Agland Investment Services, Inc.
GLOBAL AGRICULTURE, FOOD, AND RESOURCE CONSULTANTS

# Agland Investment Services

www.aglandinvest.com

# Development of a Sustainable Ethanol Program

IAMA 19th Annual Food and Agribusiness World Forum and Symposium

Budapest, Hungary, June 23, 2009

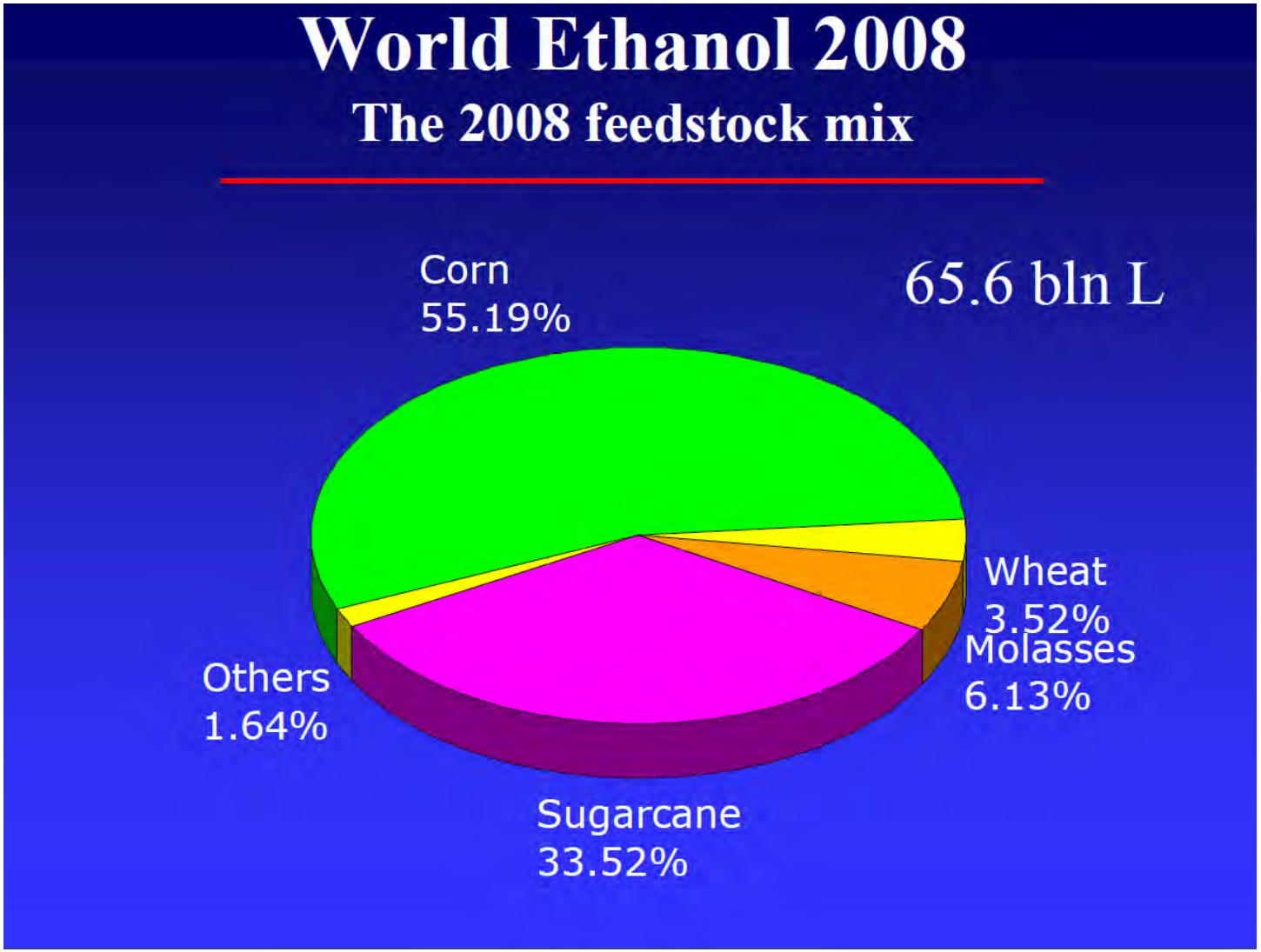
# Global Production of Ethanol - 2008

## 2008 World Fuel Ethanol Production

| Country | Liters (Millions) | Percent |
|---|---|---|
| USA | 34,065 | 51.92% |
| Brazil | 24,497 | 37.34% |
| European Union | 2,777 | 4.23% |
| China | 1,900 | 2.90% |
| Canada | 900 | 1.37% |
| Other | 486 | 0.74% |
| Thailand | 340 | 0.52% |
| Colombia | 300 | 0.46% |
| India | 250 | 0.38% |
| Australia | 100 | 0.15% |
| Total | 65,614 | 100.00% |

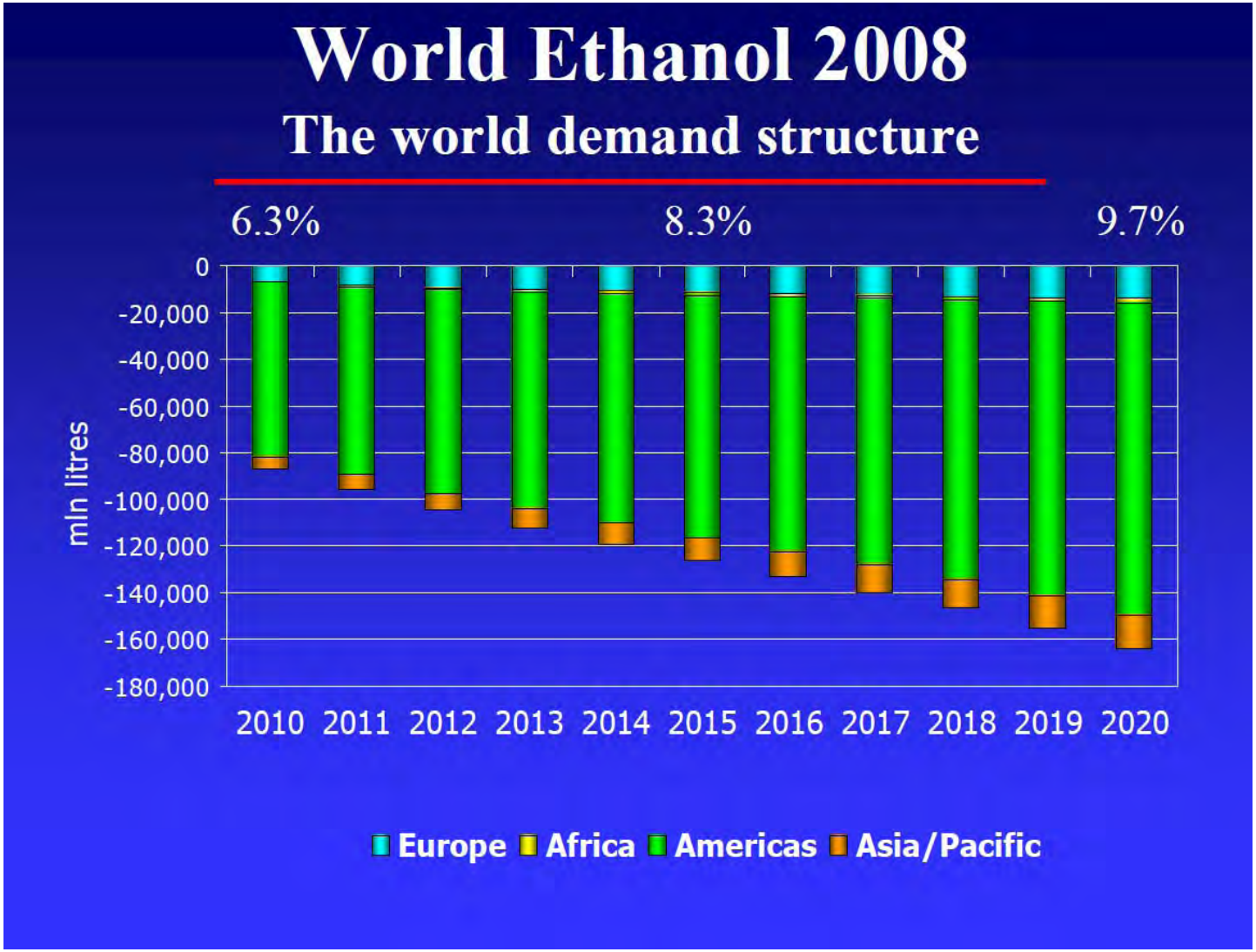
Source: F.O. Licht's World Ethanol Conference 2008

# Ethanol - 2008 Feedstock Mix



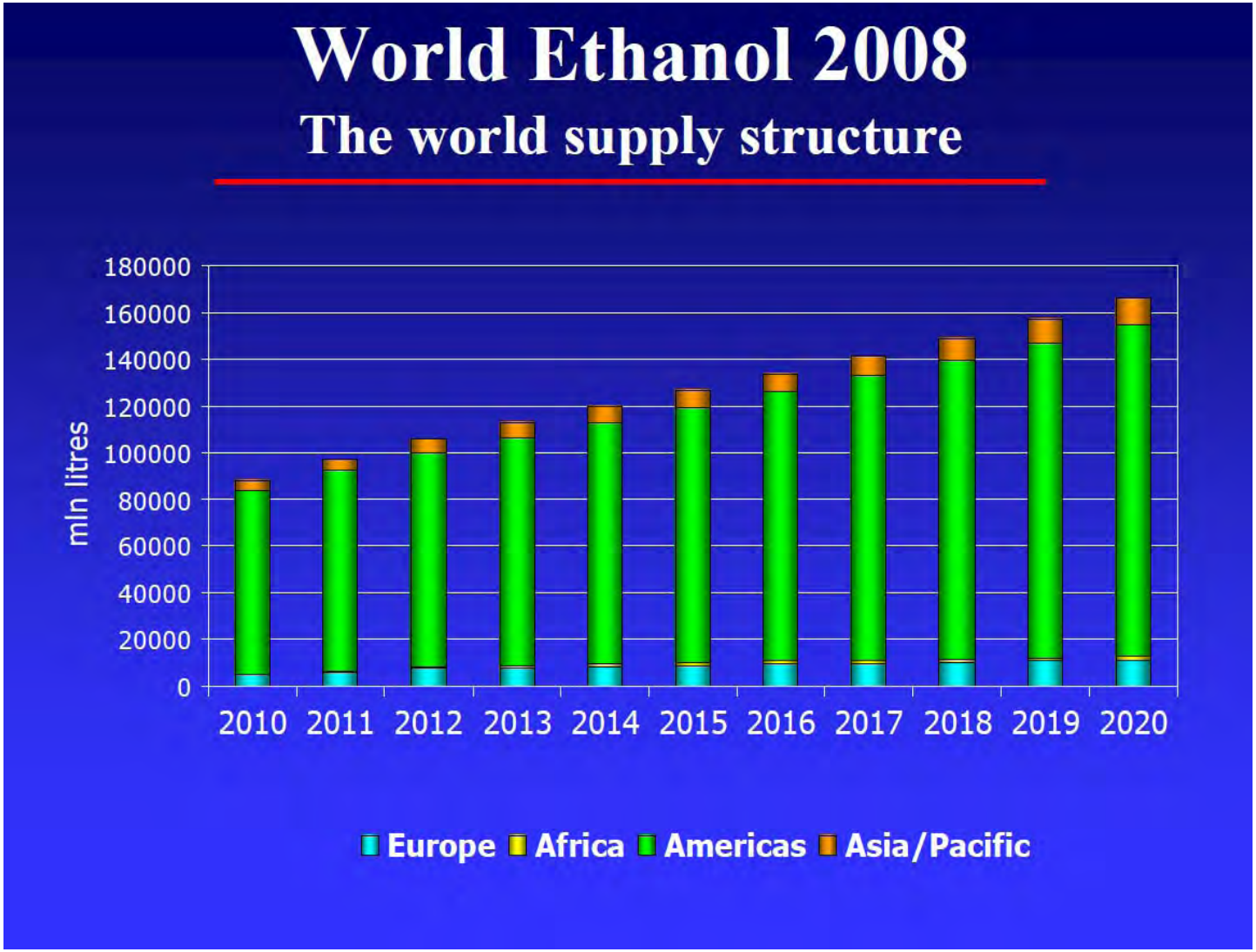

Source: F.O. Licht's World Ethanol Conference 2008

# World Ethanol Demand Structure - 2008




Source: F.O. Licht's World Ethanol Conference 2008

# World Ethanol Supply Structure - 2008

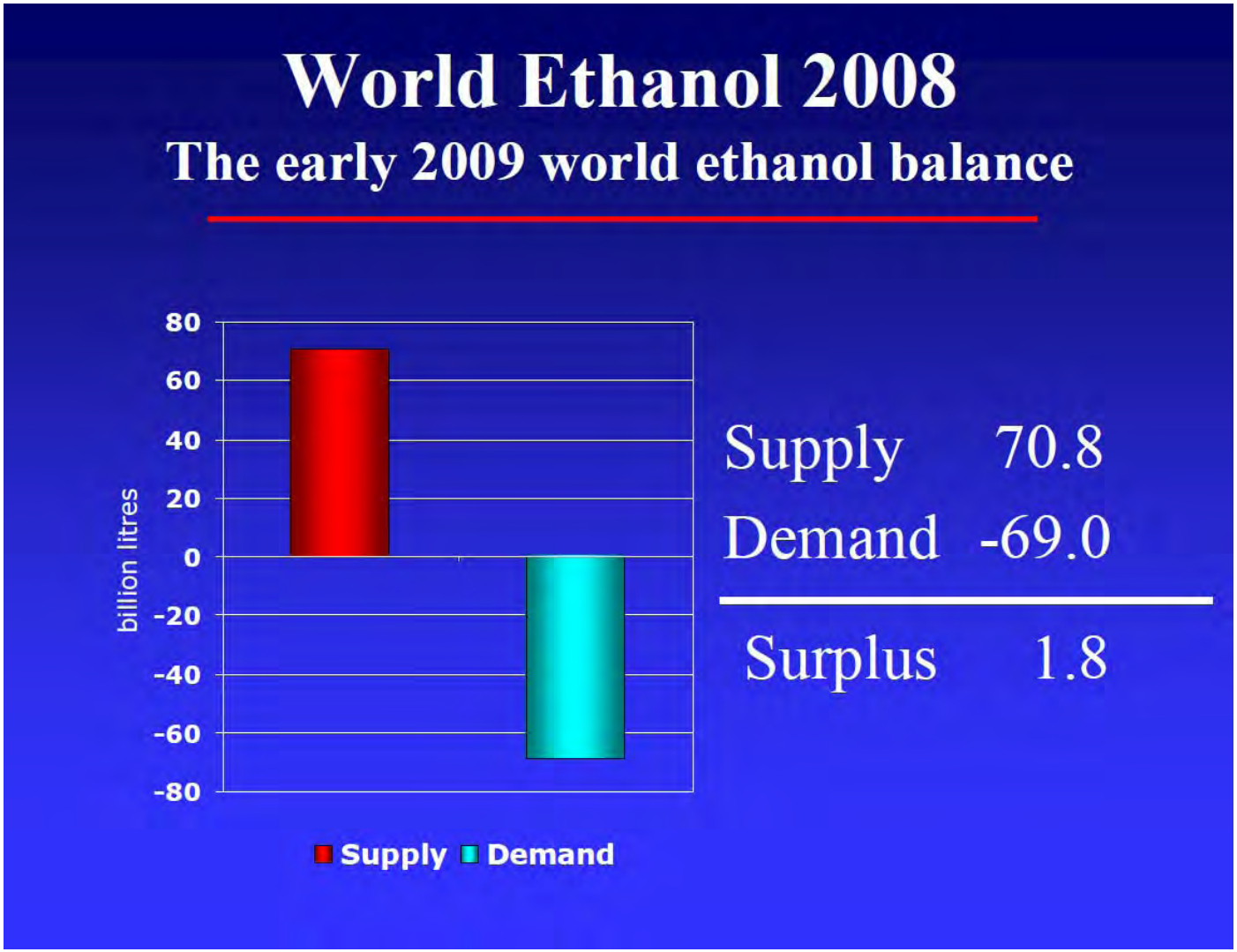



Source: F.O. Licht's World Ethanol Conference 2008

# Ethanol-Global Surplus/Deficit Projections


Source: F.O. Licht's World Ethanol Conference 2008

# Early 2009 World Ethanol Balance




Source: F.O. Licht's World Ethanol Conference 2008

# Need for Low Cost, Sustainable Production

- Low cost producers that can produce biofuels in a sustainable, environmentally sensitive manner will be at a distinct advantage
  - Market conditions show that suppliers will respond to increased demand for ethanol.
  - New second generation biofuels will begin to come into the market place, as well as new modes of transport.
  - New regulations, such the Low Carbon Fuel Standard (LCFS) passed by the California Air Resources Board (CARB), will strongly encourage biofuels produced with Greenhouse Gas Emissions reduction and minimal indirect land–use effects.

# Low Carbon Fuel Standards of CARB

- LCFS- performance standard base on total amount of carbon emitted per unit of fuel energy.
- The standard includes all carbon emitted in production, transportation, and use of the fuel
- California's LCFS calls for at least a 10% reduction in emission per unit of energy by 2020.
- One of most controversial and challenging issue is the inclusion of indirect land-use changes in the calculations for the LCFS

Source: Daniel Sperling and Sonia Yeh, Low Carbon Fuel Standards, Issues in Science and Technology, Winter, 2009

# Indirect Land Uses Changes

- When biofuel production increases, land is diverted from agriculture to energy production.
- Displaced agricultural production is replaced elsewhere, bringing new land into intensive agricultural production
- This newly farmed land was used for less-intensive purposes. If biofuel production does not result in land-use changes (if biofuel is made of crop residues), then indirect land use effects are small.
- If rainforests are destroyed or vegetation burned, carbon releases are huge.

# Summary of LCFS Methodology

- A Detailed Life-Cycle Analysis and Model will be prepared for each energy source and assigned a carbon intensity value, which include points for estimated indirect land use effects.

- Producers who do not agree with the CARB estimate can challenge the model and provide evidence to the contrary.

- The carbon intensity value becomes important in the marketplace because the companies that are blending fuels and being held collectively to a standard of a 10 percent reduction in greenhouse gas emissions will value more highly biofuels with a lower carbon intensity.

# LCFS in Practice

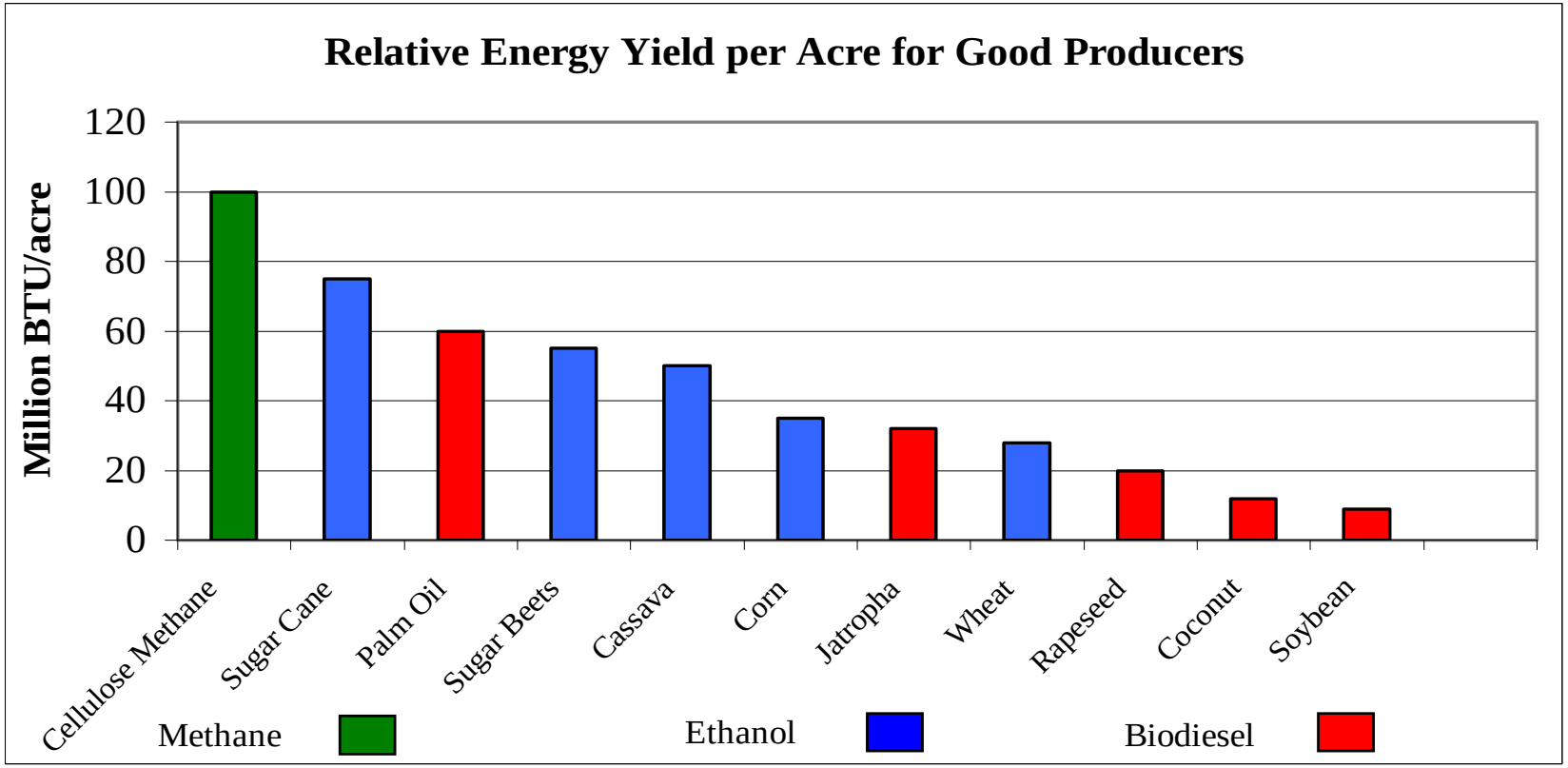
- The new California law is not without controversy. Numbers will be adjusted as more data is available.

- Indirect land use values are quite controversial
  Examples: Corn Ethanol
  Sugar Ethanol from Brazil

- More information available at:

www.arb.ca.gov/fuels/lcfs

# The future of Bioenergy should focus on the most sustainable, lowest cost fuels



# Raw material represents two-thirds of bioenergy production costs

- Tropical regions have a competitive advantage
  - More solar energy and longer growing seasons
  - Fastest growing feed stocks are tropical
  - Low cost of key production inputs: land, labor
  - Local technological and varietal expertise

# What about cellulosic biofuel?

- Cost of biofuels in the tropics today represents target for best possible cellulosic cost of production

  Of course, production in the tropics will be judged by the total costs of production, including the indirect land use costs. So, sustainable production in the tropics is important.

- Cellulosic technologies can be applied to high-growth tropical feedstocks. Low cost feedstocks will remain the key, regardless of technological innovation

- What is the real cost of production cellulosic biofuel?

- What is the price of energy security?

Agland Investment Services, Inc.
GLOBAL AGRICULTURE, FOOD, AND RESOURCE CONSULTANTS

# Agland Investment Services

www.aglandinvest.com

# Development of a Sustainable Ethanol Program

IAMA 19th Annual Food and Agribusiness World Forum and Symposium

Budapest, Hungary, June 23, 2009