
Controlled traffic farming in Argentina: challenges and opportunities

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Argentina

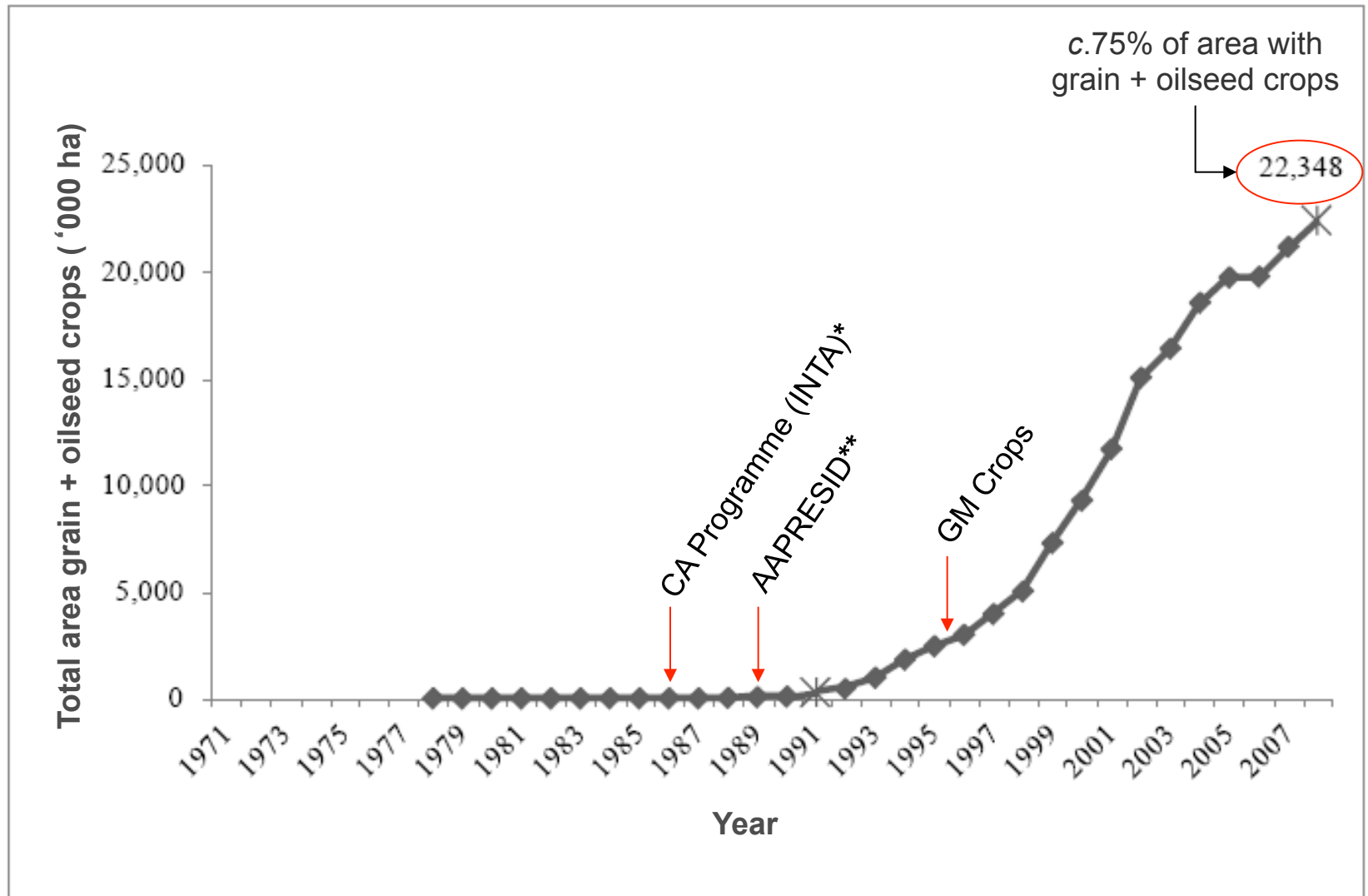


[Source: Google]

Background agricultural sector

- **Significant changes since the mid-1980' s**
 - c.9% of world agricultural output,
 - 8th largest producer and 12th largest exporter of agricultural commodities.
 - Agriculture related activities represent c.20% of the country' s GDP
- **Rapid growth in production and productivity**
 - Increased global supplies of cereals and oilseeds,
 - More stable global food prices.
- **Key drivers**
 - Favourable conditions in the world markets,
 - Introduction of new technologies,
 - Research and extension effort.

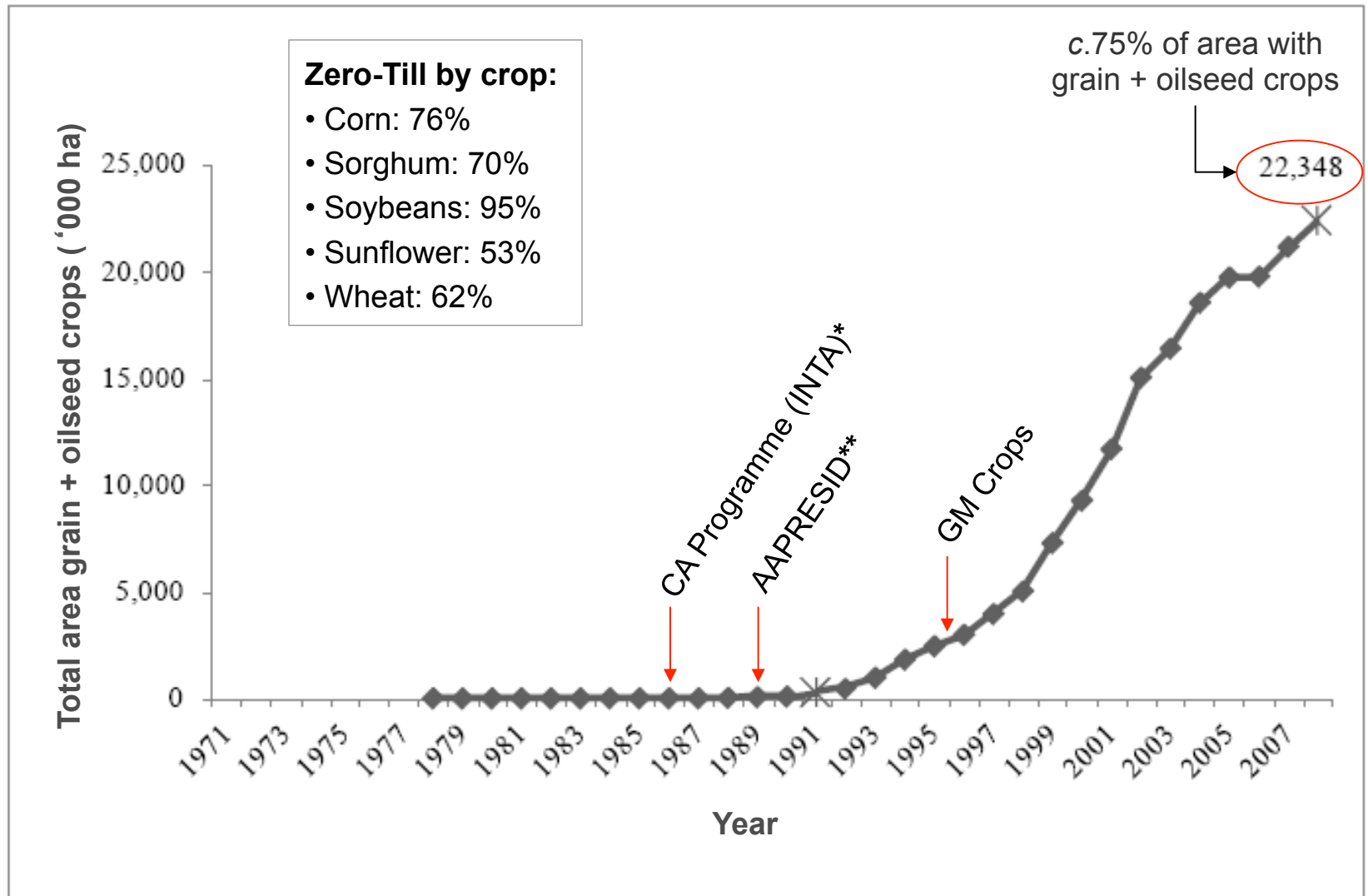
Adoption of zero-tillage 1978-2008



[Source: AAPRESID, 2009; Trigo et al., 2009]

*Conservation Agriculture Programme (INTA)
**Argentinean Assoc. of Growers in Zero-Tillage

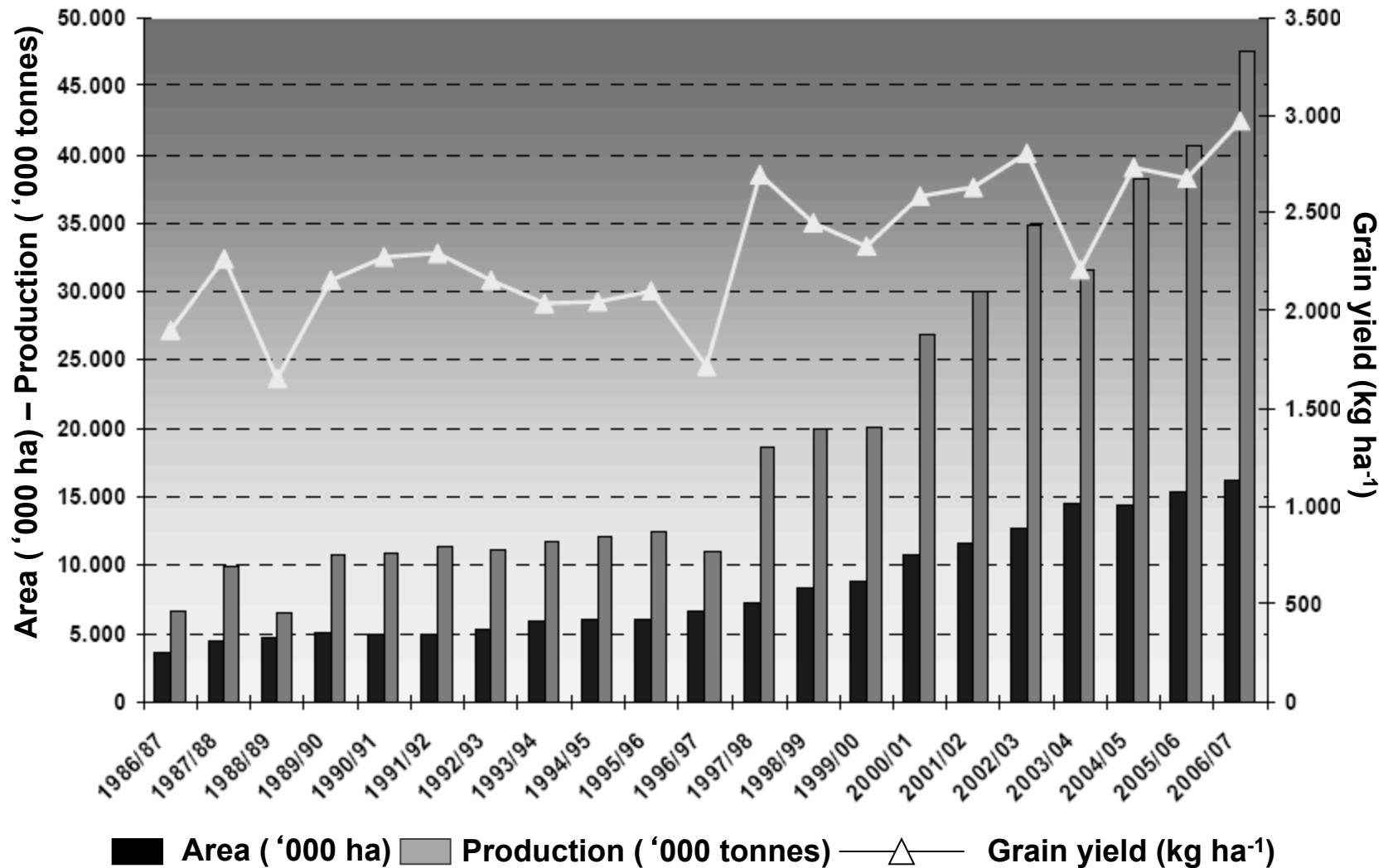
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Productivity trends: soybeans (1987-2007)



[Source: Giancola et al., 2009]

Zero-tillage



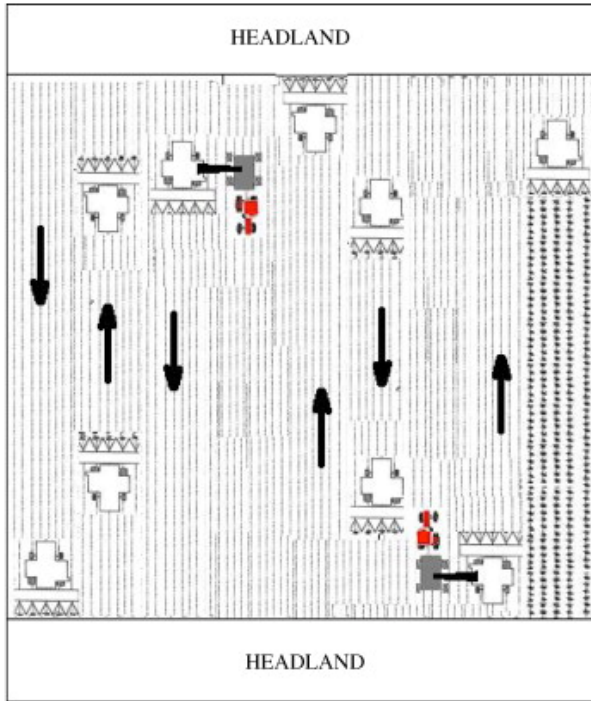
Wheat zero-till after corn



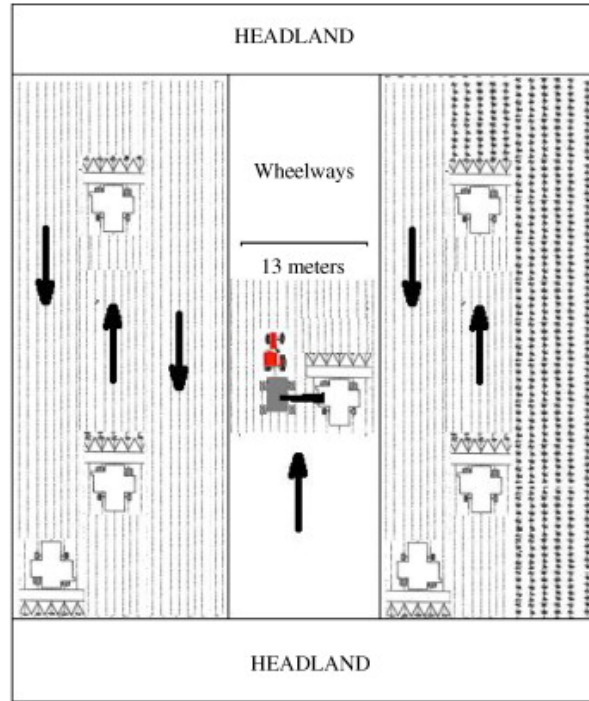
**Soybeans Post-harvest 2011
(c.30 mm h⁻¹; 110 mm)**

Effect of traffic on crop yield: a case study on soybeans

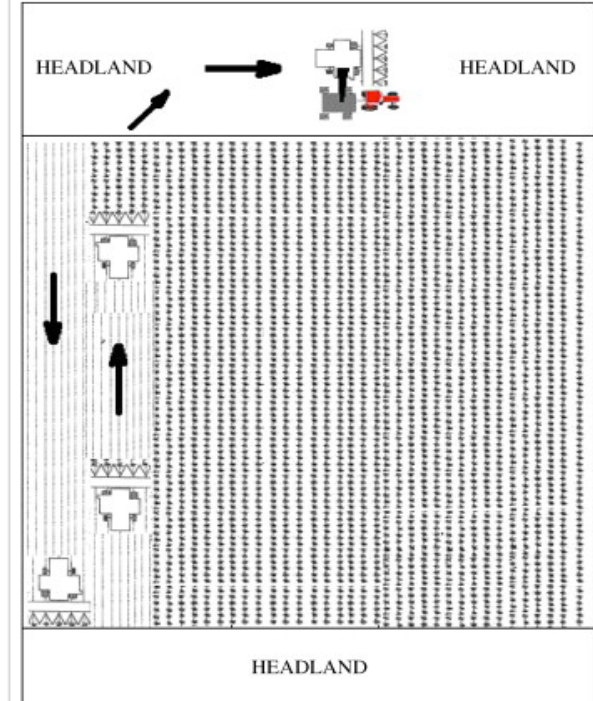
Treatment 1: 38.5 t km⁻¹ ha⁻¹
(Standard traffic)



Treatment 2: 20.1 t km⁻¹ ha⁻¹
(Confined traffic)



Treatment 3: 15.2 t km⁻¹ ha⁻¹
(Reduced traffic)



- 9 years under zero-till prior to the experiment with standard traffic regime
- Soil: Typical argiudol, moderately well drained, 20% (w w⁻¹),
- Machinery: Combine (15.3 t), tractor (8.5 t), grain cart (20 t).

Effect of traffic on crop yield: a case study on soybeans

Crop	Soybeans (reference yield: 2.7 t ha ⁻¹)					
	Treatment 1	ΔYield	Treatment 2	ΔYield	Treatment 3	ΔYield
Harvest season						
Traffic density	38.5 t km ⁻¹ ha ⁻¹	(%)	20.1 t km ⁻¹ ha ⁻¹	(%)	15.2 t km ⁻¹ ha ⁻¹	(%)
2003	2.67 ^a	-1.1	3.12 ^b	15.5	3.30 ^b	22.2
2004	2.52 ^a	-6.6	3.12 ^b	15.5	3.43 ^b	27.0
2005	2.48 ^a	-8.14	3.14 ^b	16.3	3.49 ^b	29.2
Mean	2.56	-5.30	3.13	15.8	3.40	26.1

Different letters indicate significance within years (P<0.01).

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Mean	2.56	-5.30	3.13	15.8	3.40	26.1
Gross margin*	403	-	587	-	674	-

*US\$ ha⁻¹; based on direct costs and (internal) price of crop for 2012/2013 (322 US\$ t⁻¹).

Different letters indicate significance within years (P<0.01).

[Source: Botta et al., 2007a-b; Ghida-Daza, 2012; Antille et al., 2013]

Challenges associated with CTF adoption

- **CTF is still a novel concept**

- **Possible concerns**

- ❑ Realisation of benefits in practice and on a farm-scale,
- ❑ Performance of permanent traffic lanes in wet conditions,
- ❑ Harvesting operations involving contractors – supervision/discipline,
- ❑ Consistency – design of simple easily-followed systems,

- **Possible barriers**

- ❑ Incompatibility between crops,
- ❑ Reliance on different contractors for different operations,
- ❑ Cost of conversion and recent investments in machinery,
- ❑ Cultural issues,
- ❑ More management,
- ❑ Economic context – domestic agricultural policies.

Responses required for CTF adoption

- **Emphasis on knowledge/technology transfer**
 - Increase awareness of CTF and its benefits,
 - Effective use of technology networks available.
 - **Strategic planning**
 - Determine the appropriate engineering approach to CTF,
 - Application of whole-farm economic modelling.
 - **Applied research and development**
 - Effort must be on identifying efficient and cost-effective methods,
 - Promote on-farm action-learning activities,
 - Review existing soil management practices and alternative methods to mitigate soil compaction,
 - Use scientific evidence to influence policy makers and land managers.
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Opportunities for CTF development

- Favourable conditions in global markets for key commodities,
- Agricultural sector extremely responsive to economic incentives,
- Demonstrated improvement in profitability
- Synergism between CTF and zero-tillage,
 - Supported by (rapid) adoption of PA-related technologies.
- Wide range of technology networks available,
 - Independent and private organisations,
 - Government-funded research and extension institutions.
- Planting pools,
 - Agreement between producers and other agents,
 - Major source of financing,
 - Tend to incorporate more advanced technology.

CTF development

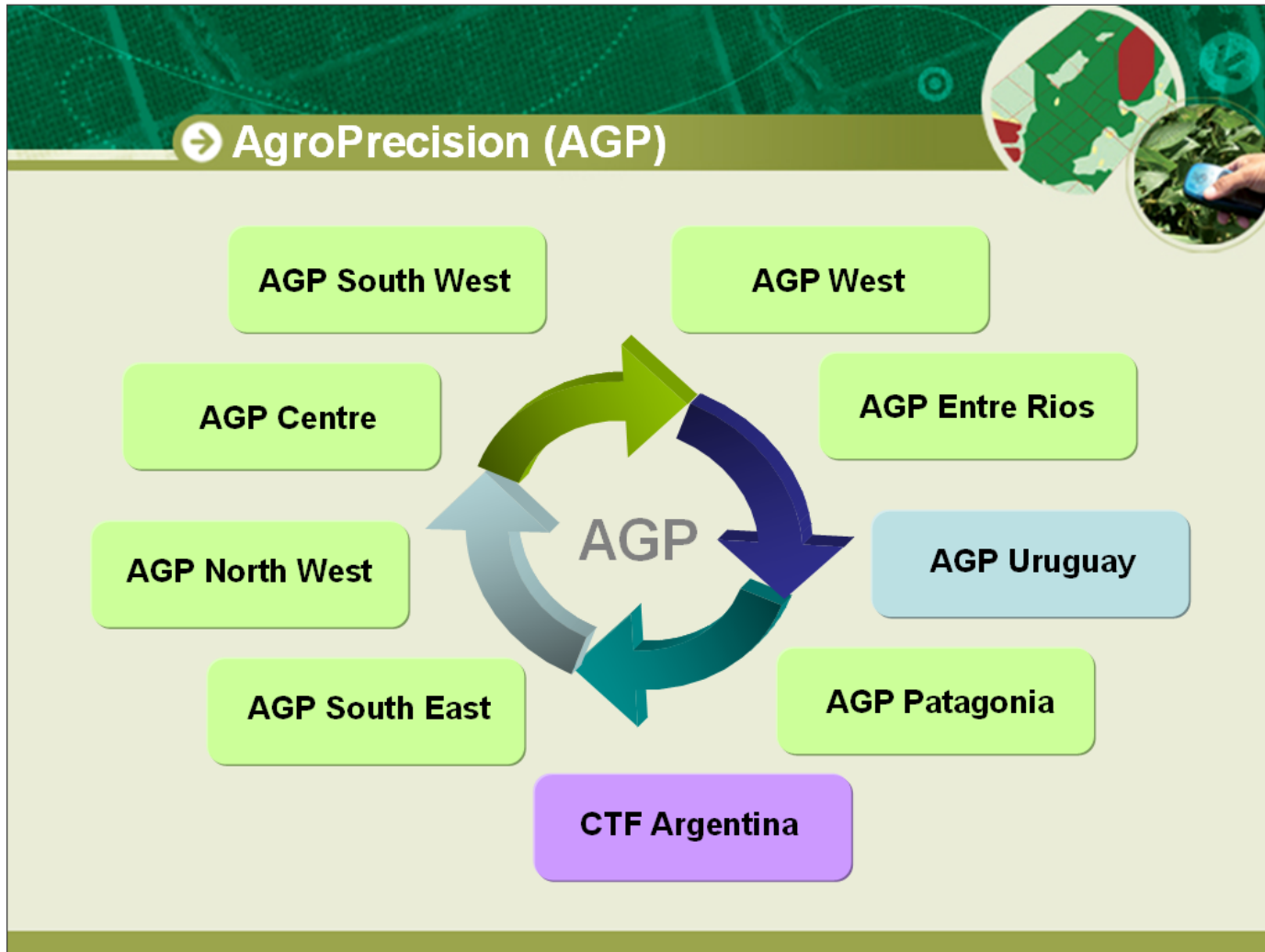


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CTF development



Summary

- **Role of controlled traffic farming**
 - Sustainable intensification of agriculture,
 - Increased productivity and environmental performance,
 - Critical for an agriculture-dependent economy.
 - **Need for integrated R & D + adoption programme**
 - Key to help address the challenges and deliver sustainable intensification,
 - Effective bridge between knowledge and practice.
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THANK YOU



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