The Future of South American Agriculture

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and
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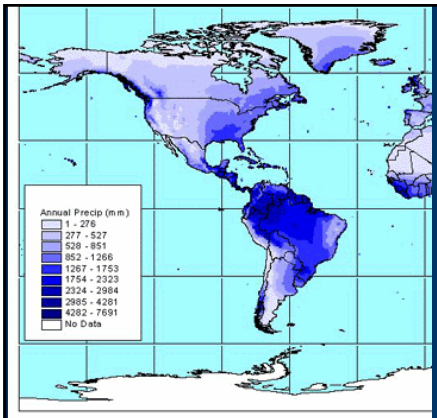
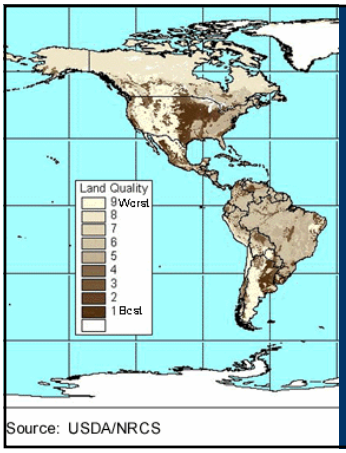


Source: Climatic Research Unit, University of East Anglia

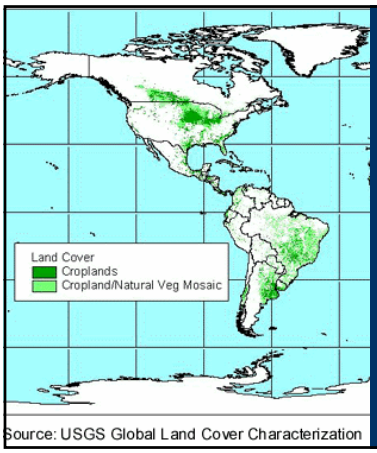
Average Precipitation 1961-1996



Source: USDA/NRCS

Land Quality

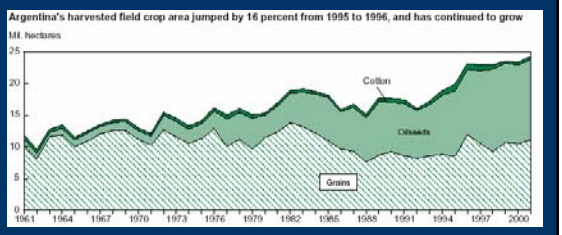
IGBP Cropland



Source: USGS Global Land Cover Characterization

Argentina

Argentina's Harvest Field Crops



Argentina

- Geographic concentration of production
  - 300 kilometers to ports
  - 80% transported by truck
  - The ports at Rosario-San Lorenzo-San Martin complex handles 56% of all Argentina grain exports
  - Export terminals load 40,000 tons per hour with storage capacity of 3.9 million tons in 24 ports

Argentina

- Poor infrastructure and logistics
  - Total harvest 65 million tons; storage capacity 49 million tons
  - Shortage of storage and truck capacity at harvest
  - Highways in poor shape; only 30% are paved
  - Privatized highways but still expensive tolls
- But improving rapidly
  - Producer - FOB spread down from $68/ton during 80s to just $11/ton since 1991
  - Port costs down from $9/ton in 1990 to $4/ton in 1998
  - Privatized railway rates down 40% recently

Argentina

- Compared efficiency between Argentina and US railway transport
  - Argentina: full train of 40 rail cars, each holding 40 tons, moves 1,600 tons at a time;
  - US: 100 car units each holding 100 tons, move 10,000 tons at a time

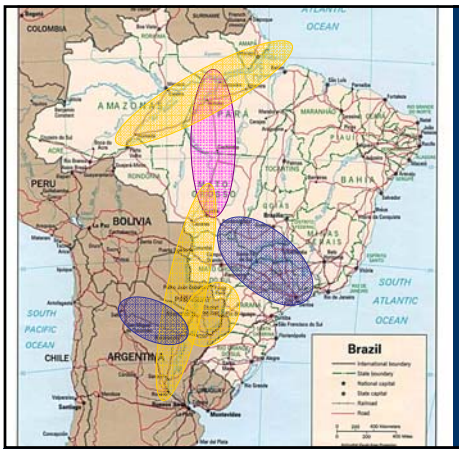
Argentina

- Port terminals expansions
  - Cargill terminals at Quebracho and Bahia Blanca
  - Glencore-Toepfer at Bahia Blanca
  - Louis Dreyfus terminal at General Lagos
  - Terminal 6 at Puerto San Martin
- Transport improvements
  - Parana river dredged to 32 feet allowing Panamax vessels
  - Barge transport logistics on Paraná- Paraguay waterway
  - Rail service connection between northwest growing region to barge loading facilities in Resistencia

Argentina

Brazil

- 80% of exports through southern ports
- Margin improvements from farm gate to F.O.B. export ports (1983-1997)
  - Parana from $52/ton down to $31/ton
  - Mato Grosso do Sul from $76/ton down to $47/ton



Pink – Road
Blue – Rail
Yellow - Barge

Brazil

- Recent developments
  - Privatization of railways
  - Madeira-Amazon Waterway
    - 1 million tons 1999-2000
    - $84/ton central Mato Grosso to Rotterdam
  - Tiete-Parana Waterway
  - BR163 highway from Cuiaba north to Santarem
  - Ferronorte Santos-Mato Grosso
    - 780 95-tons railcars; 50 locomotives
  - Parana-Paraguay waterway
    - Dredging impact on Pantanal wetlands

Hidrovia Parana- Paraguay

- 3,700 km (2,200 miles) navigable with locks or dams
- Barges carry up to 6 million tons of agriculture products
- Production flows through farmland in Bolivia, Brazil and Paraguay to River Plate into Atlantic Ocean
- To Argentina's crushing plants and Rosario & Santa Fe ports
- Ongoing infrastructure developments to improve Hidrovia logistics

Hidrovia Parana-Paraguay

- Barges and trucks compared (figures from Argentina)
- One barge = 50 trucks = 30 railway cars
- One barge = 1,400 tons
- One barge convoy = 20-25,000 tons
- Cost for 250 kilometers
  - truck $13 per ton
  - railway $10.5 per ton
  - barges $5 per ton

Means of Transport and Costs

	Use of transport means (%)			Transport costs (US$/ton/1000 km)		
	Argent.	Brazil	USA	Argent.	Brazil	USA
Road	82	67	16	60	33-50	45
Railway	17	28	23	50	25-30	25
River	1	5	61	10	13	5
			Weighted Price	58	36	16

Source: Rabobank International, 1998

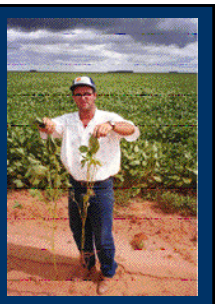
Cerrados

- 207 million hectares
  - 50 million are currently used
  - 90 million more could be used
  - Equal to all US acreage on corn, soybeans, wheat and feed grains

Cerrados

- First settlers in 60s
  - soil management constraints
  - poor environmental fit of available crops
- Late 70s
  - soil management technologies
  - tropical soybeans
- Migrant farmers from southern states
  - sold 1 hectare , bought 4-10 hectares in Cerrados

Two seasons: one rainy (Sept.-March) and one dry (April-Aug) rainfall varies: 2000 mm (78”) in the central west , 800 mm (31”) in the northeast



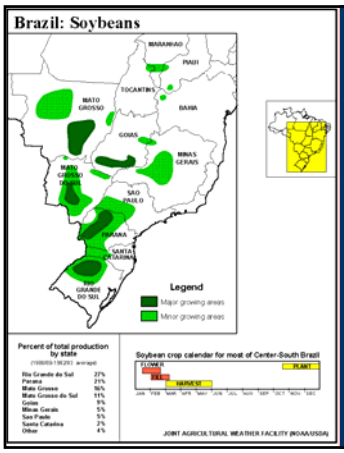
- Low fertility, acidic soils
- Requires use of limestone and fertilizer
- Very well drained, deep and easy to cultivate

The H Farm

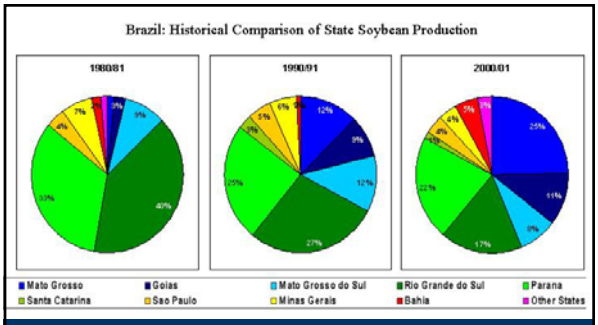
18,000 hectares
Soybeans 4,000; edible beans 2,000; upland rice 2,000; corn 950; cotton 3,500
$15 million gross receipts ($337 per acre)

Opening Cerrado Land

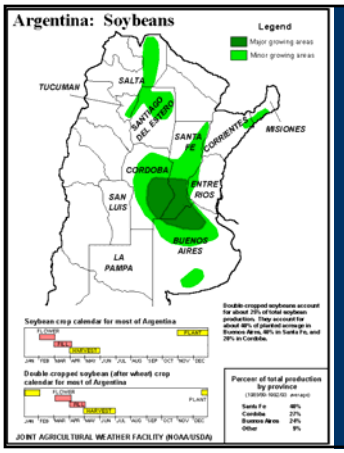
- Remove wooded vegetation
- Disk, lime and plant
- Upland rice first crop
- Fertility and time (5 years for high fertility)
  - Third year before 50 sacks/ha soybean yield
  - Fifth year before 120-150 sacks/ha corn yield
- Seven to ten years for development
- Land prices range from $40 to $800 per acre



Brazilian Soybean Production

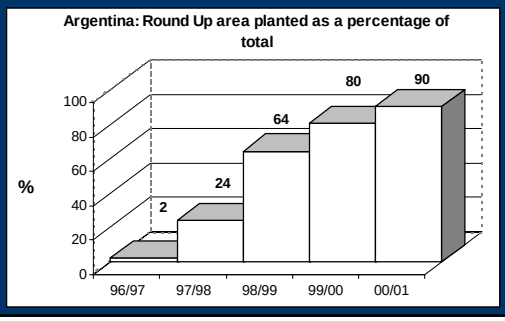


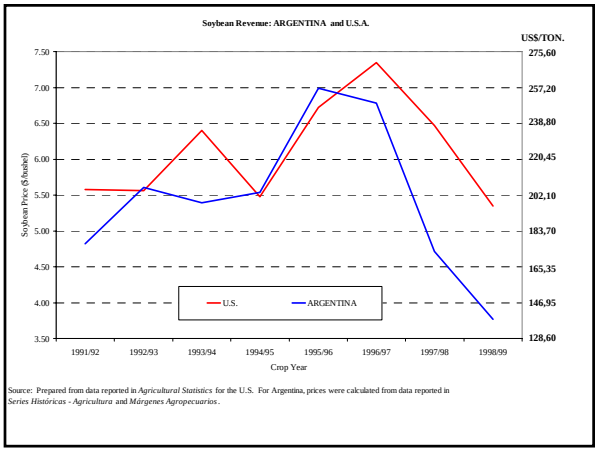
Source: FAS/USDA



Argentinean Soybean Production

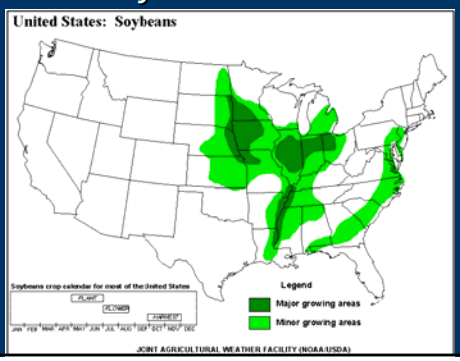
Round-Up Ready Use



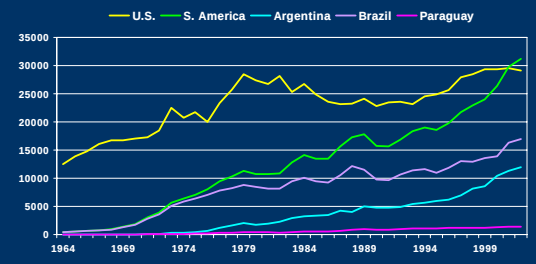


Source: Prepared from data reported in *Agricultural Statistics* for the U.S. For Argentina, prices were calculated from data reported in *Series Históricas - Agricultura* and *Márgenes Agropecuarios*.

U.S. Soybean Production

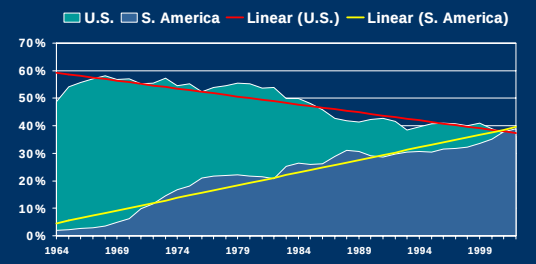


Soybean Area Harvested (1000 Hectares)

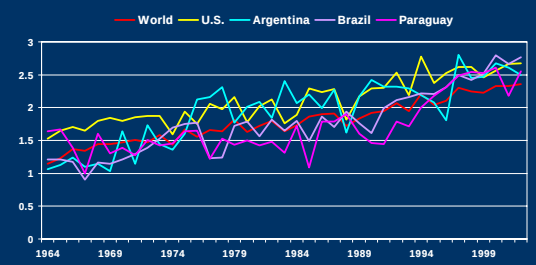


1 Hectare = 2.47 Acres

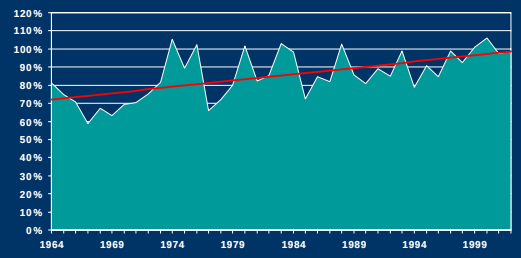
Percent of World Acres Harvested



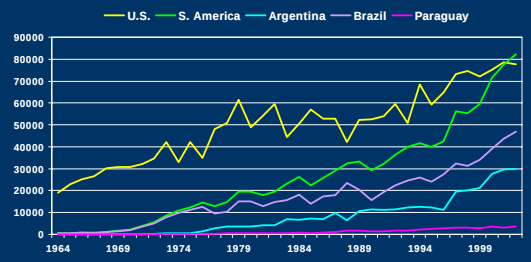
Soybean Yield (tons per hectare)



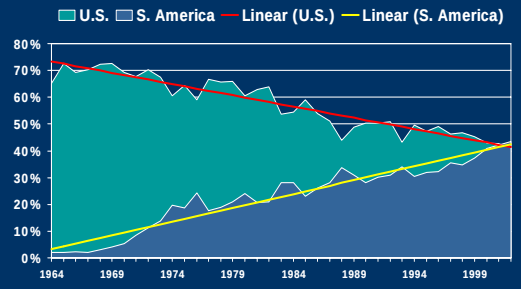
South American Soybean Yield as a Percent of U.S. Soybean Yield



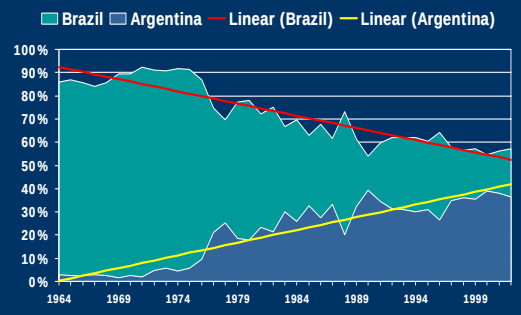
Soybean Production (1000 tons)



Percent of World Soybean Production



Percent of South American Soybean Production



Brazil Soybean System

- Center-West frost free; three crops are possible
- 90 million hectares of Cerrado still available
- Land costs in Matto Grosso perhaps 1/10 of U.S. (but not for same quality)
- Large scale farming (2/3 of area over 1000 hectares per farm)
- Yields near parity with U.S. (for improved land)
- South region is 500 km to ports (310 miles)
- Matto Grosso is 1500 km to ports (930 miles)

Table E-1—Soybean production costs: United States, Brazil, and Argentina, 1998/99

Cost item	U.S. Heart-land[1]	Brazil[2] Parana	Brazil[2] Mato Grosso	Argentina N. BA / S. SF[3]	Argentina Chaco
			U.S. $ per acre		
Variable costs:					
Seed	19.77	16.69	11.23	n/a	17.90
Fertilizers	8.22	20.66	44.95	n/a	0.00
Chemicals	27.31	20.56	39.97	n/a	16.90
Machine operation/repair	20.19	26.88	18.22	n/a	24.00
Interest on capital	1.81	5.63	12.11	n/a	n/a
Hired labor	1.29	22.72	5.58	n/a	4.30
Harvest	n/a	n/a	n/a	n/a	22.24
Miscellaneous	n/a	2.00	n/a	n/a	n/a
Total variable costs	**78.59**	**115.14**	**132.06**	**96.29**	**85.34**
Fixed costs:					
Depreciation of machinery/equipment[5]	47.99	41.04	8.97	19.09	
Land costs (rental rate)	87.94	14.28	20.54	62.72	
Taxes and insurance	6.97	1.63	0.55	n/a	
Farm overhead[6]	13.40	n/a	n/a	20.67	
Total fixed costs	**156.32**	**56.95**	**30.01**	**102.47**	
Total production costs	**234.91**	**172.09**	**162.08**	**198.76**	
Yield (bushels/acre)	**46.00**	**41.35**	**41.65**	**50.60**	
Variable costs per bushel	1.71	2.78	3.17	1.90	
Fixed costs per bushel	3.40	1.38	0.72	2.02	
Total costs per bushel	5.11	4.16	3.89	3.92	

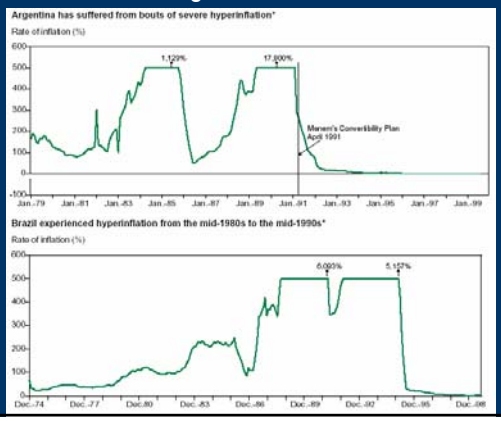
Source: ERS/USDA

Table E-2—Hypothetical assessment of "export cost competitiveness," 1998/99

Cost item	U.S. Heartland	Brazil				Argentina	
		Parana		Mato Grosso		Buenos Aires / Santa Fe	
	$/bu.	$/bu.	% of U.S. cost	$/bu.	% of U.S. cost	$/bu.	% of U.S. cost
Production costs:[1]							
Variable costs	1.71	2.78		3.17		1.90	
Fixed costs	3.40	1.38		0.72		2.02	
Total production costs	**5.11**	**4.16**	**81**	**3.89**	**76**	**3.92**	**77**
Internal transport & marketing[2]	0.43	0.85		1.34		0.81	
Cost at border	**5.54**	**5.01**	**90**	**5.23**	**94**	**4.73**	**85**
Freight costs to Rotterdam[3]	0.38	0.57		0.57		0.49	
Price at Rotterdam	**5.92**	**5.58**	**94**	**5.80**	**98**	**5.22**	**88**

Source: ERS/USDA

Farming with Inflation?



Macroeconomic Forecasts

Variable	Argentina	Brazil
Inflation (02)	45%	5.5%
Inflation (03-0-7)	11%	5.8%
Turmoil (18 months)	High	Moderate
Country Risk Premium	13.5%	9%
Total Risk Premium	18.7%	14.2%
Long-Term Rating	Ca	B1
Exchange Rate	3.67	3.12

Conclusions

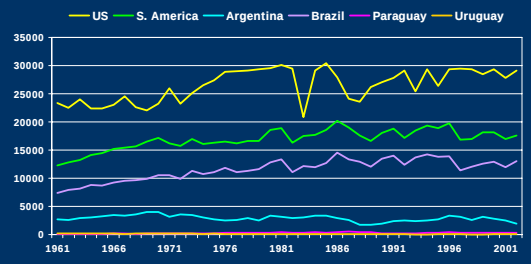
- Land exists and there is the potential for growth in regions of Brazil.
- Brazil and Argentina will be strong competitors in the future.
- Markets work! Land price is differentiated by risk, taxes, and development costs.
- What price is needed to bring that land in production?
- What risk are you willing to bear?
- Can you get a 25%+ return on your investment?
- If it sounds too good to be true, it might be!

References

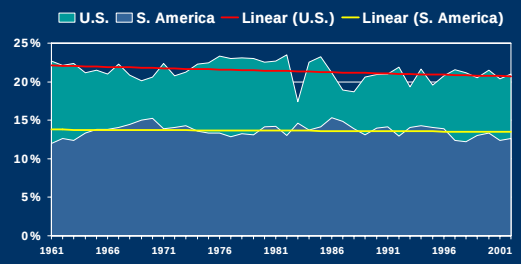
- Ag Brazil Website
  - www.AgBrazil.com
- Agriculture in Brazil and Argentina: Developments and Prospects for Major Field Crops
  - http://www.ers.usda.gov/publications/wrs013/

Corn

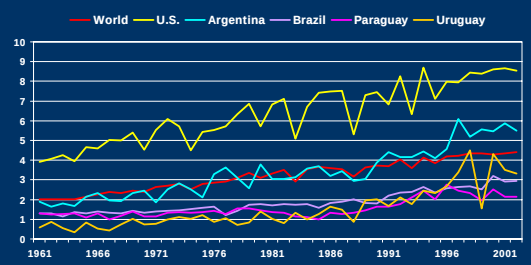
Corn Area Harvested (1000 hectares)



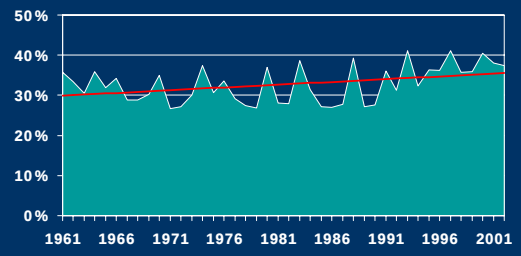
Percent of World Corn Acres Harvested



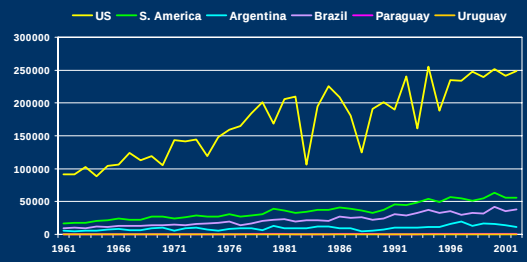
Corn Yield (tons per hectare)



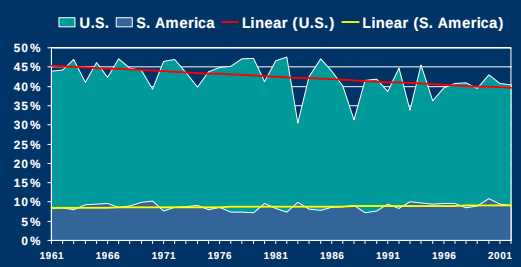
South American Corn Yield as a Percent of U.S. Corn Yield



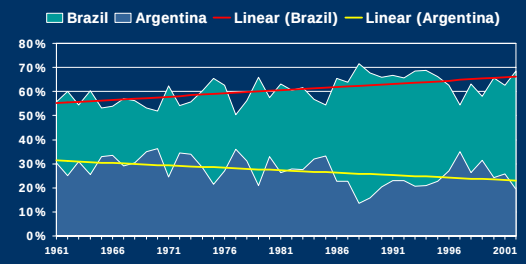
Corn Production (1000 tons)



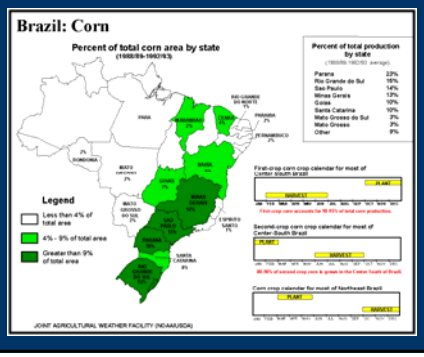
Percent of World Corn Production

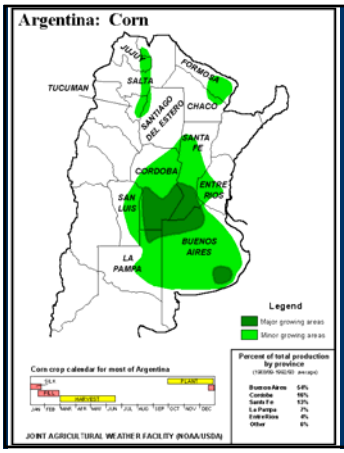


Percent of South American Corn Production



Brazilian Corn Production





Argentinean Corn Production

U.S. Corn Production