Agriculture: Tendencies & Deficiencies

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Hayatt Cancún Caribe, Blvd. Kukulcán, Km. 10.5, Quintana Roo, cp. 77500, México
“Science is like a blabbermouth who ruins a movie by telling you how it ends. There are some things we don’t want to know. Important things.” **Ned Flanders**
Summary of Conclusions

The main staples I have looked at are wheat, rice, barley, potatoes, and rye.

- The world’s production of these staples is not keeping up with population growth
- Their production is stagnant or declining, and crop areas are declining
- Per capita production (kg per person) and per capita yield (kg per person per ha) are declining

We are witnessing a global failure of modern food supply and hyperinflation of food prices
Summary of Conclusions, cntd.

The main energy crops I have looked at are maize, sugarcane, soybeans, and oil palms

- The world’s production of these crops is rapidly expanding
- Their crop areas are increasing (exponentially for soybeans and oil palms)
- Per capita production is increasing, but per capita yields are declining

We are witnessing a global move away from food to energy crops. Diverting more land to pure energy crops, switchgrass, etc., will only deepen the crisis.
Field Development Patterns

Each ASTER sub-image covers an area of 10.5 x 12 km.
Courtesy of NASA/GSFC/METI/ERSDAC/JAROS and U.S./Japan ASTER Science Team
Food Crops Are in Decline...

Brief Explanation
Areas of World Grains...

Yields of World Grains...
Per Capita Production...

Per Capita Production - Trends...

5 mg of Salt = 30 grains

Sophie Patzek, Memorial Hospital Lab, SF, CA
This is 1/2 Hectare

Garden of the French Laundry Restaurant in Yountville, Napa Valley, CA, 3/22/08
Per Capita Yields...

Per Capita Yields - Trends...

Agribusiness Invades the Tropics...
World Energy Crops...

Areas of Energy Crops...

Forest Fire, Central Borneo

Red is forest. Sources: www.pandhitopanji-f.org/.../imagegallery.htm, ESA
More Borneo Forest Fires
Amazon Deforestation: Result

Source: Greenpeace: New soybean fields
Yields of Energy Crops…

Crop yields, t dmb/ha-yr

Per Capita Production...

Per Capita Production - Trends...

Per Capita Yields...

Per Capita Yields - Trends...

Failure of Green Revolution...
Failure of Industrial Monocultures

Sustainability

100%

Optimum

100%

Maize agriculture

Resilience

(Diversity + Redundant interconnections)

Efficiency

(Streamlined)

Sources: Dr. Robert Ulanowicz, private communication, April 8, 2008
The overall efficiency of all cereal grain crops in the world has been almost constant, declining from 25.6 kg of cereal grain per kg of N at 4% per annum since 1985. Source: Figure 9b in Source: Cassman et al. *Cereal Yields and Natural Resources*, ARER, 2003
Efficiency of US Corn Agriculture

The Law of Diminishing Return

Breeding New Hybrids...

Adapted from Cassman et al. *Cereal Yields and Natural Resources*, ARER, 2003
Breeding New Soybean Hybrids...
Global Food Price Hyperinflation...
World Food Price Index...
Food Indices...

Sources: FAO and DOE EIA. Accessed Dec. 6, 2008
Conclusions

- There has been a systemic breakdown of democracy, science, and common sense in dealing with global food supply and energy production.

- Extreme hardship to an ever larger number of poor people and destruction of the lungs and kidneys of the planet have been the result.

- World agriculture is following the exact path of western agriculture, but without commensurate power to purchase field chemicals.

- We have managed to transform grain and plant oil into energy commodities directly linked to the price of crude oil.