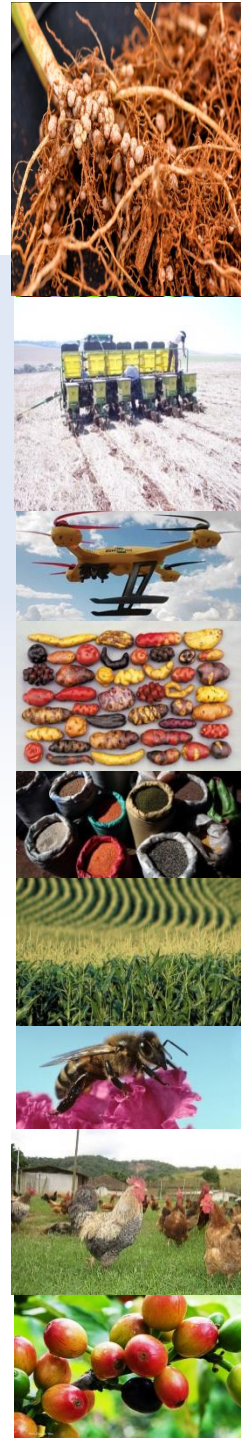# Brazil's experience in scaling-out low carbon agriculture

Pedro Luiz Oliveira de Almeida Machado
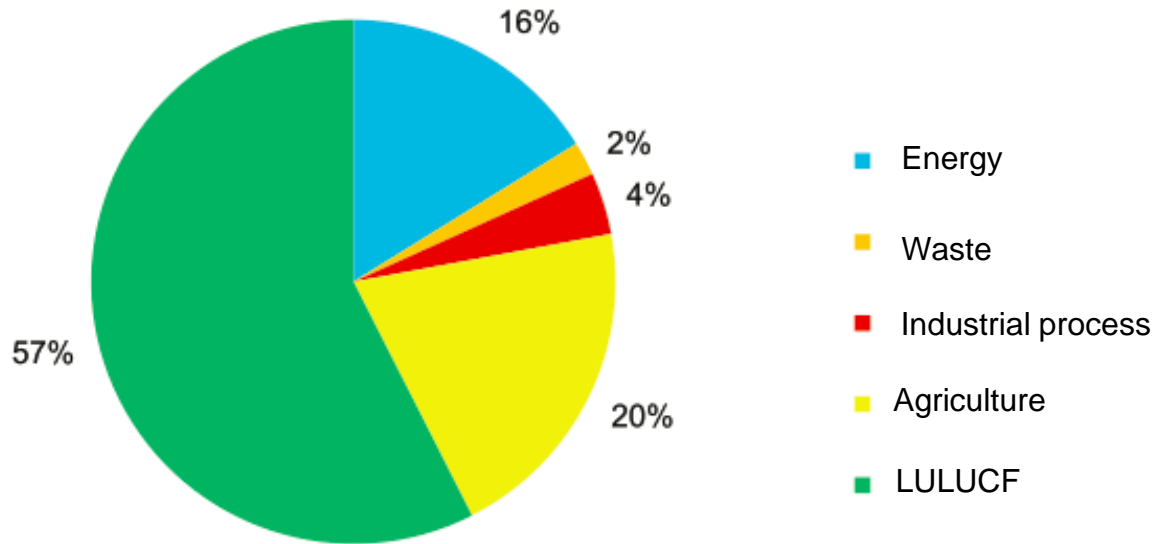
Presented at the 8th Meeting of G20 Agricultural Chief Scientists
Tokyo
April 25-26, 2019

Brazilian GHG Emissions – 2005 (CO_2e)

16%
2%
4%
57%
20%

- Energy
- Waste
- Industrial process
- Agriculture
- LULUCF

National Plan on Climate Change – PNMC (2008)

. 15 Ministries (Energy, Agriculture, Transportation, Economy, Science & Technology)

freepick.com

PNMC
National Plan on Climate Change
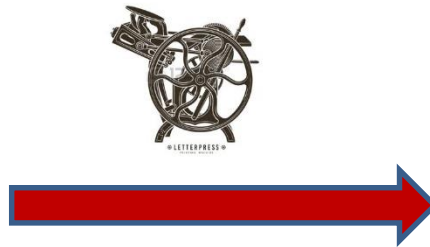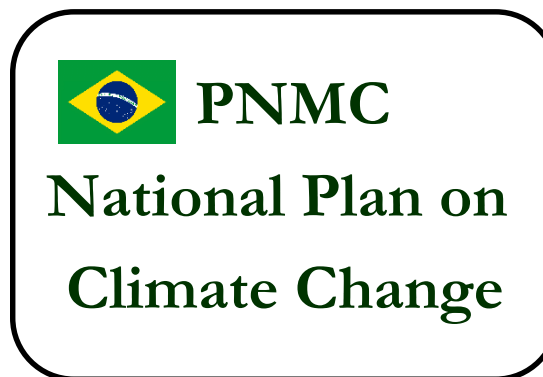
. **voluntary commitment** to reduce between 38% of its emissions projected by 2020.

. Approx. 1 billion t CO_2 eq less from different sectors:

➢ Amazon deforestation control (PPCDAm);

➢ Cerrado deforestation control (PPCerrado);

➢ **Agriculture** (160 M t CO_2 eq less than if nothing is done);

➢ Energy (wind and solar power; biofuels etc);

➢ Steel industry (planted forests);

➢ Transportation

Agricultural Sector
Making it happen!

The ABC Plan – The Selected Practices that reduce or avoid emissions of GHG and contributes to adaptation to climate change.

It includes capacity building, research funding, and monitoring.

The ABC Program – The Farm Loan Scheme with US$1.7 billion available in 2012. Repayment within 15 years at 5.5% annual interest rate. Both governmental and private banks offer this loan scheme.

Targets for 2020

Technology Process	Increase in area/use	Mitigation potential (million Mg CO_2e)
1. Recovery of degraded pasture land	**15 million ha**	83.0 – 104.0
2. Integrated crop-livestock-forestry systems	**4 million ha**	18.0 - 22.0
3. No-till farming with cover crops	**8 million ha**	16.0 - 20.0
4. Use of biological nitrogen fixation	**5.5 million ha**	10.0
5. Planted forests	**3 million ha**	8.0 – 10.0
6. Treatment of Animal Waste	**4.4 million m³**	7.0
Total		133.9 - 162.9

Embrapa
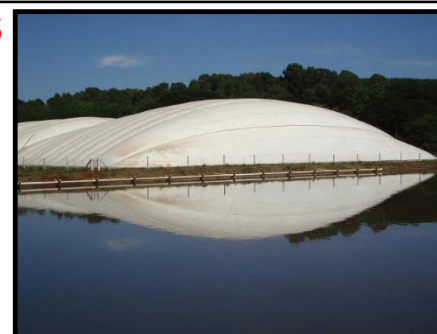
Governance of the ABC Plan

Nacional ABC Plan

CIM -
Deliberate, approve and guide actions within the scope of the National Policy.

GEx -
Coordinates the preparation and implementation of the National and Sectoral Plan

Executive Comission

Steering Committee of the ABC Platform

ABC Platform

Federal Level

State Management Group (GGE)

State Level

State Meetings

Awareness Seminar

Workshops

State ABC Plan

Key partners

Farm cooperatives

Cooperativas (unidades)
- 1
- 2
- 3
- 4
- 5
- 6
- 7

Organizado por: FGV/EMBRAPA

0   465   930   1.860   Km

Farmer's Union

Legenda
- Sindicatos Rurais

0   500   1,000   2,000   Km

Organizado por: FGV/EMBRAPA
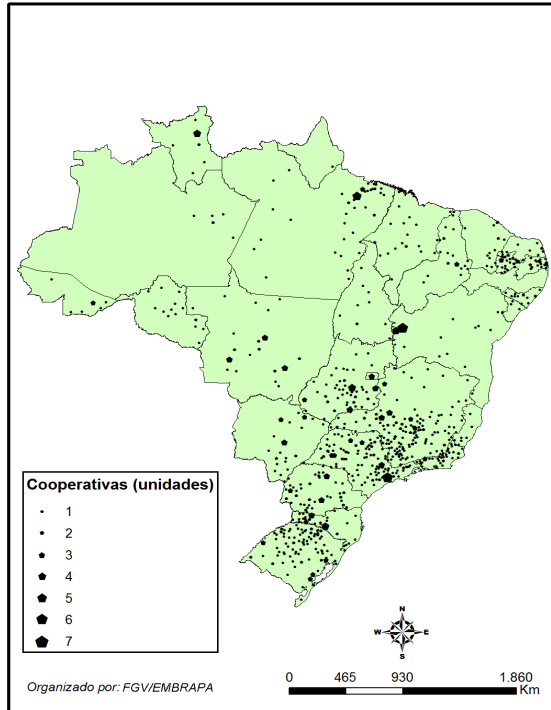
Rural extension offices

Legenda
- Escritórios ATER

0   500   1,000   2,000   Km

Organizado por: FGV/EMBRAPA

Embrapa
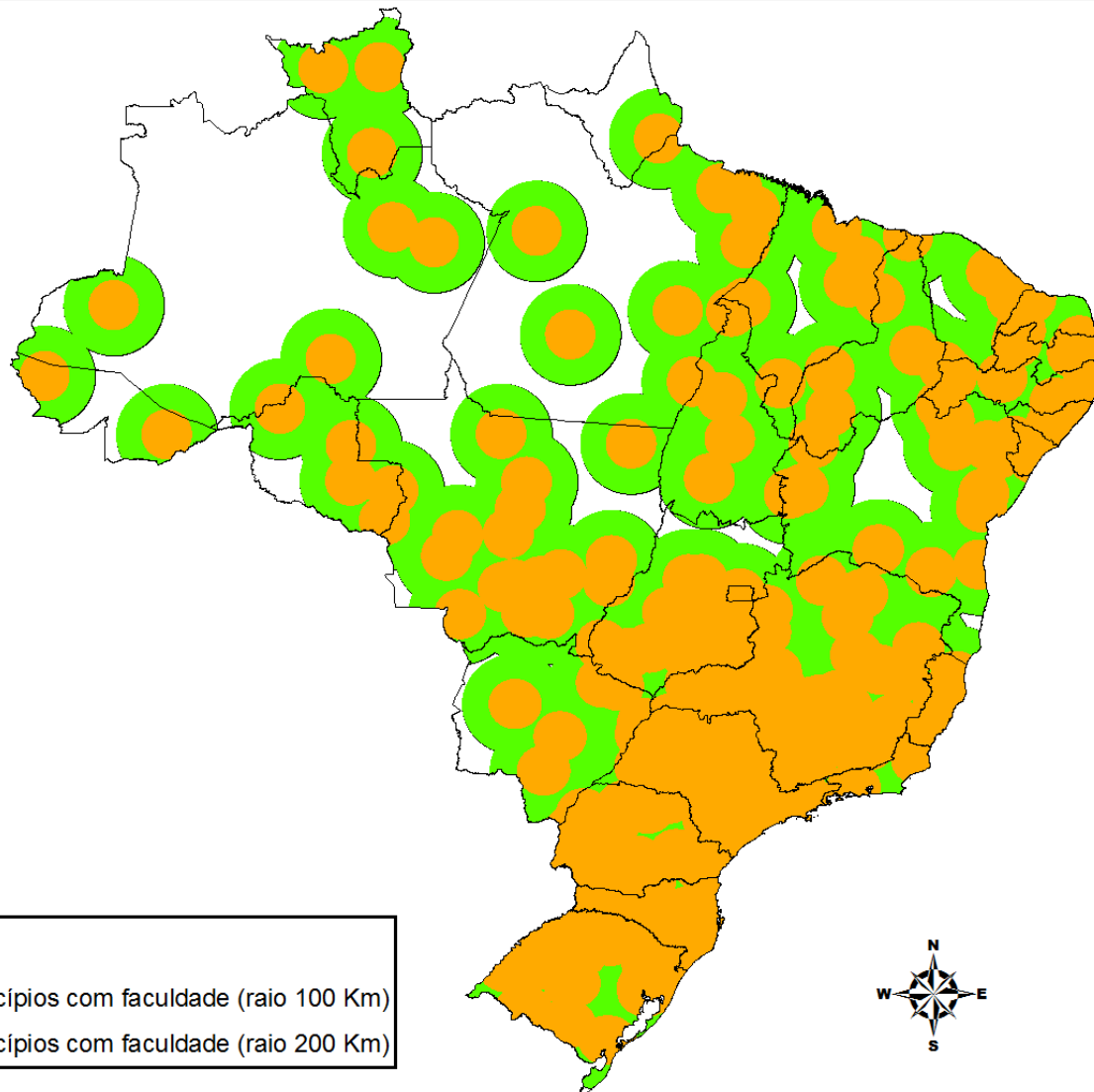
FGV | EESP • agro
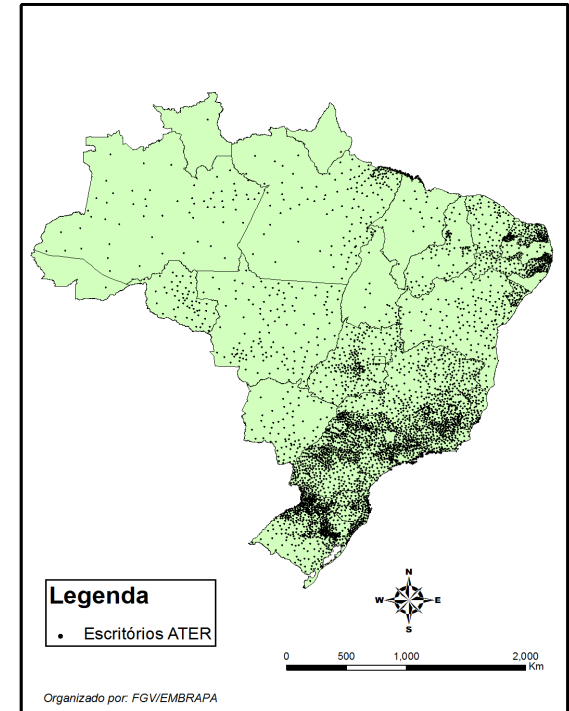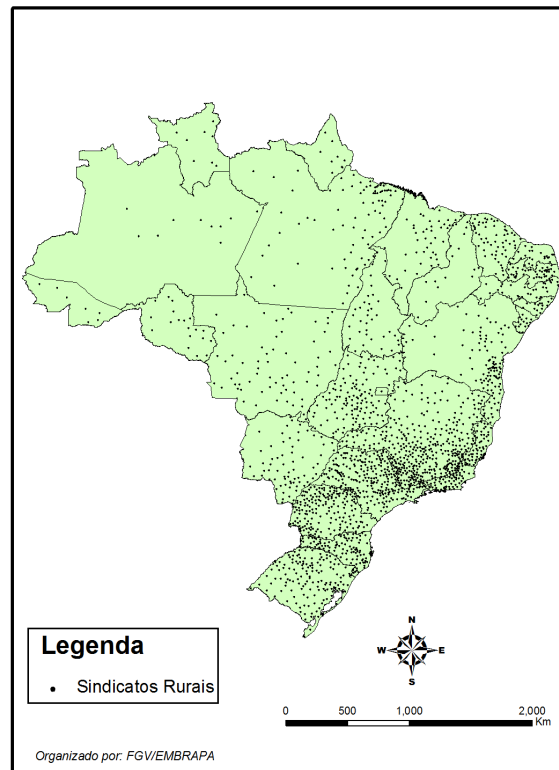
Contribution by Agricultural Universities

Spatial distribution of the possible role of universities in training the ABC Plan, within 100 KM and within 200 KM

Legenda

- Municípios com faculdade (raio 100 Km)
- Municípios com faculdade (raio 200 Km)
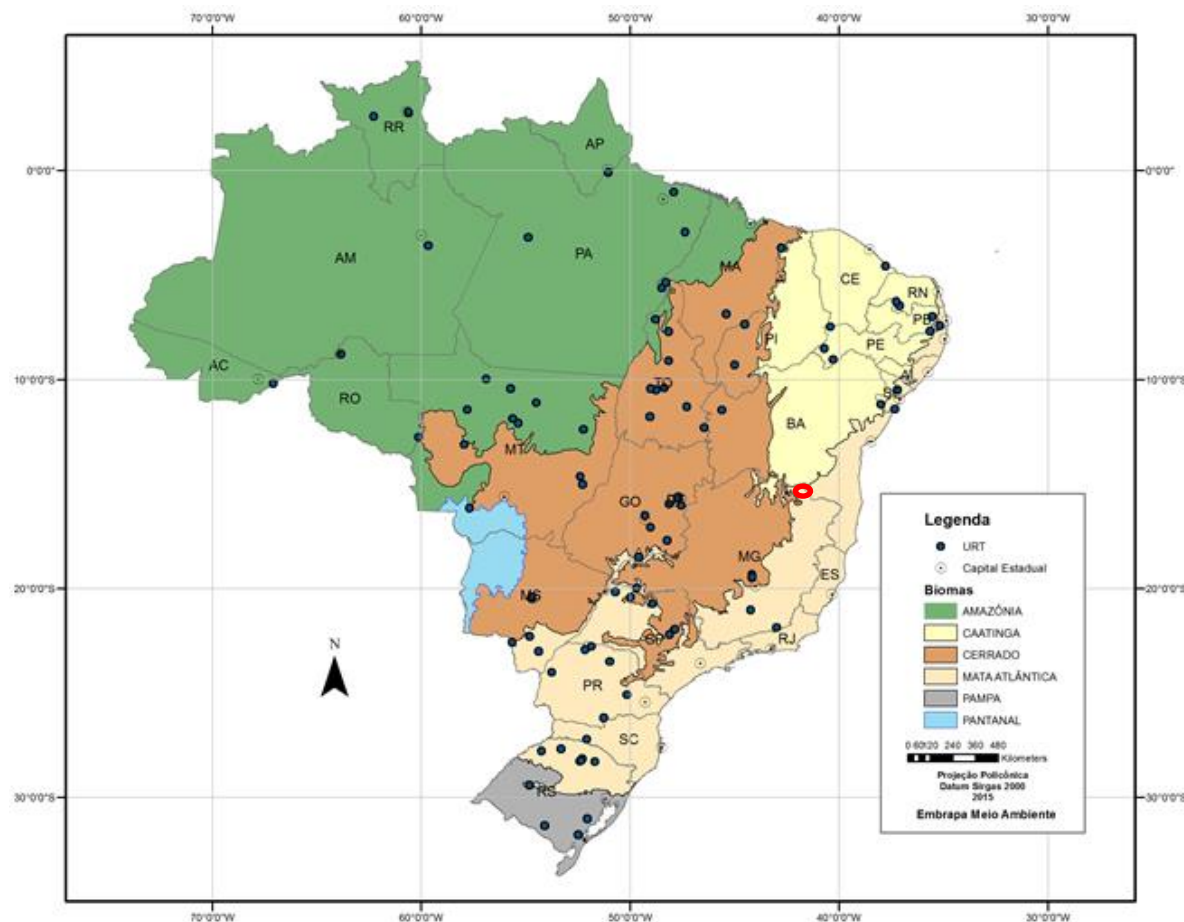
Organizado por: FGV/EMBRAPA

0   500   1.000   2.000 Km
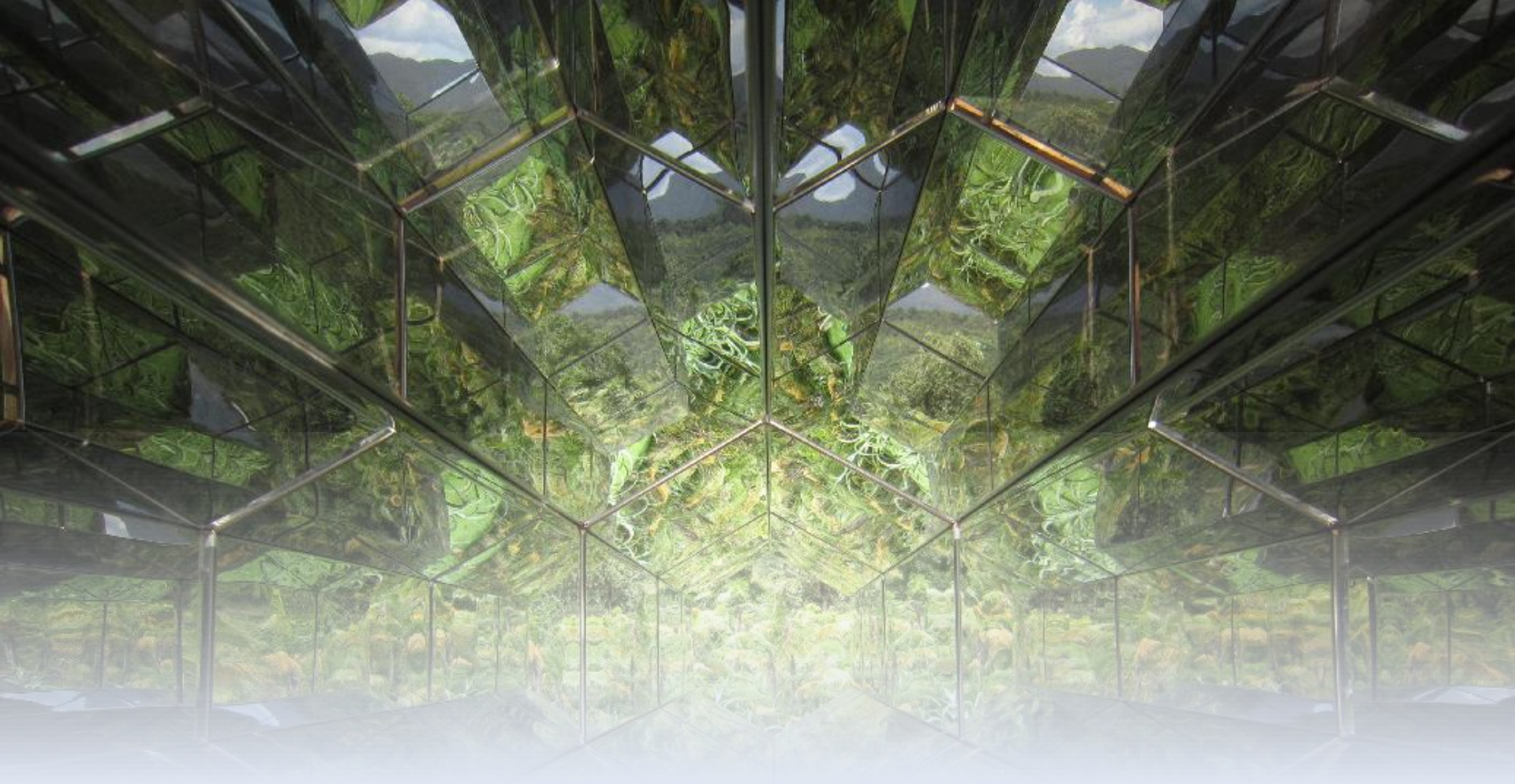
ICLF Network Association

URT – Technological Reference Units

Technology transfer

. **On-farm capacity building**

. Communication

Research

Results so far

Meeting the area and emission targets set in 2009

Practice	Target area for 2020 (M ha)	Results in 2018 (M ha)	% appr.
Pasture recovery	15.0	4.5 - 10.5	30 - 70
Integrated CLF	4.0	5.8	145
Zero tillage	8.0	9.9	124
Planted forests	3.0	1.1	37
BNF	5.5	9.9	180

Practice	Emission target for 2020 (Mt CO_2 eq)	Results in 2018 (Mt CO_2 eq)	% appr.
All practices	132.9 - 162.9	100.2	62
Pasture recovery	83.0 - 104.0	16.9	18
Integrated CLF	18.0 - 22.0	22.1	111
Zero tillage	16.0 - 20.0	18.2	91
Planted forests	8.0 - 10.0	2.0	25
BNF	10.0	18.2	182

Monitoring low-carbon agriculture

1 – Carbon and nitrogen measurements once every 5 years
2- Monitoring biomass changes with satellite images
3 –Estimating de NPP each 30 days using Modis and Landsat. Radar?
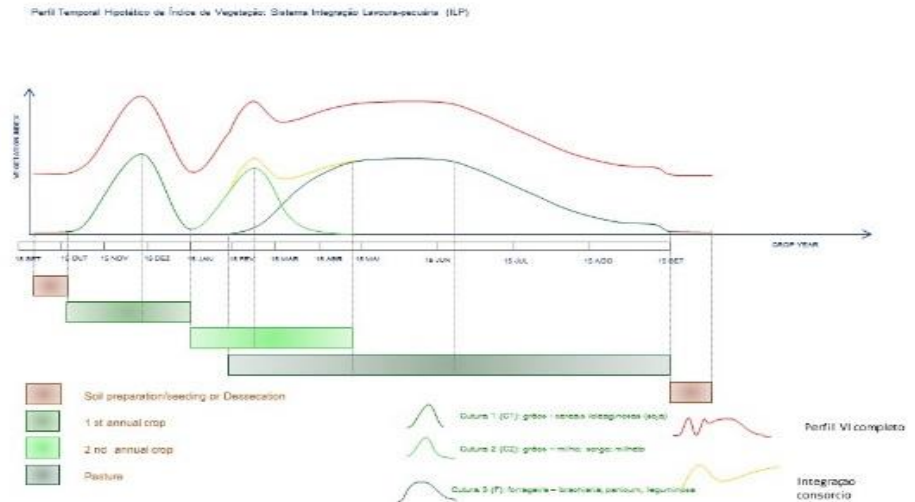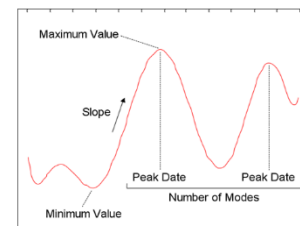
ABC Program – disbursement/harvest year

Total disbursement of ABC Program per harvest year

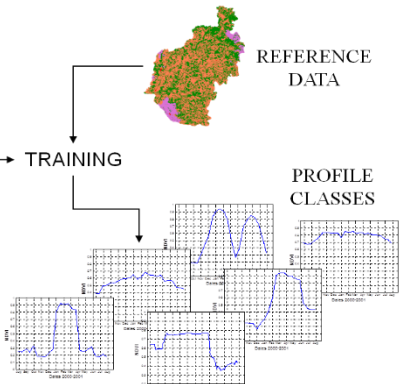| Period	Nr. of Contracts	Disbursement value (R$1,000)	Available through the Credit Line (R$) Bi	Average value per contract (R$1,000)	Δ% of average value of contracts
2010-2011	1.290	418.300,00	2,00	324,26	-
2011-2012	5.038	1.515.995,40	3,15	300,91	-7,2%
2012-2013	4.961	2.864.753,83	3,40	577,45	91,9%
2013-2014	5.882	2.695.119,38	4,50	458,20	-20,7%
2014-2015	8.018	3.656.402,33	4,50	456,02	-0,5%
2015-2016	3.344	2.052.466,03	3,00	613,78	34,6%
2016-2017	1.808	1.220.934,51	2,99	675,30	10,0%
2017-2018 (from Jul-Jun)	2.460	1.617.716,69	2,13	657,61	-2,6%
Total	**32.801**	**16.041.688,17**	**25,67**	**489,06**	**--**

Source: data SICOR, SPA and SMC/MAPA

Total disbursement (USD Billion)	Nr. of loans
Jan 2010 - Jan 2019	
4.3	34271

Area of ABC Plan technologies in rural properties financed by ABC Program from Jan 2013 to Mar 2018

ICLF (6%)
386,254 ha

Pl.Forest (10%)
631,731 ha

Pasture recov. (50%)
3,266,190 ha

Zero till (32%)
2,078,389 ha

Total
6,485,004 ha
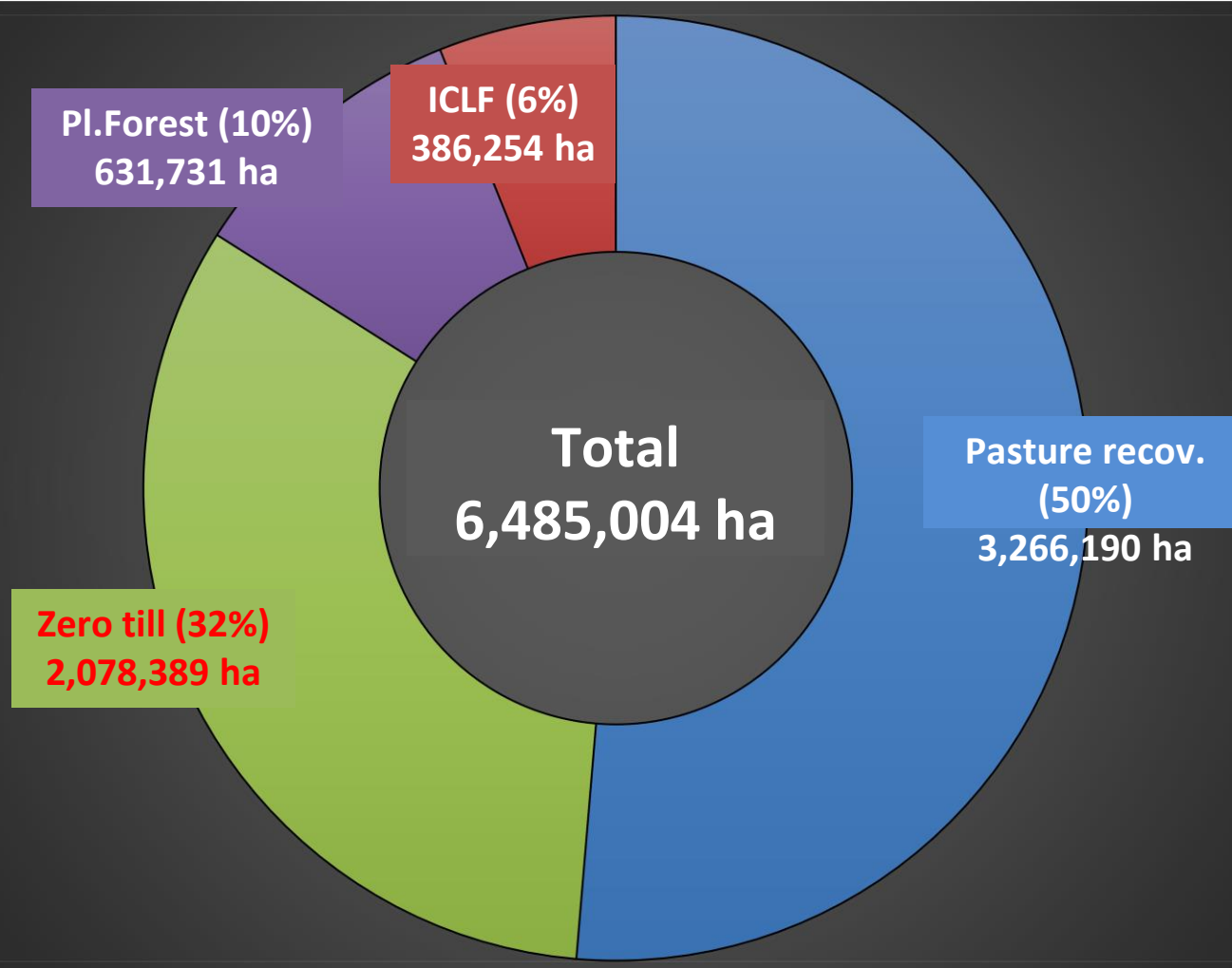
Capacity building achieved between 2011/2017

(Target Audience: 2% Students, 30% Producers, 70% Technical)

57,000 Accumulated

Atualizado em 2017							
Eventos de Capacitação Plano ABC (ano-base 2011 a 2017)							
Estado	**Nº de Participantes (70% Téc. e 30% Prod.)**						
	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Total Geral**
AC	-	-	21	-	-			21
AL	-	14	-	63	-			77
AM	-	34	28	-	18			80
AP	-	-	-	-	22			22
BA	-	88	346	-	60			494
CE	-	-	-	72	-			72
DF	285	84	304	34	210	183		1.100
ES	-	60	-	-	185			245
GO	666	365	-	3.690	1.599	86	280	6.686
MA	-	168	20	-	700			888
MG	-	1.793	-	512	1.744	1.263		5.312
MS	118	-	-	-	1.588	96		1.802
MT	124	447	101	-	-	266		938
PA	-	70	-	-	48			118
PB	36	170	-	-	69	231		506
PE	-	20	-	-	-			20
PI	188	695	-	-	103			986
PR	1.926	3.773	2.935	-	70			8.704
RJ	-	-	-	-	-			-
RN	-	11	-	-	-			11
RO	185	150	-	-	-			335
RR	-	-	-	-	-			-
RS	-	768	56	-	72			896
SC	-	524	50	-	-	213		787
SE	-	-	-	88	-			88
SP	317	50	1.000	-	65	35		1.467
TO	237	1.420	785	6.063	2.684	4.174	1.910	17.273
TOTAL	**4.082**	**10.704**	**5.646**	**10.522**	**9.237**	**9.513**	**7.417**	**57.121**

Fonte: MAPA

Synergy with other National Policies

Law for Protection of Native Vegetation

Forest Code 2012

Set-aside area
. 20%, 35% and 80%

Areas of Permanent Preservation (APP)
. River buffer strips

National Irrigation Policy 2013

National Programme to Combat Desertification (PAN-Brasil)

National System of Conservation Units 2000

Environmental Regularization Programme 2014

Rural Environmental Registration (*www.car.gov.br*)

Agricultural Policy for Planted Forests 2014

Final remarks

- Indicators show a fairly efficacious policy for low-carbon resilient agriculture

- Tireless efforts to enable public-private partnership to make things happen

- Surprising motivation by farmers and ranchers in adoption at own costs

- Improvements are needed:

  - Bank/finance system for loans could help more on traceability;

  - Planted forests need adjustments or more support for adoption;

  - Emission coefficients need to be more specific to activity and soil-climate type.

Thank you!

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Photo: M.Lopes