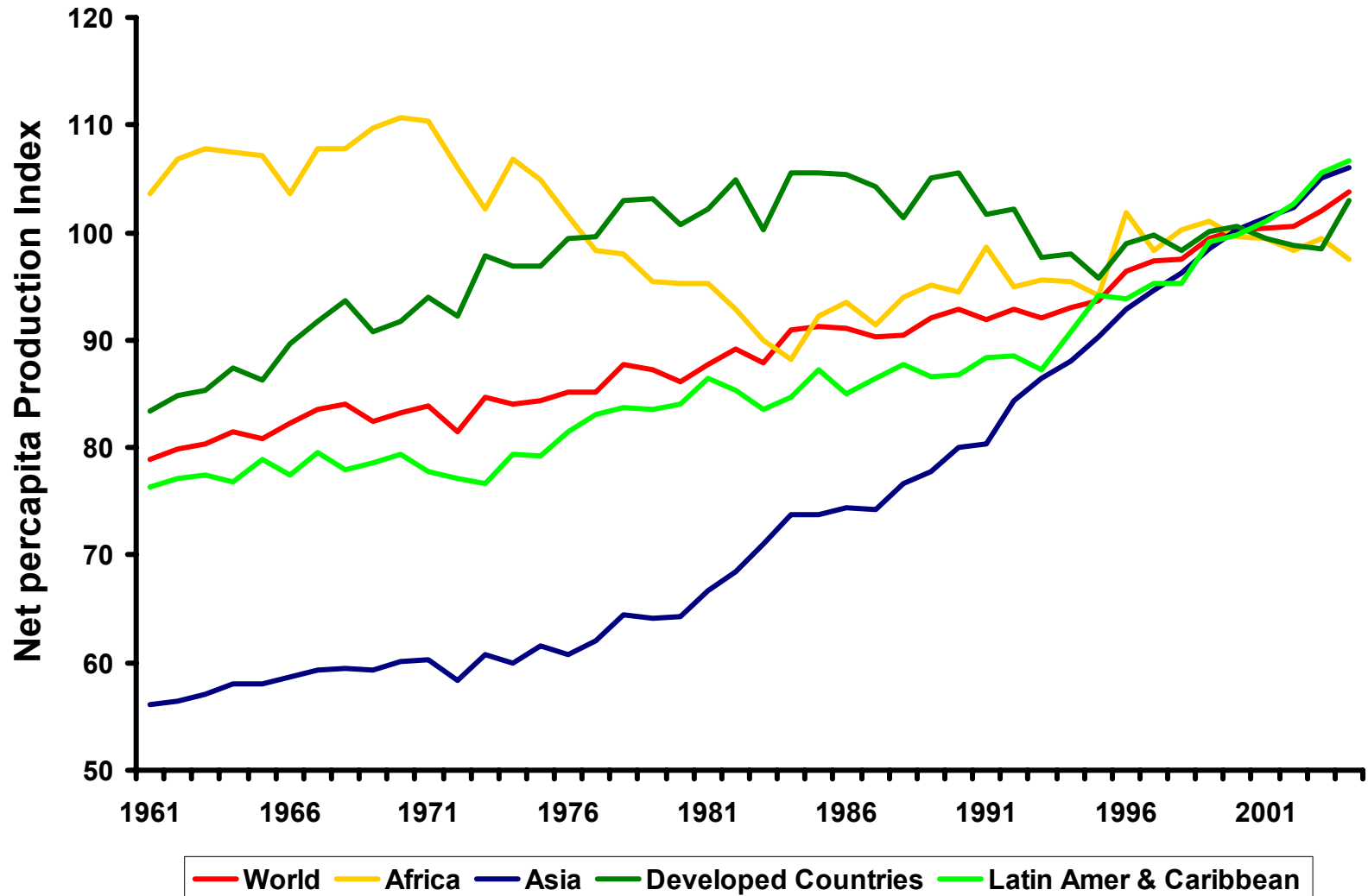
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Expert Meeting on
Participation of Developing Countries in New Dynamic Sectors for World Trade:
Review of the Energy Sector
Adjusting to the New Energy Economy
Geneva November 30, 2006

Agricultural Background

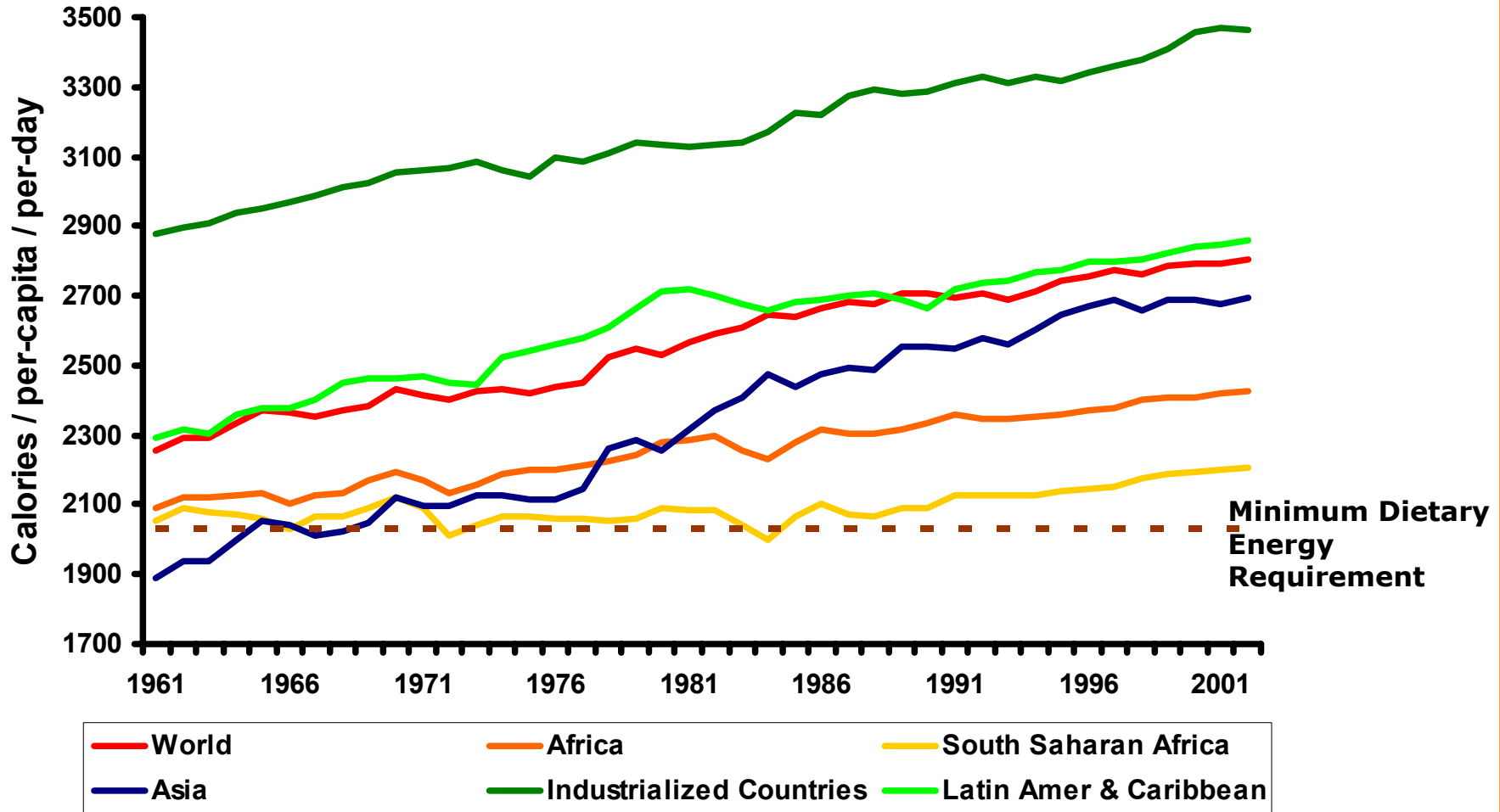
- Ag population 2.5 billion people
 - 800 million people food insecure
 - In developing countries:
 - 50% of employment
 - 15% of GDP
 - Agriculture is an ecosystem based enterprise
 - Biofuels is a link between energy and agriculture
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Agricultural Production by Selected Country Groups



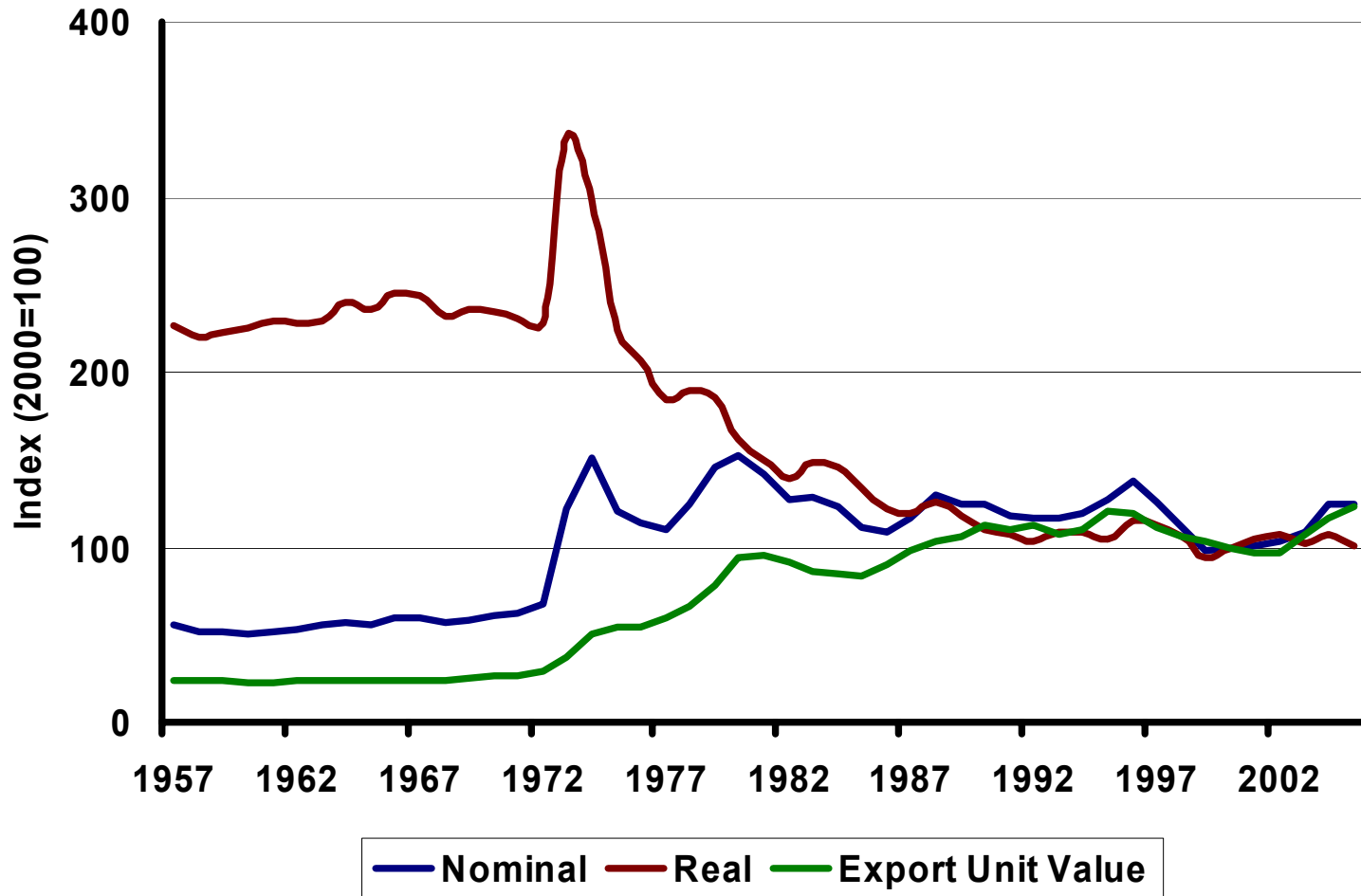
Source: FAOSTAT 2005

Food Security: A Global Production Problem ?



Source: FAOSTAT 2005

Agricultural Commodity Prices

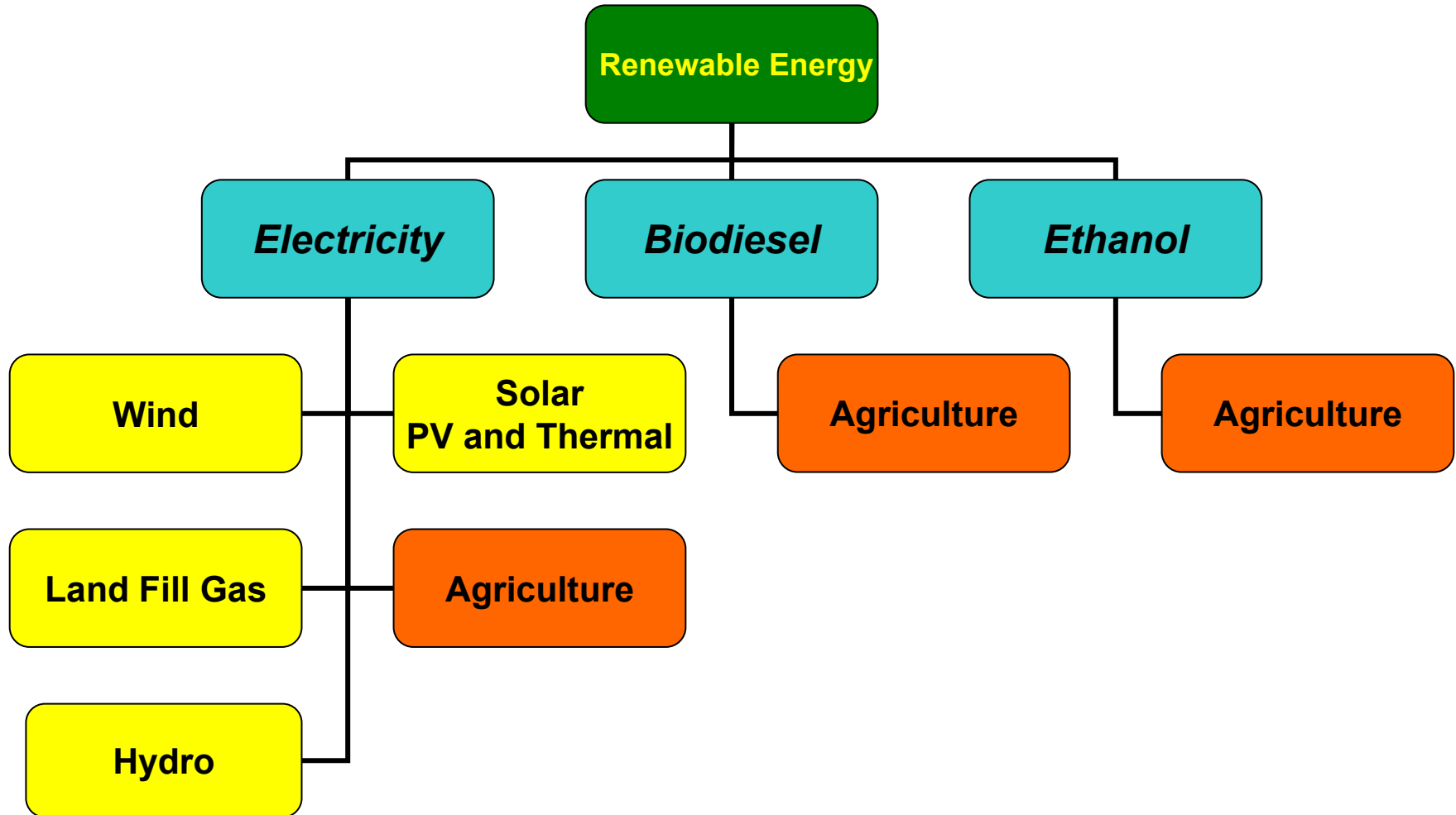


Source: IMF

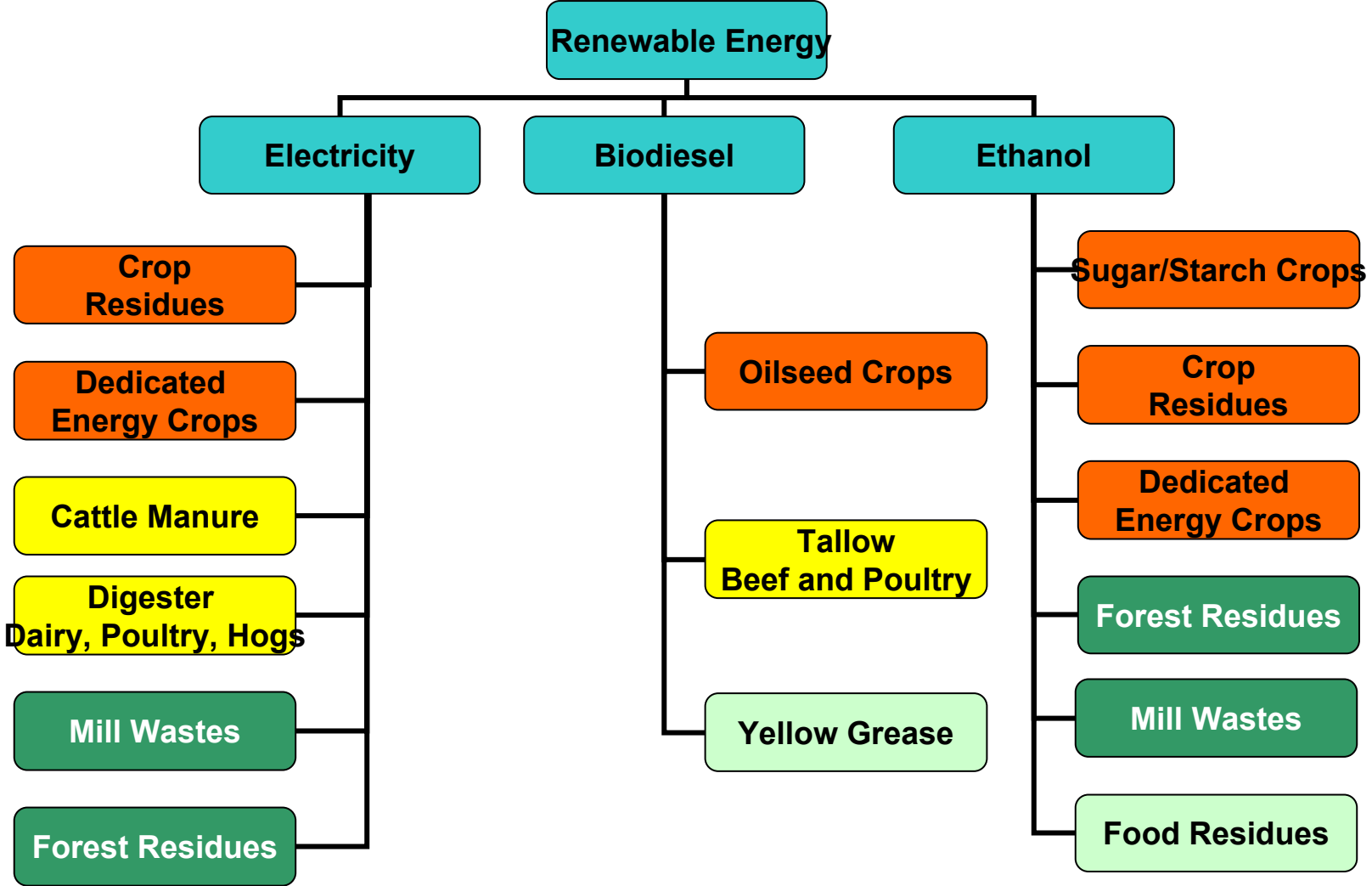
Biofuels Opportunity

- Transportation Fuels Consumption:
 - Gasoline: 21 m barrels / day (Ethanol 3%)
 - Diesel: 21 m barrels /day (Biodiesel 0.2%)
 - Equivalent of:
 - Ethanol: 30 million barrels / day
 - Biodiesel: 23 million barrels / day
 - Hypothetically:
 - Ethanol: 300m ha of sugar or 590m of corn
 - Biodiesel: 225m ha of palm
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Agricultural Feedstocks the base for many energy services



Feedstock Diversity: An Opportunity for Agriculture and a Technological Challenge

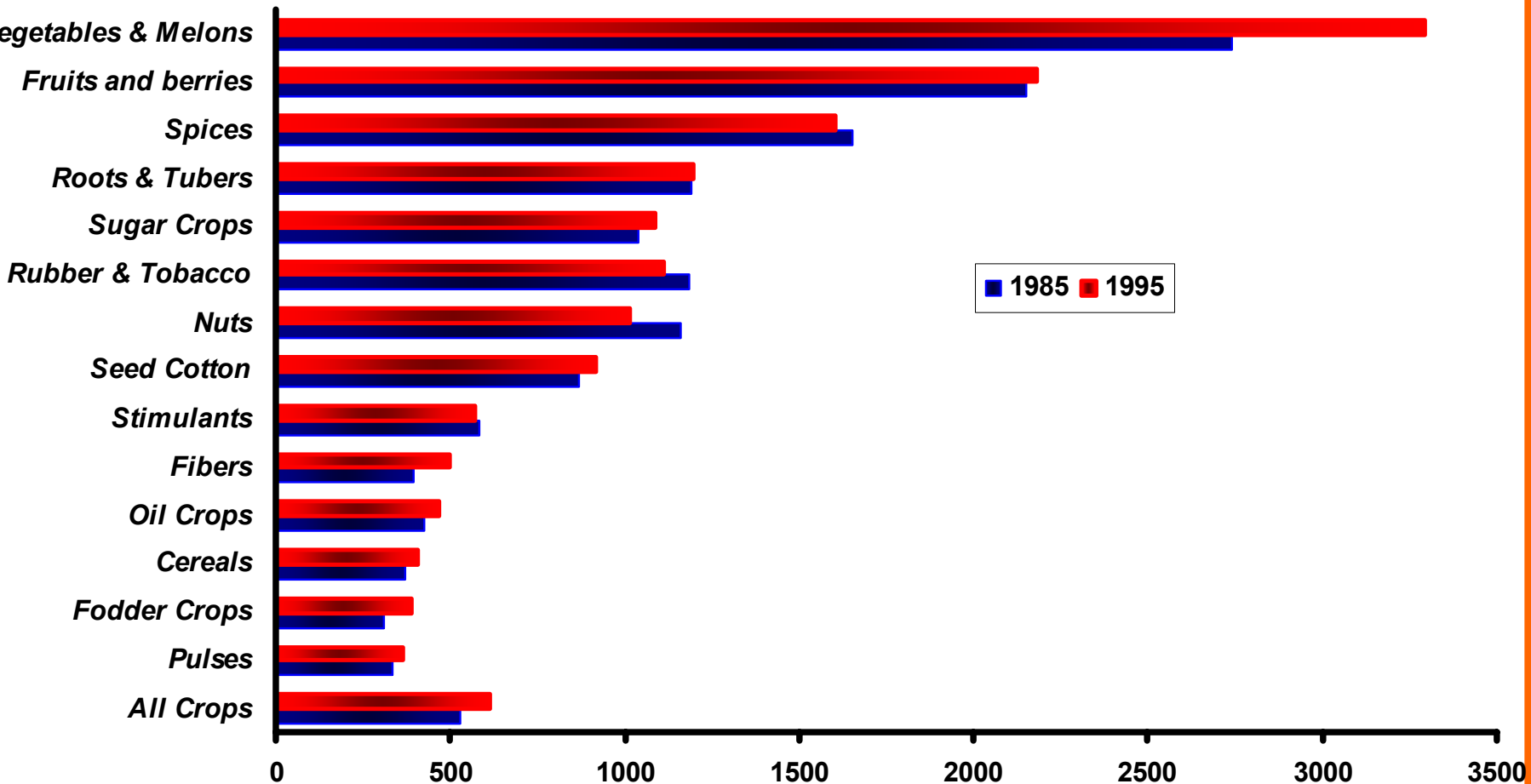


Changes in Arable Land

| | Increase of arable land 1961-2003 | Arable land that could be brought back | Potential arable land that could be added |
|-----------------------|-----------------------------------|--|---|
| United States | | 14,000,000 | |
| European Union | | 6,000,000 | |
| Canada | 4,800,000 | | |
| Australia | 2,600,000 | | |
| Brazil | 37,000,000 | | 100,000,000 |
| Argentina | 6,400,000 | | |
| China | 39,000,000 | | |
| India | 5,900,000 | | |
| Former URSS | | 33,000,000 | |
| Others | 31,873,000 | | |
| Total increase | 127,573,000 | 53,000,000 | |

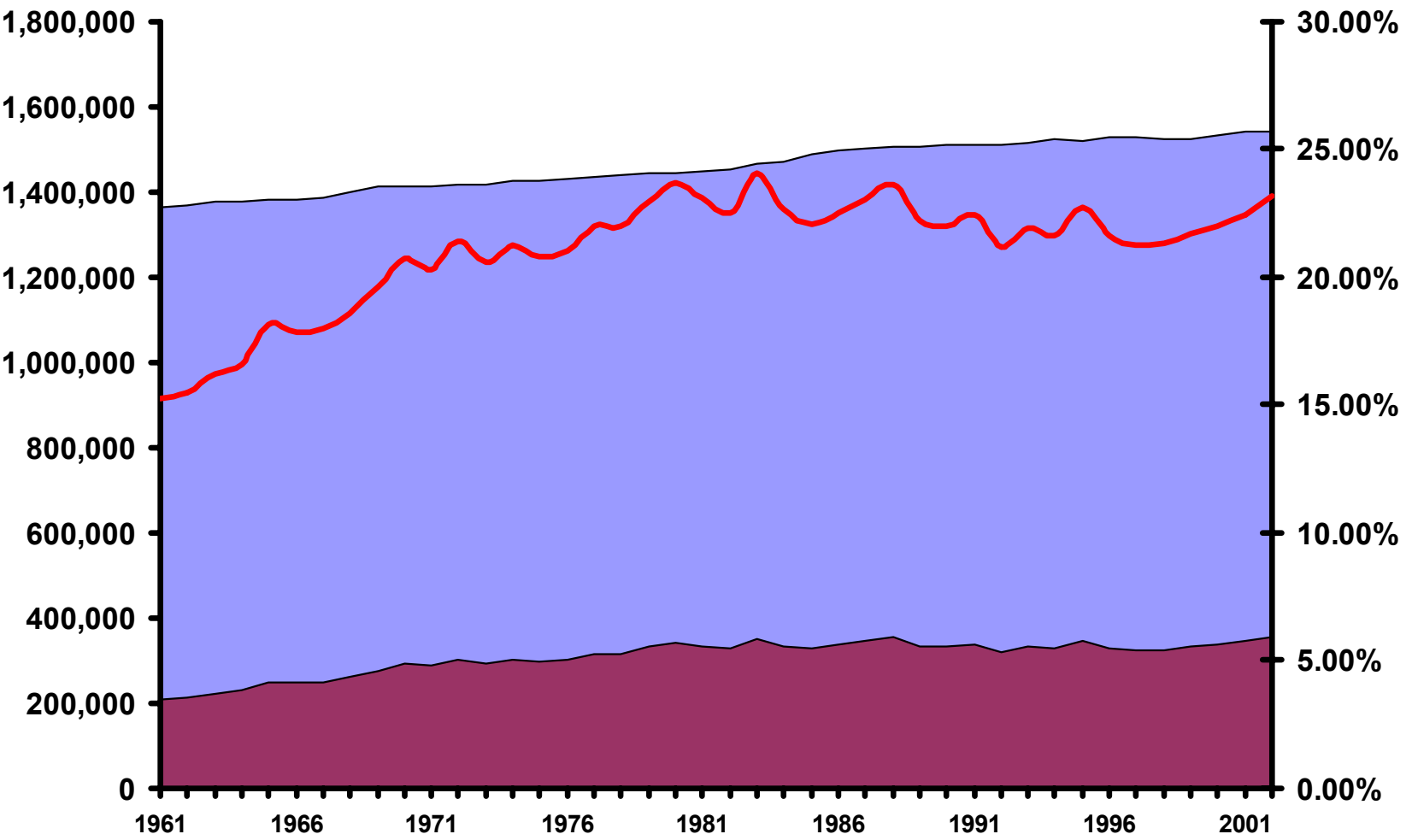
Land Use Competition for Biofuels

Yield Per Hectare of World Crops – Int \$ / HA



Source: FAO

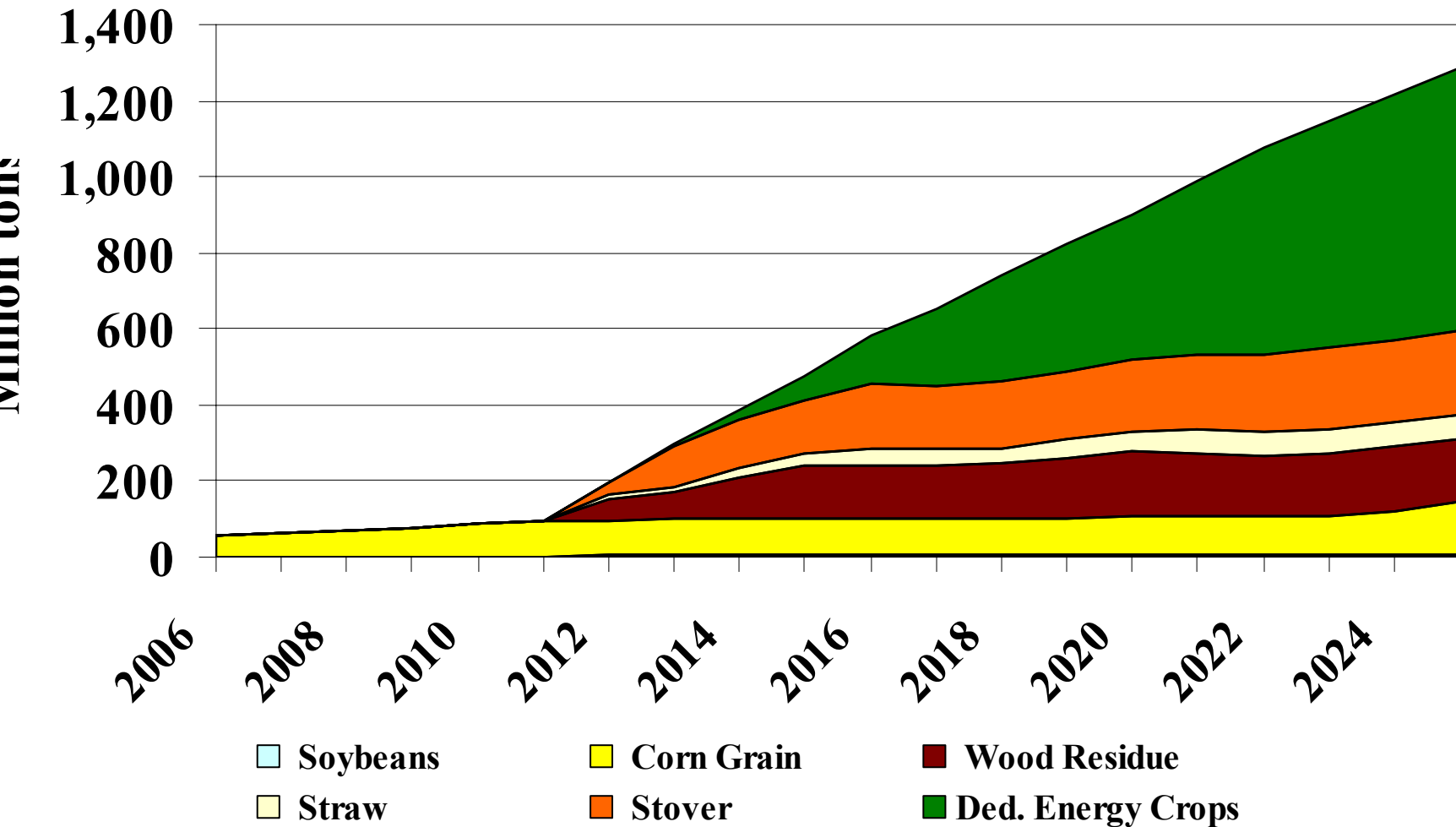
World Land Use for Animal Feed crops



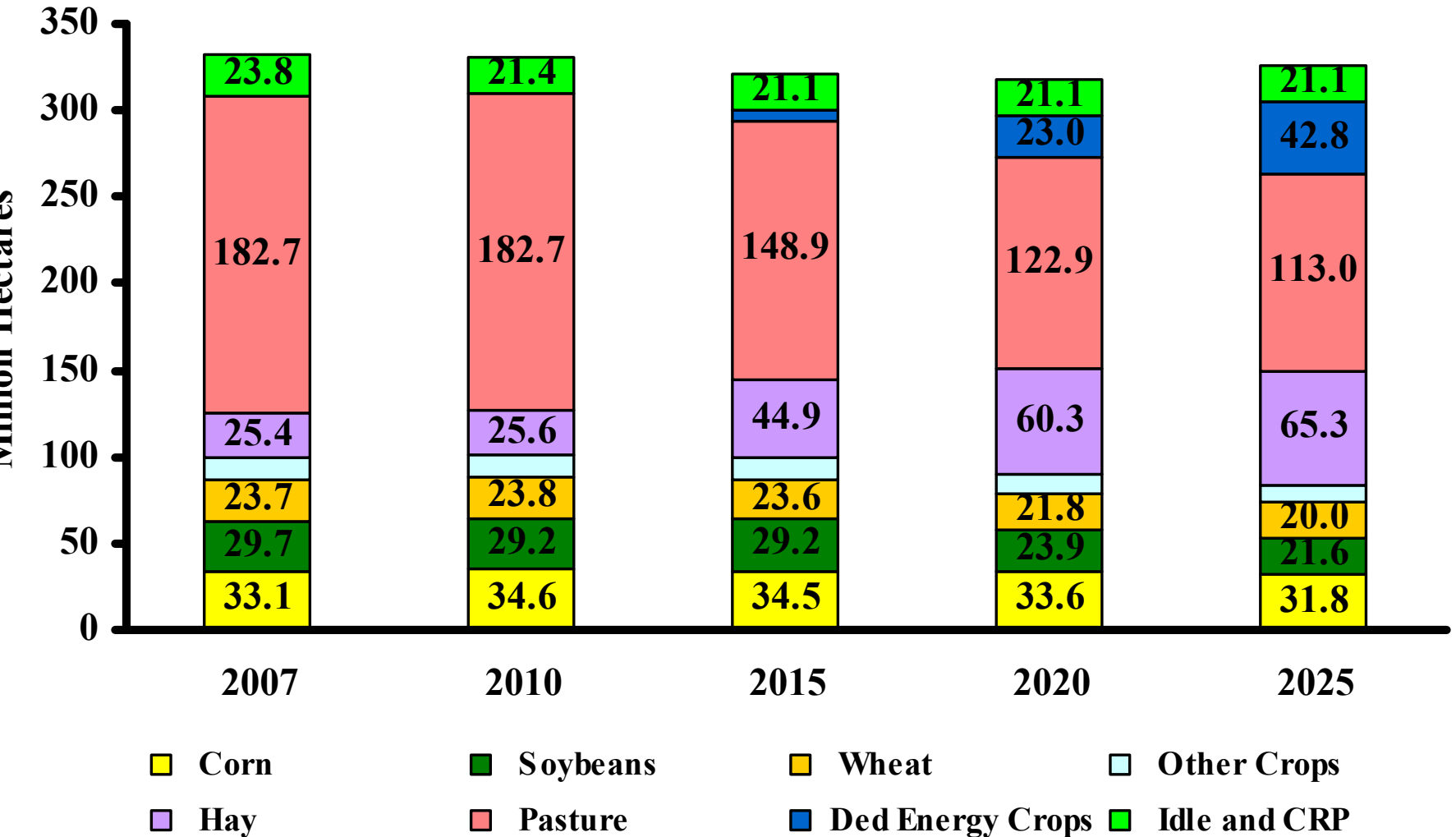
Legend: Total Cropland (blue area), Cropland For Feed (maroon area), % (red line)

Source: FAOSTAT 2005

Potential Use of Ag Feedstock to Achieve 25x25' in the USA



Changes in Land Use: 25x'25 USA



Price Impacts of 25x'25 in the US

| Crop and Scenario | Projected for the Year: | | | | |
|--------------------------------|-------------------------|---------------|---------------|---------------|---------------|
| | 2007 | 2010 | 2015 | 2020 | 2025 |
| | \$/MT | | | | |
| Corn: | | | | | |
| Bioenergy Goals | 77.3 | 100.2 | 95.1 | 96.9 | 115.1 |
| <i>Baseline</i> | <i>79.9</i> | <i>94.4</i> | <i>94.4</i> | <i>91.1</i> | <i>89.3</i> |
| Wheat: | | | | | |
| Bioenergy Goals | 115.6 | 118.3 | 125.4 | 144.7 | 148.9 |
| <i>Baseline</i> | <i>117.1</i> | <i>122.8</i> | <i>134.1</i> | <i>132.2</i> | <i>130.7</i> |
| Soybeans: | | | | | |
| Bioenergy Goals | 206.1 | 233.9 | 248.6 | 257.3 | 271.6 |
| <i>Baseline</i> | <i>203.4</i> | <i>224.1</i> | <i>229.8</i> | <i>220.4</i> | <i>214.3</i> |
| Cotton | | | | | |
| Bioenergy Goals | 1143.4 | 1143.4 | 1390.0 | 1412.5 | 1412.5 |
| <i>Baseline</i> | <i>1143.4</i> | <i>1143.4</i> | <i>1277.9</i> | <i>1277.9</i> | <i>1300.4</i> |
| Energy Dedicated Crops: | \$/dry ton | | | | |
| Bioenergy Goals | 0.0 | 0.0 | 46.85 | 60.90 | 81.85 |
| <i>Baseline</i> | <i>0</i> | <i>0</i> | <i>0</i> | <i>0</i> | <i>0</i> |

Impacts of Increase Commodity Prices in Food Security of Developing Countries

- Increase competitiveness of local production & traditional food crops.
 - Increase Ag production capacity
 - Investment in research & technology
 - Investment in infrastructure
 - Reduce impact on consumer prices through increase investment and efficiency of local marketing system to reduce transaction costs
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Impacts in Net Food Importing Countries

- Biofuels opportunities
 - Food processing and waste as feedstock
 - Participate in regional bioenergy industry
 - Increase Ag production capacity
 - Investment in research & technology
 - Investment in infrastructure
 - Increase export opportunities
 - Investment in infrastructure
 - Grant market access
 - Potential Reduction in Price of energy
 - Increasing importance of biofuels should reduce price of oil
 - As biofuels expands prices of biofuels should also decrease
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Fostering Rural Development

- Increase value of agricultural production
 - Through higher crop prices
 - Through new agricultural activity: residues, energy dedicated crops
 - Increase non-farm economic opportunities
 - Most pre-treatment and/or conversion for biofuels would occur close to feedstock production centers
 - Investment in infrastructure
 - Provide opportunities for local ownership of conversion industry
 - Patterns of expenditure and purchasing, of local own businesses have stronger ties with rural communities
 - If incentives are necessary prioritize them to locally own operations
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Key Challenges

- Biofuels technology
 - Commercial introduction of cellulose to ethanol technology
 - Expand transportation fleet capable to take full advantage of biofuels
 - Integration of feedstock production and recovery of by-products for animal feed
 - Institutional development
 - Strengthen land property rights and enforcing mechanisms to protect small holders
 - Develop and enforce sustainable criteria for production and conversion of feedstock into biofuels
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Key Challenges

(continuation)

- Biofuels development strategy
 - Priority should be local production and utilization
 - Unrestricted trade could fuel environmental and social degradation
 - Market driven brakes
 - Price of oil would fall as bioenergy industry expands
 - As the production of biofuels expands, cost of feedstock would increase
 - Expansion of the industry, although policy driven, should be consistent with market signals and technology developments
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Concluding Remarks

- Opportunity to develop domestic energy industry
 - Opportunity for large inflow of resources to agriculture and rural areas
 - Increase in productivity is key
 - Land resources can cope with energy and food demand at reasonable prices
 - Temporary safety net for urban poor and rural landless
 - Sustainable criteria should play a key role in the development of the bioenergy sector
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Thank You !

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