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Rural do Paraná - IAPAR-EMATER

BRAZIL

# Situação Atual do Sistema Plantio Direto e da Agricultura de Conservação na América do Sul

**Rafael Fuentes Llanillo**

Diretor de Integração do Instituto de Desenvolvimento Rural do Paraná

Presidente da Comissão de Relações Internacionais da FEBRAPDP

**International Forum on Black Soils Conservation and Utilization**

**Beijing, China, July 21th-23th, 2021**



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Nos anos seguintes ocorreu processo similar na Argentina, Uruguai, Paraguai e Bolívia.

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Parte significativa dessa evolução é resultado do amplo processo de adoção do Sistema Plantio Direto e da Agricultura de Conservação na região

Fonte: Conservation Agriculture in South America  
In: Advances in Conservation Agriculture

Livro vai ser publicado em Setembro 2021

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### Advances in Conservation Agriculture

Volume 3: Adoption and Spread

Edited by Professor Amir Kassam  
University of Reading, UK and Moderator, Global Conservation  
Agriculture Community of Practice (CA-CoP), FAO, Rome, Italy



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### About the book

This title provides an authoritative review on the adoption and spread of CA systems in different regions around the world. It documents the multi-stakeholder research and development effort that has been going on in the different countries to assist farmers to adopt CA in differing agroecological and socio-economic contexts and refers to the wealth of research and experiential evidence currently available.

### About the editor

**Professor Amir Kassam** is Visiting Professor at the University of Reading (UK) and Moderator of the FAO-hosted Global Platform for Conservation Agriculture Community of Practice (Global CA-CoP). He is a Fellow of the Royal Society of Biology (UK) and has received an OBE from the British Government for services to tropical agriculture and to rural development.

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**Tabela 1** Área de AC na América do Sul em 2008-09, 2013-14, 2015-16 e 2018/19

Countries	Area under No-Till (million hectares)			
	2008/2009	2013/2014	2015/2016	2018-2019
Brazil	25.50	31.81	32.00	43.00
Argentina	19.72	29.18	31.03	33.00
Paraguay	2.40	3.00	3.00	3.10
Bolivia	0.71	0.71	2.00	1.86
Uruguay	0.66	1.07	1.26	1.28
Venezuela	0.30	0.30	0.30	0.30
Chile	0.18	0.18	0.18	0.18
Colombia	0.10	0.13	0.13	0.13
South America	49.57	66.38	69.90	82.85
World	106.51	156.76	180.44	-

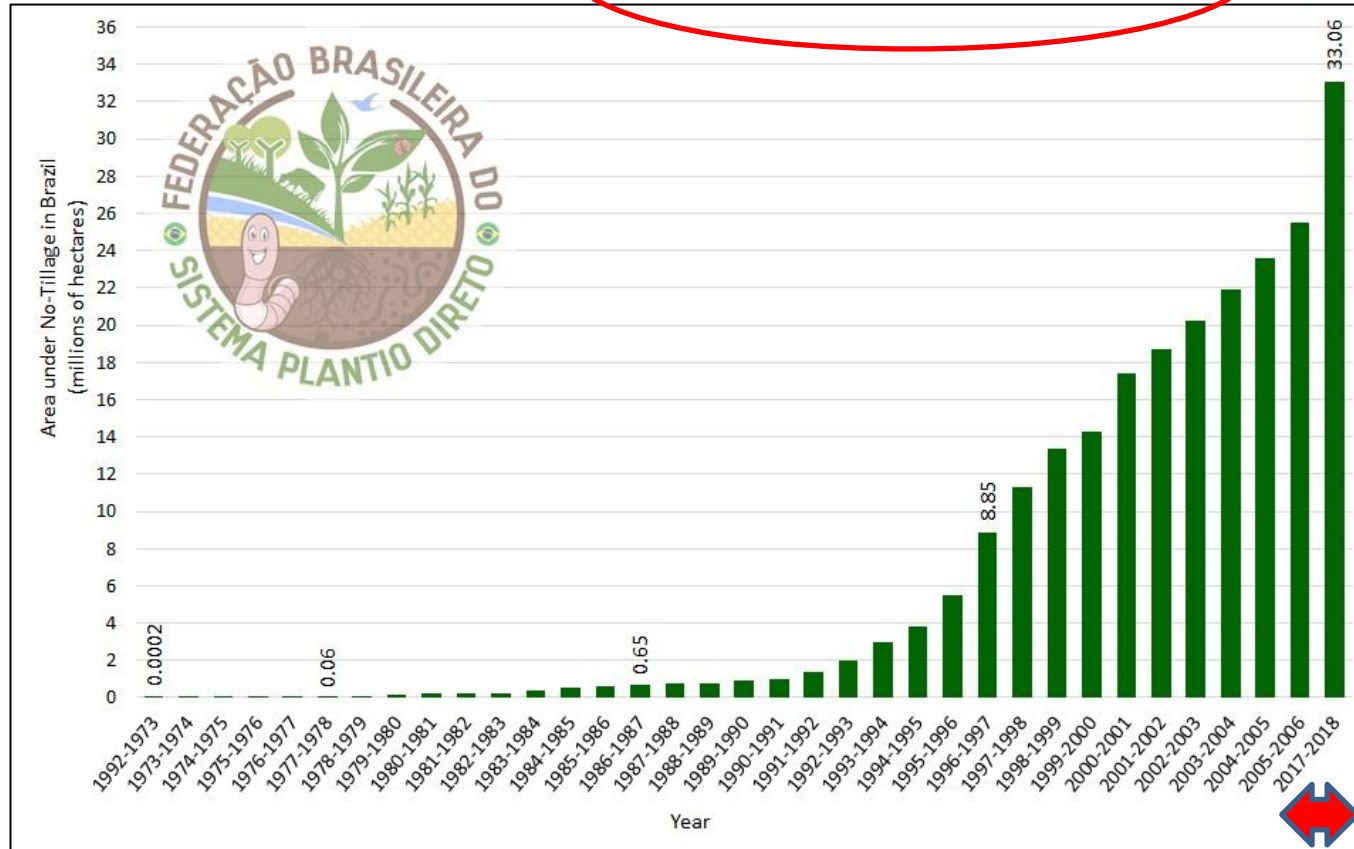
**Source:** Fuentes-Llanillo, R. et al. (2021). Conservation Agriculture in South America.

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**40% da AC Mundial**



Brasil



**Fonte:** Fuentes-Llanillo, R. et al. (2021). Conservation Agriculture in South America.  
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**11 anos**  
**85% de aumento**

**Table 2 - Number of farms and area under No-Tillage (NT), area under annual crops and proportion of No-Tillage according to major regions and whole Brazil in 2005-2006 and 2016-2017 crop years.**

Regions	2005-2006				2016-2017				Variation	
	Farms NT	Area NT	Area Annual Crops	NT/AC	Farms NT	Area NT	Area Annual Crops	NT/AC	Farms NT	Area NT
	n	ha	ha	%	n	ha	ha	%	%	%
North	20.355	220.661	727.281	30.3	28.964	1.170.982	2.021.663	57.9	42.30	430.7
Northeast	81.930	1.170.724	6.425.683	18.2	61.163	3.326.724	7.731.877	43.0	-25.35	184.2
Centralwest	16.184	6.523.624	9.971.176	65.4	25.823	13.726.366	17.510.845	78.4	70.09	110.4
Southeast	32.753	1.406.496	6.945.671	20.2	63.479	2.916.463	10.566.286	27.6	93.81	107.4
South	355.445	8.550.269	12.531.423	68.2	370.953	11.912.433	14.836.706	80.3	4.36	39.3
<b>Brazil</b>	<b>506.667</b>	<b>17.871.774</b>	<b>36.601.234</b>	<b>48.8</b>	<b>553.382</b>	<b>33.052.968</b>	<b>52.667.377</b>	<b>62.8</b>	<b>9.22</b>	<b>84.9</b>

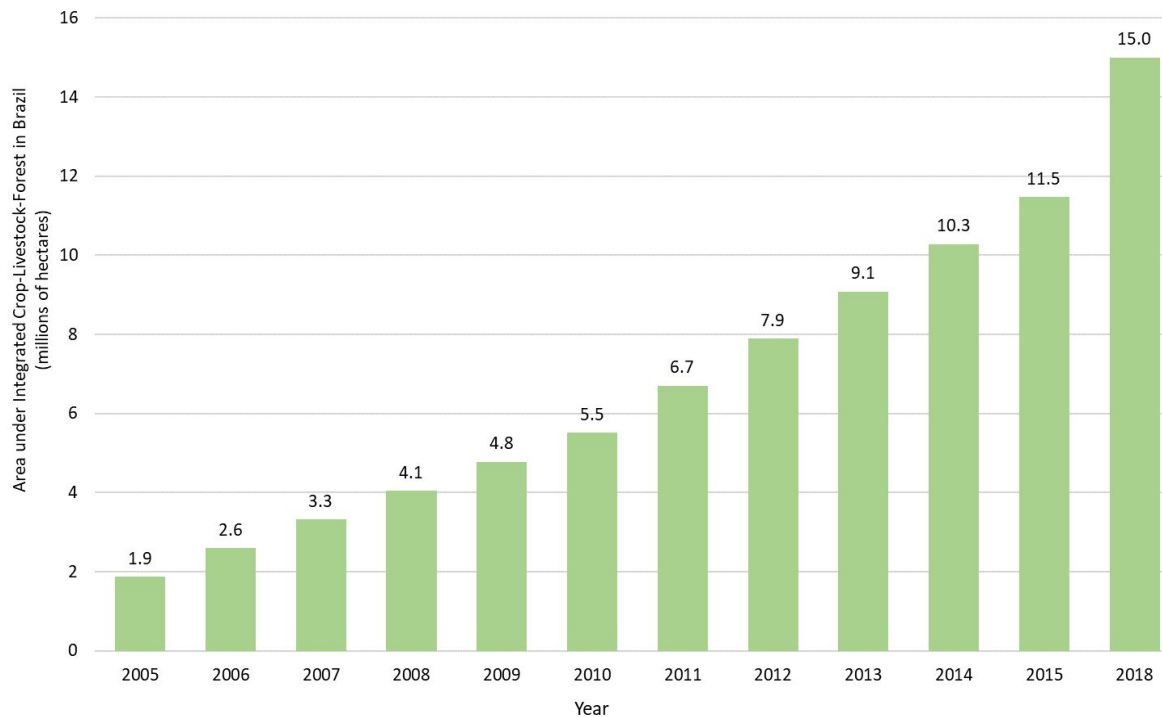
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## Brasil



**1 ano culturas  
2 anos pastagens**

**Fonte:** ICLFI Development Network. 2020. ICLF in numbers.

<https://www.redeilpf.org.br/ilpf-em-numeros/ilpf-em-numeros-ingles.pdf>

## Argentina

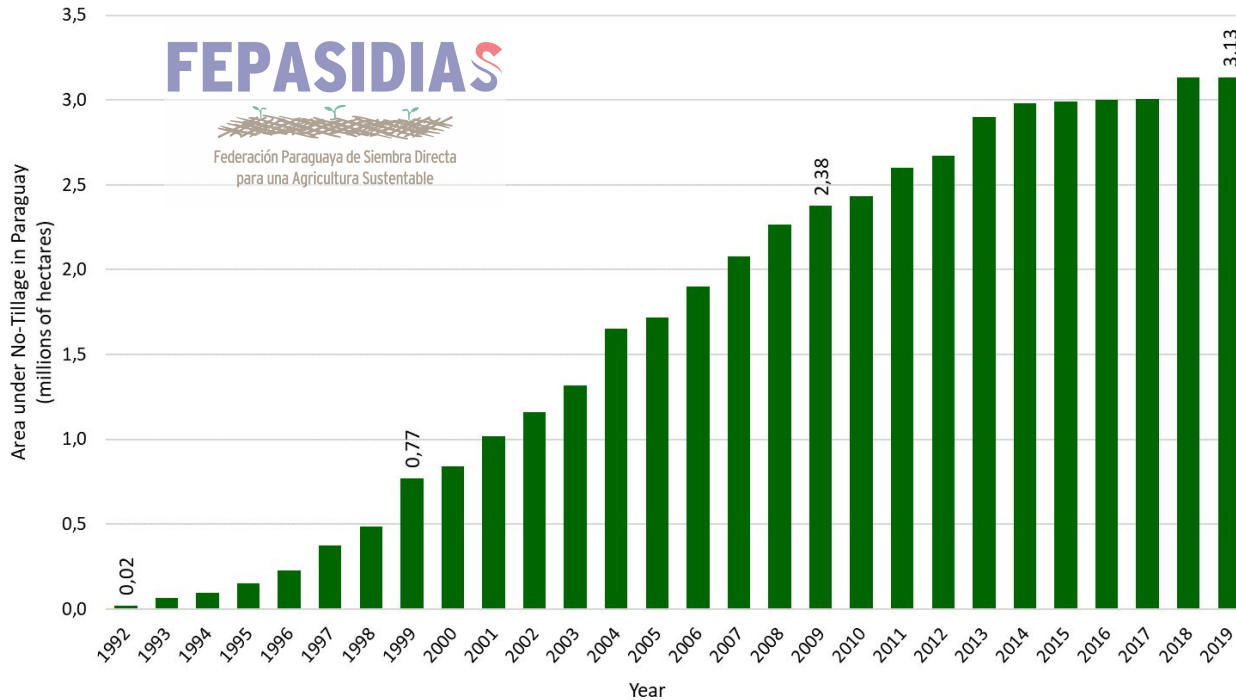


**33 milhões ha PD**  
**Parte significativa**  
**Solos Escuros / Black Soils**

**Fonte:** Fuentes-Llanillo, R. et al. (2021). Conservation Agriculture in South America.  
In: Kassam, A. Advances in Conservation Agriculture Volume 3: Adoption and Spread.



# Paraguay



**3 milhões ha PD**

**Fonte:** Fuentes-Llanillo, R. et al. (2021). Conservation Agriculture in South America. In: Kassam, A. Advances in Conservation Agriculture Volume 3: Adoption and Spread.

## Bolívia

Crop	No-Tillage		Conventional Tillage		Total
	ha	%	ha	%	
Maize	187.200	80	46.800	20	234.000
Sorghum	372.020	89	45.980	11	418.000
Sunflower	98.100	90	10.900	10	109.000
Wheat	83.460	78	23.540	22	107.000
Soya	1.117.248	88	152.352	12	1.269.600
<b>Total</b>	<b>1.858.028</b>	<b>87</b>	279.572	13	2.137.600

2 milhões ha PD

**Source:** Fuentes-Llanillo, R. et al. (2021). Conservation Agriculture in South America.  
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## Uruguay

No-Tillage Area (1,000 ha)				
2001/02	2006/07	2009/10	2013/14	2015/16
119	672	655	1.072	1.260

1.3 milhão ha PD

**Fonte:** Fuentes-Llanillo, R. et al. (2021). Conservation Agriculture in South America.  
In: Kassam, A. Advances in Conservation Agriculture Volume 3: Adoption and Spread.

A adoção em grande escala do Sistema Plantio Direto na América do Sul é responsável pelo permanente incremento da produção agropecuária, mantendo contribuição significativa no alcance da crescente demanda por alimentos, com efeitos benéficos bem conhecidos nas dimensões econômica, ambiental, social, no sequestro de carbono e na mitigação dos efeitos das mudanças climáticas. Sem dúvida é possível fazer muito mais e melhor.

Por causa da dominância da cultura de soja no verão predominam rotações / sucessões de culturas simplificadas, com diversificação insuficiente, cobertura permanente de solo pobre, levando em certos casos à volta da erosão, manejo pobre de OGMs, refletindo na ocorrência de ervas daninhas resistentes, infestação de nematoides, alta incidência de doenças fúngicas e elevada utilização de controle químico de pragas e doenças.

O Sistema Plantio Direto usando plantas de cobertura e rotação de culturas tem incrementado e melhorado a qualidade do sistema em anos recentes com maiores quantidades de biomassa e fortes efeitos em diferentes atributos de solo mas a expansão dessa tendência é necessária nos próximos anos.

Fonte:

There is a beneficial trend of development of biological technologies with the use of cover crop mixes for soil bioactivation and together with a strong adoption of biological control of insect pests and diseases that is expected to be expanded.

There are available CA-based technologies to overcome constraints, but nation-wide adoption is dependent greatly on a mix of public policies, economic incentives for crop diversity, and changes in farmers' way of thinking and attitudes. More effort needs to be put into these aspects in countries in the region where CA has not yet become popular.

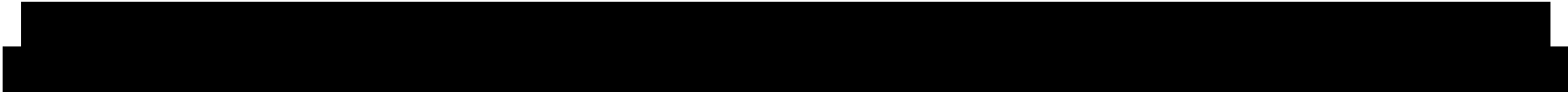




Os atores principais na adoção e expansão do Sistema Plantio Direto/Agricultura de Conservação na América do Sul foram indubitavelmente os agricultores, com inegável suporte dos avanços da pesquisa, setores industriais de máquinas agrícolas e de insumos químicos, e a extensão rural. A disposição dos agricultores inovadores de compartilhar suas lições e experiências com outros agricultores contribuiu enormemente para a aceitação dos sistemas sem preparo de solo.



Devido aos benefícios econômicos, sociais e ambientais do sistema, sob a liderança dos agricultores foi criado um ambiente sinérgico reunindo pesquisa pública e privada, indústrias mecânicas e químicas, e posteriormente extensão rural e apoio creditício um amplo processo de adoção e expansão do SPD/AC nos anos subsequentes ao início que rapidamente superaram milhões de hectares nos anos 1990 e 2000. Essa foi a principal característica do processo na América do Sul. Esse é o exemplo que muitos outros países e regiões do mundo tentam reproduzir com graus variados de sucesso.







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**Na América do Sul os desafios atuais são:**

**Como melhorar a qualidade do SPD e da AC para garantir sustentabilidade?**

**Como promover a expansão da AC para áreas de menor aptidão agrícola?**

**Como enfrentar mudanças climáticas para atender crescente demanda global?**

**Fonte**



# 2006

17,9 milhões ha

# Plantio direto



84,9 %

# 2017

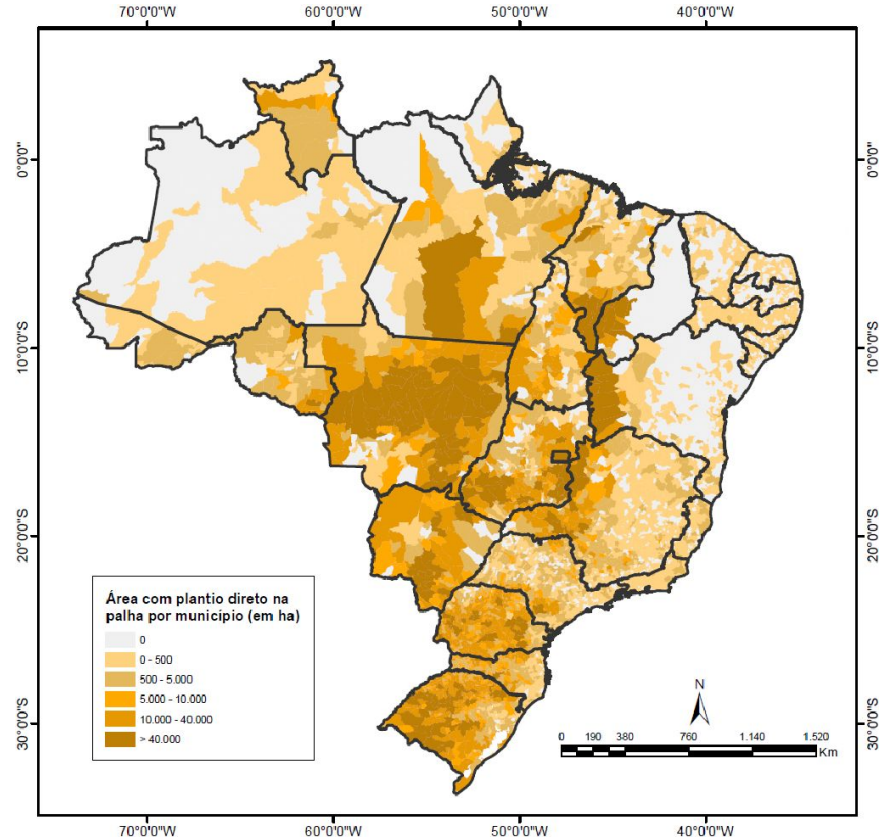
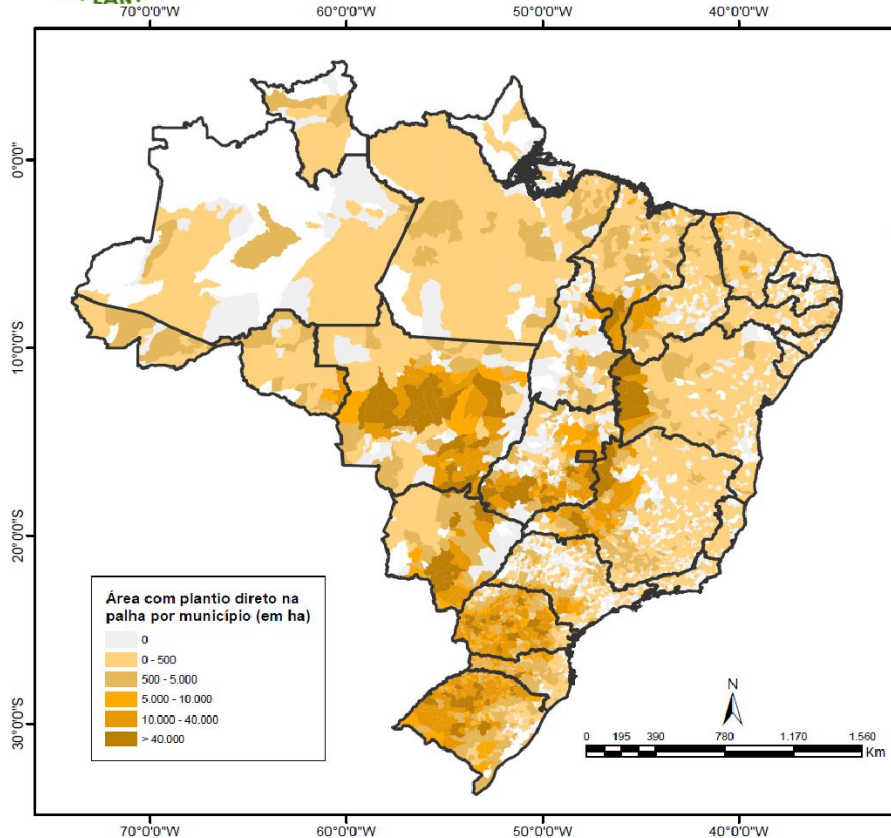
33,1 milhões ha



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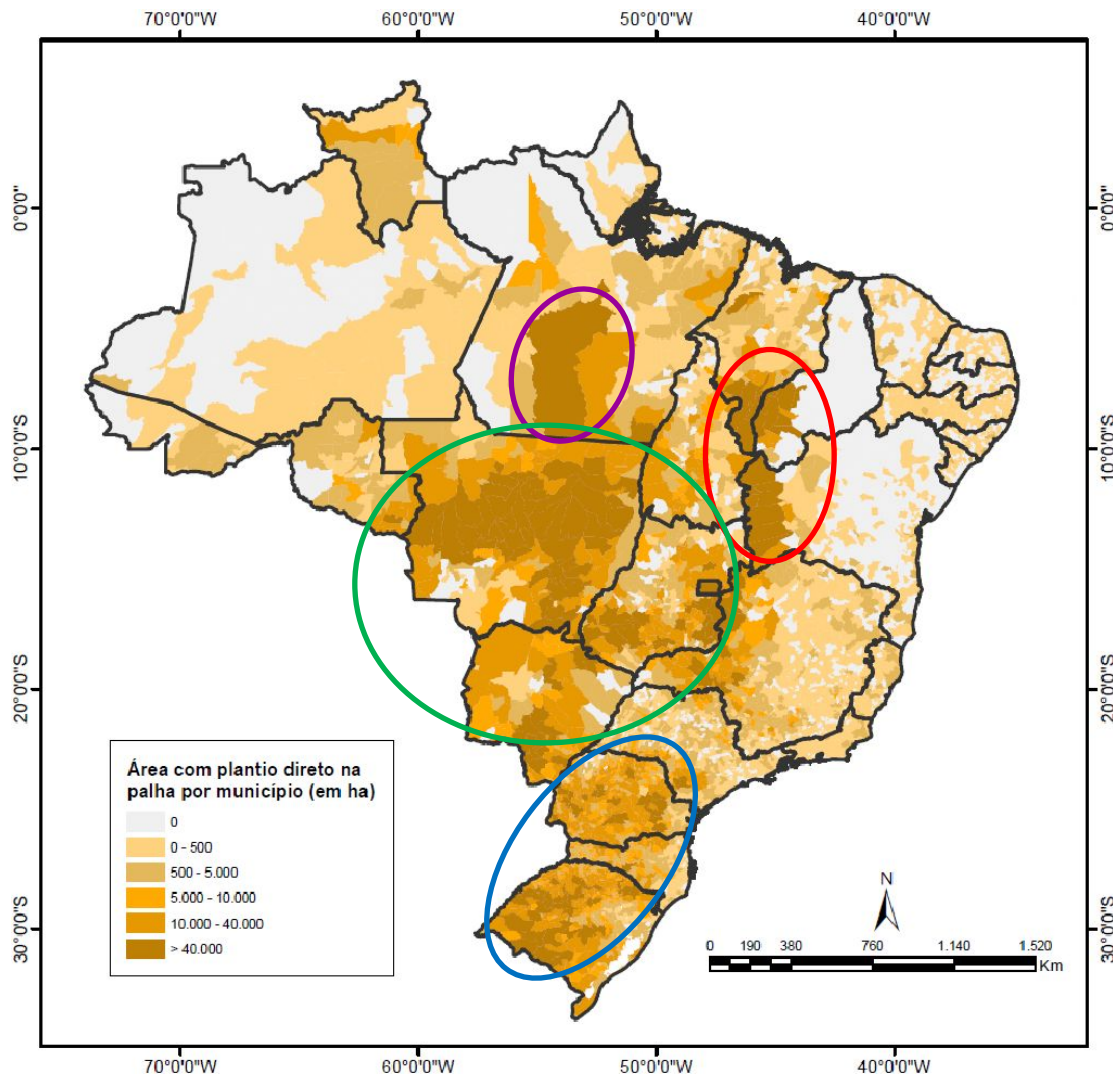
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[http://www.ecaf.org/ doi:10.1016/S2095-6339\(15\)30018-6](http://www.ecaf.org/doi:10.1016/S2095-6339(15)30018-6)

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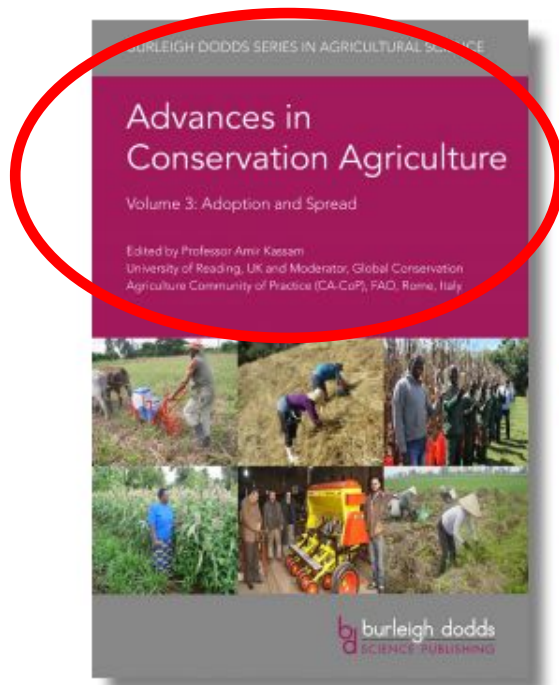
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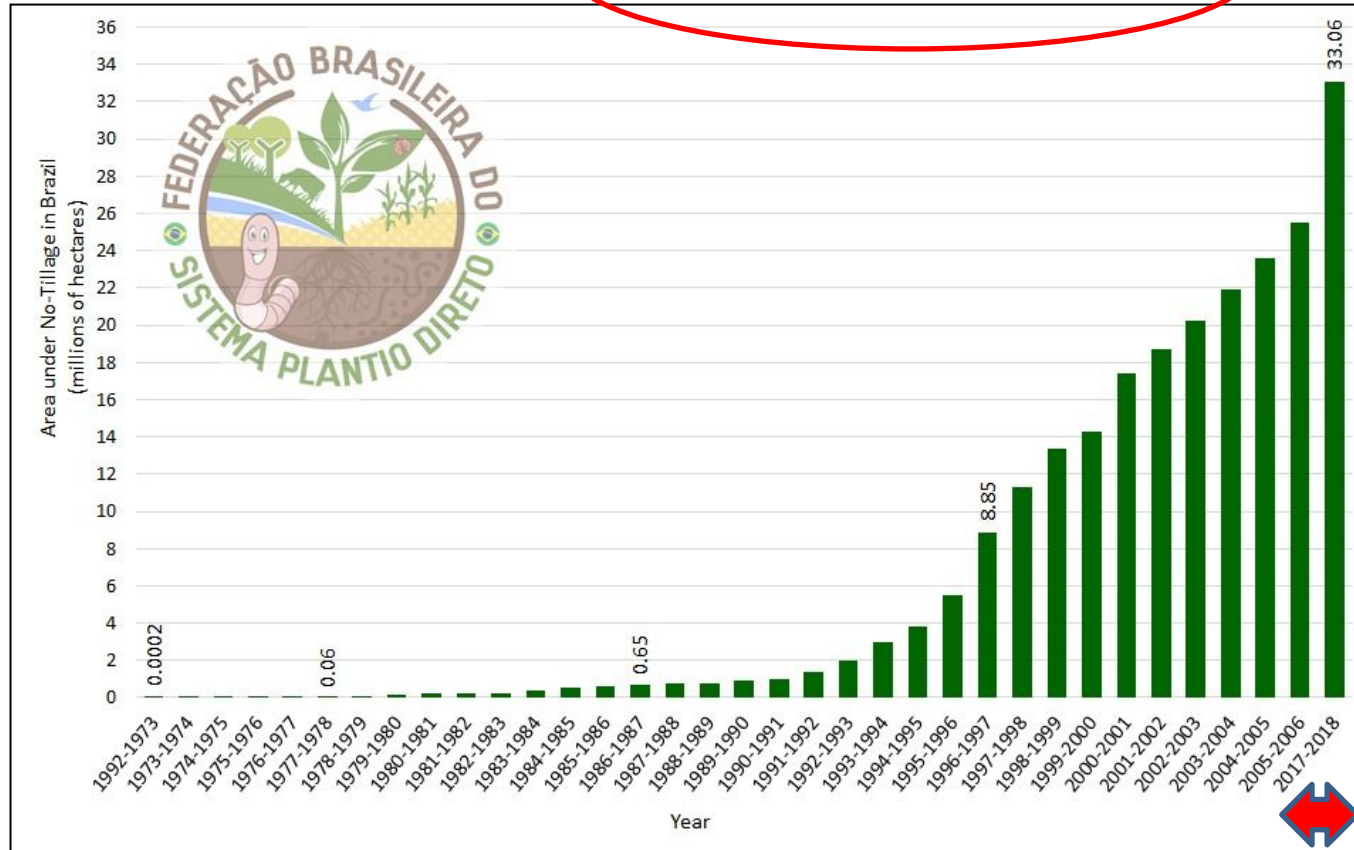
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**40% da AC Mundial**



Brasil



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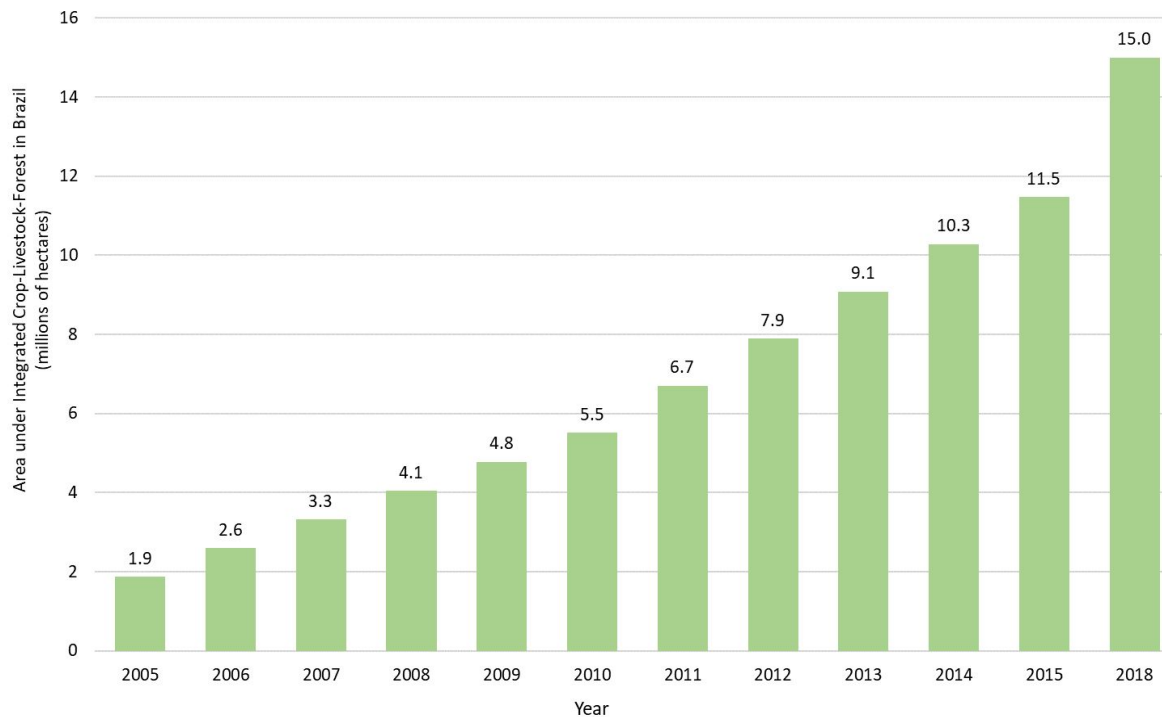
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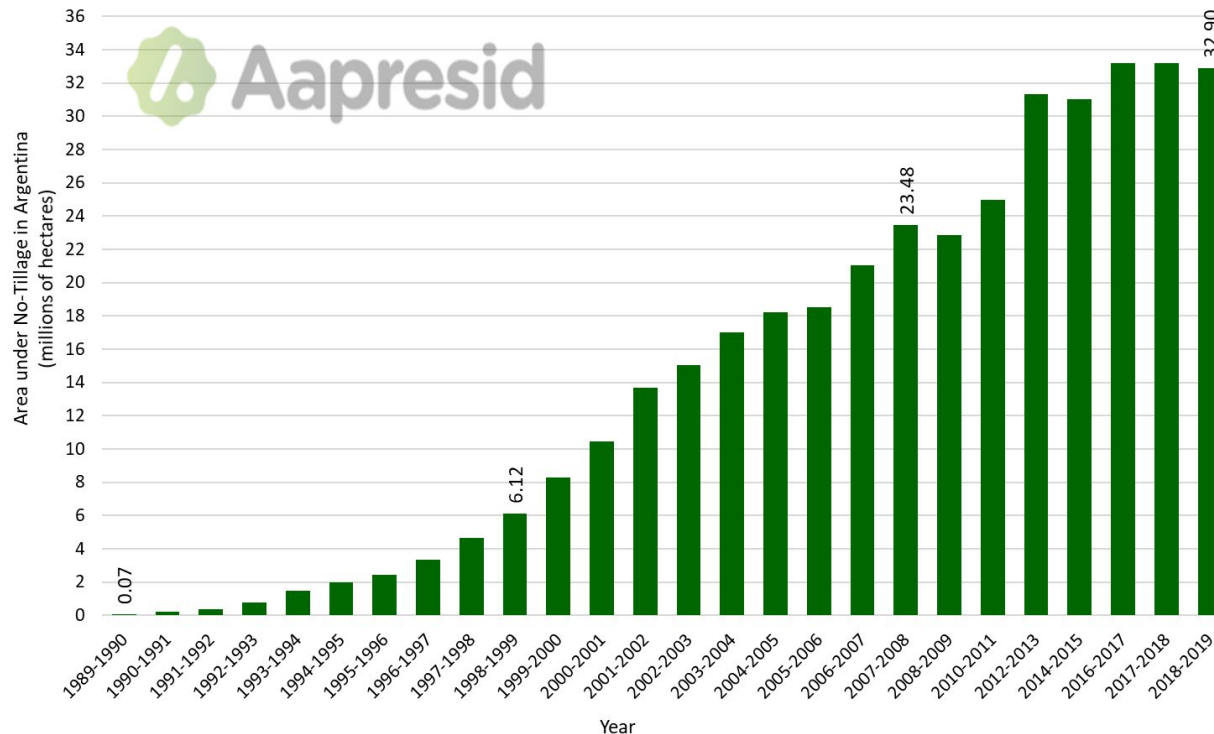


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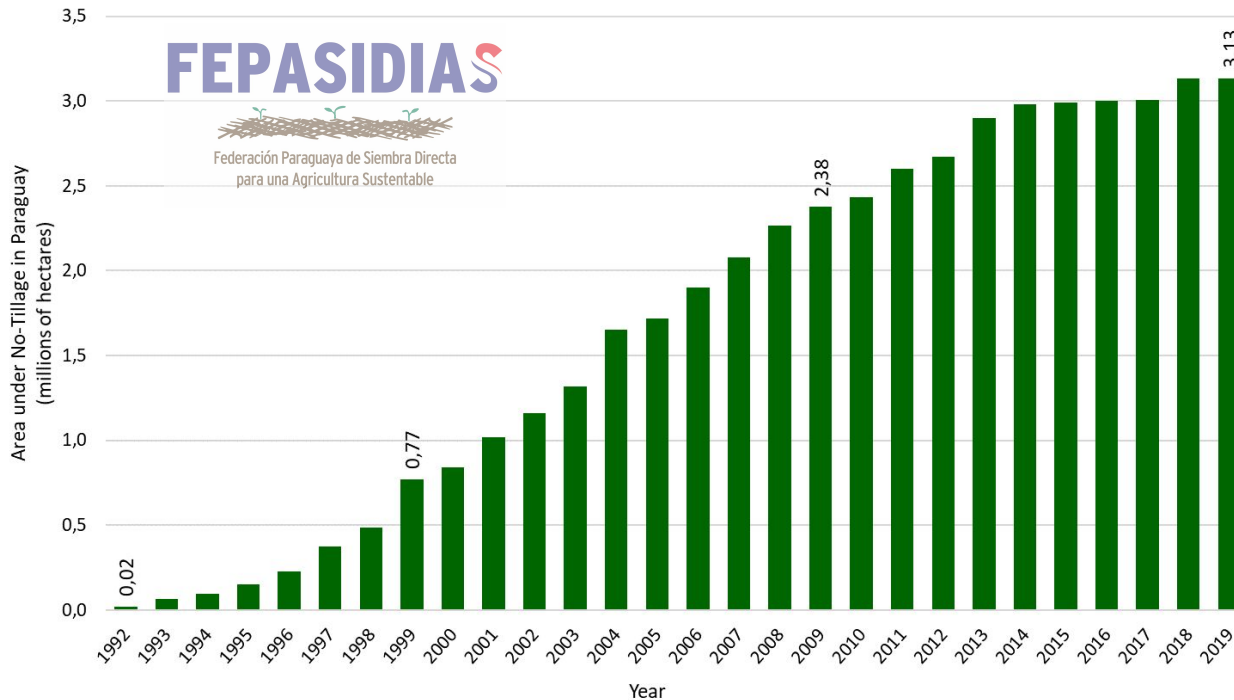


**33 milhões ha PD**  
**Parte significativa**  
**Solos Escuros / Black Soils**

**Fonte:** Fuentes-Llanillo, R. et al. (2021). Conservation Agriculture in South America.  
In: Kassam, A. Advances in Conservation Agriculture Volume 3: Adoption and Spread.



# Paraguay



**3 milhões ha PD**

**Fonte:** Fuentes-Llanillo, R. et al. (2021). Conservation Agriculture in South America.  
In: Kassam, A. Advances in Conservation Agriculture Volume 3: Adoption and Spread.

## Bolívia

Crop	No-Tillage		Conventional Tillage		Total
	ha	%	ha	%	
Maize	187.200	80	46.800	20	234.000
Sorghum	372.020	89	45.980	11	418.000
Sunflower	98.100	90	10.900	10	109.000
Wheat	83.460	78	23.540	22	107.000
Soya	1.117.248	88	152.352	12	1.269.600
<b>Total</b>	<b>1.858.028</b>	<b>87</b>	279.572	13	2.137.600

2 milhões ha PD

**Source:** Fuentes-Llanillo, R. et al. (2021). Conservation Agriculture in South America.  
In: Kassam, A. Advances in Conservation Agriculture Volume 3: Adoption and Spread



## Uruguay

No-Tillage Area (1,000 ha)				
2001/02	2006/07	2009/10	2013/14	2015/16
119	672	655	1.072	1.260

1.3 milhão ha PD

**Fonte:** Fuentes-Llanillo, R. et al. (2021). Conservation Agriculture in South America.  
In: Kassam, A. Advances in Conservation Agriculture Volume 3: Adoption and Spread.



A adoção em grande escala do Sistema Plantio Direto na América do Sul é responsável pelo permanente incremento da produção agropecuária, mantendo contribuição significativa no alcance da crescente demanda por alimentos, com efeitos benéficos bem conhecidos nas dimensões econômica, ambiental, social, no sequestro de carbono e na mitigação dos efeitos das mudanças climáticas. Sem dúvida é possível fazer muito mais e melhor.

Por causa da dominância da cultura de soja no verão predominam rotações / sucessões de culturas simplificadas, com diversificação insuficiente, cobertura permanente de solo pobre, levando em certos casos à volta da erosão, manejo pobre de OGMs, refletindo na ocorrência de ervas daninhas resistentes, infestação de nematoides, alta incidência de doenças fúngicas e elevada utilização de controle químico de pragas e doenças.

O Sistema Plantio Direto usando plantas de cobertura e rotação de culturas tem incrementado e melhorado a qualidade do sistema em anos recentes com maiores quantidades de biomassa e fortes efeitos em diferentes atributos de solo mas a expansão dessa tendência é necessária nos próximos anos.

Fonte:

There is a beneficial trend of development of biological technologies with the use of cover crop mixes for soil bioactivation and together with a strong adoption of biological control of insect pests and diseases that is expected to be expanded.

There are available CA-based technologies to overcome constraints, but nation-wide adoption is dependent greatly on a mix of public policies, economic incentives for crop diversity, and changes in farmers' way of thinking and attitudes. More effort needs to be put into these aspects in countries in the region where CA has not yet become popular.

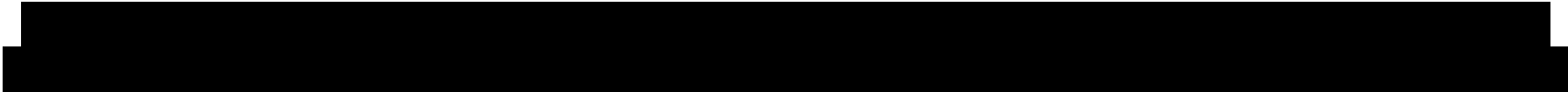




Os atores principais na adoção e expansão do Sistema Plantio Direto/Agricultura de Conservação na América do Sul foram indubitavelmente os agricultores, com inegável suporte dos avanços da pesquisa, setores industriais de máquinas agrícolas e de insumos químicos, e a extensão rural. A disposição dos agricultores inovadores de compartilhar suas lições e experiências com outros agricultores contribuiu enormemente para a aceitação dos sistemas sem preparo de solo.



Devido aos benefícios econômicos, sociais e ambientais do sistema, sob a liderança dos agricultores foi criado um ambiente sinérgico reunindo pesquisa pública e privada, indústrias mecânicas e químicas, e posteriormente extensão rural e apoio creditício um amplo processo de adoção e expansão do SPD/AC nos anos subsequentes ao início que rapidamente superaram milhões de hectares nos anos 1990 e 2000. Essa foi a principal característica do processo na América do Sul. Esse é o exemplo que muitos outros países e regiões do mundo tentam reproduzir com graus variados de sucesso.





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**Na América do Sul os desafios atuais são:**

**Como melhorar a qualidade do SPD e da AC para garantir sustentabilidade?**

**Como promover a expansão da AC para áreas de menor aptidão agrícola?**

**Como enfrentar mudanças climáticas para atender crescente demanda global?**

**Fonte**



# 2006

17,9 milhões ha

# Plantio direto



84,9 %

# 2017

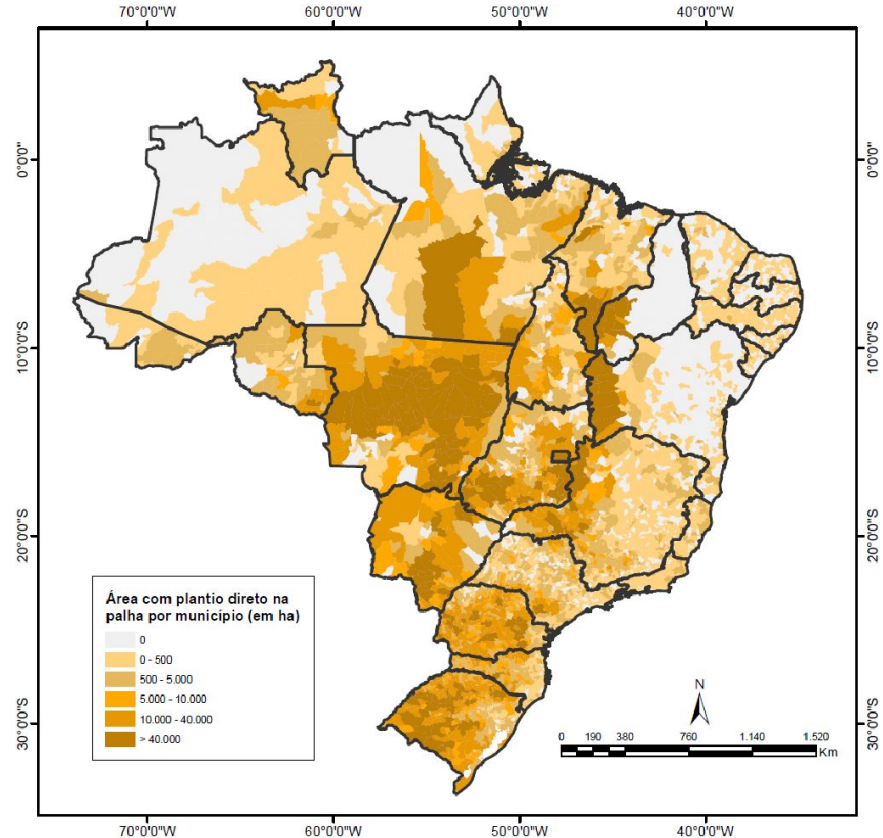
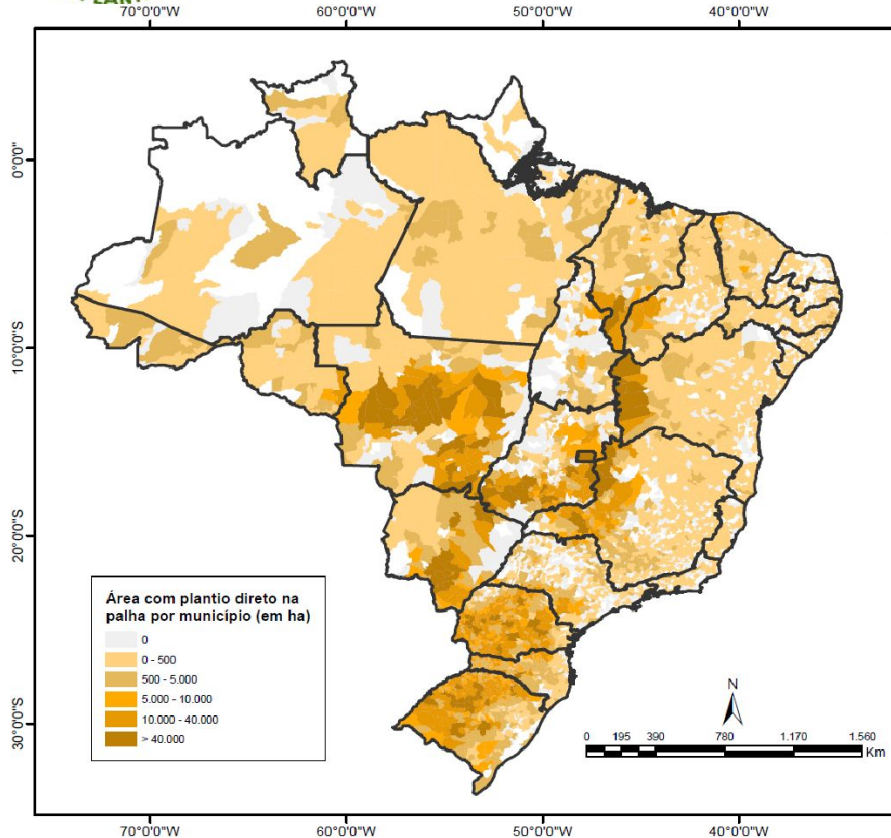
33,1 milhões ha



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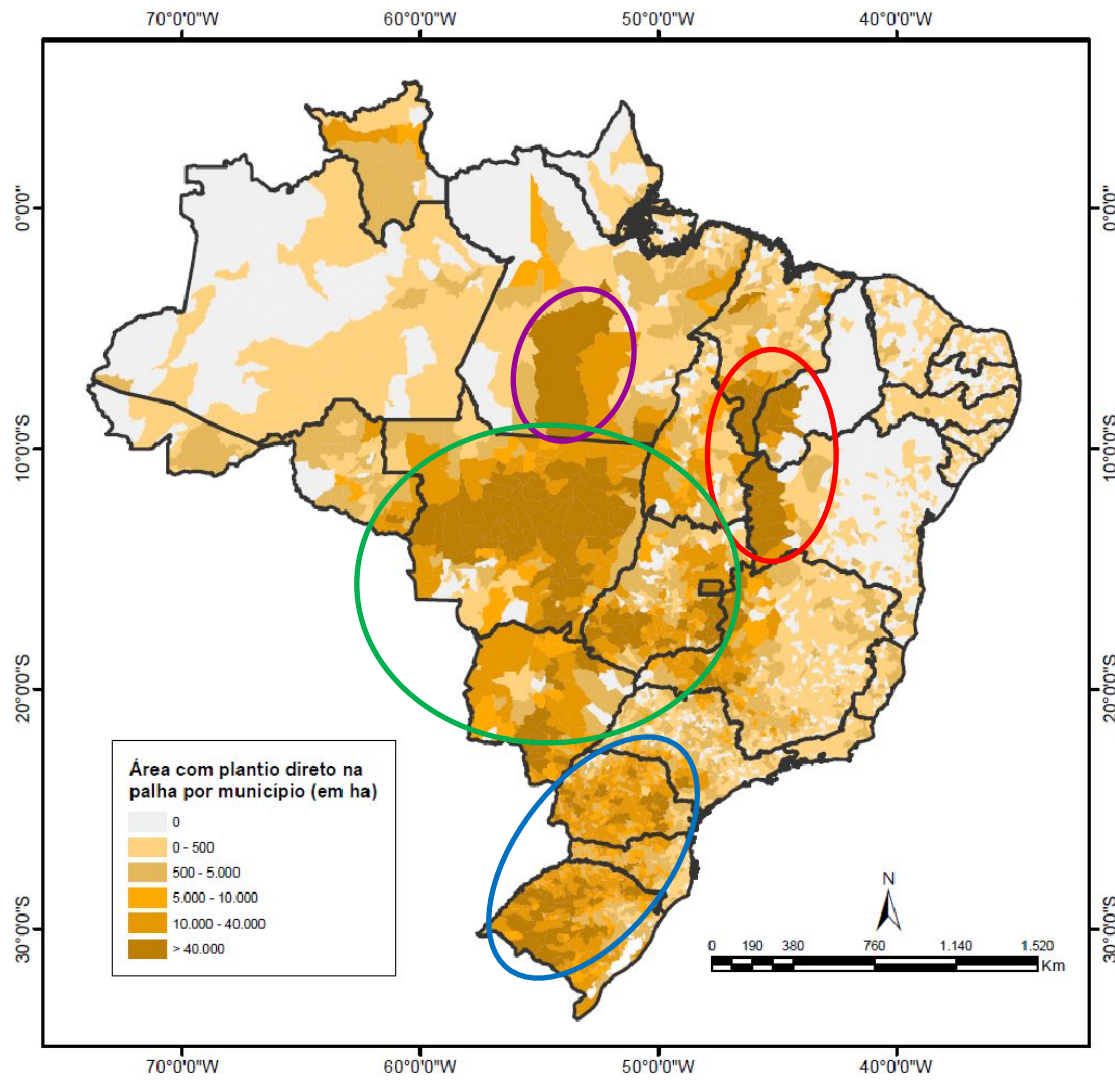
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