



**FINAL CONFERENCE**  
**SYNTHESIS REPORT OF KASSA FINDINGS**

**LATIN AMERICA**  
**Main Results**

Francisco Skora Neto - IAPAR



Country		Organization	Participant names
ARGENTINA		AAPRESID	Agustin Bianchini Roberto Peiretti
BOLIVIA		ANAPO	Carlos Paz
BRASIL		EMBRAPA	Carlos Alberto Flores Clenio Nailto Pillon Eric Scopel (Embrapa/CIRAD) Ieda de Carvalho Mendes José Eloir Denardin (Platform Coordinator) Luciano Montoya Rainoldo Kochhann
		FAEPE	Rogério Ferreira
		IAPAR	Francisco Skora Neto Gil Maria Miranda Maria de Fátima dos Santos Ribeiro (Platform Coordinator) Nilceu R.X. Nazareno
		UFG	Huberto José Kliemann Rogério Almeida

# Aspects of Conservation Agriculture

- Ecological and socioeconomic context
- Adoption/Dissemination
- Production costs
- Resource quality (water, soil chemistry and nutrient cycling, soil biology, soil physics)
- Environment: soil organic matter (SOM), soil carbon, soil and water pollution, soil erosion.

# Agroecological and socioeconomic context

## Argentina

- *Temperate/Central humid*

- *Temperate/Subhumid*

Central and nearby areas:

25% of the total country area

(good combination of temperature, rainfall and soil quality)



- Extensive grain and oilseed production - soybean, corn, sunflower, sorghum, millet/ wheat, barley, oats, rye... along with other productions like meat (beef, pork, poultry...) dairy, fruits, vegetables.

- Other areas – restrictions of soil and/or water mostly extensive cattle grazing



# Agroecological and socioeconomic context

## Argentina



# Agroecological and socioeconomic context

## Bolivia

- *Plateau (small scale farmers - subsistence)* potato, quinoa, barley, oats and pasture
- *Valleys (small scale farmers - subsistence)* potato, corn, wheat, fruits.../ peanut, tobacco.
- ***Humid tropic (commercial agriculture - external market)*** soybeans, rice, corn, sorghum, wheat, sunflower, sugarcane, sesame/cattle
- *Chaco (cattle grazing )*





# Agroecological and socioeconomic context

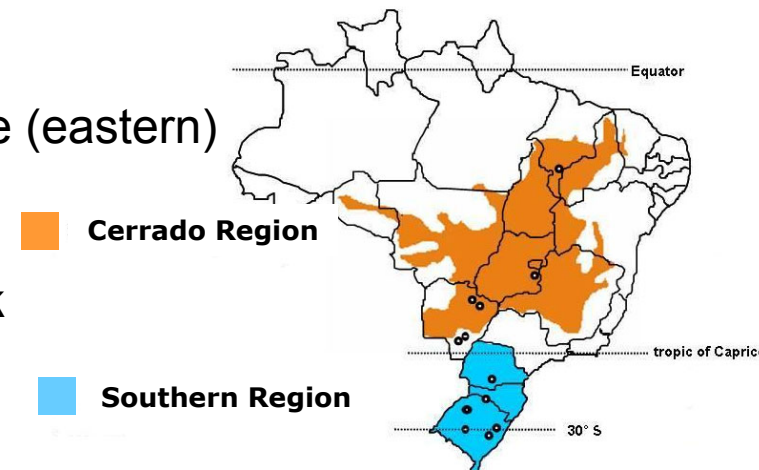
## Bolivia



# Agroecological and socioeconomic context

## Brazil

- *Southern region (Subtropical)*
- small scale -  
soybean, corn, common beans, tobacco, onion
- large scale –  
soybean, corn/wheat/ crop x livestock
- *Cerrado region (Tropical)*
- small scale –  
corn, common beans, horticulture (eastern)
- large scale –
- soybean, corn/crop x livestock





# Agroecological and socioeconomic context

Brazil

*Southern region (Subtropical)*

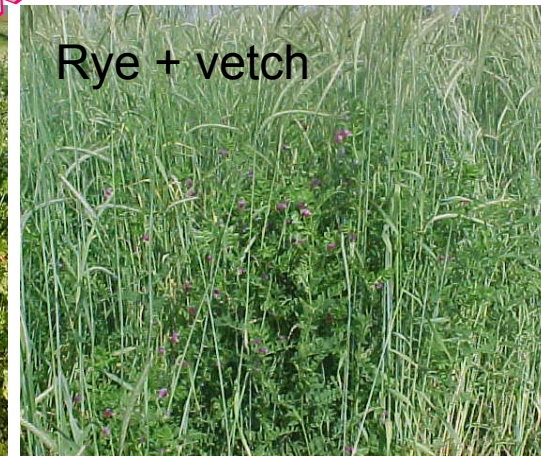




# Agroecological and socioeconomic context

Brazil

*Southern region (Subtropical)*



Cover crops

Crop x livestock

# **Brazil - Cerrado region**

## **Conventional Agriculture at the beginning**

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**O N D J F M A M J J A S O**

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**Soybean**

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# Brazil - Cerrado region

## Crop sequence at the beginning of no-till

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**O N D J F M A M J J A S O**

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**Soybean**

**Millet**

**Millet**

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**Brazil - Cerrado region**  
**No-till at the “Santa Fe” system**  
**(Harvesting/Planting)**

**O N D I F A I L A S O**

**SOIL**

**365 days/year with plants  
and roots**

**achiana**

# “SANTA FÉ” SYSTEM



**Total soil protection in soybean and corn  
direct seeding system on Brachiaria sp.  
residue**



# *Cerrado region (Tropical)*



**HARVESTING-PLANTING SYSTEM**

## Adoption

- **Soil Erosion**



- **Drudgery and labor requirements (small scale farmers)**





## Adoption

- Savings on the use of machinery



- Increase in yields and soil fertility



## Dissemination

- Farmers initiative





## Dissemination

- Partnership among public research (IAPAR, Embrapa) and extension agencies, agrochemical companies, agricultural machinery manufacturers, farmer's organizations such as Cooperatives, Friends of the Land and Brazilian No-tillage Federation - FEBRAPDP (Brazil), AAPRESID (Argentina), ANAPO and CIMMYT (Bolivia). CAAPAS (American Confederation).





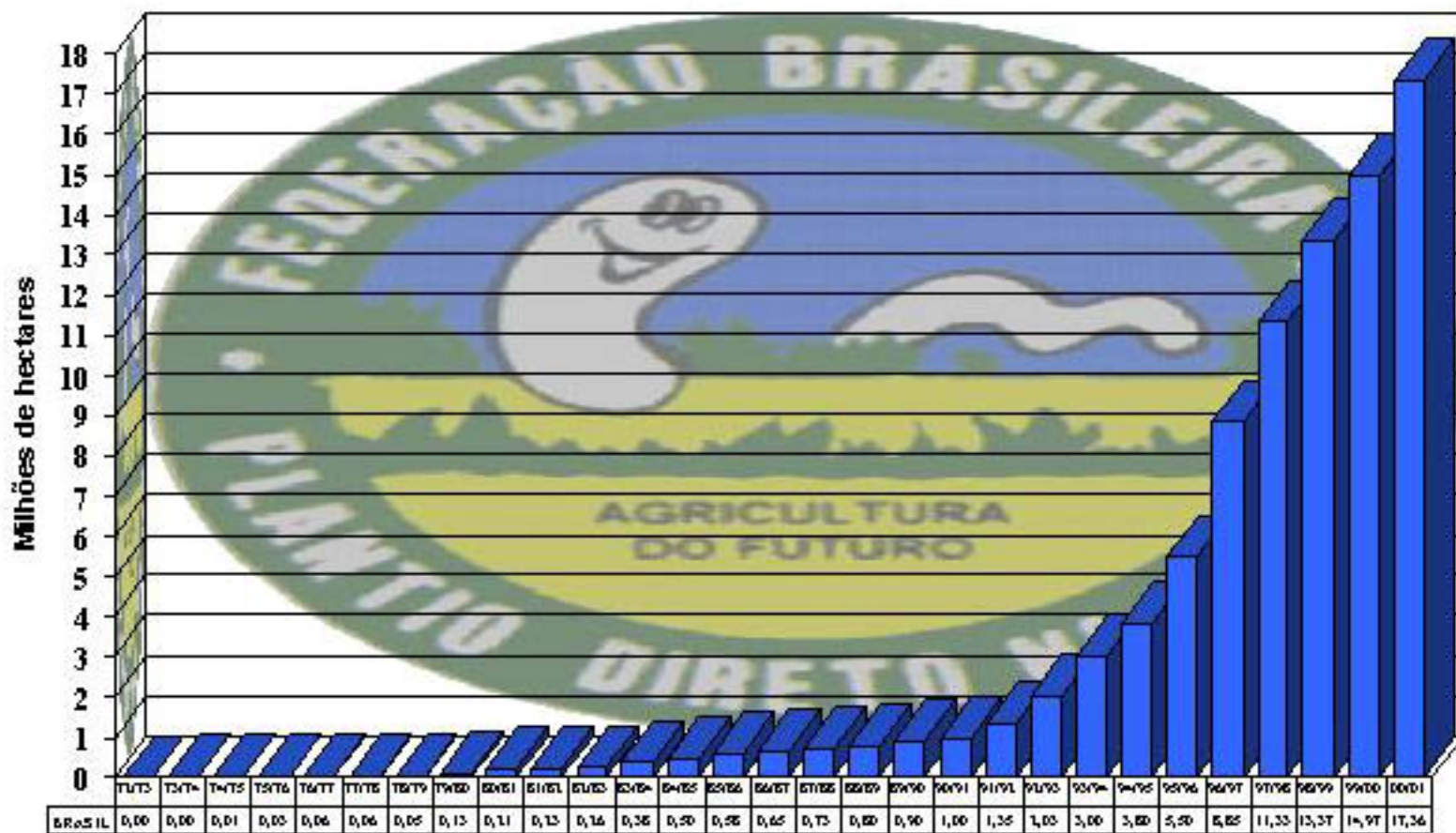
## Dissemination

### Availability of equipment and suitable herbicides



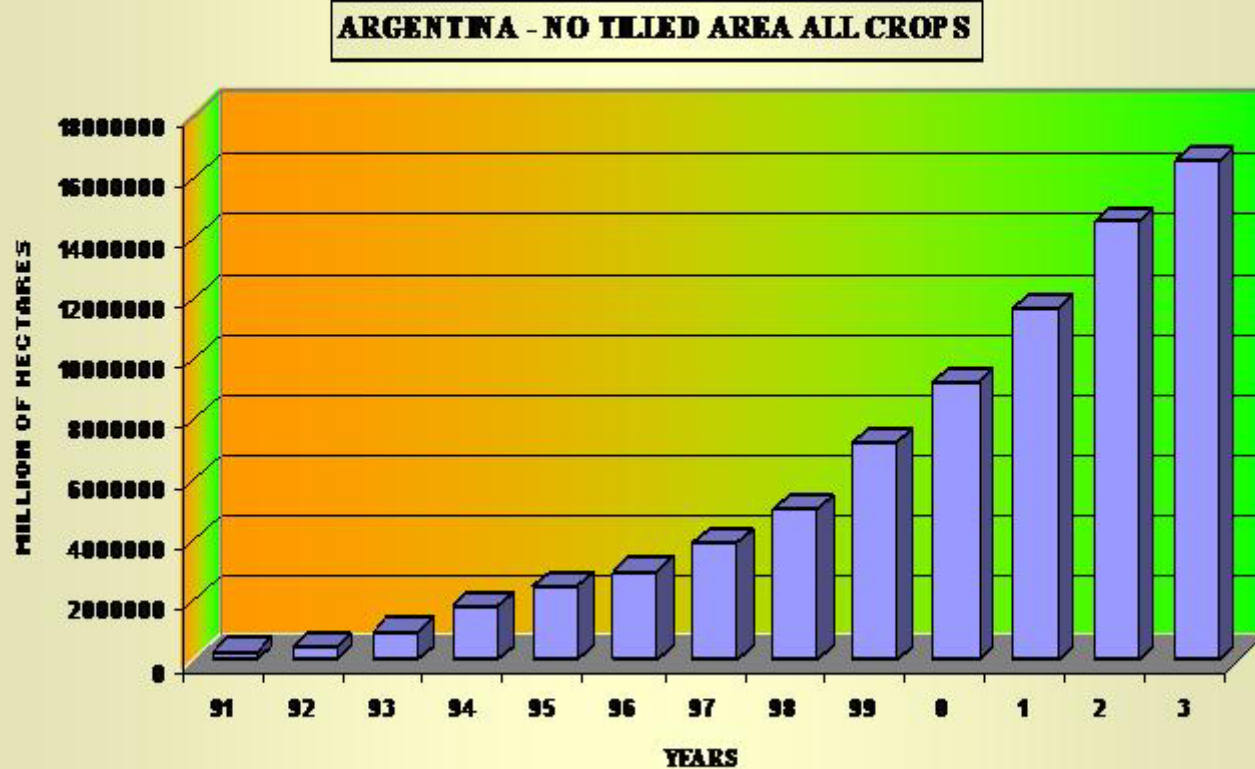


## Brasil - Expansão da Área Cultivada em Plantio Direto de 1972/73 a 2000/01 Safrã Verão/Safrinha/Inverno



fonte: EMATER-RS, EPAGRI-SC, EMATER-PR, CATI-SP, FUNDAÇÃO MS, APDQ(CERRADO)

**The pattern followed by the Argentinean No Till Adoption Process is very commonly found within the Mercosur (and CAAPAS) countries.**





- Large proportion of farmed land under CA practices in Latin America:

<b>Estimates of CA adoption rates (% of farmers) in Latin American countries according to the main agro-ecological regions and socio-economic categories of farmers.</b>				
		Argentina	Bolivia	Brazil
Tropical	Small-scale	-	40	5
	Large-scale	-	80	40
Subtropical	Small-scale	0	-	50
	Large-scale	55	-	80
Temperate/Central humid	Large-scale	70	-	-
Temperate /Subhumid	Large-scale	50	-	-

## Scientific and Practical results

- Crop yield and stability
- Soil fertility (OM, phosphorus, potassium, liming, water, biological and physical aspects)
- Carbon sequestration
- Labor and machinery requirements
- Weed, disease, and pest management
- Costs and profitability

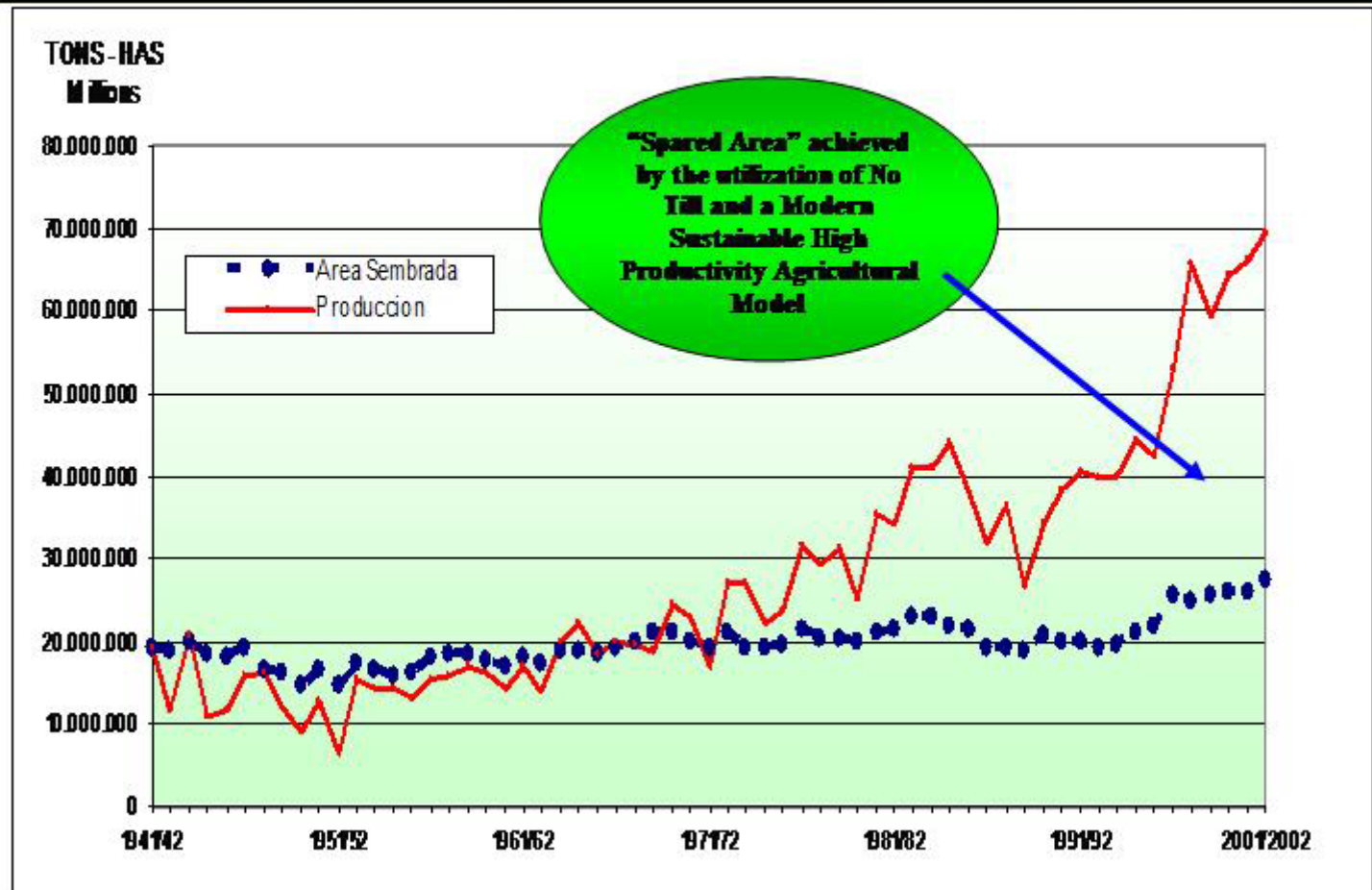




# Scientific and Practical results

## Crop yield and stability

### EVOLUTION OF ARGENTINA GRAIN PRODUCTION (Evolution of the Argentinean Total Grain Production and Planted Area)



## Scientific and Practical results

### Soil fertility

- Organic Matter
- Phosphorus availability and use efficiency (reduction 30-70%)
- Water availability
- Biological activity
- Acidity (lime rate and frequency reduction)
- Nitrogen
- ? Potassium



Photo. ANAPO



## Scientific and Practical results

### Soil biological and physical aspects

- > Biomass and activity
- > Aggregation, bio-channels



MILHETO

MILHO

SORGO

MUCUNA

SOJA

CEVADA

TRIGO

VICA

**Roots: soil structure builder**



# Scientific and Practical results

*Carbon storage rates (accumulation following conversion of a conventional tillage system to no-tillage) in Brazilian regions*

Place	State <sup>a</sup>	Succession dominant plant <sup>b</sup> or	Reported soil classification	Clay (%)	Layer (cm)	Duration (yr)	Rate (t C/ha)	
<i>Cerrados region</i>								
Planaltina	DF	S/W	Latossol (Oxisol)	40-50	0-20	15	0.5	Corazza et al., 1999
					0-40	15	0.8	
Sinop	MT	R - S/So - R/So - S/M- S/E	Latossol (Oxisol)	50-65	0-40	5	1.7	Perrin, 2003
Goiânia	GO	Rice/Soybeans	Dark red Latossol		0-10	5	0.7	ud
Rio Verde	GO	M or S/Fallow S/M or So or Mi	Red Latossol	45-65	0-20	12	0.8	Scopel et al., 2003
Planaltina	DF	M or S	Dark Red Latossol (Oxisol)	>30	0-40	16	0.4	Resck et al., 2000
<i>South region</i>								
Londrina	PR	W/S	Oxisol		0-10	22	0.31	Machado and Silva, 2001
					0-20	22	0.25	
					0-40	22	-0.17	
Londrina	PR	S/W - S/L -M/O	Red Latossol		0-20	7	0.5-0.9	Zotarelli et al., 2003
Londrina	PR	S/W/S or M/W/M or S/W/M	Oxisol Typic Haplorthox		0-10	14	0.4 <sup>d</sup>	Castro Filho et al., 1998
					0-20		0.2 <sup>d</sup>	
Londrina	PR	S/W/S or M/W/M or S/W/M	Oxisol Typic Haplorthox		0-40	21	0 <sup>c</sup>	Corazza Filho et al., 2002
Ponta Grossa	PR	(S or M)/(O or W)	Oxisol Typic Hapludox	40-45	0-40	22	0.9	Sá et al., 2001
Tibagi	PR	(S or M)/(O or W)	Oxisol Typic Hapludox	40-45	0-40	10	-0.5	Sá et al., 2001



## Scientific and Practical results

### Labor and machinery requirements



- Reductions ranging from 11 up to 46% in total labor required
- Reduction in labor peaks throughout the agricultural year
- Average reduction of 46% on total hours of equipment and machinery use



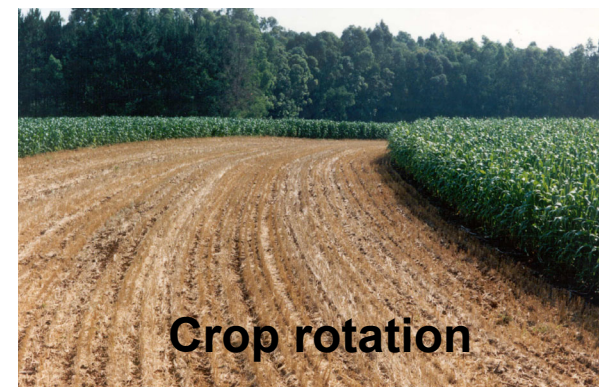
# Scientific and Practical results

## Weed, disease and pest management



**Changes on weeds, pests and diseases**

**INTEGRATED WEED, DISEASE  
AND PEST MANAGEMENT**



**Crop rotation**

**KASSA**

GOCE-CT-2004-505582





# Scientific and Practical results

## Costs and Profitability

### Disadvantages

- Initial investment (new machinery)
- Initial pesticides
- Fertilizer (mainly N)

### Advantages

- ◀ Fuel
- ◀ Labor
- ◀ Production costs with fertilizer
- ◀ Machinery costs (> productive life)
- Stable yields



**KASSA**

GOCE-CT-2004-505582

**Muito Obrigado!**  
**Muchas Gracias!**  
**Thank you!**

