# Monetary Policy, Food Inflation and Technology Response

**CIAT Seminar**

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**- Banco de la República -**

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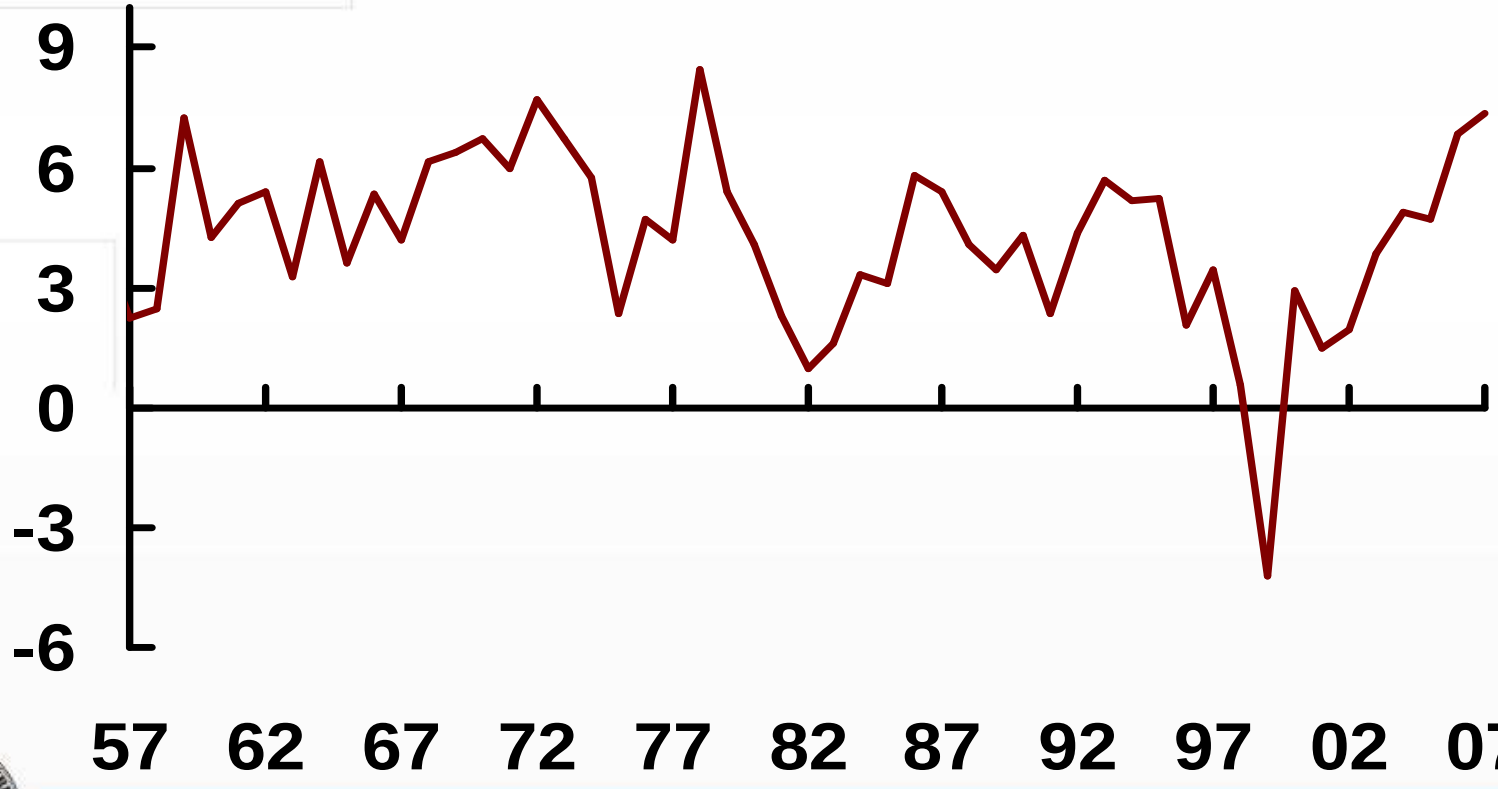
# I. GROWTH AND MONETARY POLICY IN COLOMBIA

# GDP growth in 2007 was 7,5%, the highest in the last 30 years. Projected income per capita 2008 US $3,800



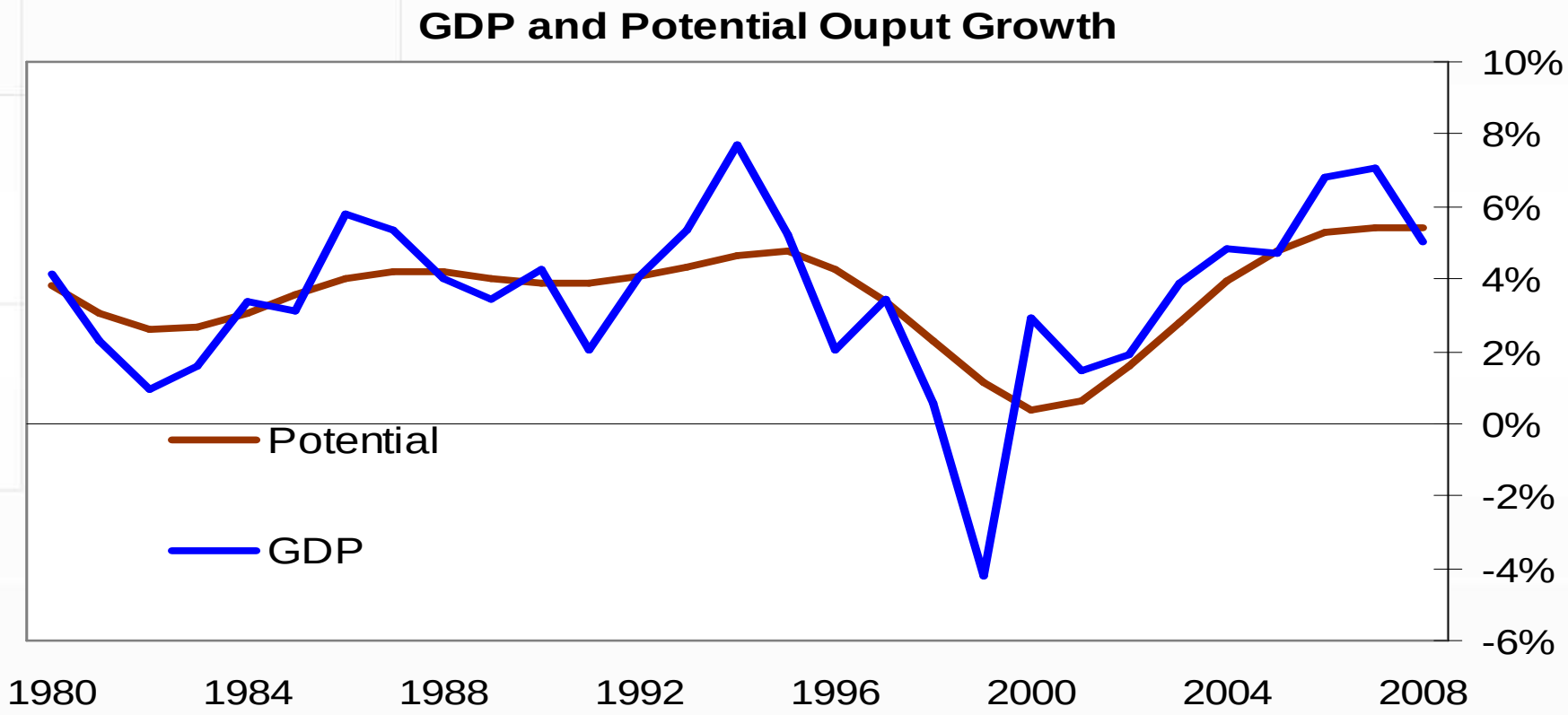
# Risks for growth sustainability

1. **Inflation as a result of a demand excess over potential GDP.**
2. **Excessive and lasting appreciation of the peso.**
3. **External shocks, contagion and financial panic.**
4. **Financial instability.**

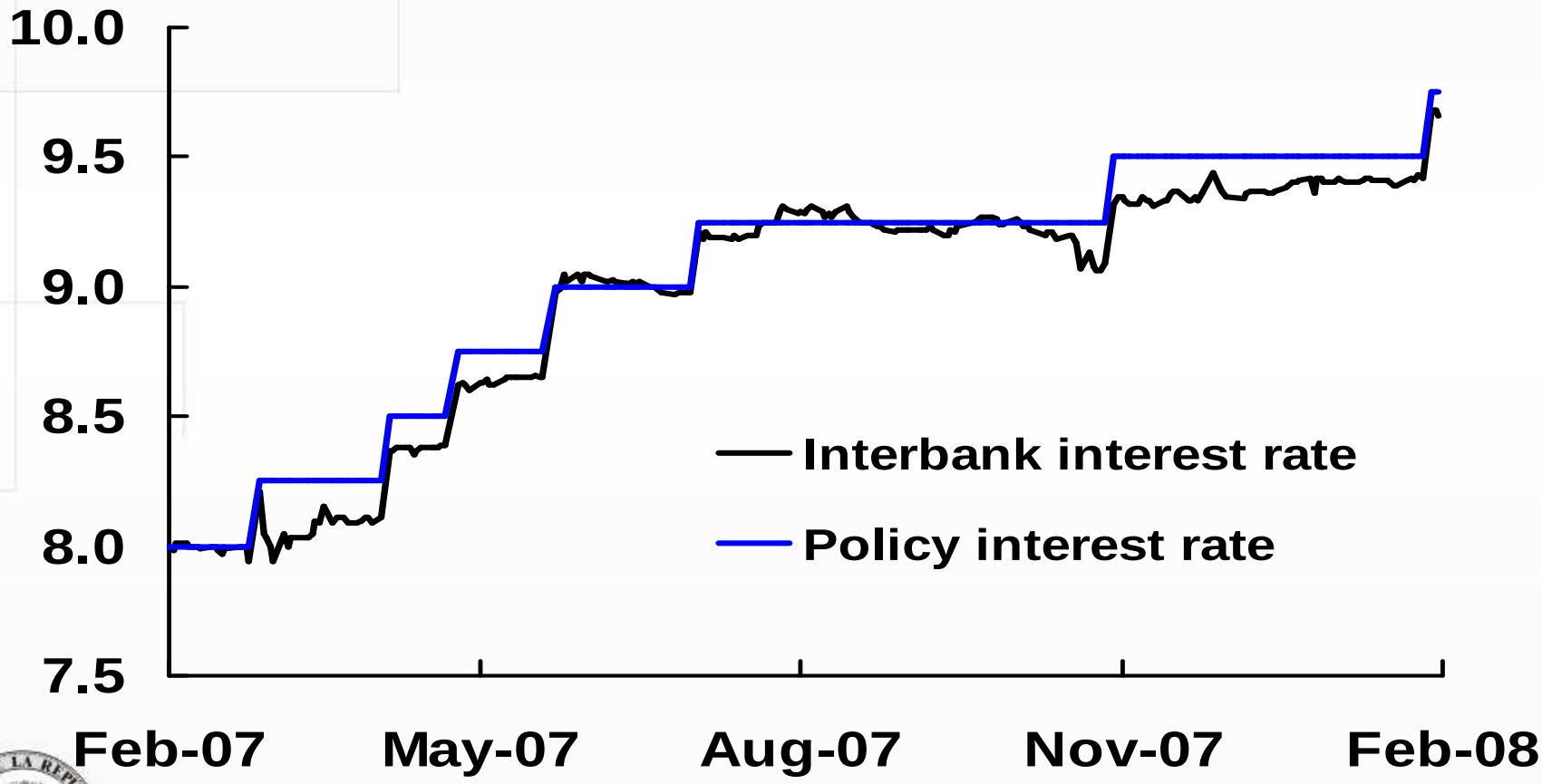
# Inflation targeting in Colombia

- **Quantitative inflation targets:**
  - **2007: 3.5%-4.5% (mid point of 4% for legal aspects).**
  - **2008: 3.5%-4.5% (mid point of 4% for legal aspects).**
  - **Long run: 2%-4%**
- **Instruments:**
  - **Interest rates of REPO operations (currently in 9.75%).**
  - **Occasional: FX intervention, reserve requirements, capital controls.**

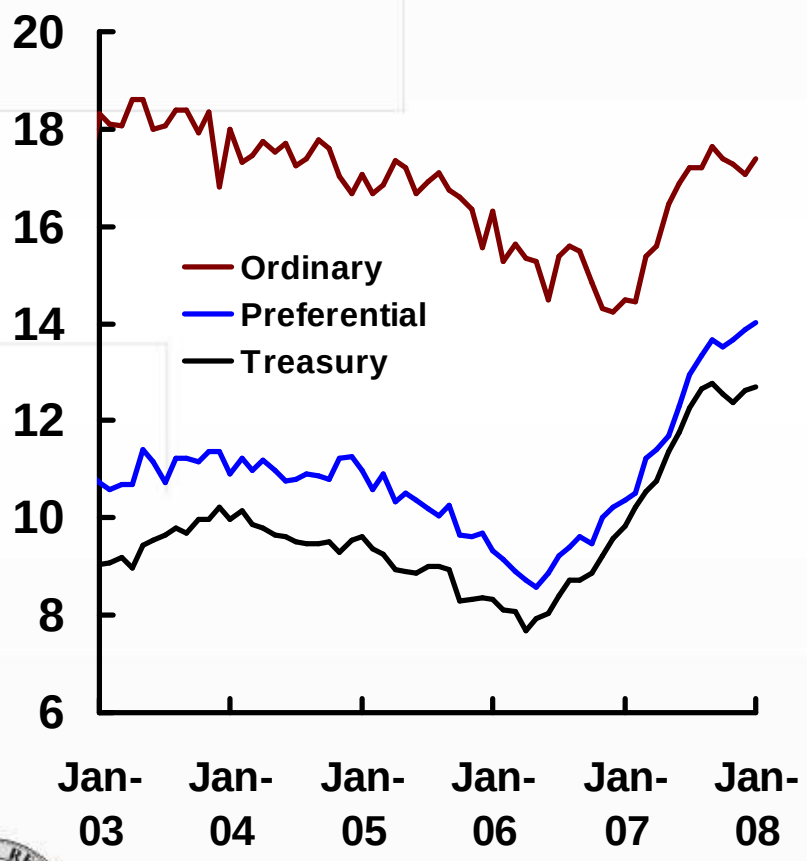
# Real GDP has been growing at a greater pace than the potential output, as a result of higher domestic demand

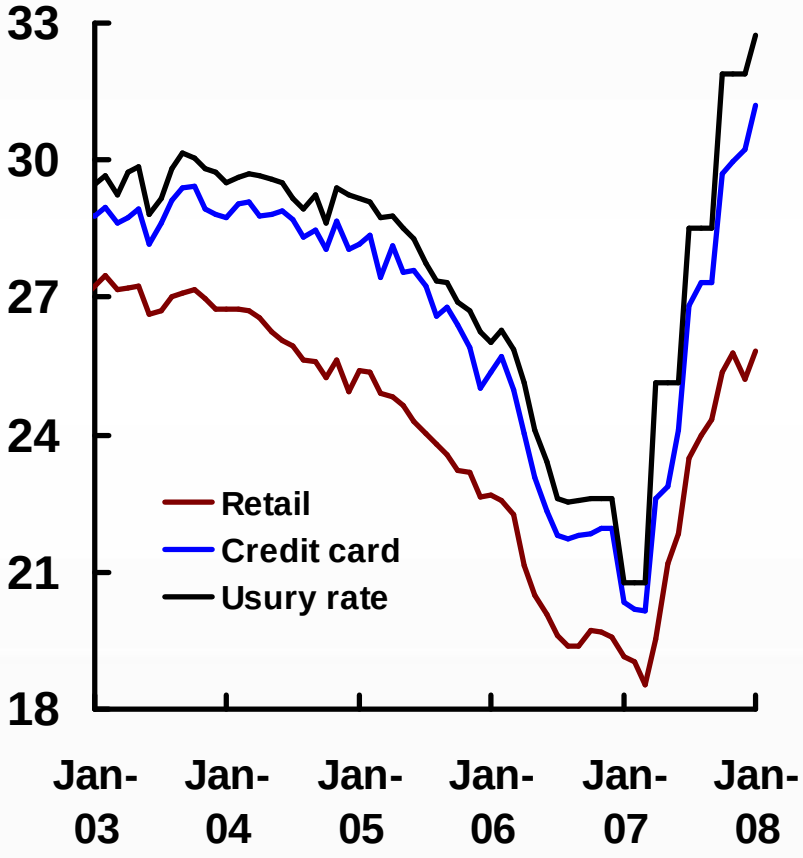


# For this reason, the Board of Directors decided to raise interest rates between April 2006 and February 2008 from 6% to 9.75% in 15 movements of 25 bp each

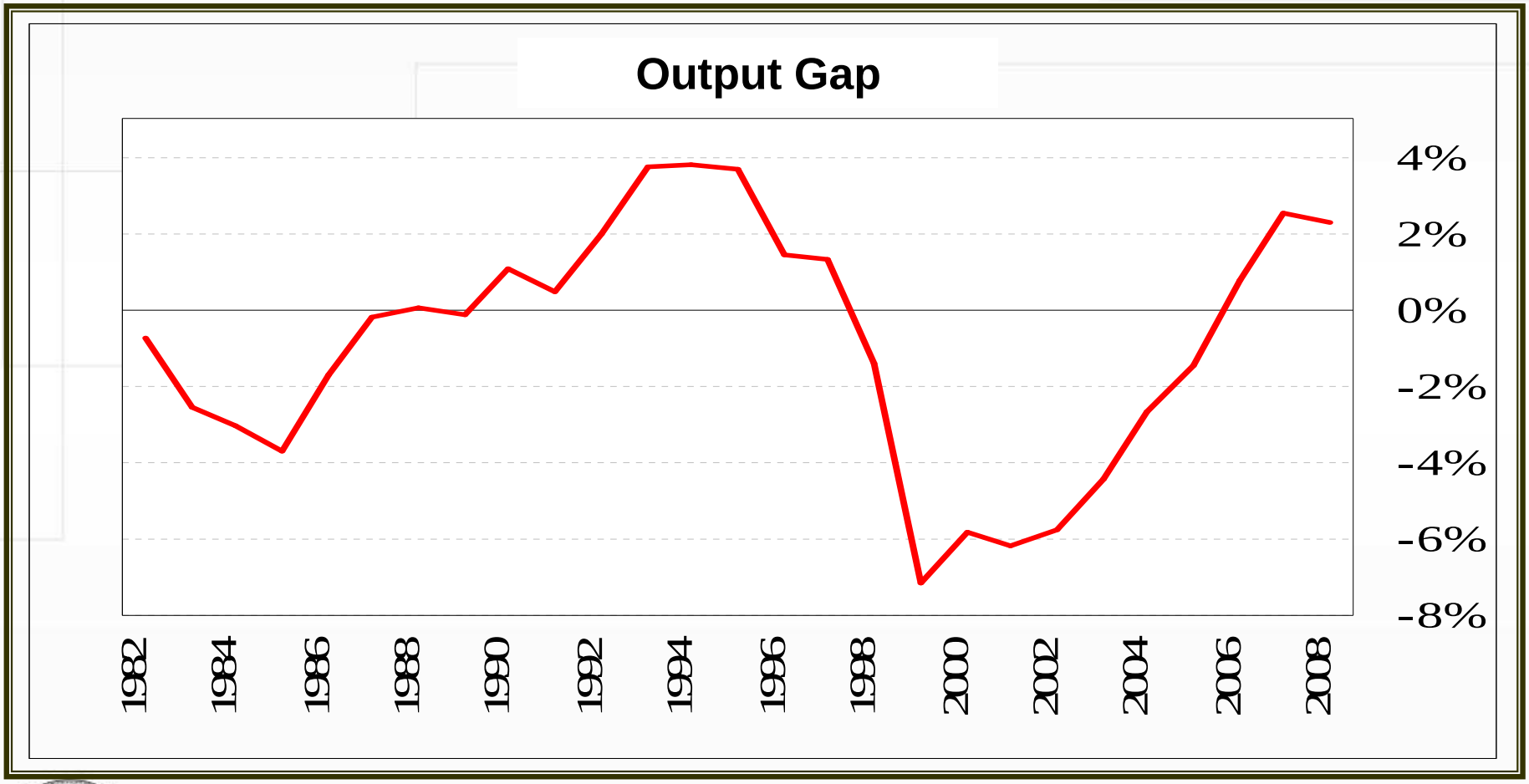


# As a result, lending interest rates have increased and will raise further because of monetary policy lags (between 18 and 24 months)



# According to the models, the output gap would start to close as a consequence of the interest rate rise



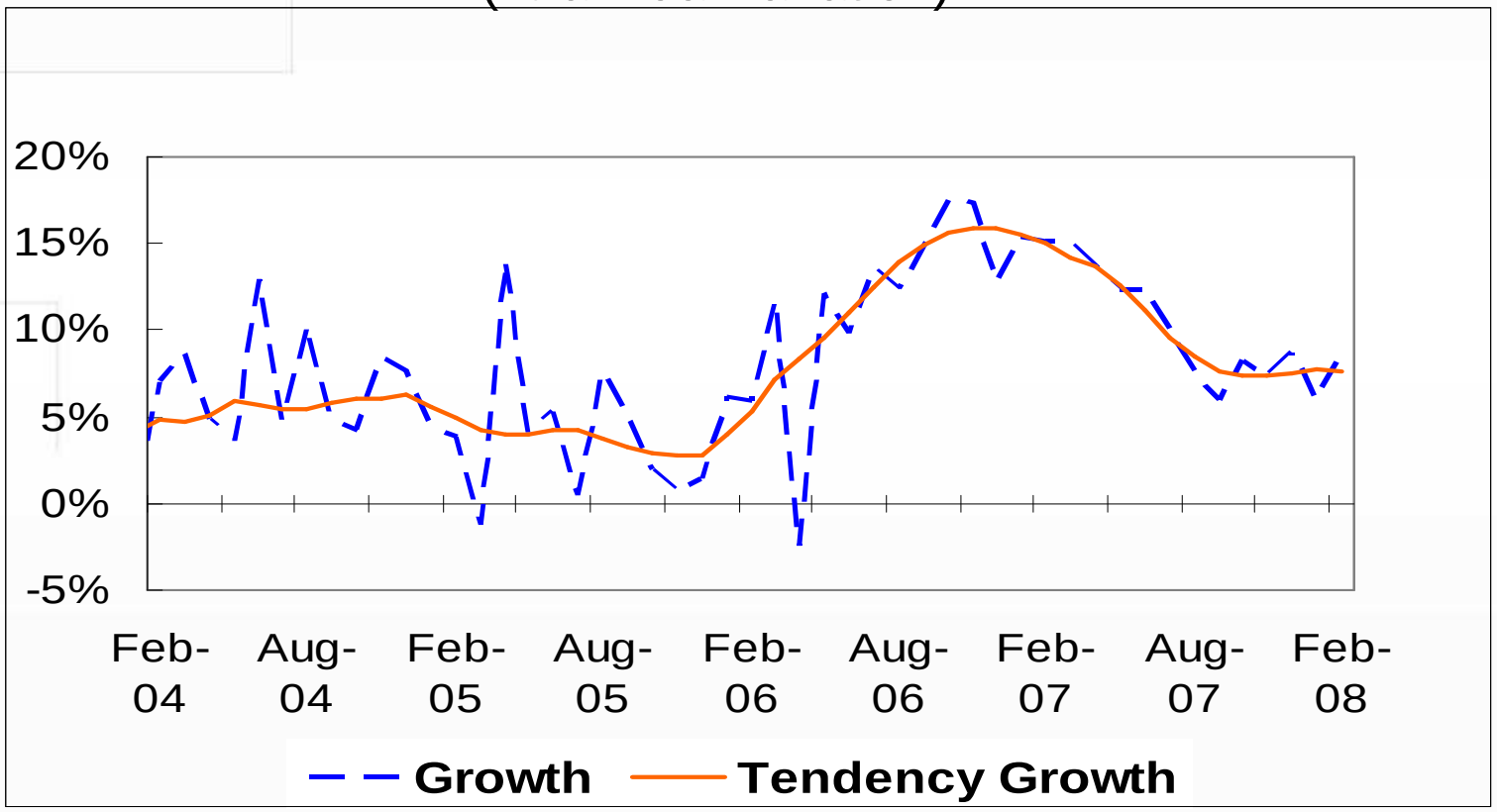
# In fact, in 2008 the Colombian economy would slow down to 5% (assuming US growth of 0.8% and military equipment purchases of US$1,6 billion)

| | 2008 |
|---|---|
| GDP | 5.2 |
| Households compsuption | 5.8 |
| Public expediture | 4.0 |
| Total investment | 17.4 |
| Private investment | 19.3 |
| Public investment | 10.0 |
| Stock change | 10.0 |
| Expots | 3.7 |
| Imports | 15.9 |

# Which in turn is consistent with the deceleration of the industrial sector

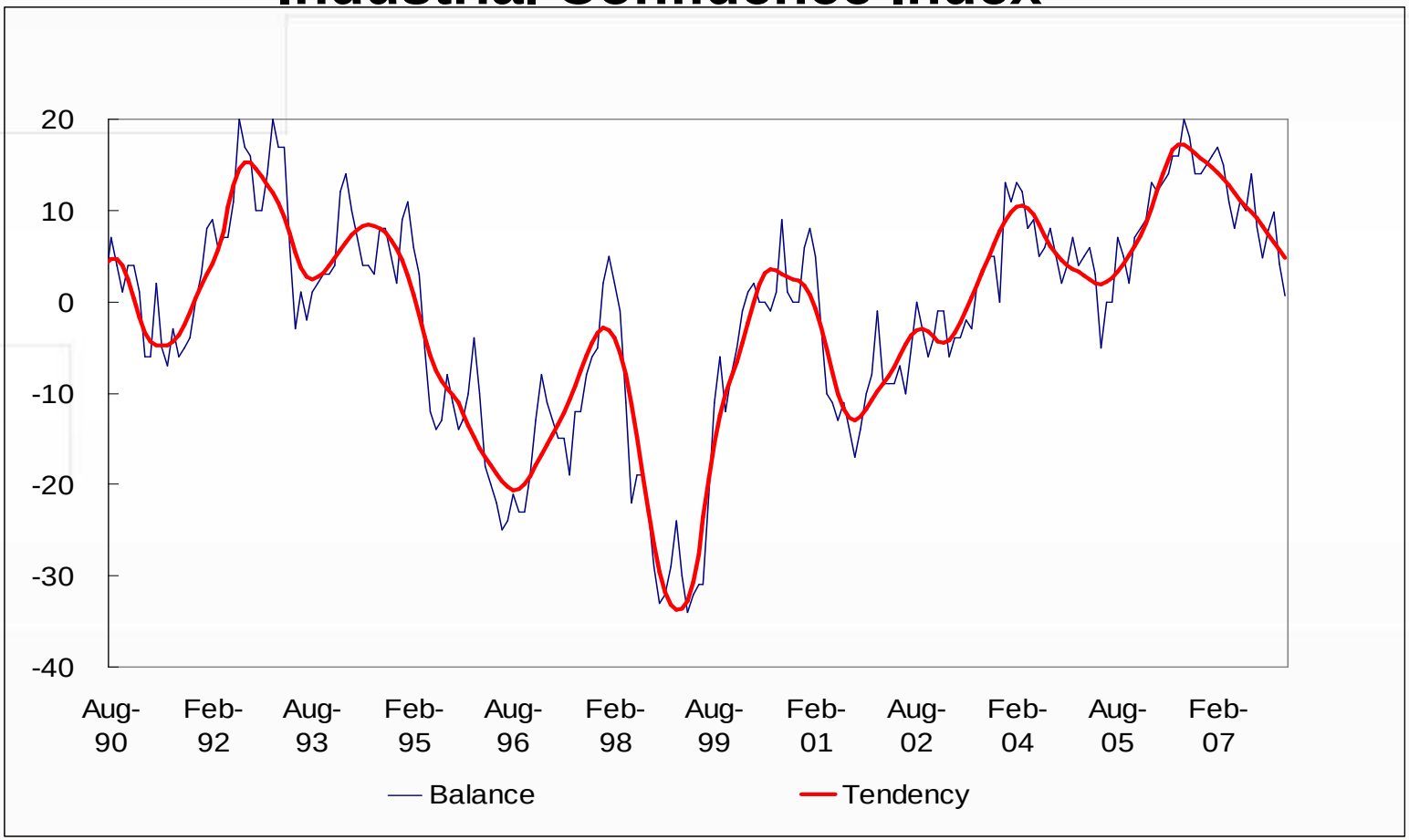
## Industrial Price Index without Coffee Milling

(% annual variation)



# … with the decrease in the industry confidence index, which confirms its deceleration since its maximum in August 2006

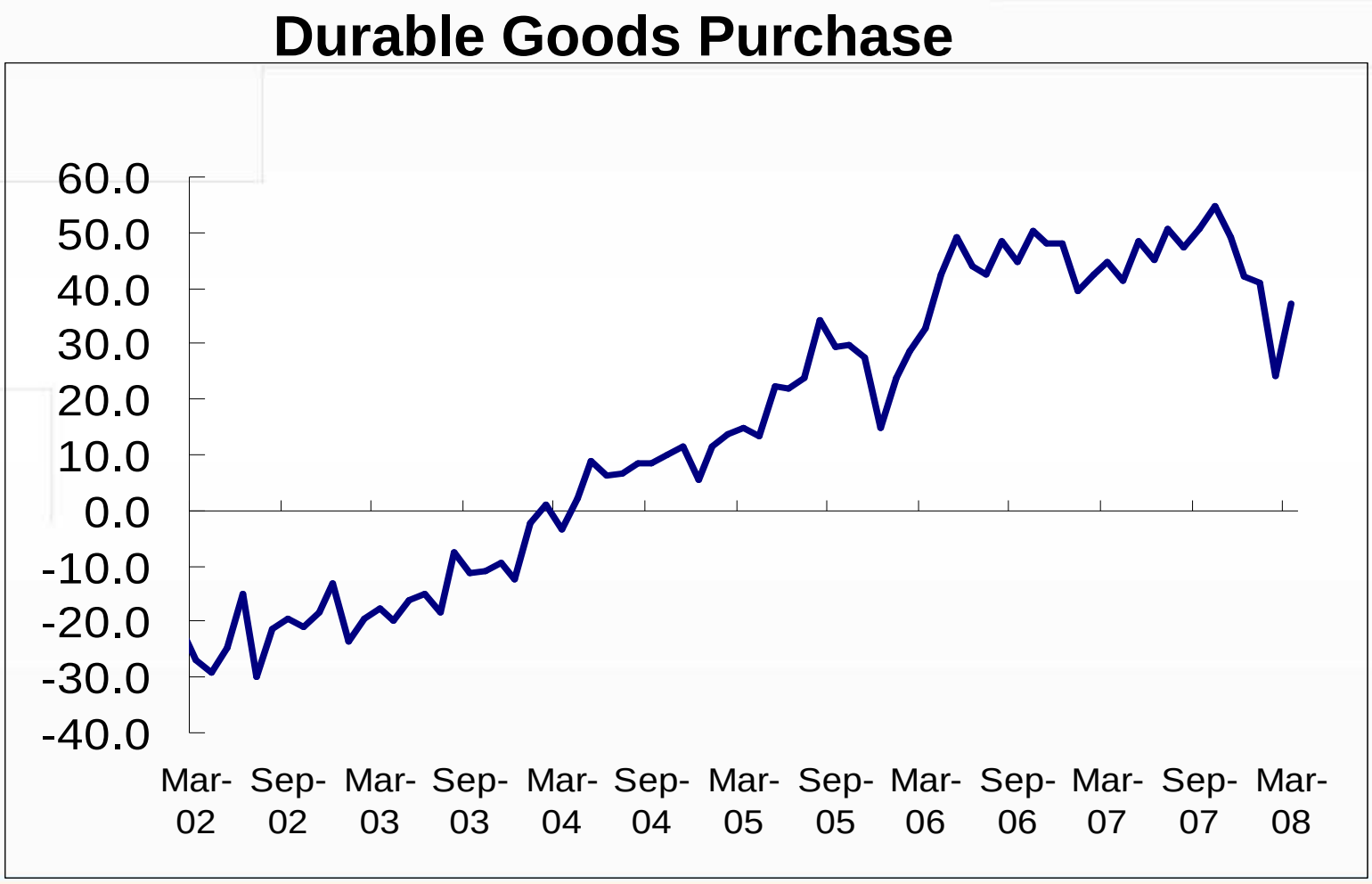
## Industrial Confidence Index



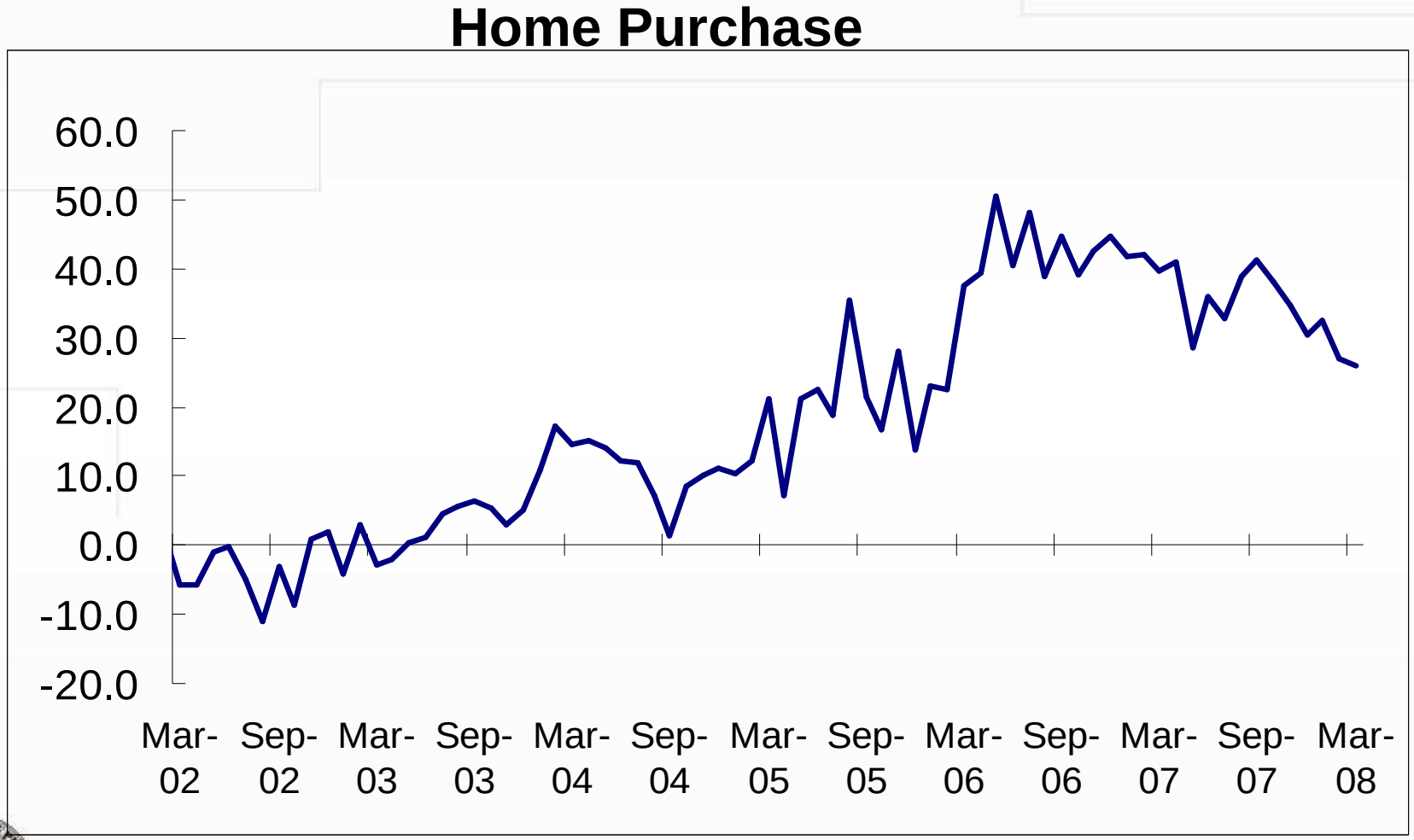
# … with the demand for energy slowdown, which is an indicator that historically has coincided with GDP trend

## Annual Growth in Energy Demand

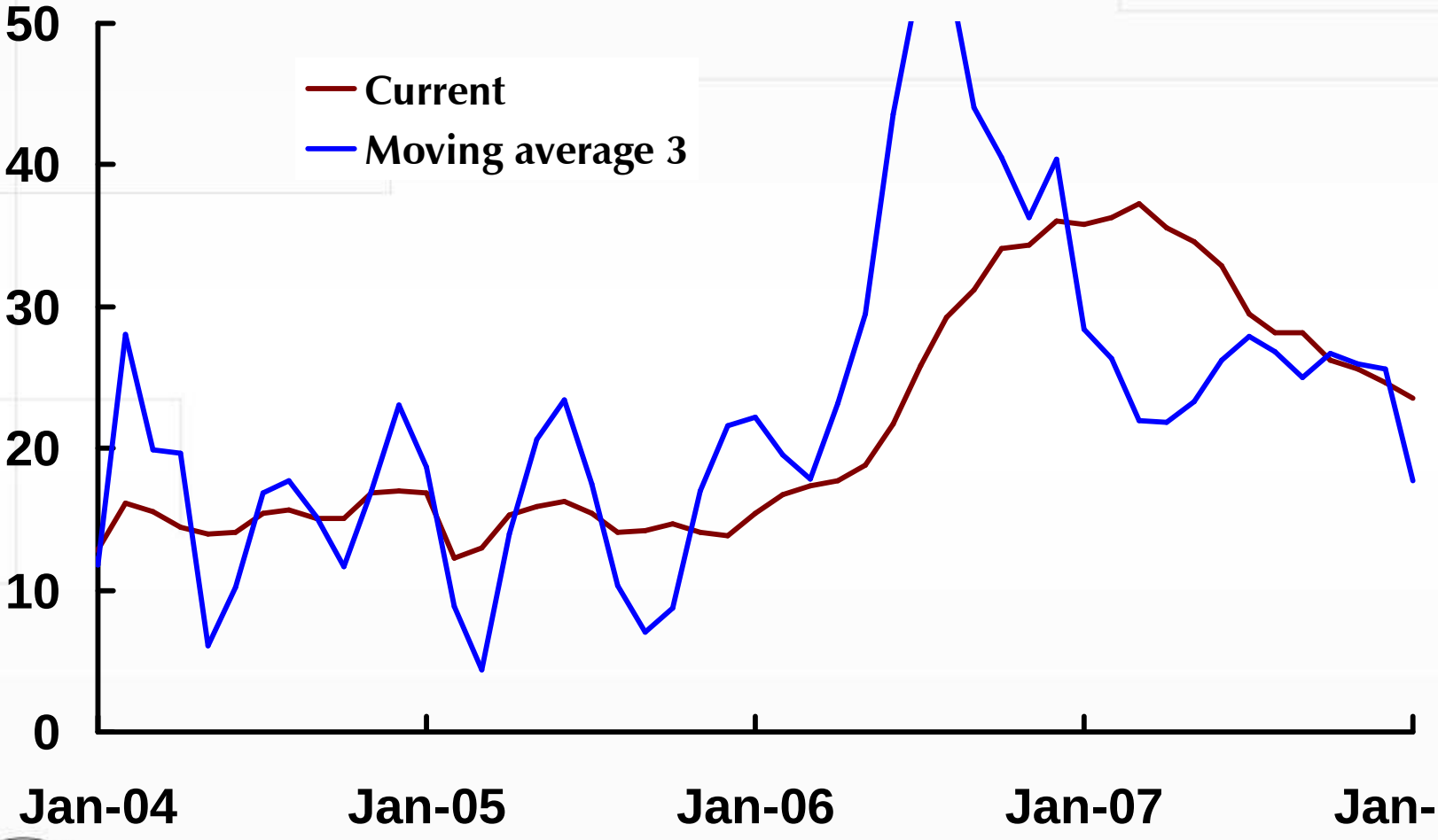
# Besides, during the last five months the durable goods consumption indicator has began to decrease



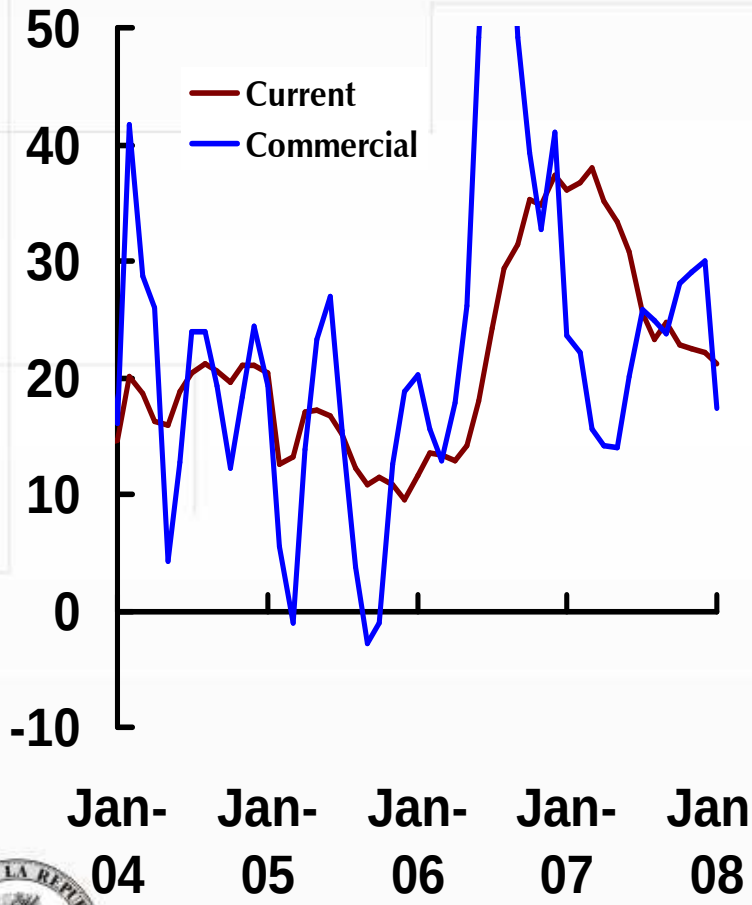
# The same has been occurring with real state acquisition, that is decelerating for the fifth month in a row

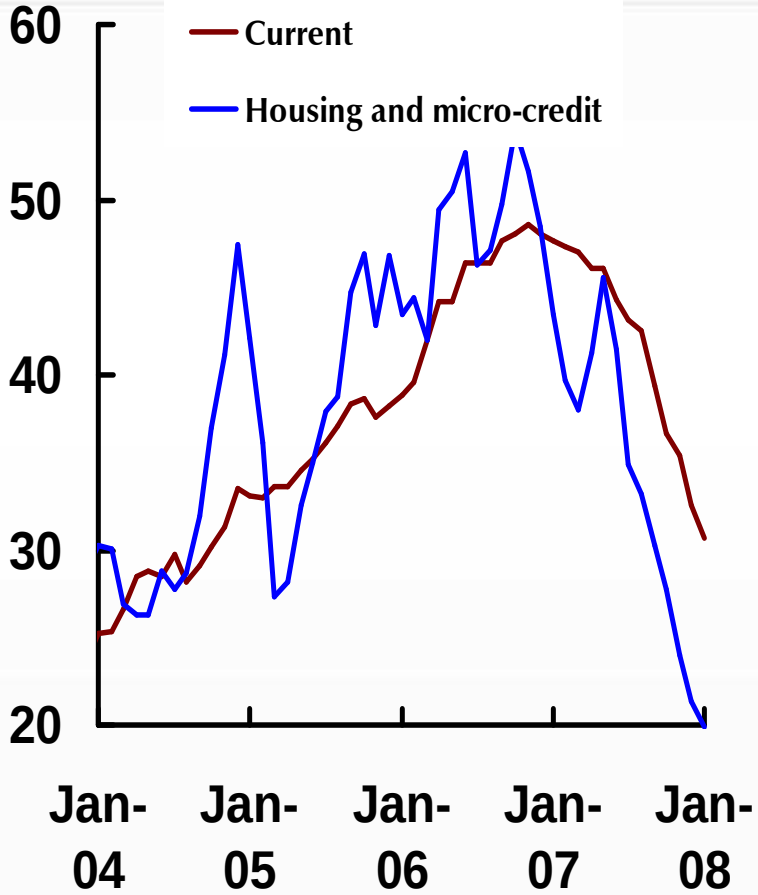


# Loan portfolio continues descending at an accelerate pace



# In particular, consumption and commercial loan portfolios have been decelerating during the last 12 months



# As a result, headline inflation decreased still further in April, the second month in a row

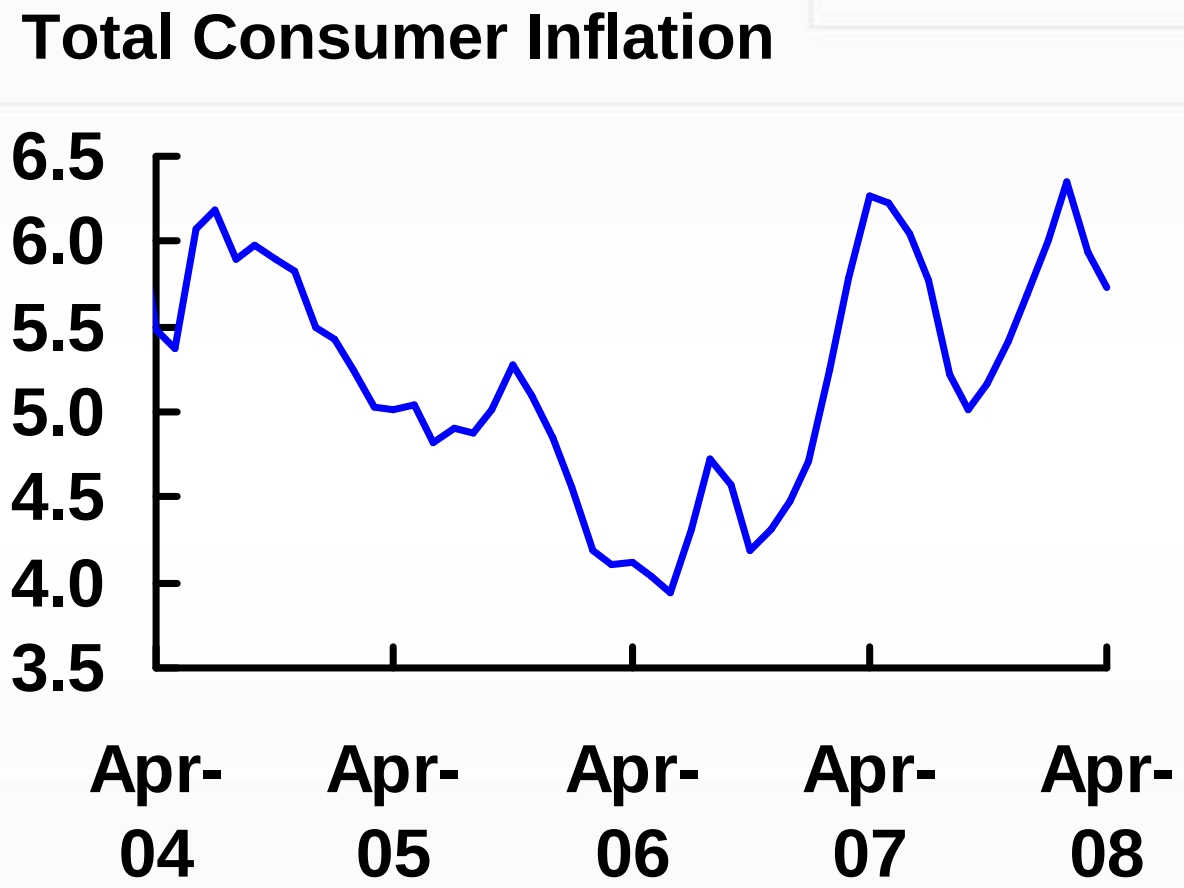
Apr-08 = 5.73%

Mar-08 = 5.93%

Feb-08 = 6.35%

Jan-08 = 6.00%

Dec-07 = 5.69%



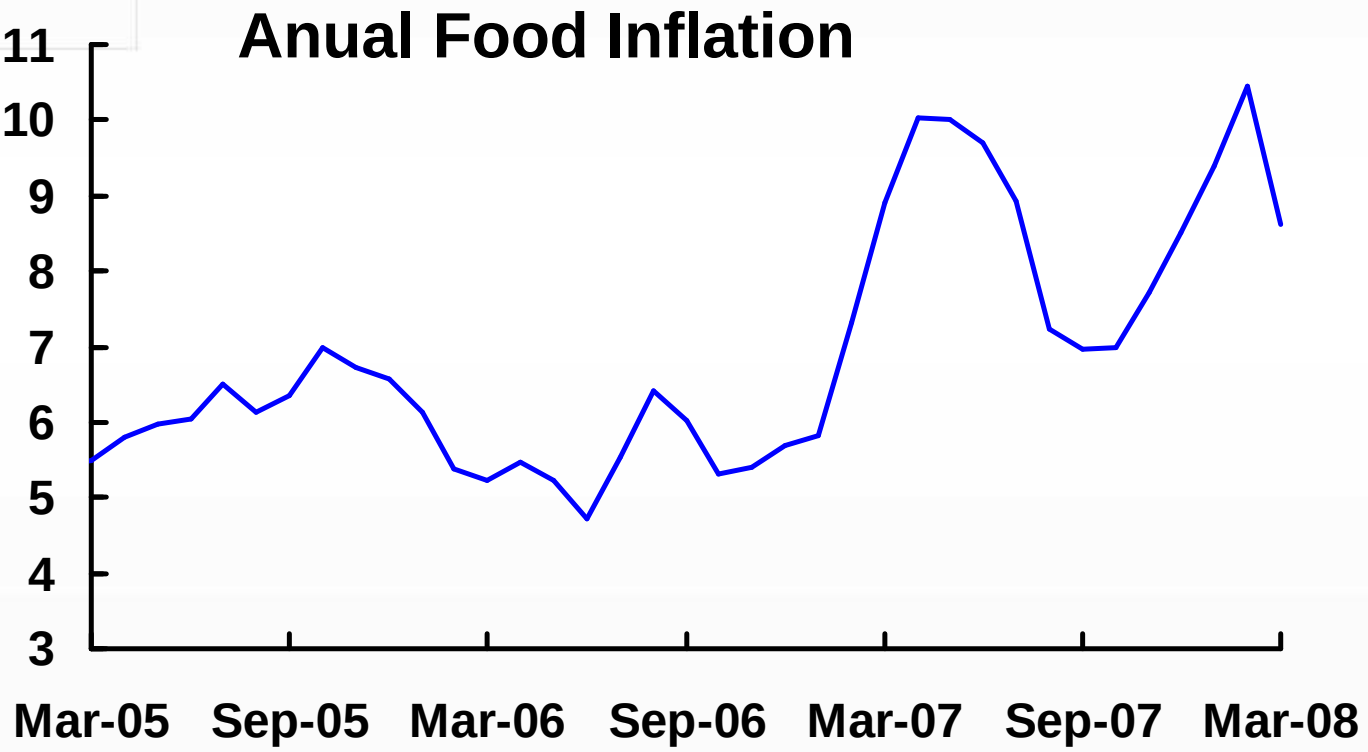
# Food inflation also decreased, in particular perishables. But still above target, mainly explained by high and rising prices of sources of animal protein: income-elasticity of demand in EM above one

Mar-08 = 8.6%

Feb-08 = 10.5%

Jan-08= 9.4%

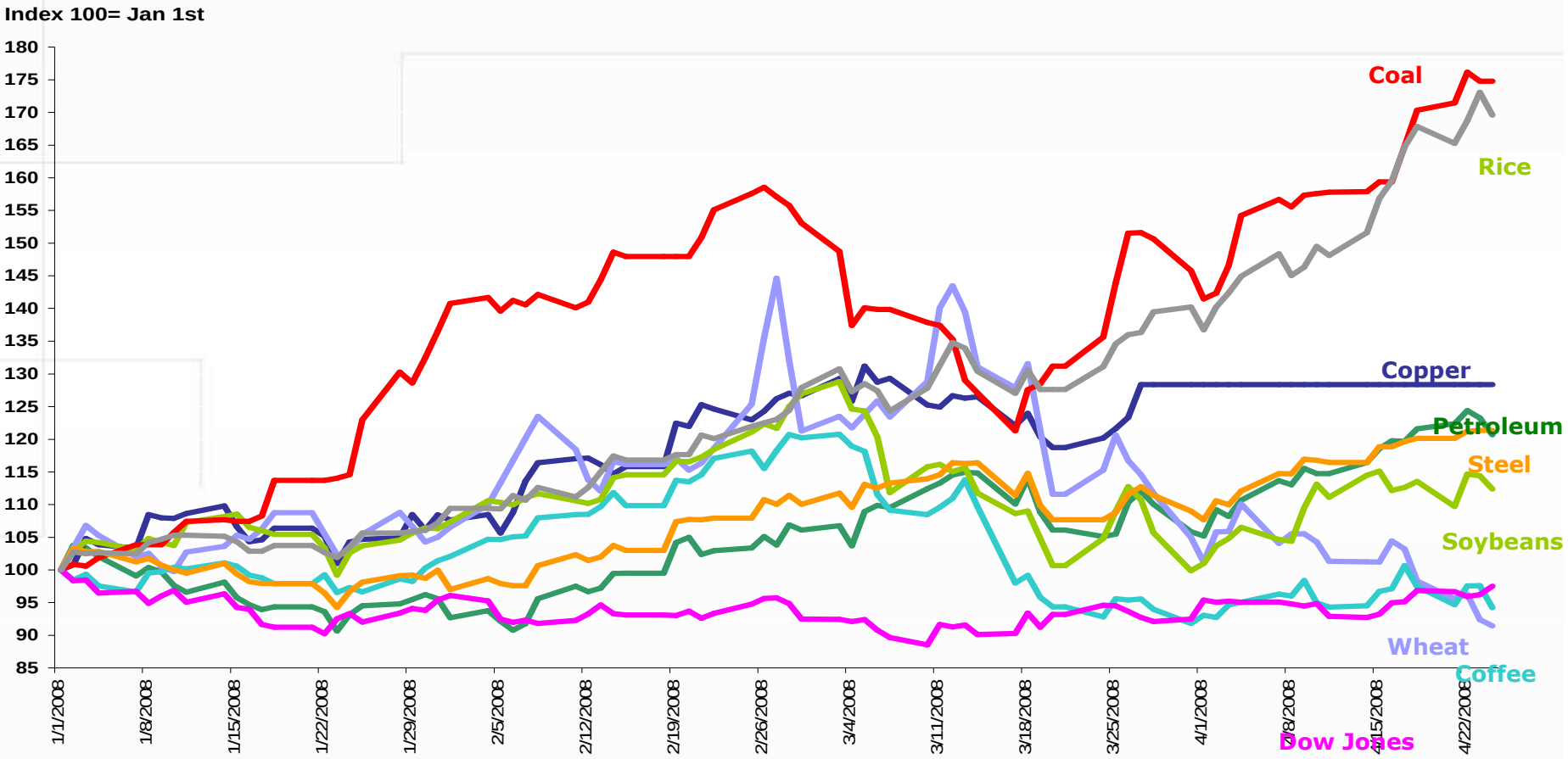
Dec-07 = 8.5%



# II. GLOBAL FOOD AND OIL INFLATION

# BUT GLOBAL Inflation Today: Raw Materials and Hydrocarbons

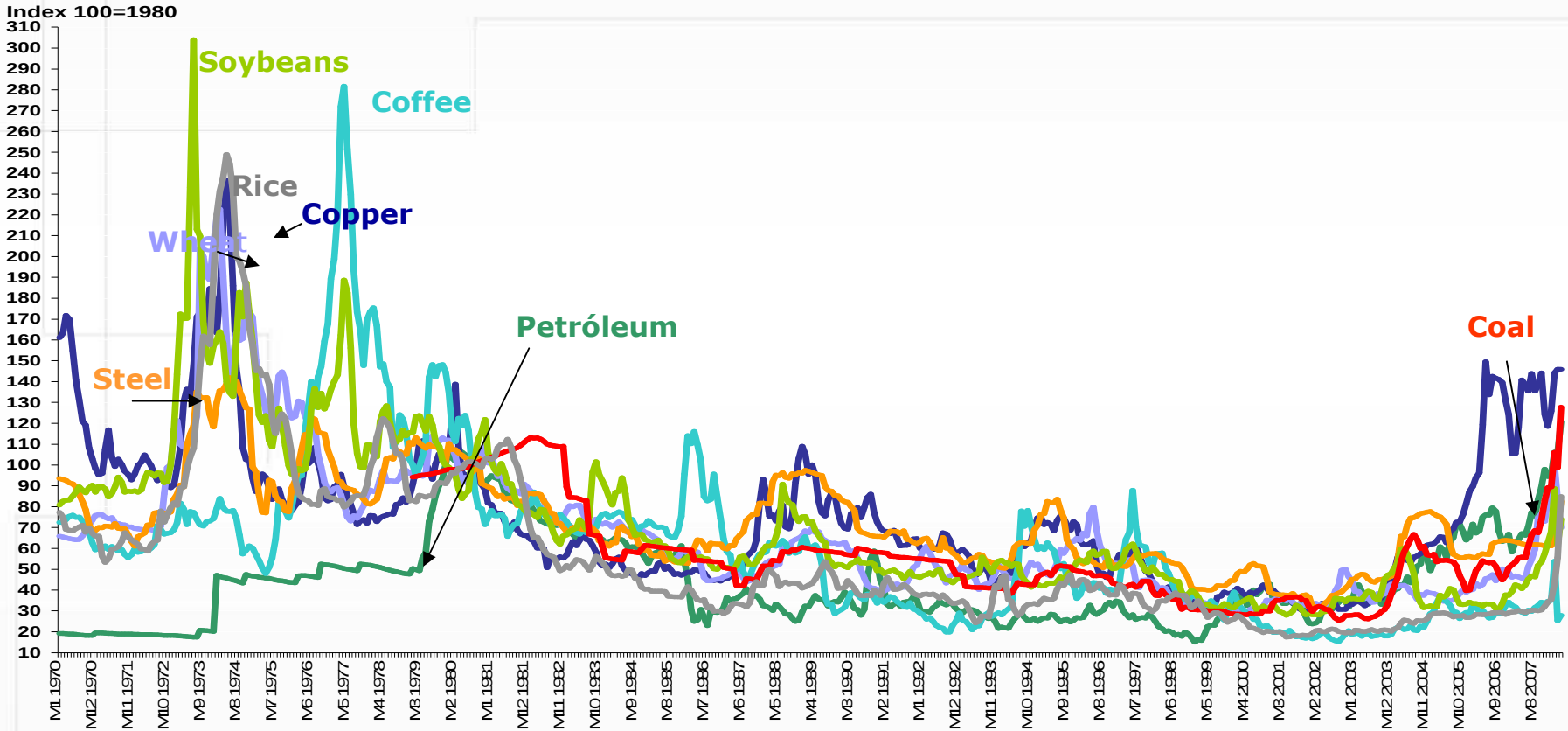
## Prices of Raw Materials




Source: E. Lora based on Bloomberg

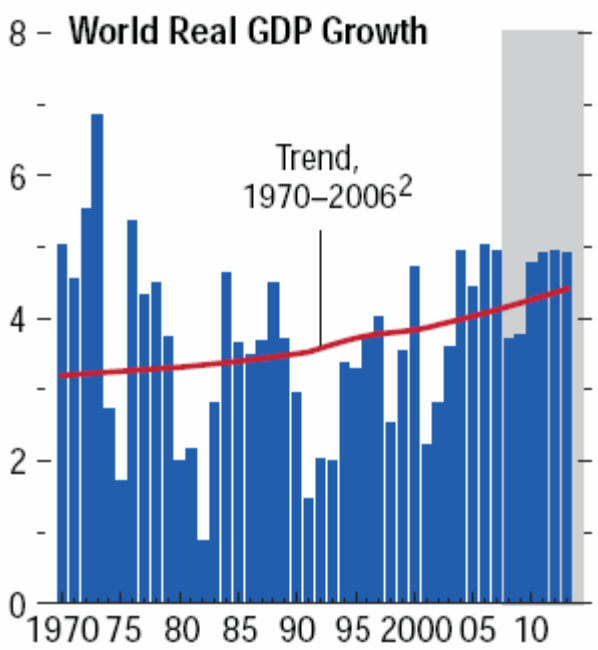
# The last major shock was in the 1970s

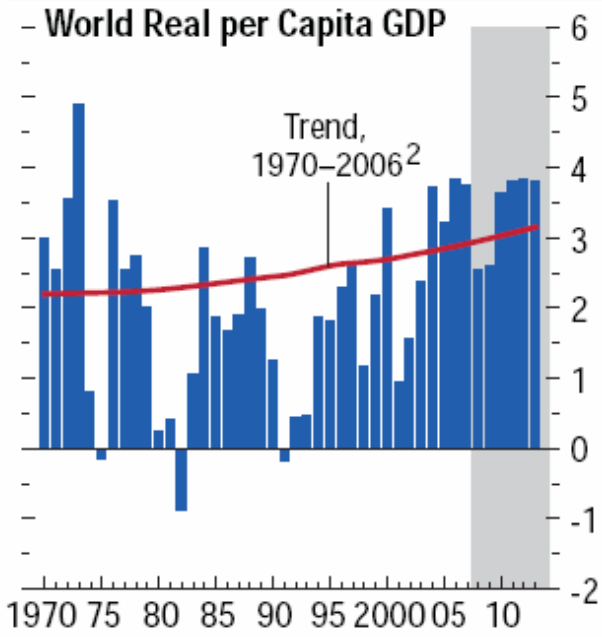
## Real Raw Material Prices

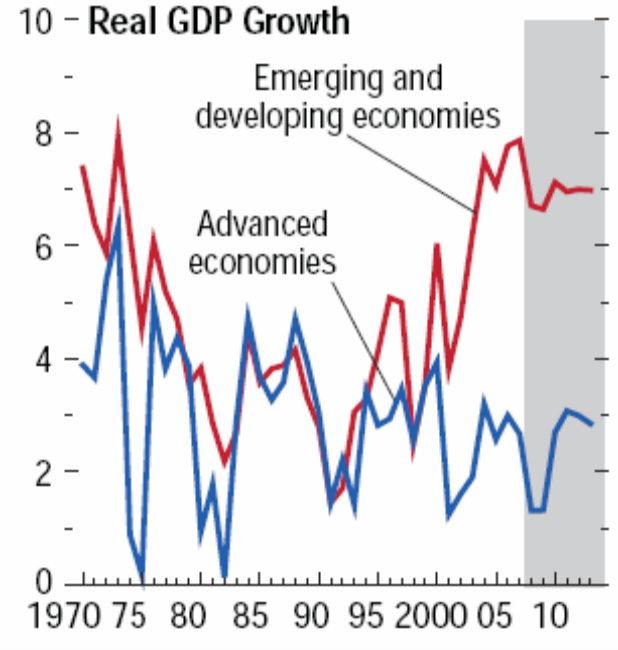



Source: E. Lora based on Bloomberg

# Global Demand Factors



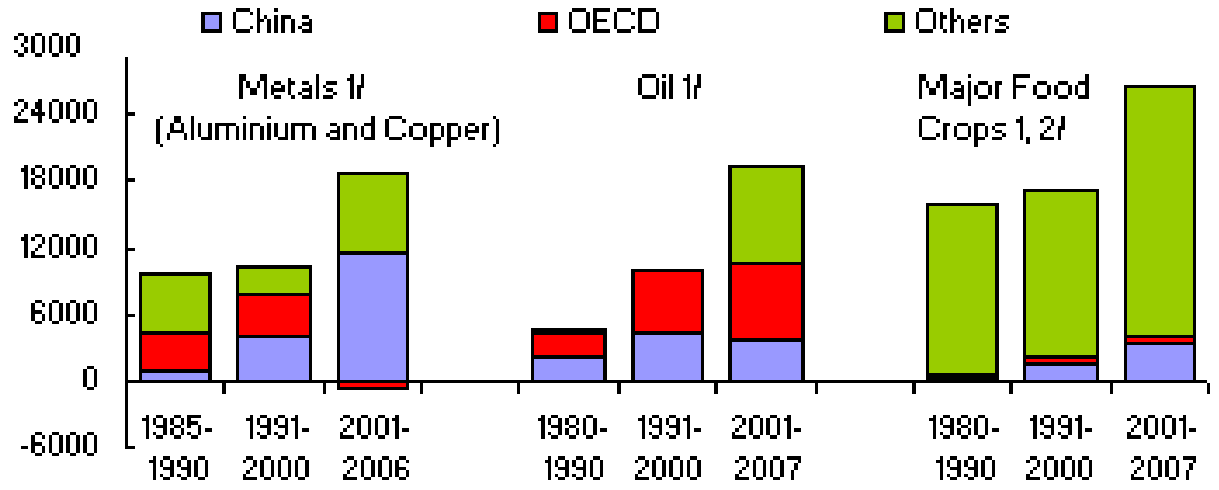

Source: IMF staff estimates.

[1]Shaded areas indicate IMF staff projections. Aggregates are computed on the basis of purchasing-power-parity (PPP) weights unless otherwise noted.

# Global demand for commodities has skyrocketed since 2001

## Contribution to World Demand

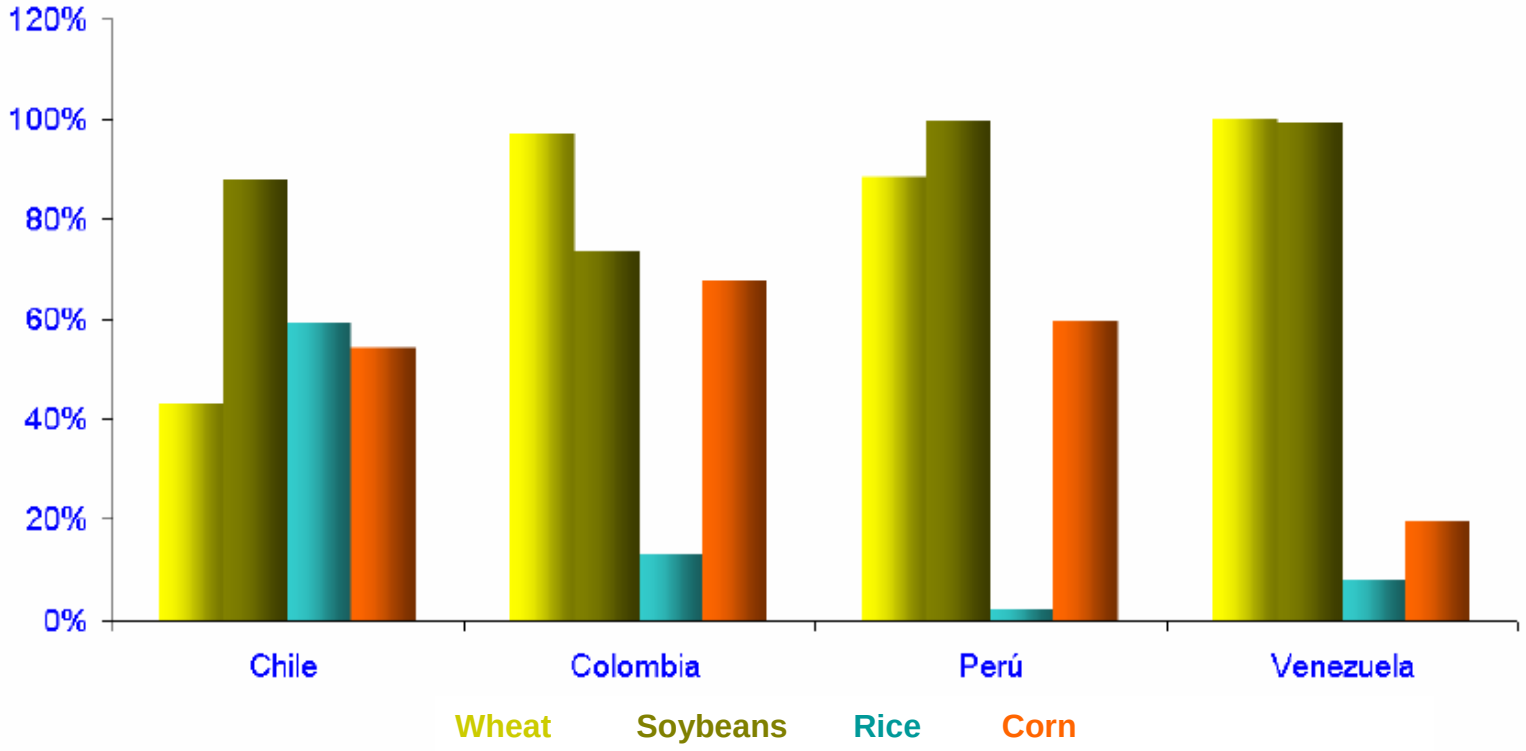
(Annual variation, Period average)




1/ Metals are in hundred thousands metric tons. Major food crops and oil are in thousands of metric tons.
2/ Major food crops are corn, rice, soybean and wheat.
Sources: USDA, World Bureau of Metal Statistics, BP and IMF staff.

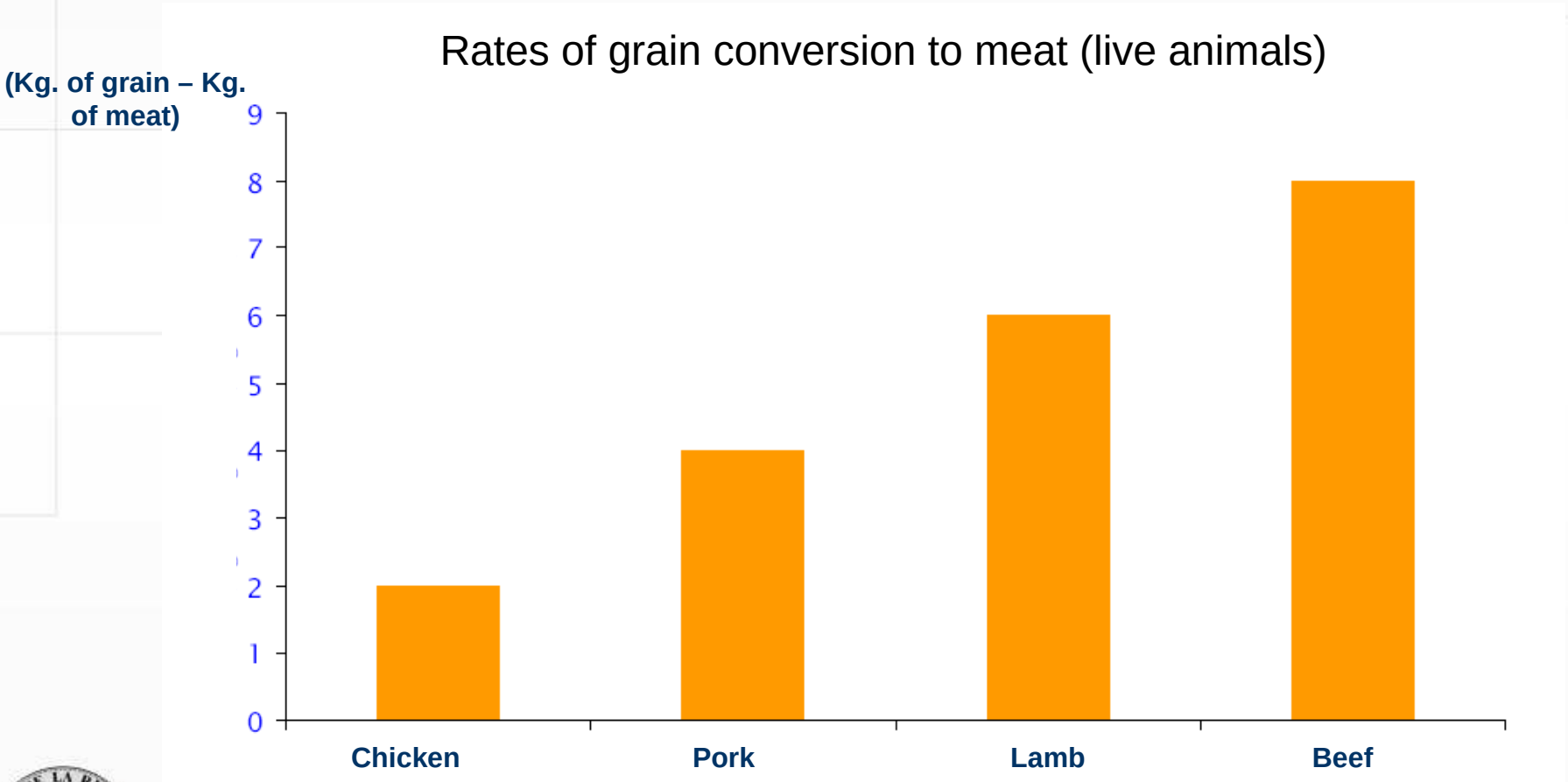
# Vulnerability of the Andean Countries in Terms of Major Grains

Imports as a share of consumption in the Andean countries




**Source: BBVA Studies Services**

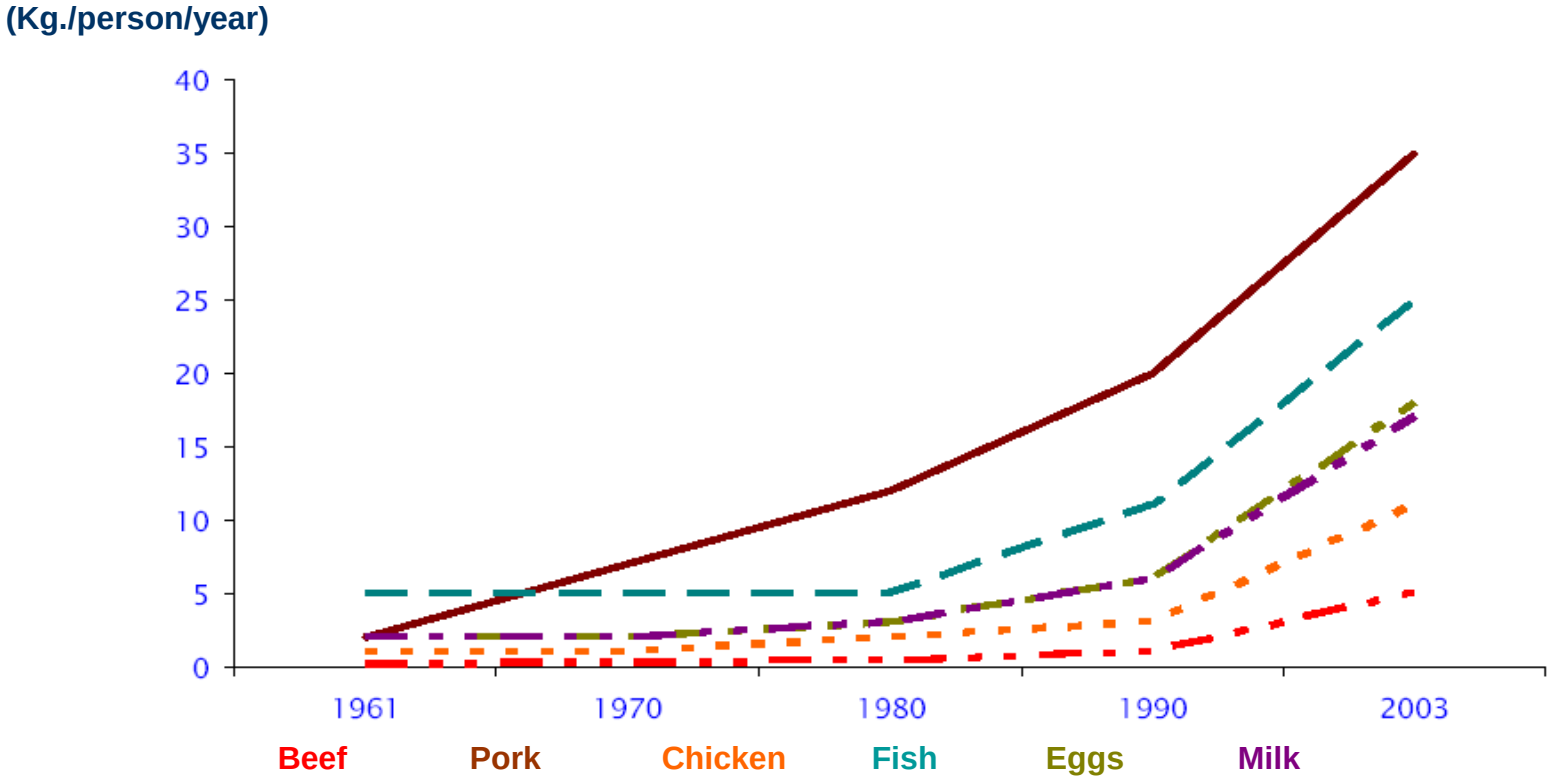
# Animal protein represents the number-one demand for grain. It also has the highest income-elasticity of demand in the emerging markets (EM): above one




Source: BBVA Studies Services

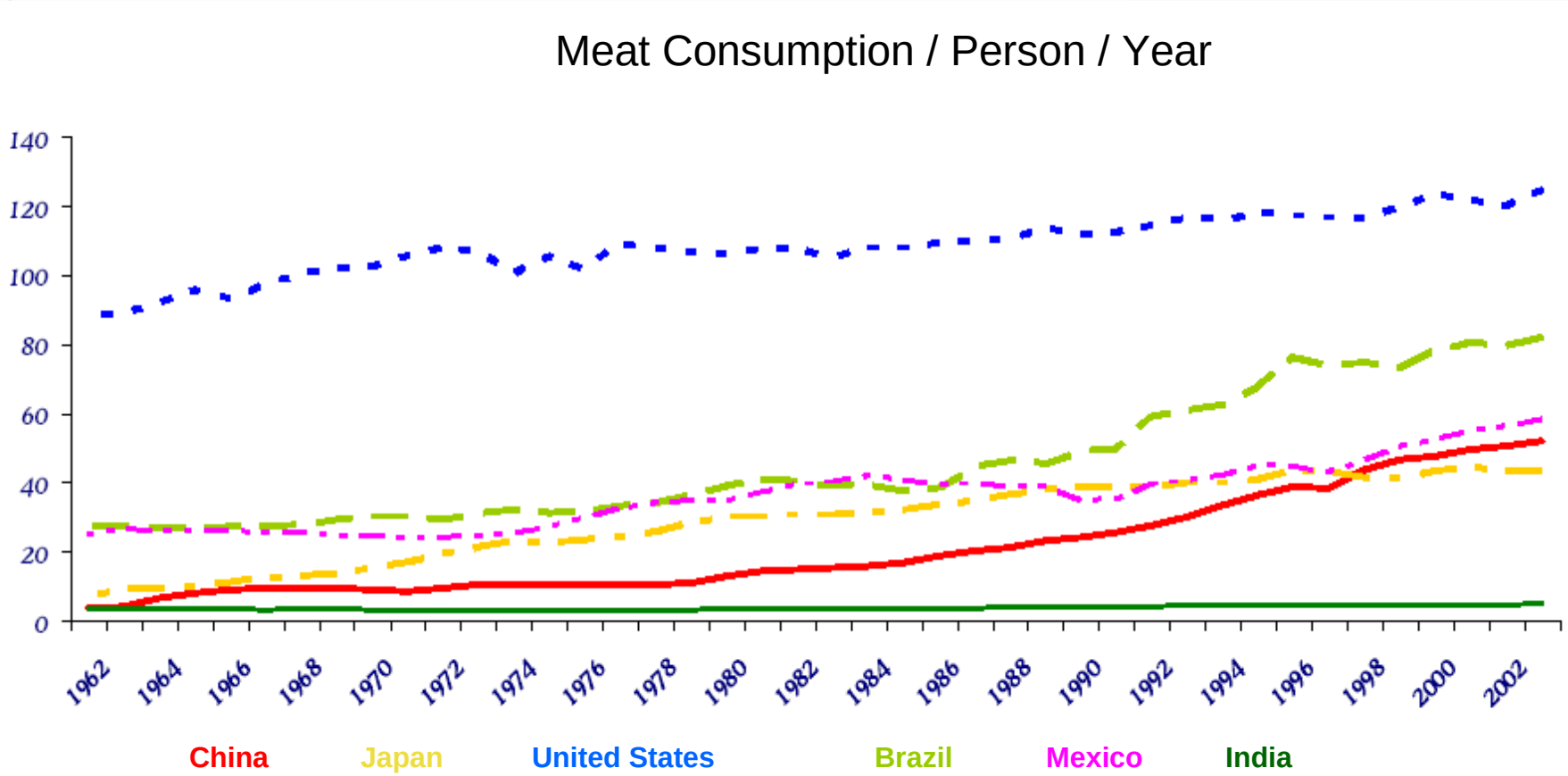
# For example, annual consumption per capita in China went from 20 to 52 kilograms in just 20 years

China: Consumption of meat and other foodstuffs of animal origin




Source FAO

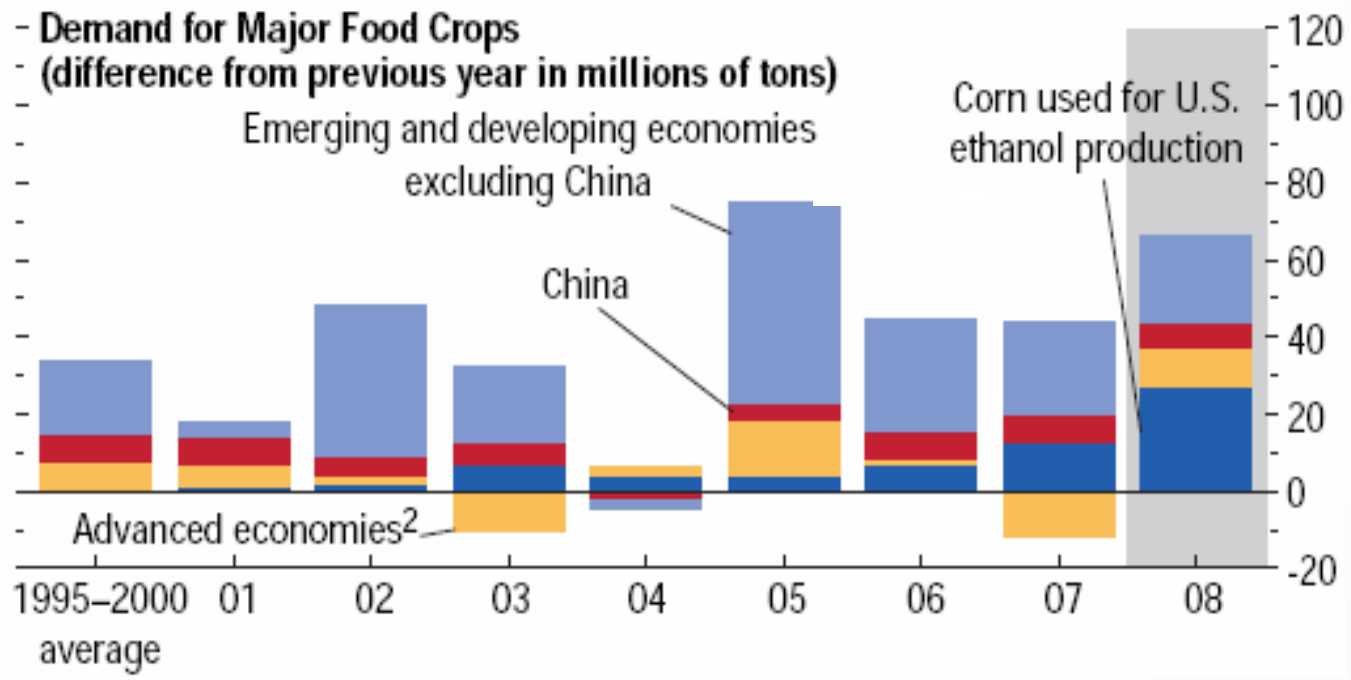
# Like China, other EM giants are increasing their meat consumption at unprecedented rates




Source: FAO

# Ethanol: another major and powerful factor of growth of global demand, followed by Biodiesel

## Demand for Major Crops



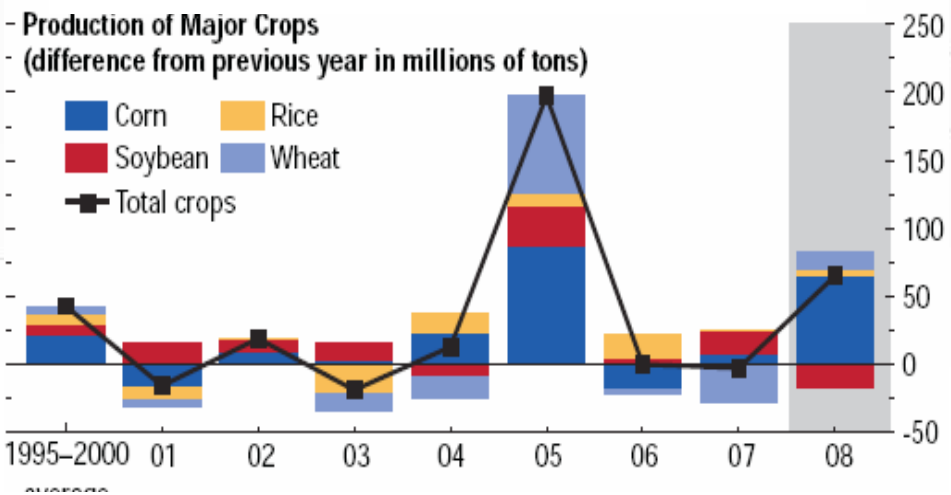

Sources: Bloomberg Financial Markets; U.S. Department of Agriculture; and IMF staff estimates.

[1]Major food crops are wheat, corn, rice, and soybeans.

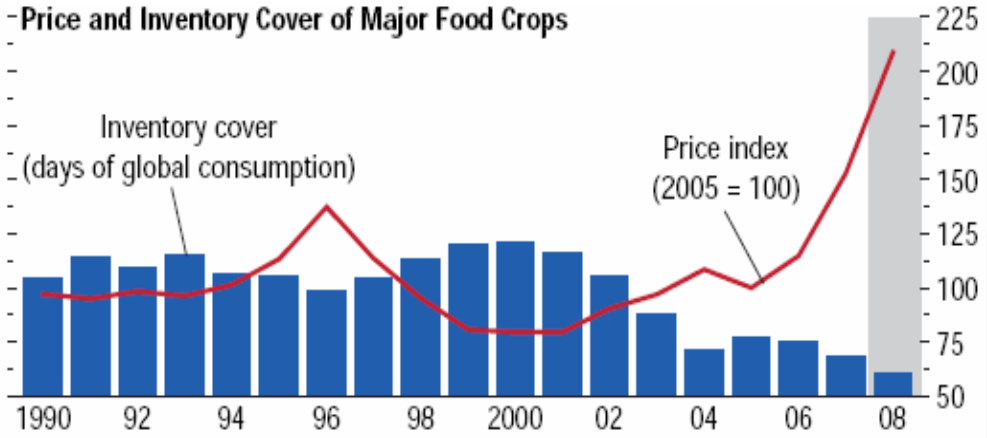
[2]Excludes corn used in U.S. ethanol production.

# And so far, the supply has been insufficient

## Major Crops: Production

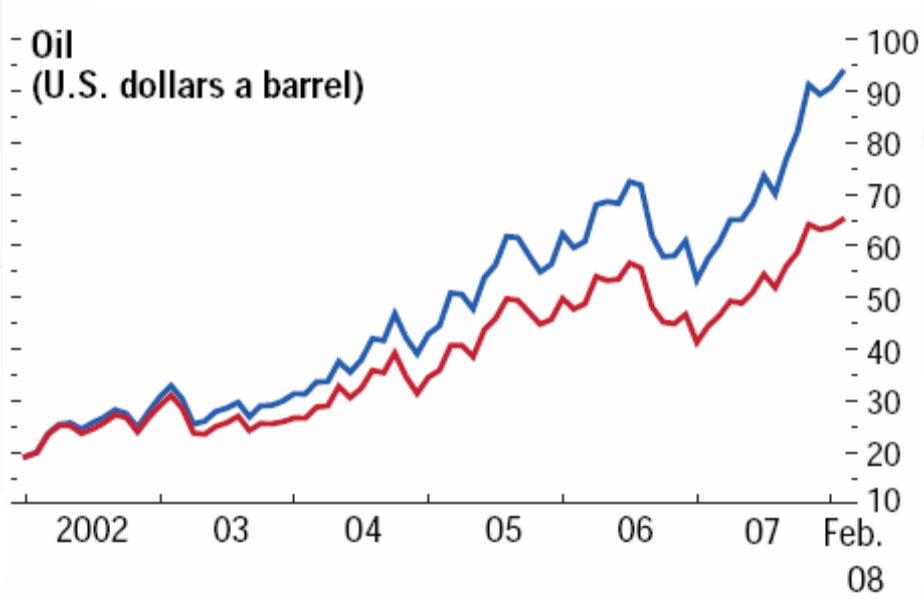


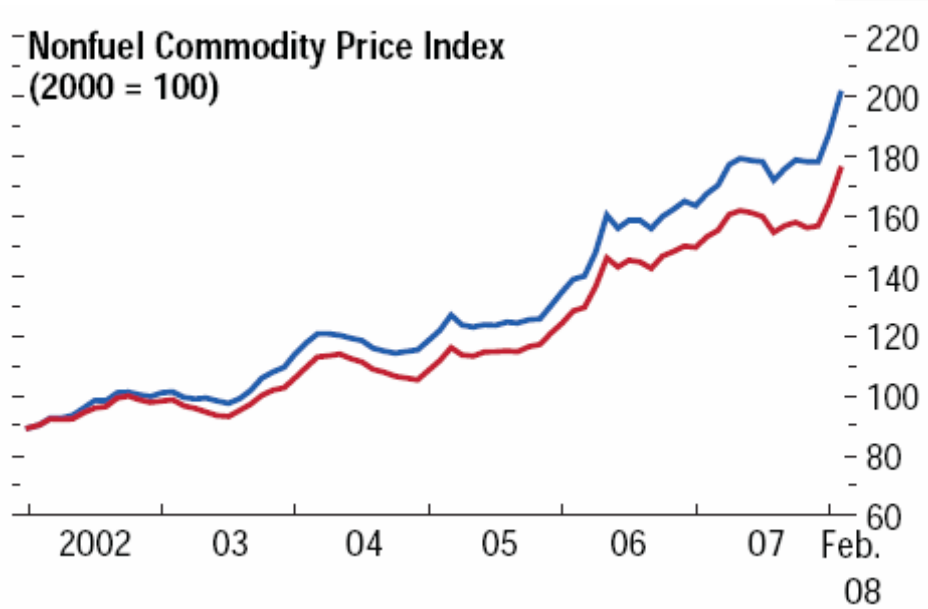

## Major Crops: Prices and Inventories




Sources: Bloomberg Financial Markets; U.S. Department of Agriculture; and IMF staff estimates.
[1]Major food crops are wheat, corn, rice, and soybeans.
[2]Excludes corn used in U.S. ethanol production.

# On top of that, devaluation of the dollar has been reflected in higher commodity prices



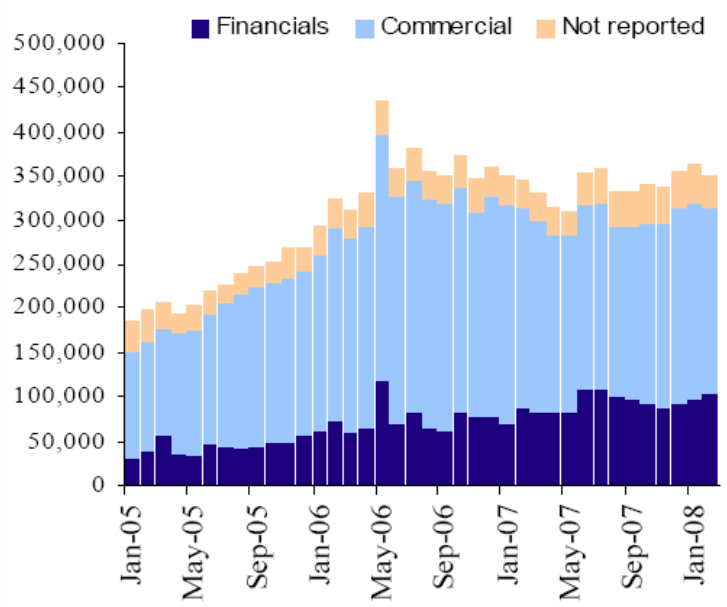




| Effect on commodities of a 1% drop in the US dollar exchange rate | | | |
|---|---|---|---|
| **Number of months after the shock** | **1** | **4** | **12** |
| **Gold** | 1.17 | 1.22 | 1.3 |
| **Petroleum** | 0.89 | 0.97 | 1.13 |
| **Non-energy commodity index** | 0.48 | 0.47 | 0.47 |
| **Aluminum** | 0.53 | 0.53 | 0.53 |
| **Copper** | 1.11 | 1.02 | 0.8 |
| **In current dollars, based on the US nominal effective exchange rate.** | | | |

# And as a consequence, financial speculation with commodities: long positions in futures contracts

## Wheat

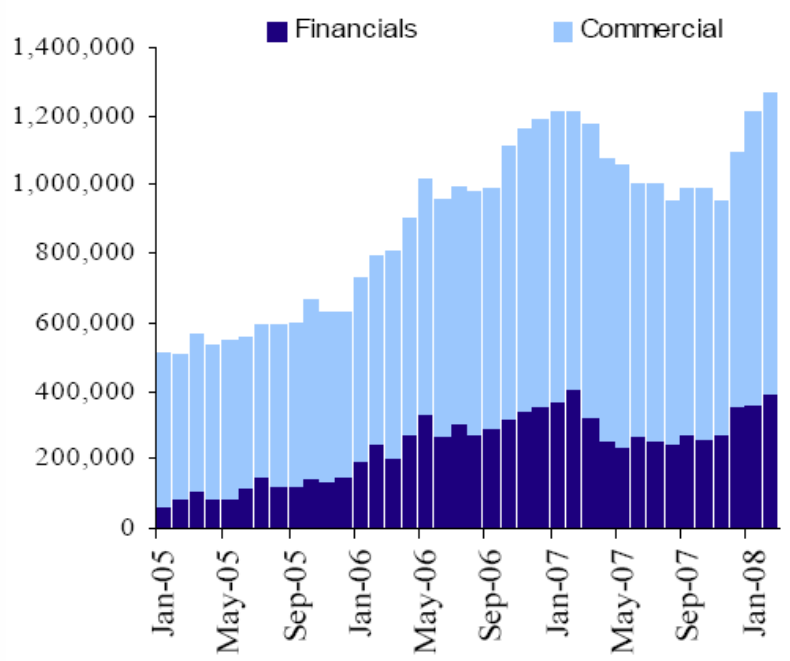
*Number of futures contracts (5,000 bushels ea.)*



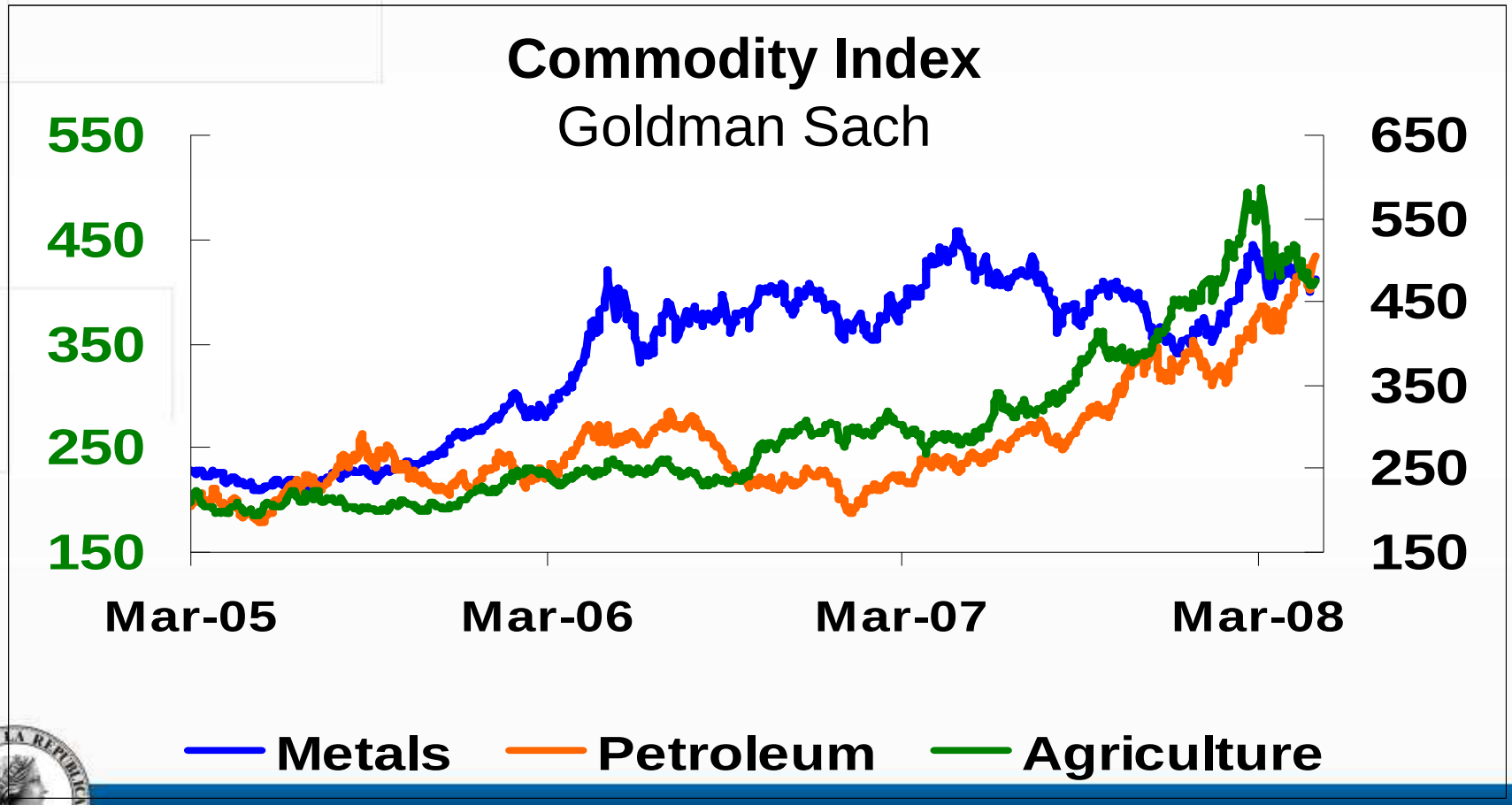

Source: Chicago Board of Trade (as reported by Bloomberg).

## Corn

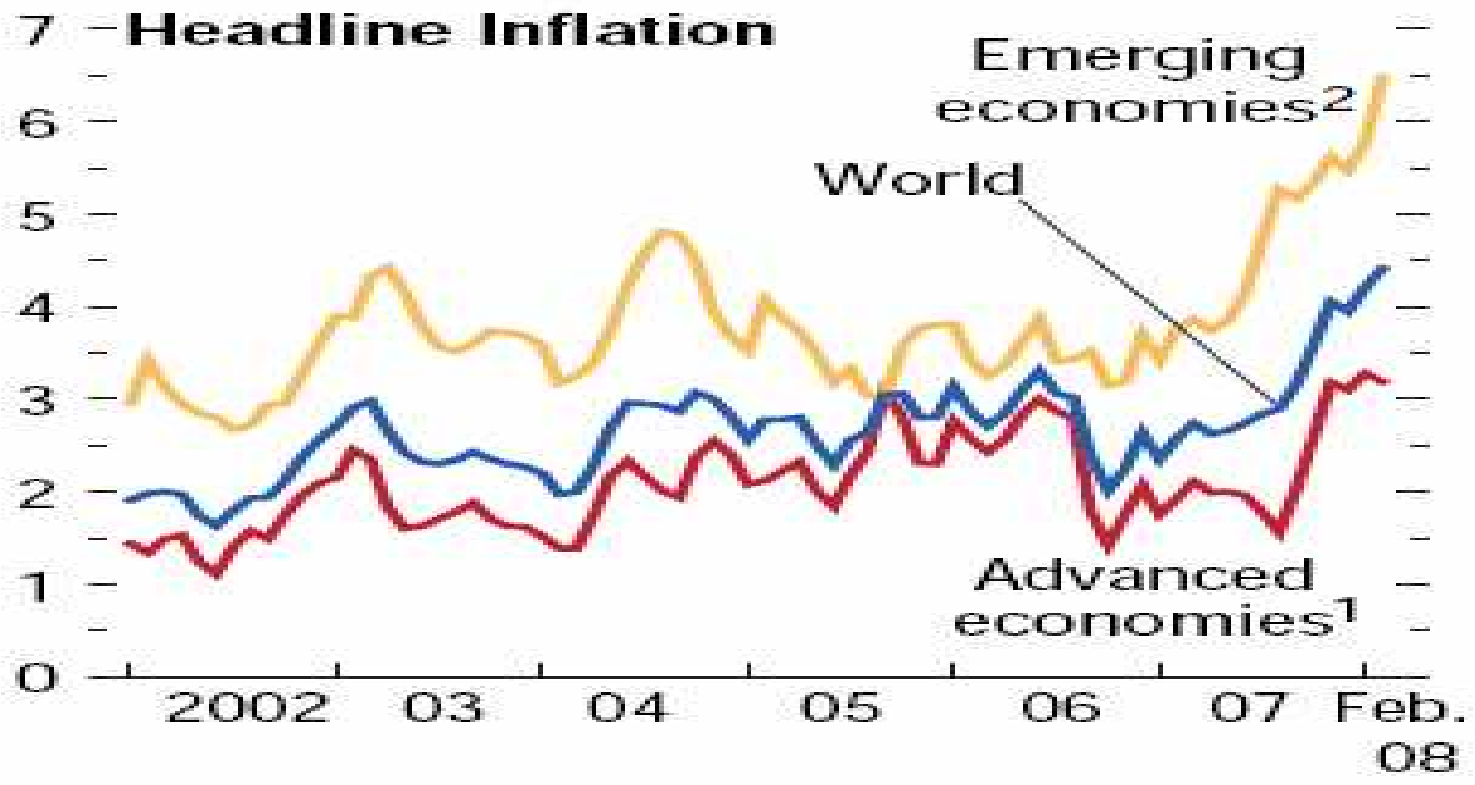
*Number of futures contracts (5,000 bushels ea.)*



# Oil prices sustain food prices, in particular raw materials for animal protein and biofuels (28% of US corn and 60% of EU oilseeds for biofuels)

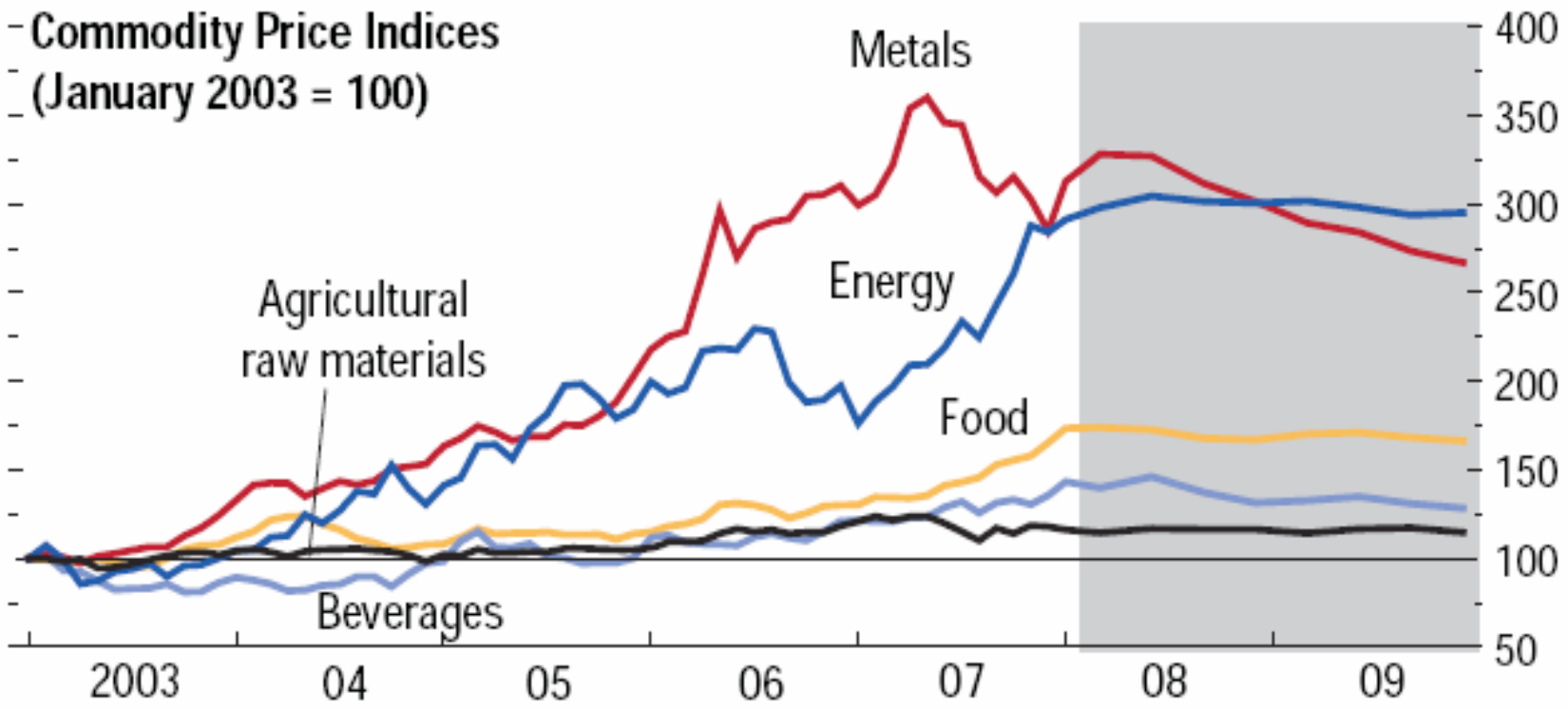


# Result: Inflation is returning




Sources: Haver Analytics; and IMF staff calculations.
[1]Australia, Canada, Denmark, euro area, Japan, New Zealand, Norway, Sweden, United Kingdom, and United States.
[2]Brazil, Bulgaria, Chile, China, Estonia, Hong Kong SAR, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Poland, Singapore, South Africa, Taiwan Province of China, and Thailand.

# Commodity prices are expected to remain high, at least during two more years




Sources: Bloomberg Financial Markets; and IMF staff estimates.

# III. TECHNOLOGY RESPONSE

# Finally, technological innovation will help to dissolve food-driven inflationary pressure

| | |
|---|---|
| 1 | Biotechnology: substantial leaps in productivity and resistance to drought, erosion and soil salinity. |
| 2 | Biofuels based on new sources that do not compete with food: jatropha, micro-algae, biomass (bamboo, switchgrass), cellulose (wood). |
| 3 | Renewable Energy: nuclear (General Electric, Westinghouse, Toshiba, Hitachi and AREVA), wind power, solar thermal, hydro, geothermal, ocean. |
| 4 | Development of hybrid engines and mass use of hydrogen instead of gasoline. |
| 5 | Opening up new environmentally-sustainable agricultural frontiers, such as the Orinoquia region in Colombia (6 million hectares). |

# Have we taken advantage (or wasted) the 'good times' up to now?

- **Parafiscal or self-tax funds?**
- **Stabilization funds, such as the petroleum fund in Norway or the copper fund in Chile?**
- **Are we saving to invest in new know-how and innovation in biotechnology?**

# No bonanza in the world has lasted so long

***"…there come seven years of great plenty throughout all the land of Egypt, and there shall arise after them seven years of famine, and all the plenty shall be forgotten…"***

**Genesis 41: 29-30**

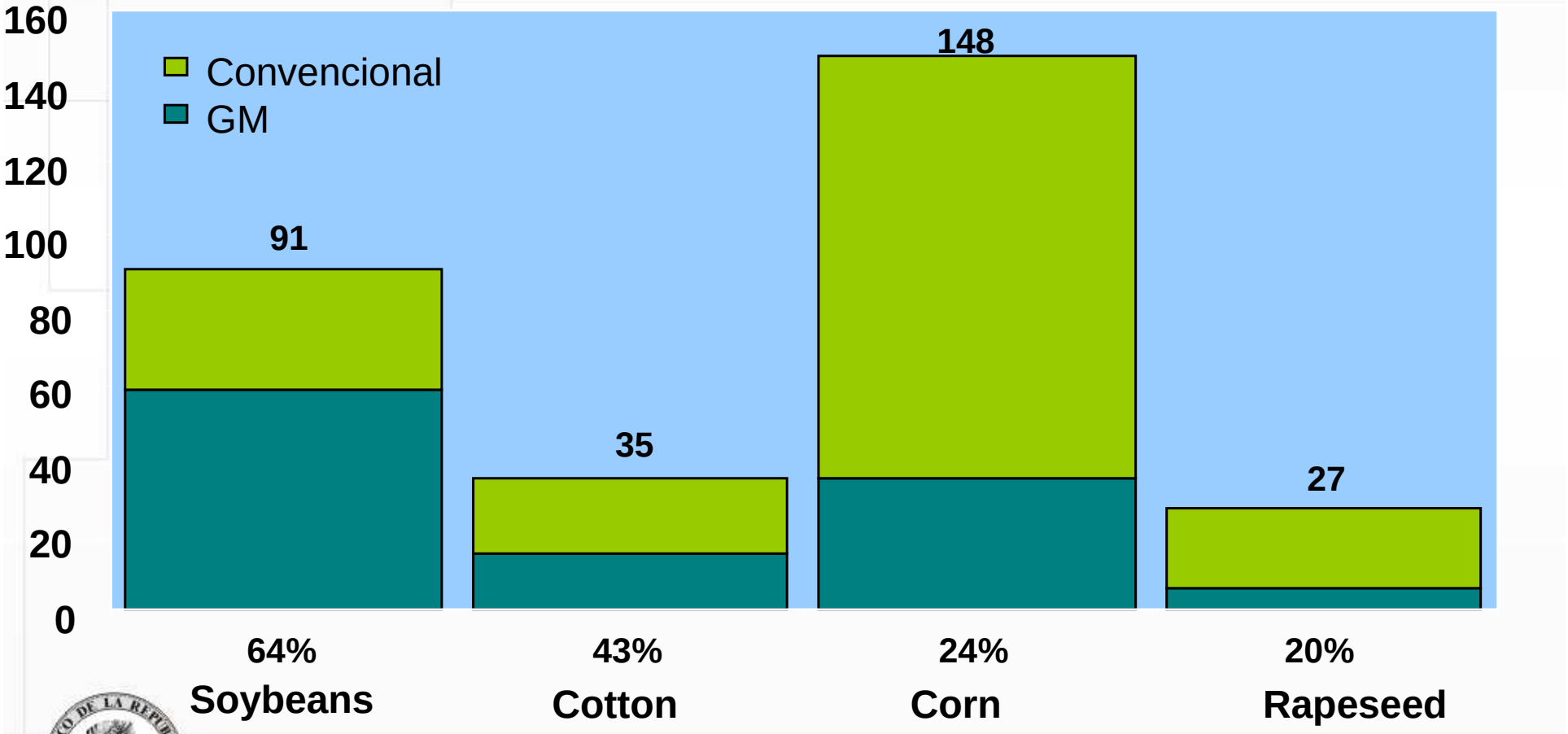
# Biotechnology: the second green revolution that is only beginning

**Use of live organisms or their derivatives to modify or improve plants or animals or to create microorganisms for specific applications. Has made it possible to improve crops by creating multiple species in far less than half the time phyto-improvers required to obtain new varieties through natural selection or to obtain hybrids.**

# GMO (genetically modified organisms) are the off-spring of biotechnology

**The first GMO, in 1994. In 2007, 114.3 million hectares (8% of the world's surface), including 11.2 million dedicated to biofuels. In 2010, there will be more than 150 million hectares. The United States, Argentina, Brazil, Canada, India and China are the leaders; that is, the agricultural powers of the planet. This year, GM rice will make history.**

# Remember Club of Rome in 1970 or the response of technology: nuclear energy, hydrogen, hybrid motors, second green revolution with biotech seeds, etc.



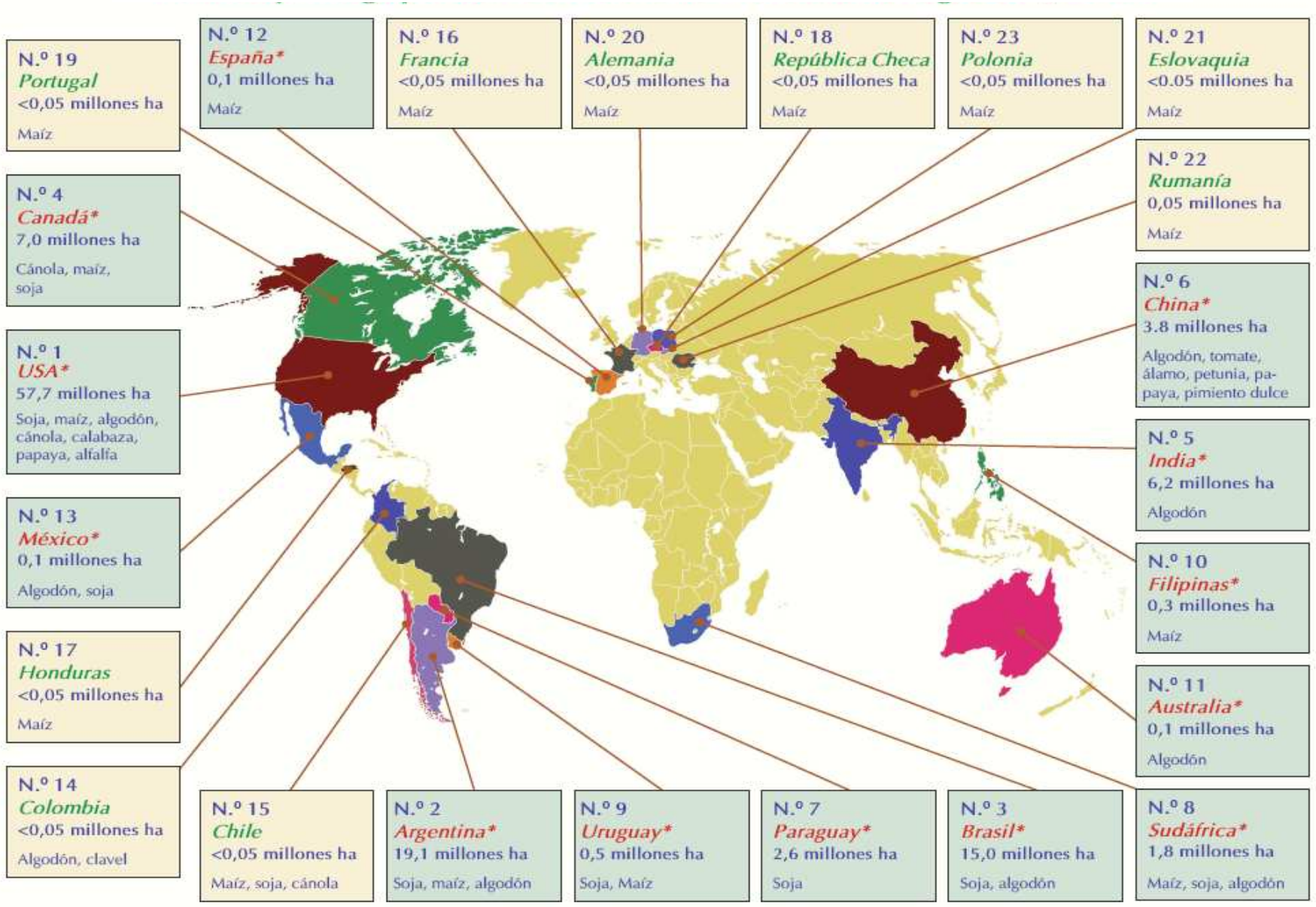
# The response of biotech: 114 m of has (8% of world arable land). The leaders:

| País | Has. mills | Crops |
|---|---|---|
| UE | 57,7 | Soybeans, corn, cotton. Biofuels: 10,4 |
| Argentina | 19,1 | Soybeans, corn, cotton |
| Brasil | 15,0 | Soybeans, cotton, corn. Biodiesel: 0,75 |
| Canada | 7,0 | Rapeseed,corn, soybeans. Biodiesel: 0,05 |
| India | 6,2 | Cotton |
| China | 3,8 | Cotton, tomato, ¿rice?, oilseeds |
| Paraguay | 2,6 | Soybeans |
| South Africa | 1,8 | Corn, soybenas, cotton |
| Colombia* | 0,3 | * 14. Cotton, corn |

# Adoption in Europe: 2007

- **Europe: 100,000 hectares – 77% growth 2006-2007:**
  - **Eight out of 27 EU countries used GM seeds.**
  - **Bt-corn is the GM crop in the EU.**
  - **Spain is the number one country, with 70,000 hectares of corn**
- **France, the Czech Republic, Portugal, German, Slovakia, Spain, Rumania and Poland (which only started in 2007)**

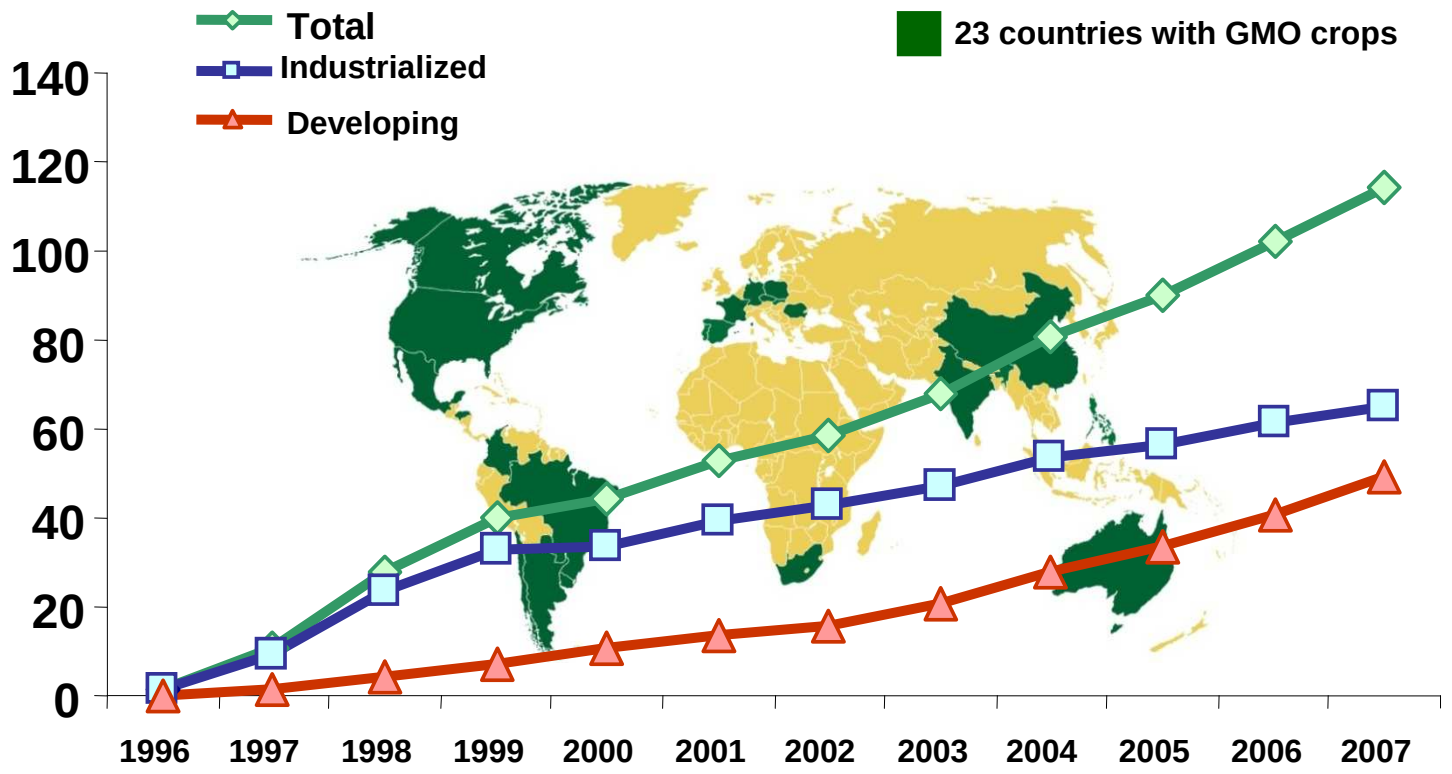
# Countries and Mega Countries with Biotechnological Crops




* **13 biotechnological mega countries grow at least 50,000 hectares of biotechnological crops.**

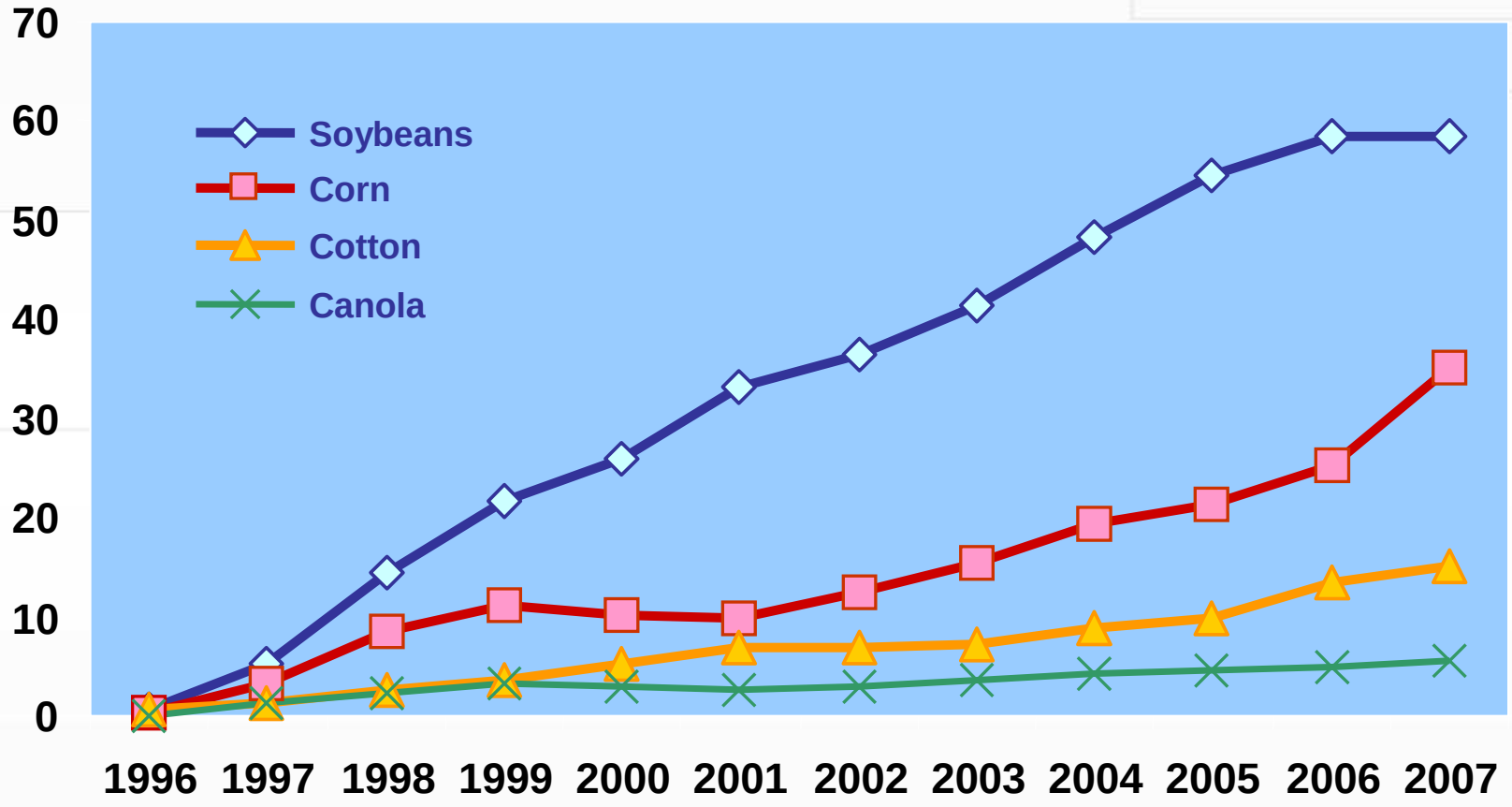
**Source: Clive James, 2007.**

# GMO Crop Area Worldwide
# Millions of Hectares (1996-1997)




**12% increase, 12.3 million hectares (30 million acres) between 2006 and 2007**
**Source: Clive James, 2007.**

# GMO Crop Area Worldwide: 1996-2007
# By Crops (Millions of hectares)



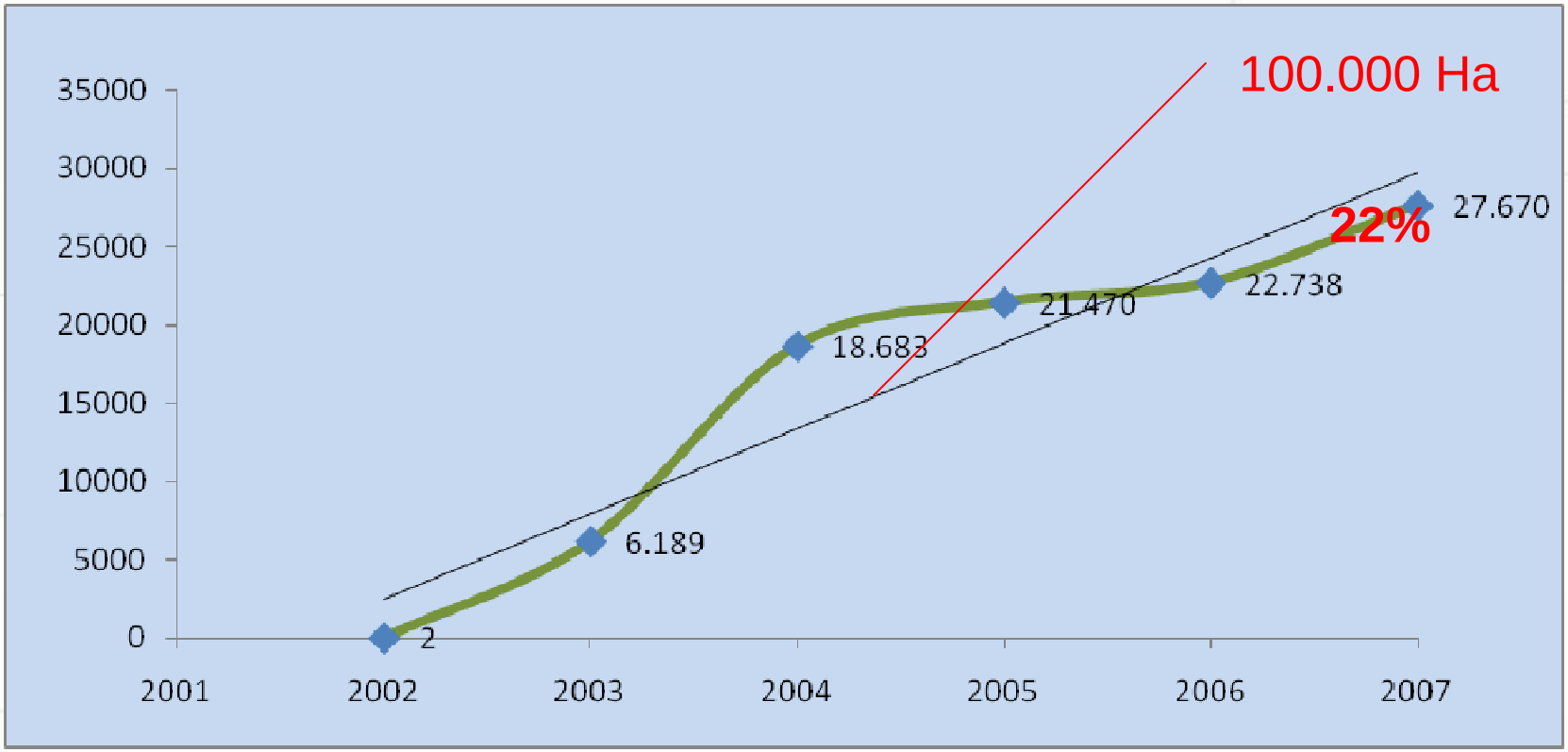

**Source: Clive James, 2008**

# India and China report tangible benefits

- **Bt-cotton increased the field yield in India by 50% and average income per hectare by USD250.**
- **In China, the field yield was up by 10% and average income per hectare by USD220.**
- **50% reduction in use of insecticides**

**Source: Clive James, 2008**

# Total GMO Crop Area in Colombia: 2007 (Hectares)




- **In six years with GM crops, a total of 96,752 hectares have been planted in Colombia.**
- **In 2007, there was an increase of 22% in amount of land in Colombia planted with GM crops.**

**Source: Ica, 2008**

# GM Crops in Colombia

- **27,670 hectares in 2007 versus 22,738 in 2006 (+22%).**
- **Colombia: 14th in the world**
- **The blue carnation was the first GM crop, followed by cotton in 2003.**
- **Controlled planting of GM corn is now authorized. Insect resistant technology/ tolerance to herbicides/ combined. HOWEVER, ITS COMMERCIAL APPLICATION IS CURBED.**
- **Approval of the GI corn-soybean system for mass application in Orinoquia is urged.**

# Pending Tasks

1. **Elimination of red tape hindering the mass adoption of biotechnology**

2. **Joint ventures with public and private sources of biotechnology to develop species based on gene inoculation of local varities. various sites. Important experiences: Embrapa and Copersucar in Brazil; Ji Dai, An Dai and Hebei Provincial Seed Company in China; and Clarck in South Africa.**

3. **Biotechnology for biofuels based on sources that do not compete with food, such as jatropha, microalage, biomass and cellulose. The potential of grass such as switchgrass and bamboo are important to bear in mind, along with the microalgae program at the U. of Antioquia.**

## In the next ten years:

- **Fruits and vegetables resistant to drought, salinity and pests, and enriched with antibodies and vaccines; that is, 'functional' fruits and vegetables.**
- **News sources of biofuels that do not compete with food.**
- **Oil seeds-omega 3 fats**
- **Fodder enriched with amino acids and phosphates**

# Thank you