The Green Revolution In Brazil

Lessons And Consequences

Eswar Anandapadmanaban	eswara@mit.edu
Jordan Benjamin	jordbenj@mit.edu
Mario Contreras	deku@mit.edu
Alexis Cuellar	alexisc@mit.edu
Tiffany Tao	tifftao@mit.edu
Daly Wettermark	dalyw@mit.edu

1950 - 1970: Slow Growth - Horizontal Expansion

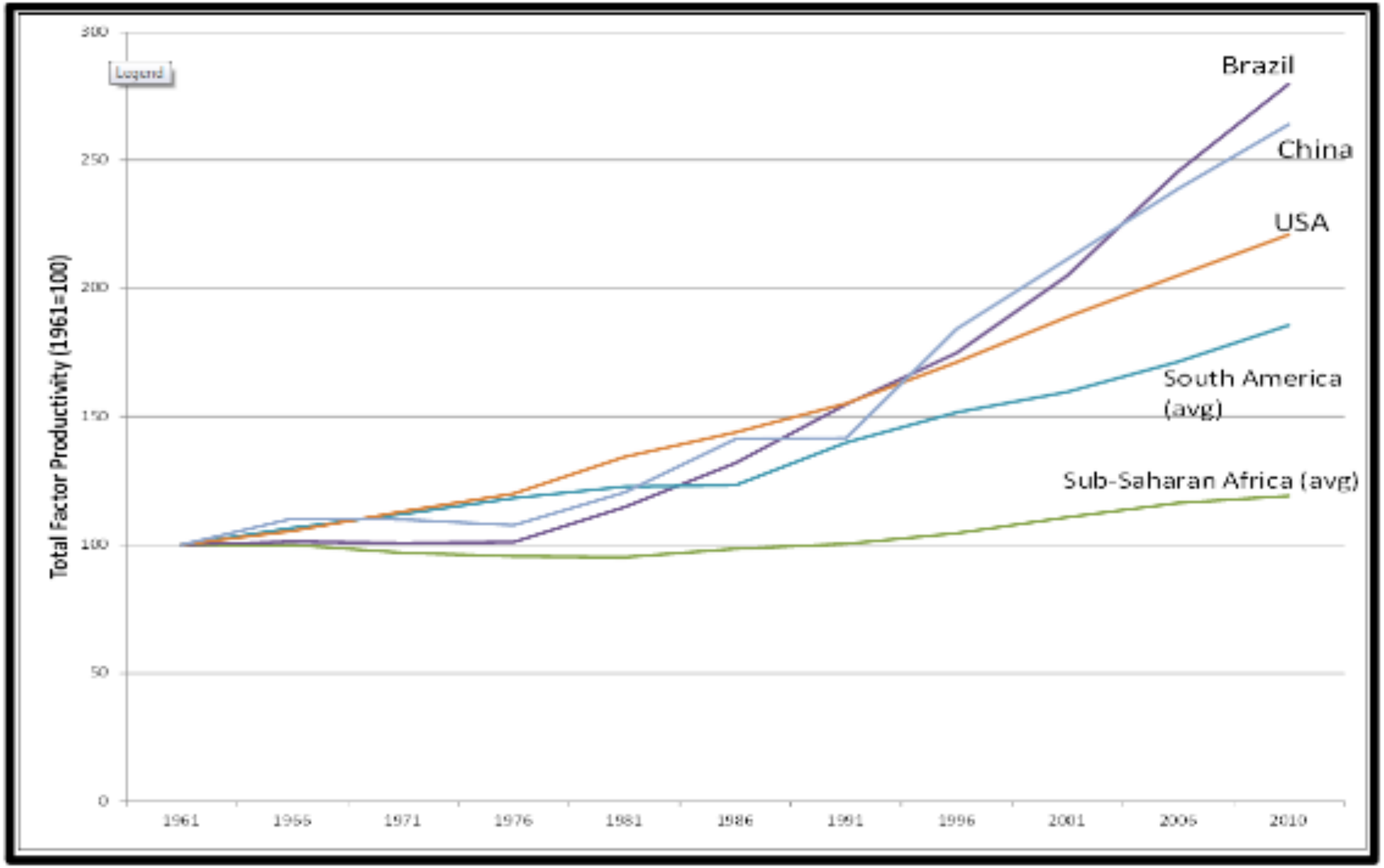
- As the Green Revolution began in the rest of the world, Brazil had no real changes in technology

- Colonial economy
  - Exported cash crops: coffee, cotton, sugar, etc.
  - Small subsistence sector for domestic market
    - Still a net importer of crops

- Horizontal expansion due to incorporation of more land
  - No change in yield per unit land
  - 5.4% annual food production increase between 1950 & 1959
  - 82.5% increase in agricultural land between 1950 & 1970

- Investment in roadways
  - Better infrastructure for transporting goods

Figure 2: Total Factor Productivity in Agriculture for Selected Countries 1961-2010



Source: USDA Economic Research Service (2013)

1970s - 1990s: Modernization

Brazilian Agricultural Research Corporation (EMBRAPA) founded in 1973

- Diversification of Crops
- Higher Yield Crops
- Soil Development, Deacidification with lime

1970s: Large Scale (But Inefficient) Military Intervention

- Credit for Agricultural Development and Expenses
- Cheap Land For Agriculture (continues to this day)
    - Issues with deforestation, fires, and wildlife disruption
- Much land given to poor who cannot capitalize
    - Top 1% of farms produce > 50% income
    - Bottom two-thirds produce 3.27% of income

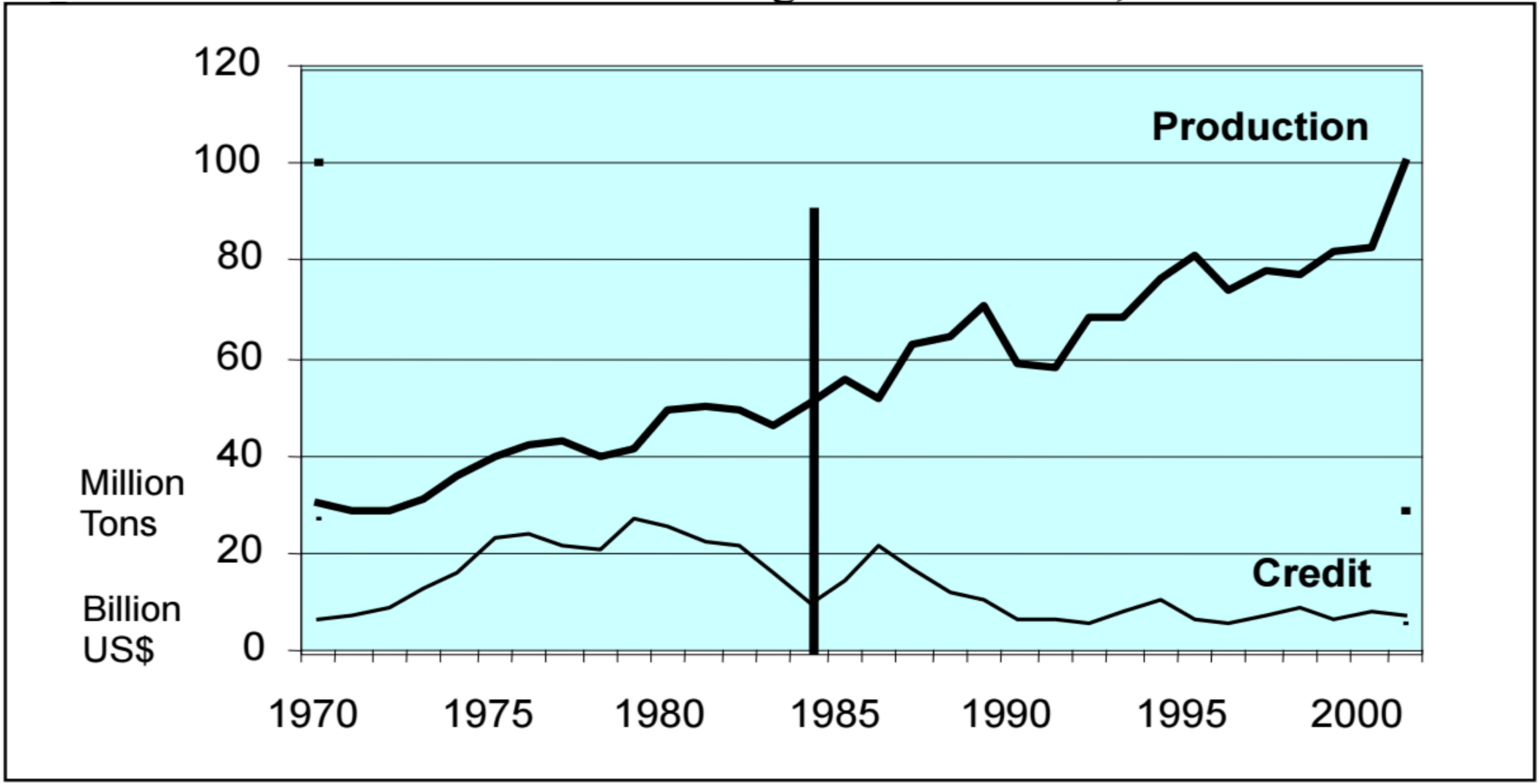
1980s Transition to Minimum price guarantees

- Did not encourage diversification
- Resulted in useless government agricultural stockpiles

1990s: Market Destabilization and Collapse

- Government intervention declines as markets become unstable and collapse
- Not entirely economic in nature

Production of Grains and Agricultural Credit, 1970-2001.



Sources: Production: CONAB, Ministério da Agricultura; Agricultural credit: Banco Central.

1990s - Present: Post-Modernization

- Government intervention once again, but with a long term focus
- Subsidized financial credit after economic crash
  - Mainly for capital financing and purchasing modern equipment
- Continued agricultural research
  - Particularly by universities to increase arable land
- More involved in international markets
  - Foreign investors bought out Brazilian farms
  - Displaced Brazilian workers
- More crops grown for biofuels
  - Soy bean/corn
- Worked on stabilizing prices
  - Establishing a fair competitive market.

What was done wrong?

- As technology increased output the market was flooded
- Allowing foreign investors to take control of large farming conglomerates
- Large corporate-owned farms make it difficult for small farmers to keep up economically
- Price stabilization efforts ended up causing unnecessary surpluses of some crops

What was done right?

- Government investment in roads helped move crops to the markets faster and at a lower cost.

- EMBRAPA research
  - Increased yield on existing amount of land
  - No-till agriculture
  - High-yield crop varieties
  - Became highly efficient in producing soy and other cash crops for export
  - Conversion of barren soil into arable soil expanded usable land

- Eventually, subsidies for small farmers allowed them to invest in new technologies and keep up with larger farms.

How can we do it better in the future?

New innovations should come with regulations to prevent market failure.

Make more of an effort to preserve natural species when land is converted to be used for agriculture.

Don’t create surpluses just because we have the capability. Instead, focus on sustainability and and producing a full spectrum of food for the country’s own people

Finally, from a global perspective, the increase in agricultural exports in Brazil reflects the important contribution of the country to reduce world hunger and macroeconomic (inflationary) pressures, and to stabilize prices in agricultural markets. This ability to expand its agricultural production in a sustainable, scientific-based path will inevitably strengthen Brazil's role in world markets in the near future.

Sources

- http://www.agricultureandfoodsecurity.com/content/1/1/4
- http://www.agricultureandfoodsecurity.com/content/pdf/2048-7010-1-4.pdf
- http://www.tandfonline.com/doi/abs/10.1080/03066150.2010.512458#aHR0cDovL3d3dy50YW5kZm9ubGluZS5jb20vZG9pL3BkZi8xMC4xMDgwLzAzMDY2MTUwLjIwMTAuNTEyNDU4QEBAMA==
- http://www.brazil4africa.org/wp-content/uploads/publications/working_papers/IRIBA_WP02_What_Explains_The_Intensification_and_diversification_of_Brazil's_Agricultural_Production_and_Exports.pdf
- http://www.ers.usda.gov/media/849059/err137_reportsummary.pdf