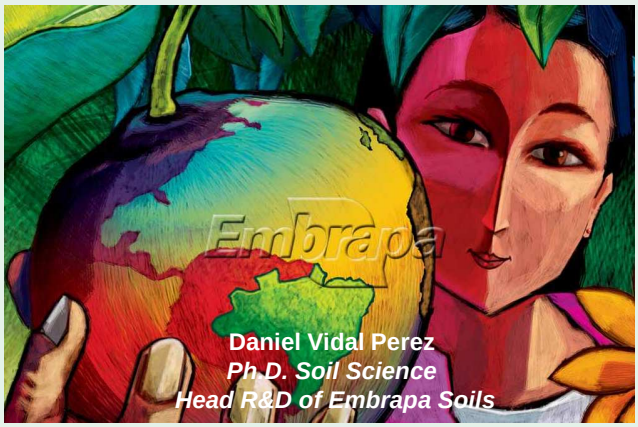
Keynote address on the evolution of agriculture and fertilization in Brazil



Daniel Vidal Perez
Ph.D. Soil Science
Head R&D of Embrapa Soils

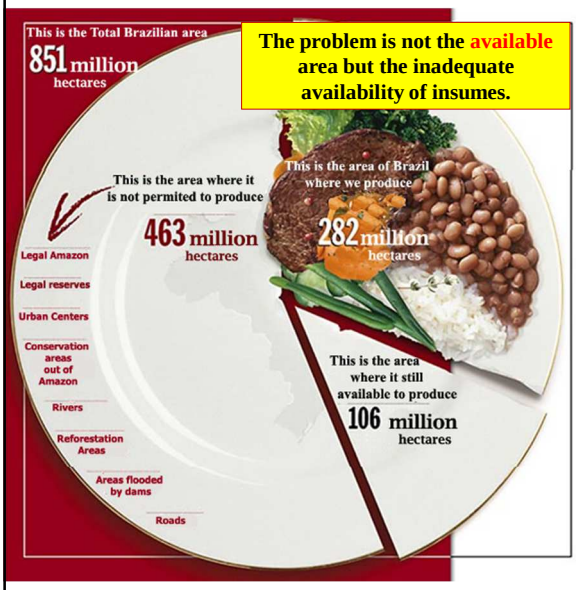
Embrapa 40 anos

Embrapa

Outline

- Highlights Brazil and Brazilian Agriculture
- Atual context of fertilizers importance to Brazilian Agriculture
- Historical relationship of Fertilizers, Food and Bioenergy production in Brazil
- Constraints and proposal solutions to advances in Tropical Agriculture

Brazilian Tropical Agriculture



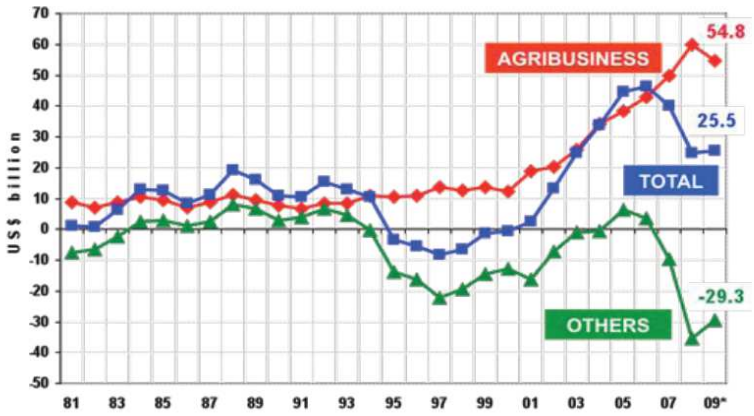
Edition: Revista VEJA, 03/03/2004
Source: IBGE e CONAB; Adapted from: MAPA

Land distribution

(Million ha)

Grassland	220
Annual Crops	47
Permanent Crops	15
Sub-total	282
Amazon Forest	345
Conservation Areas	55
Cities, lakes and roads	20
Planted Forests	5
Other uses	38
Areas that are still available for agriculture	106
TOTAL	851

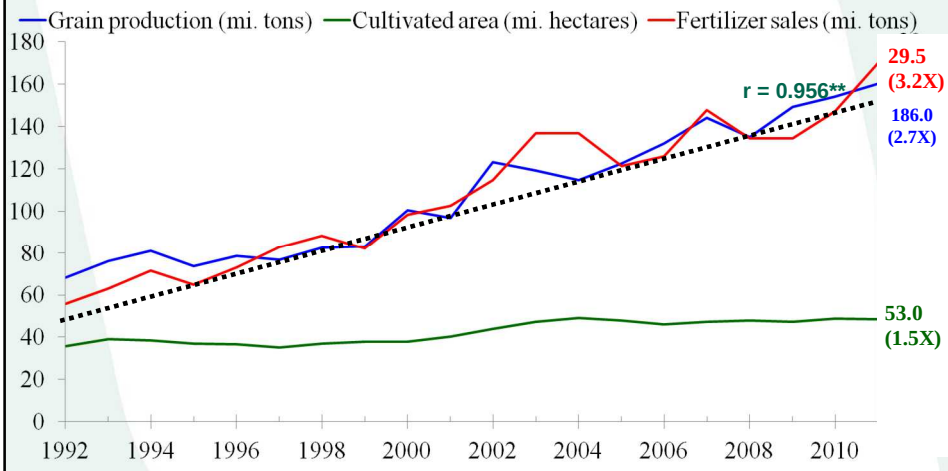
Inpact of Agriculture (agrobusiness) on Brazilian Comercial Trade



Agribusiness Trade Balance: 1989 to 2009.

(Prepeared by: Contini e Martha, 2010)_

The strategic importance of fertilizers for the grain production in Brazil



Source: ANDA e SIACESP, CONAB,AMABrasil, Business Sector, 2012 ; 2013

Elaborated by: Guilherme, L.R. and Lopes, A.S., 2012, atualized by J. C. Polidoro, 2013

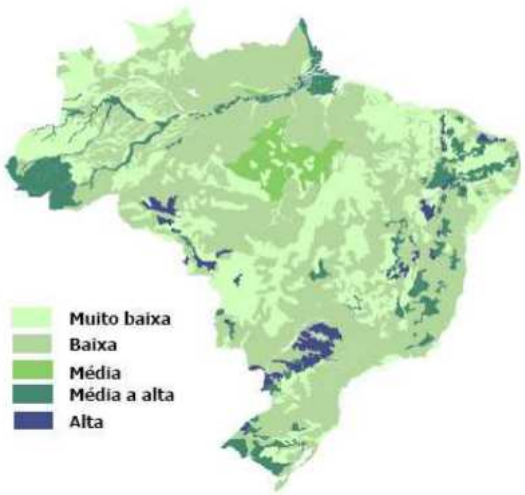
And...What's the Impact on natural resources?

The Techological advances in Brasilian Agriculture resulted in an " economy" of aproximately **80 millions** hectars in the natural ecological sistems, like Amazon forest and Savanas.

The Brazilian Natural Soil Fertility Map

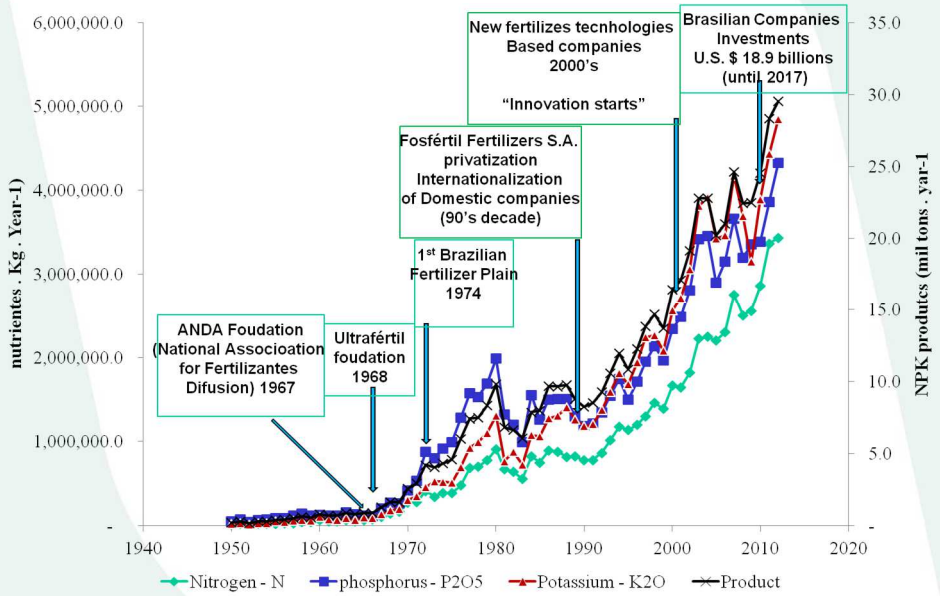
The major food producing areas, have naturally, acid soils and poor nutrients.

» **Without fertilizers, no productivity.**



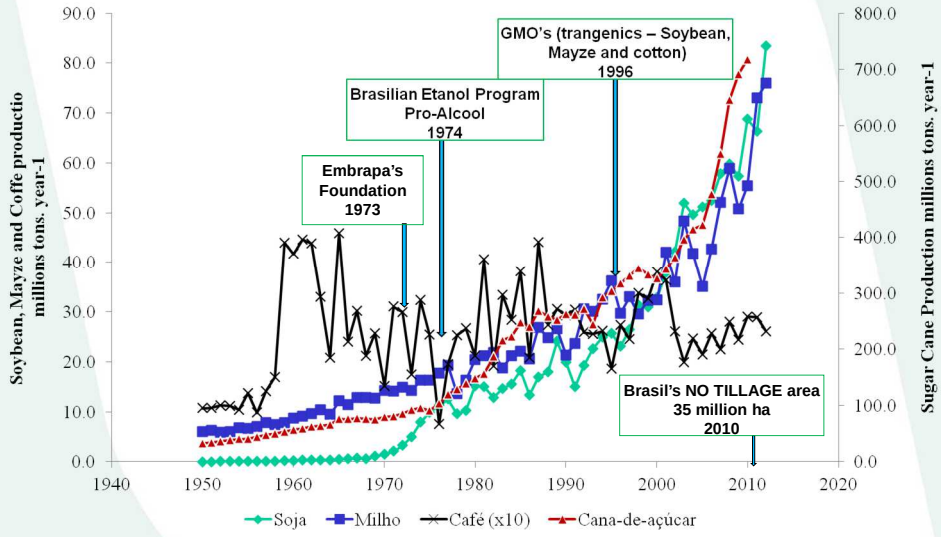
Sourse: IBGE, 2002

Historical Evolution of Brazilian Agriculture Fertilizer Consumption



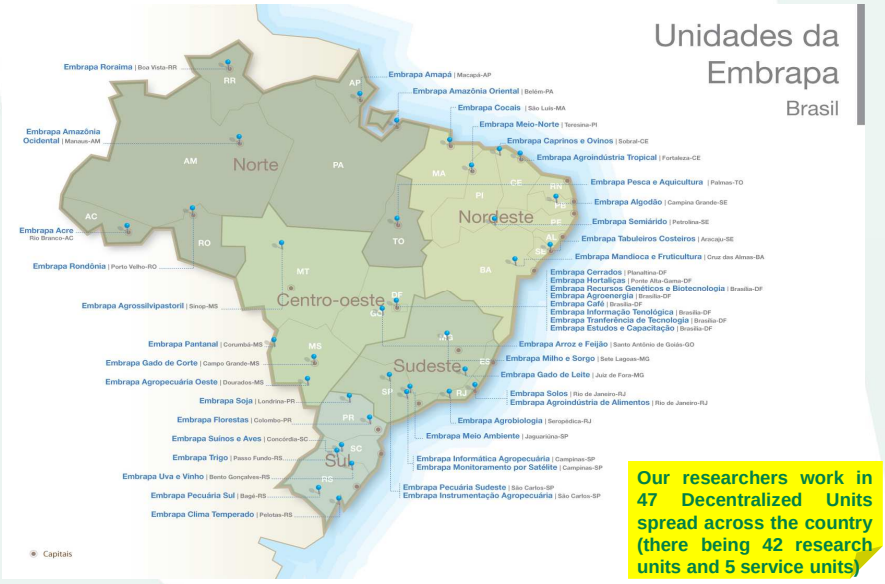
Source: Dias, J. C. Raizes da Fertilidade, 2005. ANDA, 1975-2012, Prepeared by Polidoro, J. C. 2013.

Historical Evolution of Brazilian Agriculture Development and Technology Innovation



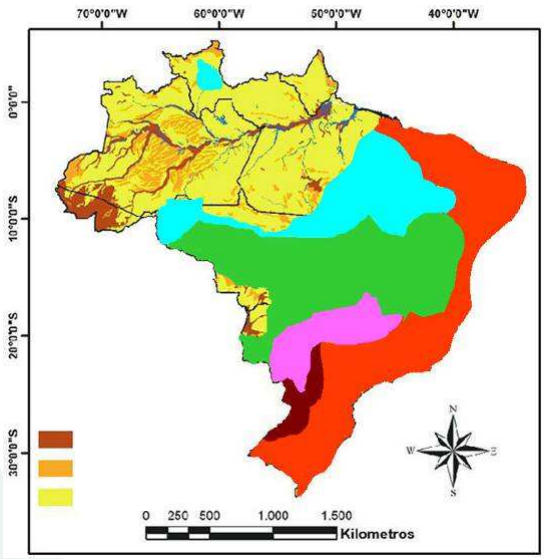
Source: CONAB, 2012, IPEA, 2012, Prepeared by Polidoro, J. C. 2013.

Embrapa



Our researchers work in 47 Decentralized Units spread across the country (there being 42 research units and 5 service units)

Historical Agriculture Expansion in Brasil



Until the 50's

During the 60's

During the 70's

During the 80's

Since the 90's until today

Brazilian fertilizer market: Share By State

ESTADOS	2011			2012			%	%
	NOV(a)	JAN-NOV(b)	%	NOV(c)	JAN-NOV(d)	%	(c/a)	(d/b)
MATO GROSSO	292	4.382	16,5	314	4.950	17,9	7,5	13,0
SÃO PAULO	474	3.814	14,4	451	3.778	13,6	-4,9	-0,9
RIO GRANDE DO SUL	318	3.197	12,1	369	3.394	12,3	16,0	6,2
MINAS GERAIS	473	3.362	12,7	488	3.344	12,1	3,2	-0,5
PARANÁ	270	3.363	12,7	280	3.282	11,8	3,7	-2,4
GOIÁS	287	2.499	9,4	227	2.493	9,0	-20,9	-0,2
BAHIA	150	1.775	6,7	128	1.826	6,6	-14,7	2,9
MATO GROSSO DO SUL	104	1.121	4,2	145	1.332	4,8	39,4	18,8
SANTA CATARINA	55	628	2,4	46	657	2,4	-16,4	4,6
MARANHÃO	49	447	1,7	61	456	1,6	24,5	2,0
ESPÍRITO SANTO	43	361	1,4	48	379	1,4	11,6	5,0
PIAUÍ	44	304	1,1	54	394	1,4	22,7	29,6
TOCANTINS	42	250	0,9	54	354	1,3	28,6	41,6
ALAGOAS	26	194	0,7	24	194	0,7	-7,7	0,0
PERNAMBUCO	22	180	0,7	18	179	0,6	-18,2	-0,6
SOMA	2.649	25.877	97,6	2.707	27.012	97,5	2,2	4,4
OUTROS	76	633	2,4	82	691	2,5	7,9	9,2
TOTAL BRASIL	2.725	26.510	100,0	2.789	27.703	100,0	2,3	4,5

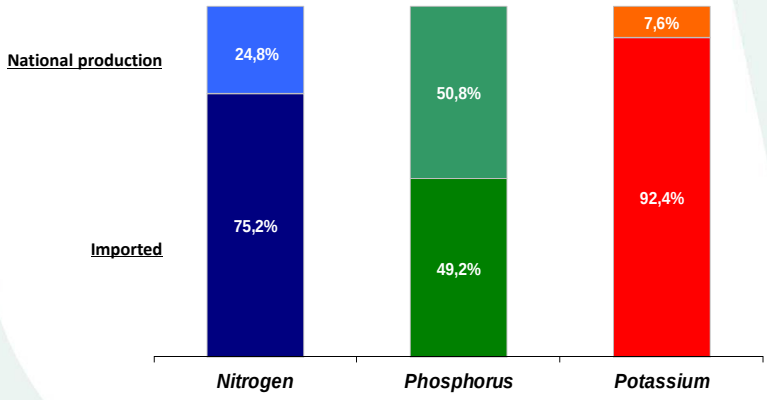
Sourse: ANDA, 2012 Elaborated by: Roquetti Filho, D., 2012

Agriculture and Fertilization in Brazil: Constraints and Solutions

Foto: V. M. Benites, 2012

Constraint 01: The "Myth" of Brazilian Import Fertilizers Dependency

In 2012, imports accounted for **71.9%** of supply of fertilizers, with a consumption of 29.5 million tons of products.



Source: ANDA e SIACESP, AMABrasil, Business Sector

Extracted from ANDA, 2012, Roquetti Filho, 2012 e atualized by Polidoro, 2012

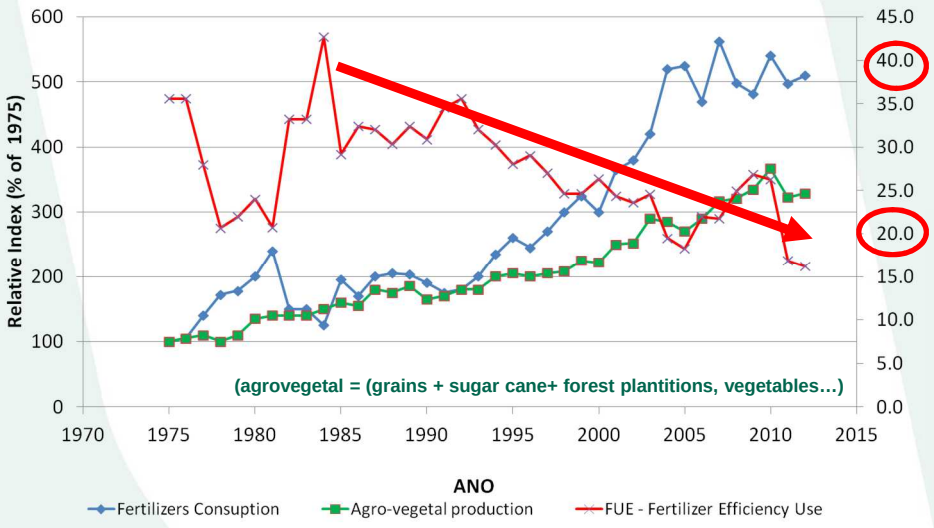
Solution: Brazilian companies announce the investiments of US$ 19.0 billions to 2017

National production X demand for fertilizers

	2012 (mil tons)			2017 (mil tons)		
Nutrient	production	demand	%	production	demand	%
Nitrogen	880	3,543	24.8	2,001	4,272	46.8
Phosphorus	2,220	4,372	50.8	4,052	5,237	77.4
Potash	325	4,284	7.6	3,300	5,223	63.2
NPK	**3,425**	**12,199**	**28.1**	**9,353**	**14,732**	**63.5**

Extract from Mesquita, L.A.V, 2012 and FIESP, 2012

Constraint 02: Decrease of FUE – Fertilizer Efficiency Use in Agro-vegetal production in Brazil



Source: ANDA; IBGE, CONAB, 2012 e Lopes, A. S., 2007, Elaborado por Polidoro, 2012

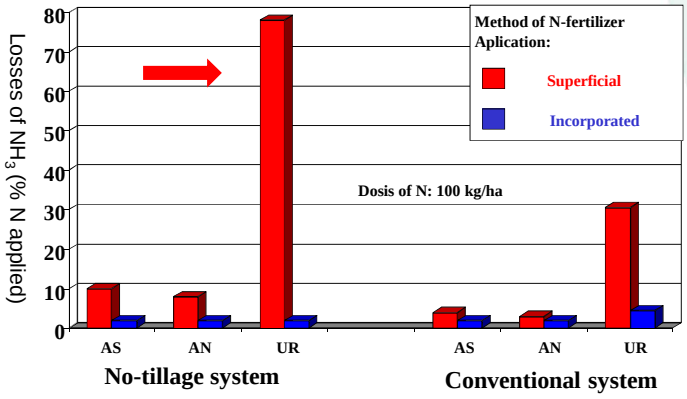
Possibles Causes of Constraint 02: Decrease of FUE

Change in fertilizer technology aplication without scientific comprovations or without the principles of Best Practices of Fertilizer Use

Ex.: Superficial phosphate fertilization at Oxisoil in Savanas site

Possibles Causes of Constraint 02: Decrease of FUE

Potential of Nitrogen losses by ammonia volatilization from fertilizer on maiz cultivation systems in the Cerrado



AS = ammonium sulphate AN = Ammonium nitrate UR = urea

Source: Lara-Cabezas et al, 1998

Proposal solution:
A Brazilian program of Best Practices for fertilizer Utilization

IPNI INTERNATIONAL PLANT NUTRITION INSTITUTE

Cordinator : Dr. L. I. Prochnow

Proposal Solution: Development and Innovation in Slow- and Controlled-Release and Stabilized Fertilizers

Year	%N	Product
1924	12-40	Urea-formaldehyde (European patent)
1955	12-40	Urea-formaldehyde (commercial use in USA)
1990	10-42	Multicote®
1990's	44	VCote®, TR2®, ESN®, Duration®
2000's	36 -44	Kimcoat®, Policote®, Polyblen®, FH Nitromais®, Super N ®, Duramax ®,etc. (Brasil).

Actually, Brazilian agriculture uses Slow- and Controlled-Release and Stabilized Fertilizers on approximately **7.5 million hectares** (Polidoro, JC, Rolim, MV and Borsari, F. 2012)

Adapted from Dr. James Robbins, University of Arkansas, 2005 and presented by Terry A. Tindall, 2011 – II WS Tecnol. Fertil. Uberlândia – MG.

In this scenario… Embrapa created the FertBrasil Network to promote technological solutions for fertilizers in tropical agriculture

Rede FertBrasil

http://www.cnps.embrapa.br/redefertbrasil/

FertBrasil Network

Rede FertBrasil

- 211 members
- 138 Reseraches from Embrapa
- 22 Research Centers at Embrapa
- CNPS,CPPSE, CNPAF, CNPAB,CPAC, CTAA,CNPMS, CNPSo, CNPA, CPAF-RR, CPAF-RO, AIT, SNT, CPAO, CPATU, CNPAT, CNPTIA, CNPDIA, CNPC, CNPCT, CNPTC, CNPA, SEN
- 73 Researches from Universities and Institutes
- APDC (CATs), CETEM, COMIGO, FESURV, Fundação MT, IAC, IPEN, UFES, UFG, UFLA, UFRJ, UFRPE, UFRRJ, UFV, UNB, USP.
- Strong partnerships with fertilizer industry companies

Strategies of FertBrasil Network

» **Best practices for the efficient use of fertilizer (nutrients) in Brazilian agriculture (partnership with IPNI)**

» **Identification of alternative sources of nutrients for Brazilian agriculture**

» **New technologies in fertilizer suitable for production systems in Brazil (tropical conditions)**

Thank You!

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Ministério da Agricultura, Pecuária e Abastecimento

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