

Farming, Finance and the Global Marketplace

Federal Reserve of Kansas City
Regional Economic Symposium



Forces Shaping the Agricultural Marketplace of the Future

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June 8-9, 2010



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Overview of Presentation



Focus: Influence of market fundamentals and policy on 21st century profitability

Review of primary **demand** drivers

- Influence on the characteristics of the market and the food system

Review of global **supply** system

- Current condition, expected changes, growing constraints

Review of **policy** drivers

- Threats to prosperity

Summary observations

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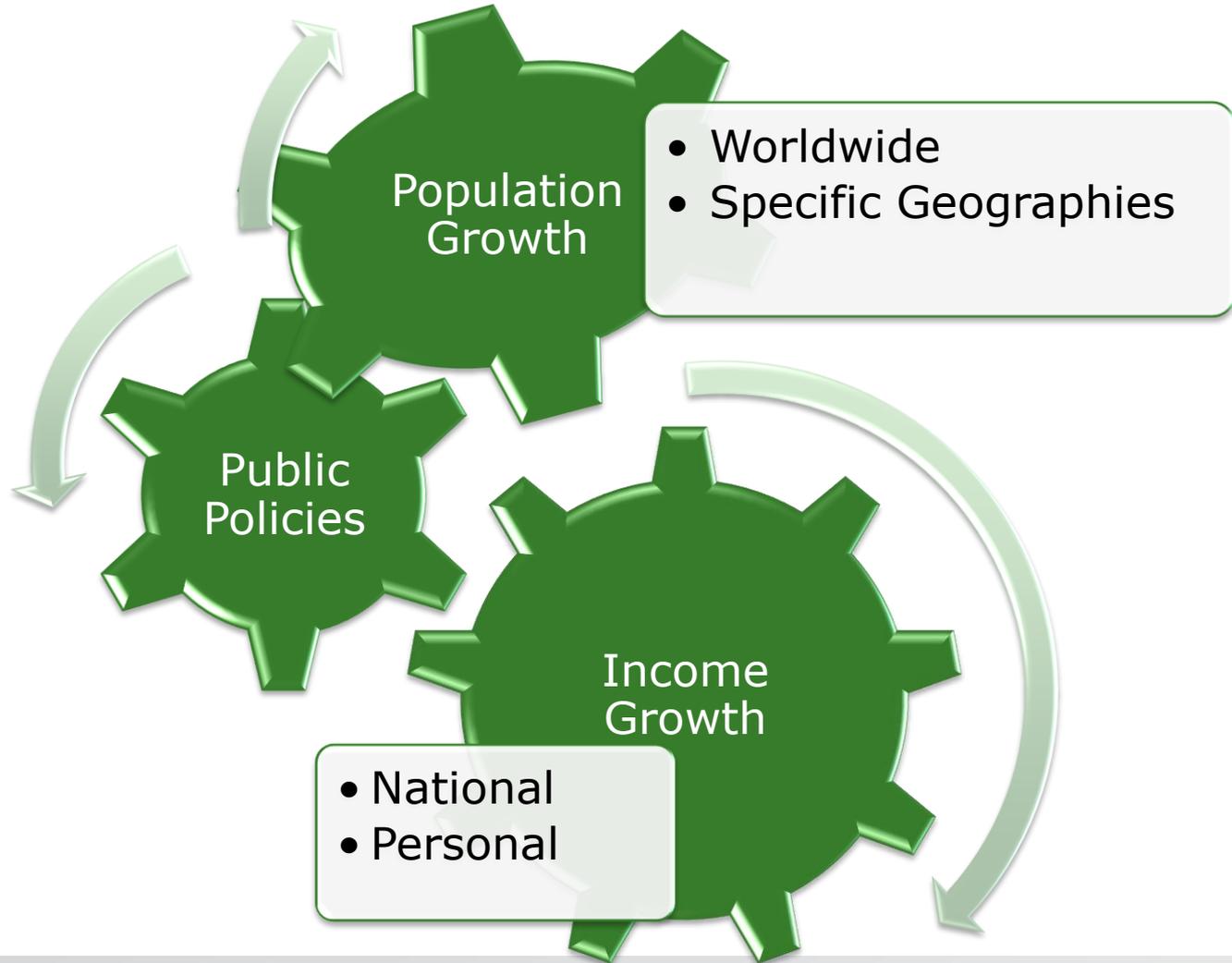
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Review of **policy** drivers

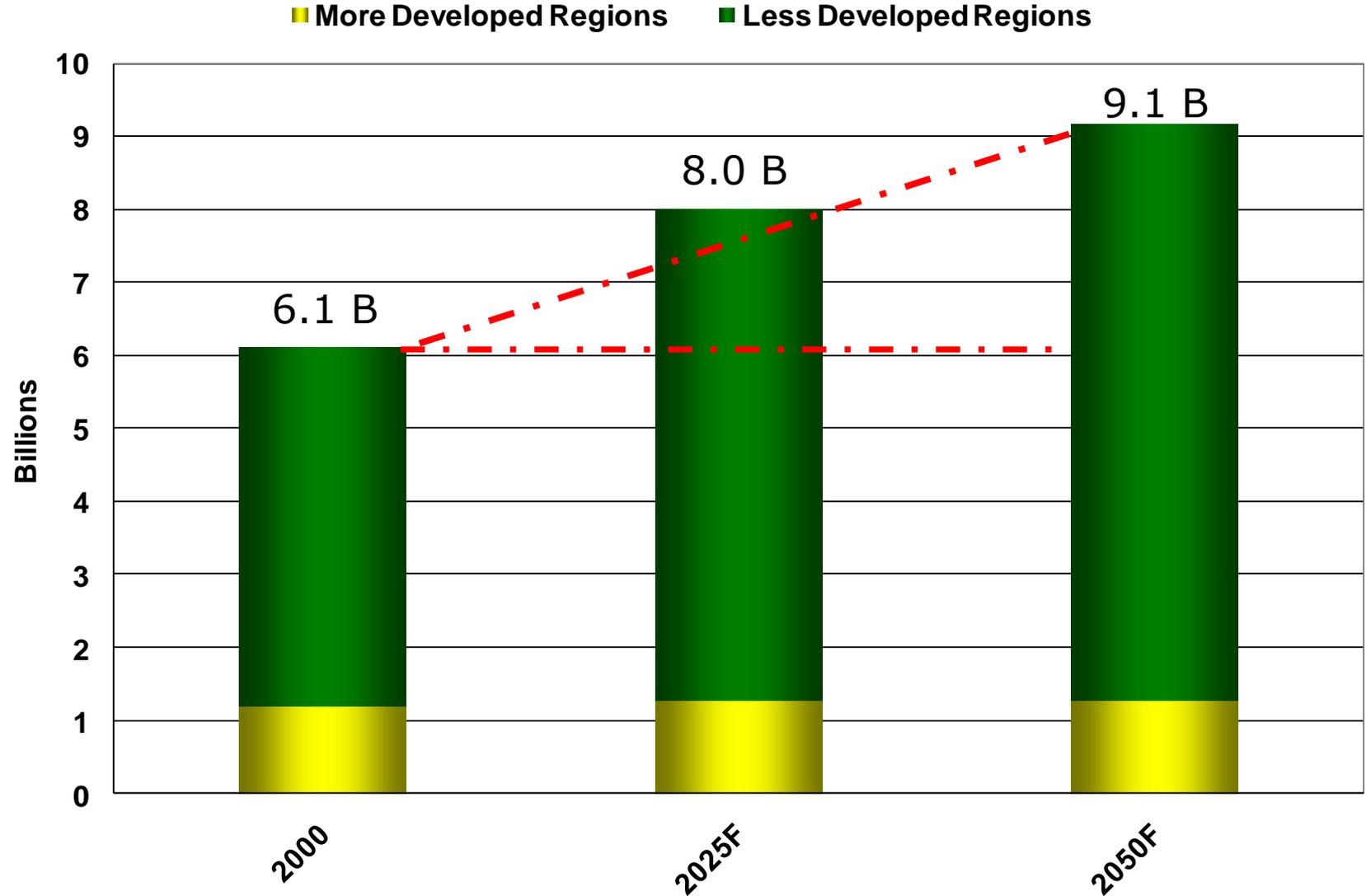
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Basic Business Drivers



Global Population Growth

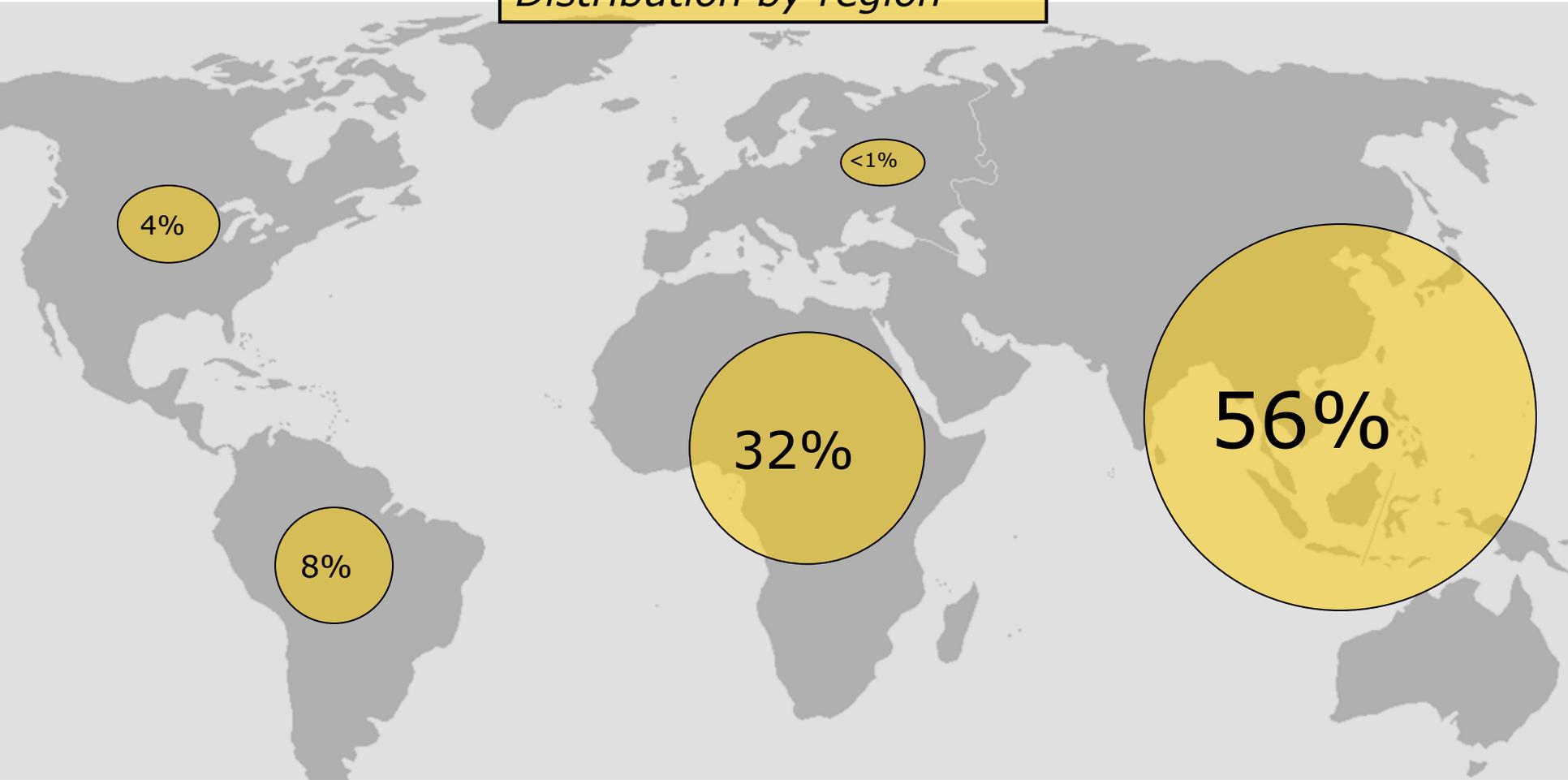


Source: United Nations, World Population Prospects 2008 Revision

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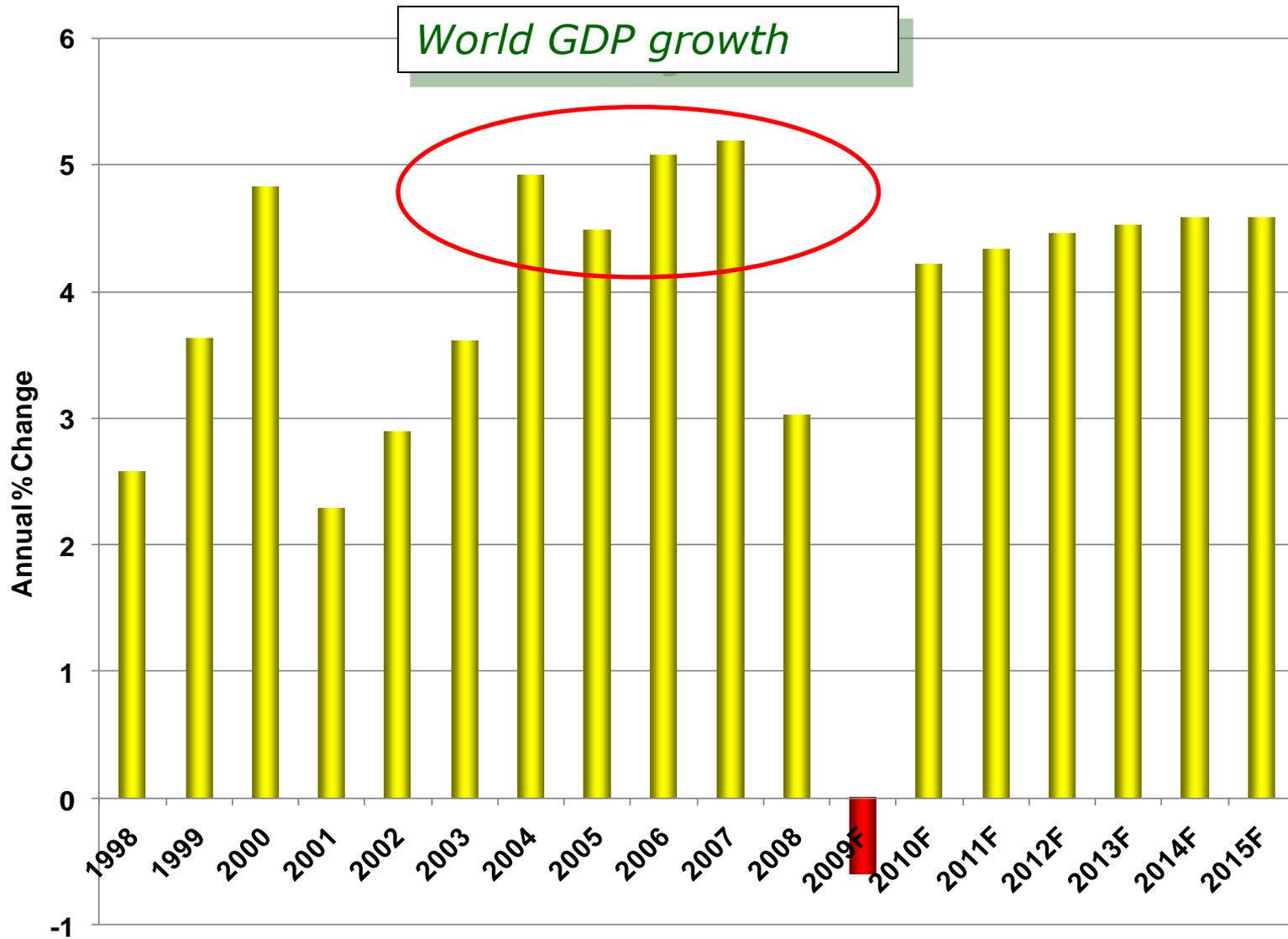
Population Growth by 2025

Distribution by region



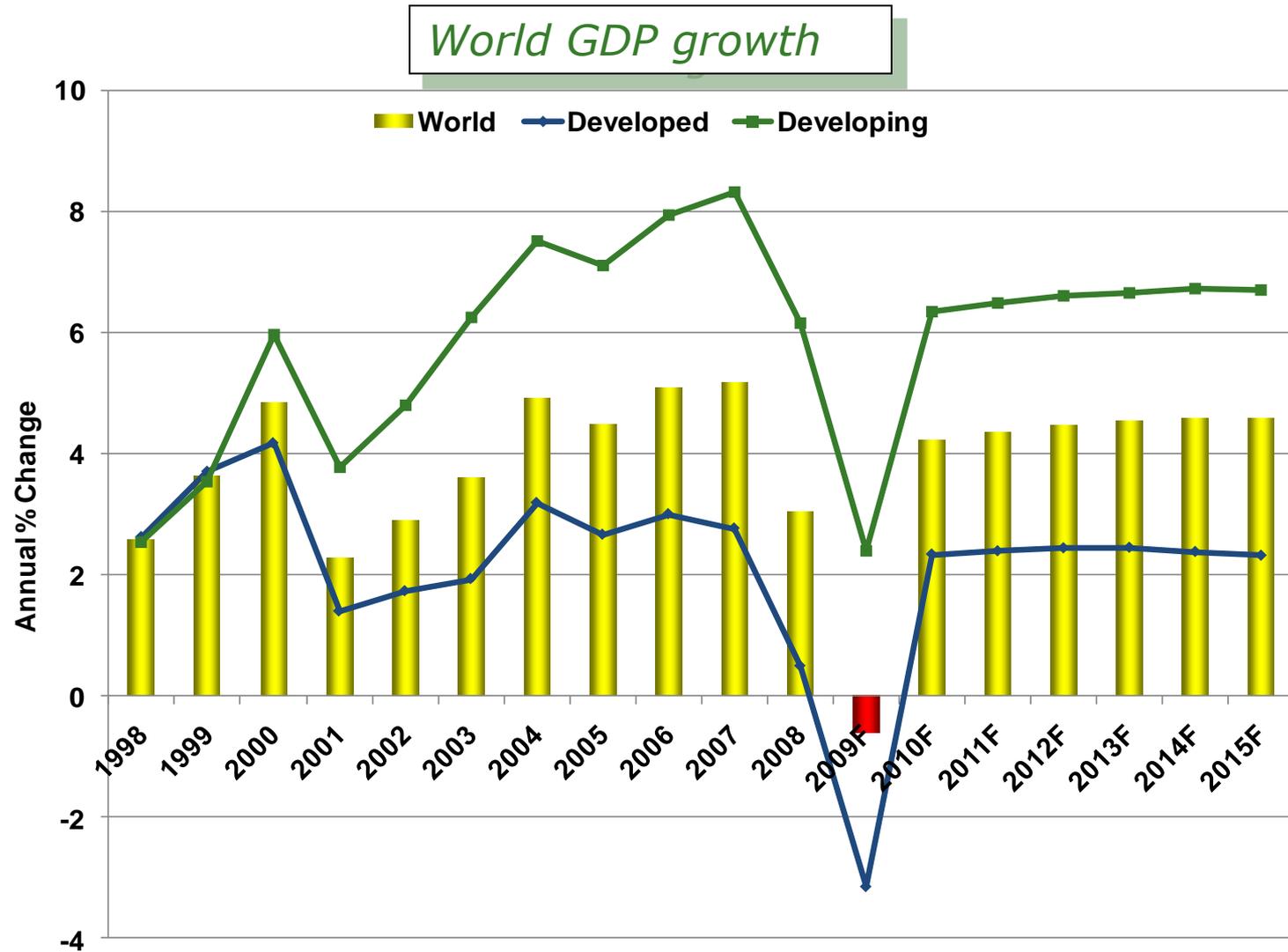
Source: United Nations, World Population Prospects 2008 Revision

Global Macro Economy



Source: International Monetary Fund (IMF), World Economic Report, April 2010

Global Macro Economy



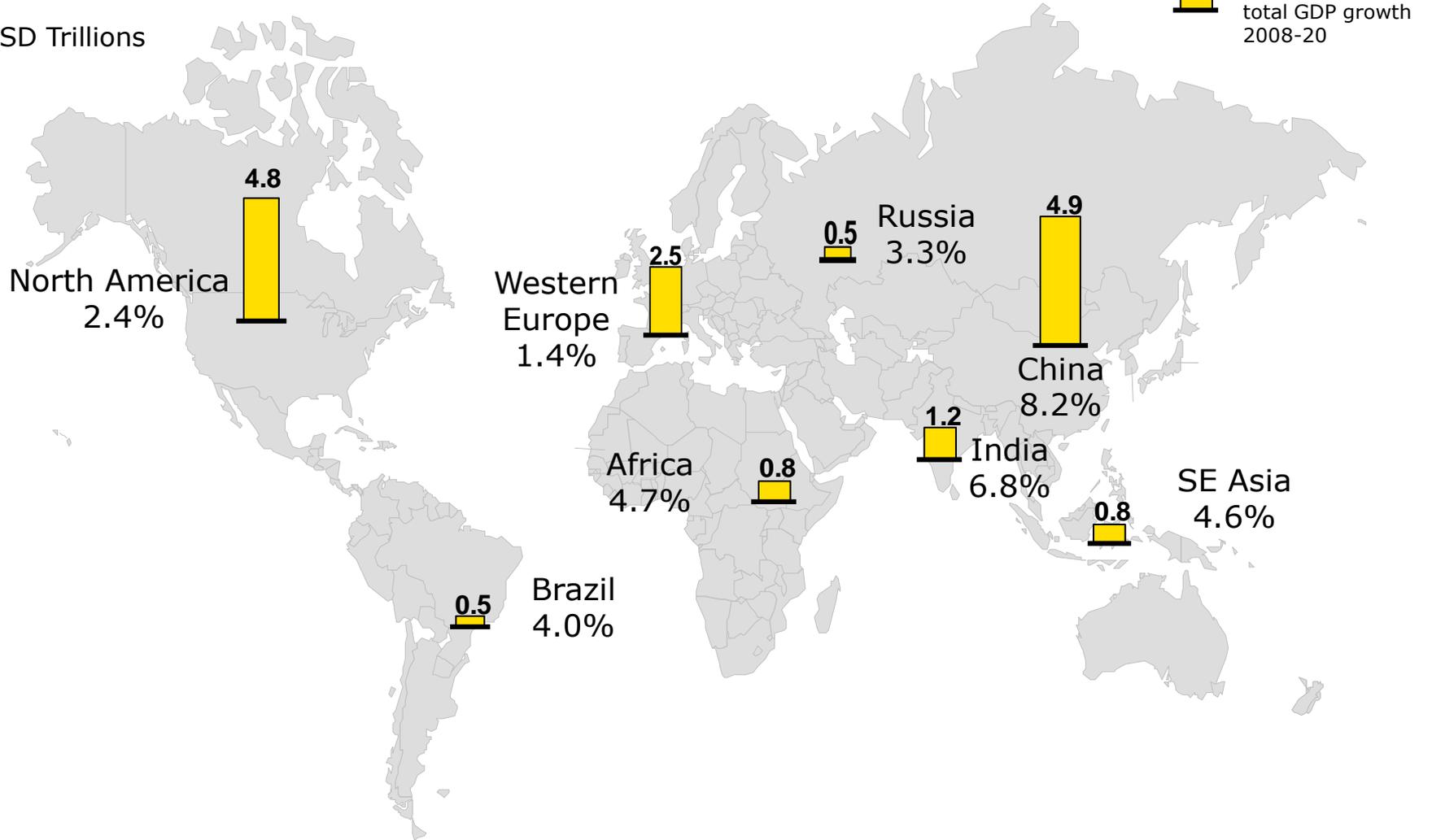
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Growth by Region¹

2008 to 2020

USD Trillions



% GDP CAGR
Absolute value of total GDP growth 2008-2020

¹ Based on real GDP growth rates (expenditure method)

Dynamics of Food Demand



Source: World Bank, 2008

Implications

End of the “third world.” “Emerging market’ label now more apt.

Perhaps 50% more agricultural output required by 2030 – approach doubling by 2050.

7+ billion tons output in 2005 – 3 to 4 billion more in 20 years – huge investment required.

Increasing urbanization – tipping point in 2007 – 70% by 2050.

Food production/consumption areas – increasingly disparate – suggests trade increasingly important.

Market Characteristics Changing Rapidly

Developing Countries

- Focus on sufficient calories, improved diets, more animal protein – basic food safety, refrigeration, reduced spoilage, infrastructure

Developed Countries

- Markets experiencing pressures – changing diets: new guidelines, school food regs, FDA rules (salt), bans, “sin taxes,” obesity, home gardens, “eat smart,” “local foods”

Requiring adaptation across food system – by farmers, processors and sellers.

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The Supply Side

Today

Surplus Food Producing Regions – Characterized by:

- R&D Investment
- Technological Innovation
- Infrastructure Investment
- Productivity Growth (crops & livestock)

Food Deficit Regions -

- Long-term neglect of rural/ag sectors
 - R&D, Extension, other services
 - Infrastructure (FM roads, storage, water, etc)
 - Poor policies (macro, sectoral, trade)

Result -

- Global ag production plant struggled to keep pace – 2006-2008
- Recession provided a breather

Growing Resource Constraints

Produce more with less...

Land | Water | Labor

Much of the world's total arable area already in use – the most fertile requiring least investment

Most remaining land has serious soil and terrain constraints

- Some covered in forests, in protected areas
- Characteristics difficult for agriculture – low soil fertility, high toxicity, hilly and other difficult terrain – human and animal disease, poor infrastructure
- Most located in **Africa**, **Latin America** and **Black Sea/Caspian Sea Region** (70% suffers soil and terrain constraints)

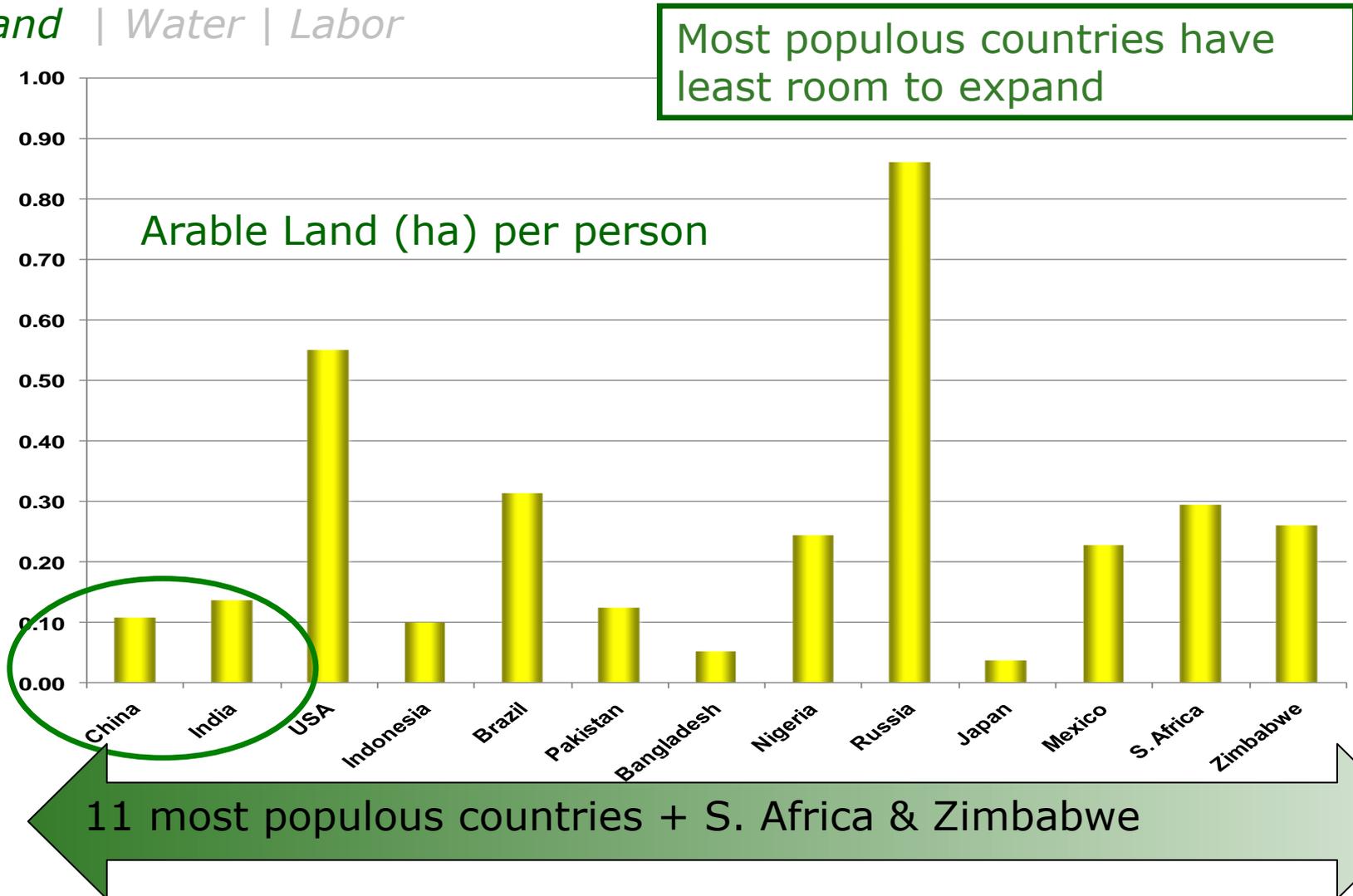
Further expansion is **controversial** – could jeopardize fragile lands

- Will require considerable capital investment

Growing Resource Constraints

Produce more with less...

Land | Water | Labor



Source: FAO/FAOSTAT 2007/2008

Growing Resource Constraints

Produce more with less...

Land | Water | Labor

70% of the world's freshwater withdrawals are used by agriculture

- 90% in India and China
- 30 developing countries already facing growing water shortages

Water and population unevenly distributed – by 2025:

- 1.8 bil. People will live in areas with absolute **water scarcity**
- 2/3rds of world population will live in '**water-stressed**' areas

Rainfed agriculture practiced on 80% of cultivated land – accounts for 60 of world's food

Irrigation can increase yields of most crops two-to-four fold

New irrigation technologies can reduce water use 30% to 60% over surface irrigation

Growing Resource Constraints

Produce more with less...

Land | Water | Labor

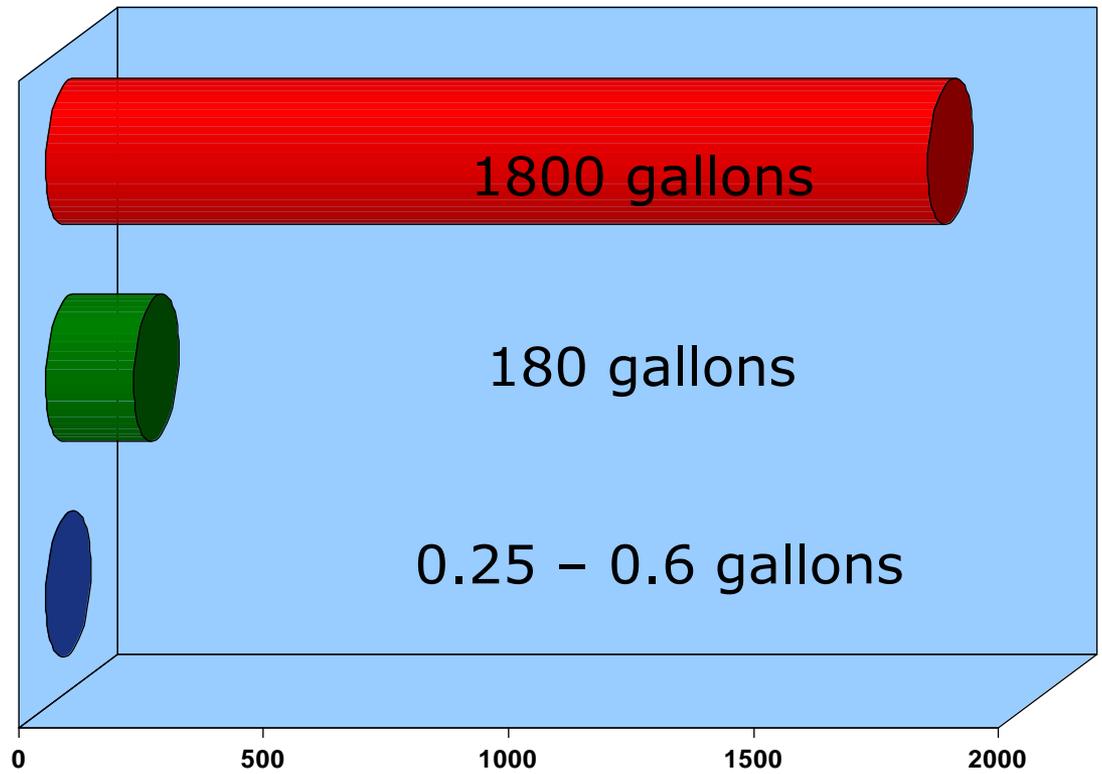
10X more water needed to raise 1 pound of beef than 1 pound of wheat

Amount of water required for:

One pound of beef

One pound of wheat

Daily drinking requirements



Growing Resource Constraints

Produce more with less...

Land | Water | Labor

Farm demographics (aging) and migration to cities importantly influence agricultural labor availability

- 70% of population will be urban by 2050

High-tech machines, complex production processes and strict production regulations require skilled labor

Tighter restraint on immigration encourages mechanization, innovation – affects capital requirements

The Backdrop of Climate Change

Effects on the food supply

- Drier parts of the world get drier, wetter parts get wetter
- Sea level rises (0.3 to 2.8 feet) by 2100, more cyclones, more frequent hot days
- Tropical food crop yields decline – temperate crop yields rise at first, then decline
- Pests increase, reducing output, raising costs

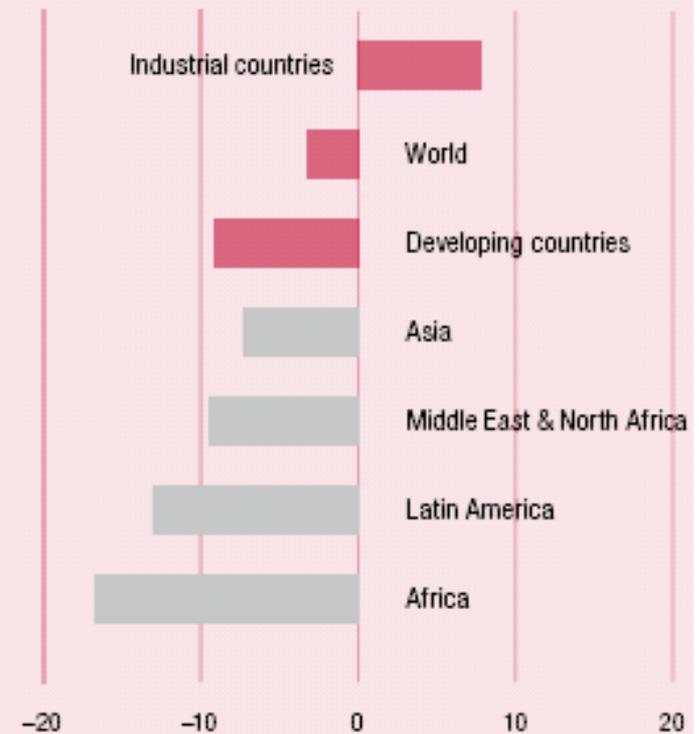
Equity Issues

- Disproportionate effect on agricultural productivity in lower latitudes – where most of the world's poor live

Figure 6

Climate change will hurt developing country agriculture

Change in agricultural output potential (2080s as % of 2000 potential)



Source: Cline 2007.

The Supply Side

Implications

Huge Challenge Ahead:

Produce more – feed the world better
with fewer resources – less intrusion

- 50% more by 2030 (3 to 4 B tons more)
- Reducing the environmental footprint

The Supply Side

Looking Ahead

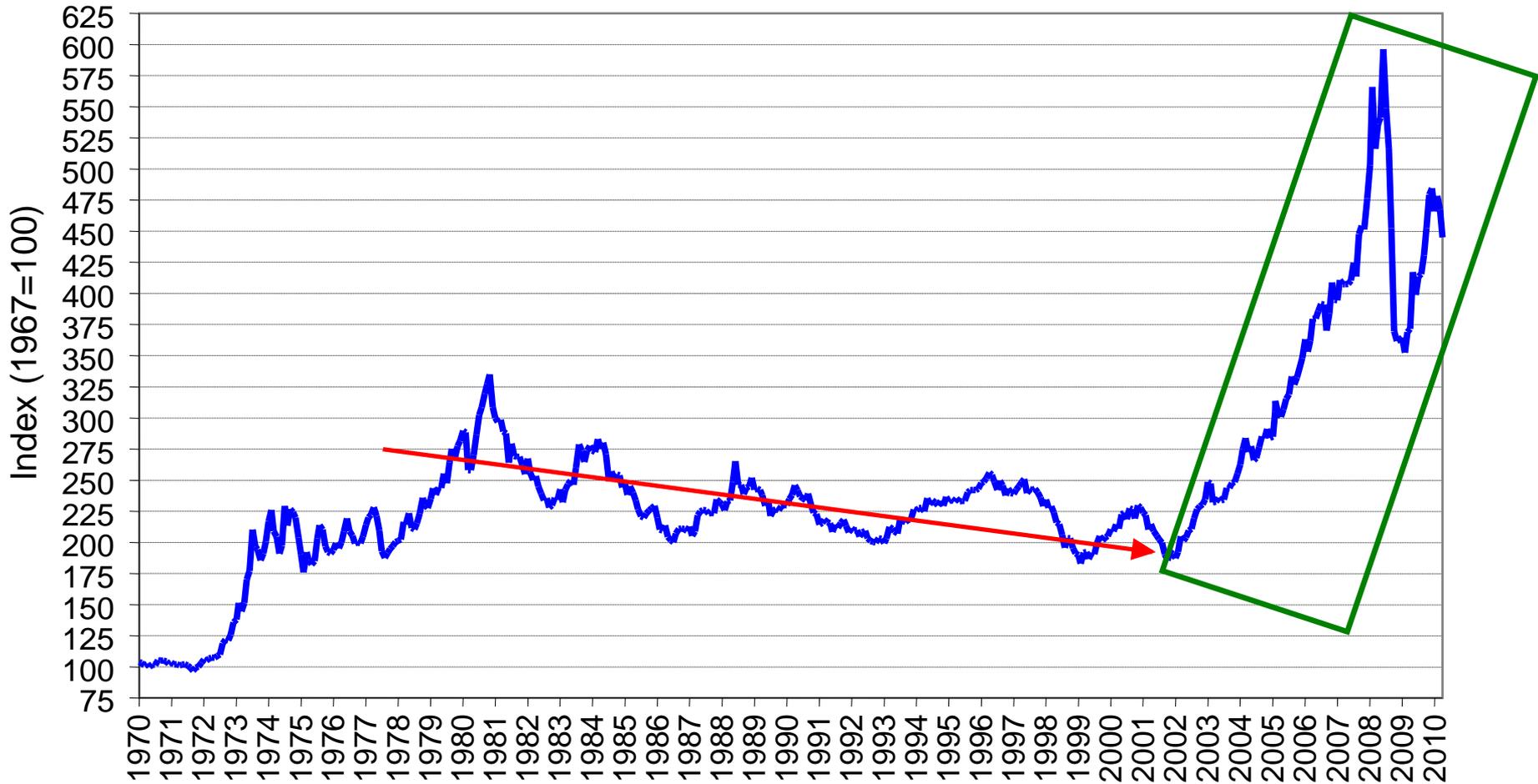
Some Positive Aspects:

- Structural Change in US and EU Farm Policy
 - Reduced artificial incentives for specific crops
 - Precludes overhanging “surpluses” – JIT inventory system
 - Farmers adjust more rapidly to market signals
 - A more robust system
- New Source Supply Expansion
 - Response to 2006-2008 price hikes – “Global Food Security”
 - Multilateral/National pledges/Initiatives
 - G-20
 - Emerging market governments
 - Multilateral/regional institutions
 - USA initiative
 - Significant investor attention

Is this time really different?

CRB Futures Index

January 1970 – April 2010



Source: Informa Economics, May 2010



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Threats to Prosperity

Rising protectionism – Failure to liberalize trade

- Food trade increasingly important
- System needs strengthening – Dispute resolution, SPS rules

Insufficient infrastructure investment in emerging countries

- Current attention can fade quickly
- Garbled message? Food security \neq self sufficiency. Result could be huge waste of scarce investment capital into an inefficient, unsustainable system
- Watch state-driven development with minimal private sector role

Lack of innovation – failure to close “the productivity gap”

- The Global Harvest Initiative
- The Global Agricultural Productivity (GAP) Index/Report

Threats to Prosperity

Dangers of never closing the gap:

- Expanded hunger and malnutrition
- Political instability (national security concerns)
- Trade disruptions
- Environmental degradation
- Slowed economic growth overall

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Concluding Remarks

Agricultural market fundamentals are strong

Challenges to the global food system are real – daunting

- Role of governments (policies) critical – no margin for missteps
- World is ever-more interconnected – requires quicker adaptation, action – pace will only accelerate

Great time to be in agriculture

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