



# No-till -

as a component of European  
Agricultural Policy and capability  
to boost agricultural development  
in countries of the post-Soviet  
region



# Contents

- **Agricultural Policy and Conservation Agriculture (CA)**
- **CA globally and in Europe**
- **The case for CA in Eastern Countries**



# CAP Reform

2014 - 2020



# MAKING SUSTAINABLE AGRICULTURE REAL IN CAP 2020

THE ROLE OF CONSERVATION AGRICULTURE

2011 | 2012



# What is CAP looking for?

- Viable food production
- Sustainable management of natural resources and climate action
- Balanced territorial development



... or in more detail:

## ➤ **Viabile food production**

- Reasonable farm income
- Competitiveness of European agriculture
- Cost effectiveness of EU budget
- Globalization of agricultural markets
- Food security (and safe food)
- High levels of production and productivity
- High quality products at affordable prices



... or in more detail:

- **Sustainable Management of natural resources and climate action**
- Protection of soil, water, air, biodiversity, environmental services
- Bio-energy crops
- Climate Change (Mitigation, Resilience)
- Resource efficiency



... or in more detail:

- **Balanced territorial development**
- Diversity and maintenance of habitats
- Landscape and ecosystem management
- Rural prosperity

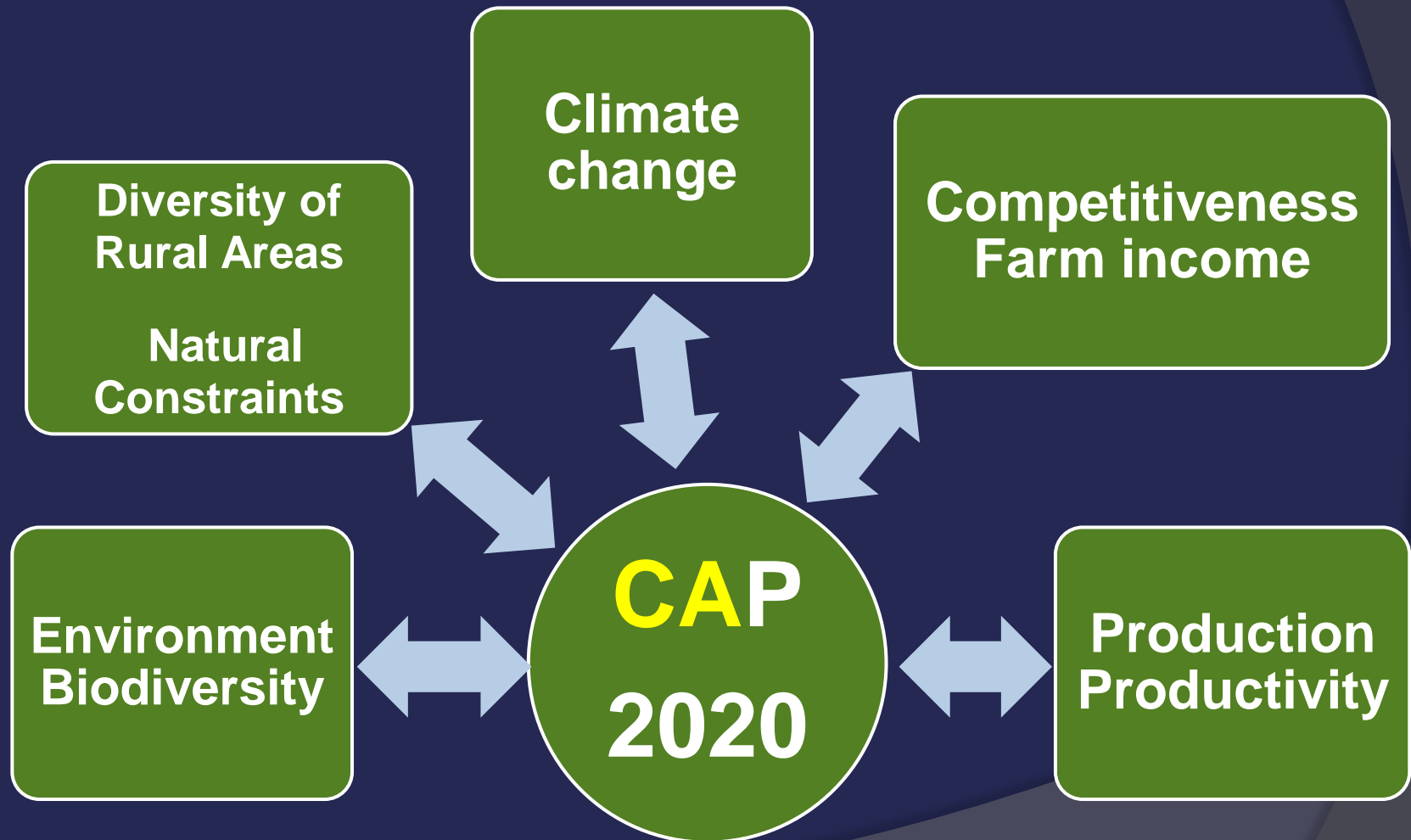




Maybe something like this?



# CAP reform aims to address:



But how to achieve these  
multiple (sometimes conflicting)  
objectives?

**Which approach?**



# We need to answer the question: How to produce more from less?

With less environmental impact !

With higher resource efficiency (land, water, nutrients, PPPs, labour, ...)!

With lower production costs to improve competitiveness !

While adapting to and mitigating Climate Change !

With reduced energy inputs and carbon emissions !

With less subsidies (compensatory payments) !

With less bureaucracy !



# Strategy for Sustainable Production Intensification

by

## Integrating Agricultural Production with Ecosystem Services



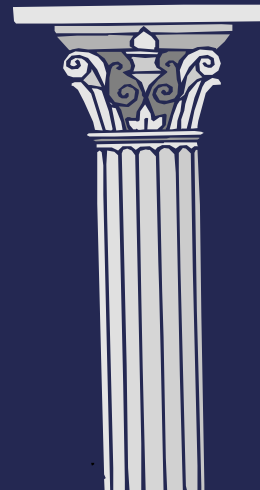
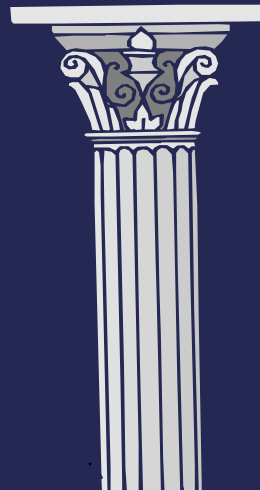
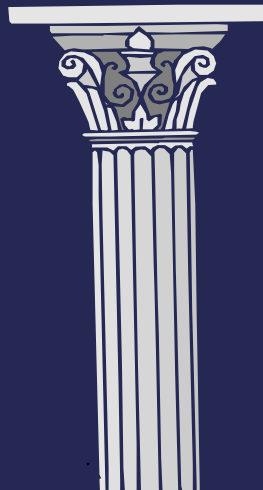
# ***Conservation Agriculture***

**Improved Productivity & Ecosystem Serv.**

**Soil/Water Protection & Fertility**

**Soil Organic Carbon**

**All Production Systems & Agroecologies**



**Minimum / no  
soil disturbance**

**Permanent cover  
residues/cover crop**

**Species diversity/  
crop rotations**



How does CA look like  
in practice?





**Minimum soil disturbance**



**Cover crops**



**Residues**



**Cover crops and residues**





**Minimum soil disturbance**



**Cover crops**



**Residues**



**Cover crops and residues**



**Diversified crop rotations to minimize external inputs**

How does tillage farming  
compare?



# Good agricultural and environmental condition?



**But underneath?**





**DIREKTTSAAT**  
semis direct  
*zero tillage*

**PFLUG**  
labour  
*plow*

**The same field, the same slope, the same crop!**



**Traditional Tillage**



**No-till into residues**



Therefore...





Crop Yields, Profitability & Competitiveness

Biodiversity & Beautiful landscape

# Conservation Agriculture

Soil Fertility & Carbon sequestration

Less surface runoff & Floods

Less soil erosion & Soil Compaction



# What we need now to make Sustainability real in CAP?

- Recognition of the need for farming to be resource efficient and deliver ecosystem services
- Accept the need for using available new knowledge and technology/practices to optimise production
- Recognition and acceptance of CA as the most sustainable food production system base
- Promote/incentivise/oblige the adoption of CA for sustainable production intensification



How to “oblige” (1<sup>st</sup> pillar)

and

promote/incentivise (2<sup>nd</sup> pillar)?



# Alternative 1<sup>st</sup> Pillar (greening) options

- Strengthen cross-compliance requirements (GAEC + SMRs) through clear but simple definitions of easily verifiable requirements that have a positive effect on ecosystem services:



## ANNEX IV

## Good agricultural and environmental condition referred to in Article 5

Issue	Standards
<p>Soil erosion:</p> <p>Protect soil through appropriate measures</p>	<ul style="list-style-type: none"> <li>— Minimum soil cover</li> <li>— Minimum land management reflecting site-specific conditions</li> <li>— Retain terraces</li> </ul>
<p>Soil organic matter:</p> <p>Maintain soil organic matter levels through appropriate practices</p>	<ul style="list-style-type: none"> <li>— Standards for crop rotations where applicable</li> <li>— Arable stubble management</li> </ul>
<p>Soil structure:</p> <p>Maintain soil structure through appropriate measures</p>	<ul style="list-style-type: none"> <li>— Appropriate machinery use</li> </ul>
<p>Minimum level of maintenance:</p> <p>Ensure a minimum level of maintenance and avoid the deterioration of habitats</p>	<ul style="list-style-type: none"> <li>— Minimum livestock stocking rates or/and appropriate regimes</li> <li>— Protection of permanent pasture</li> <li>— Retention of landscape features</li> <li>— Avoiding the encroachment of unwanted vegetation on agricultural land</li> </ul>

# Alternative 1<sup>st</sup> Pillar (greening) options

- Strengthen cross-compliance requirements (GAEC + SMRs) through clear but simple definitions of easily verifiable requirements that have a positive effect on ecosystem services, e.g. :
  - Soil quality and functions
  - Water resources (quality/quantity)
  - Biodiversity
  - Climate change mitigation & resilience



# Alternative 1<sup>st</sup> Pillar (greening) options

➤ Additional practices could apply for the achievement of greening objectives (at least 3):

- Maintaining permanent pastures

- Ecological focus area

- Crop diversification (rotational)

- Low soil disturbance

- Permanent soil cover

Proposed by  
Commission

Proposed by  
ECAF



# Alternative 1<sup>st</sup> Pillar (greening) options

- Accept production systems based on the principles and practices of Conservation Agriculture as “equivalent” to what is proposed for the “Greening” of the 1<sup>st</sup> pillar
  - Minimum soil disturbance
  - Permanent soil cover
  - Crop rotation





## ➤ **Minimum soil disturbance\***

- At least 50% of a farm's area under annual crops must be established continuously using no-till;
- In perennial crops the use of tillage implements for the management of the interrow space is allowed only in exceptional situations.

\* Minimum soil disturbance refers to low disturbance no-tillage and direct seeding. The disturbed area must be less than 15 cm wide or less than 25% of the cropped area (whichever is lower). There should be no periodic tillage that disturbs a greater area than the aforementioned limits. Strip tillage is allowed if the disturbed area is less than the set limits.



## ➤ Permanent soil cover

- At least on 50% of a farm's area under annual crops, a minimum soil cover of 30% of the surface area must be guaranteed immediately after the direct seeding operation;
- In perennial crops a minimum of 50% of the soil surface must be covered by cover crops and/or residues in the interrow space.



## ➤ Crop rotation/diversification

- In annual cropping systems a minimum of 3 different crop species must be used in the rotation, and a maximum of two thirds of the farm surface can be cropped with gramineae species.
- In perennial crops species diversity should be achieved through the establishment of a cover crop or the maintenance of the natural vegetation in the interrow space.



# 2<sup>nd</sup> Pillar options

- Define criteria/indicators to monitor and reward farming practices/farmers according their delivery of ecosystem services
- Increasing 2<sup>nd</sup> pillar budget to implement measures that clearly promote sustainable production approaches (minimizing co-financing burden through member states)
- Temporary incentives for the adoption of CA based sustainable approaches to cover possible adaptation “risks” and to invest in specific new equipment



# IMPROVEMENT AND PROGRESS AT THE FARM LEVEL

## Sustainable Agriculture CA - Systems



*Soil cover and  
biomass production %*

*Crop rotation*

*Soil cover*

*No soil disturbance*

*Intensive soil  
disturbance*

*Reduction in soil  
disturbance %*

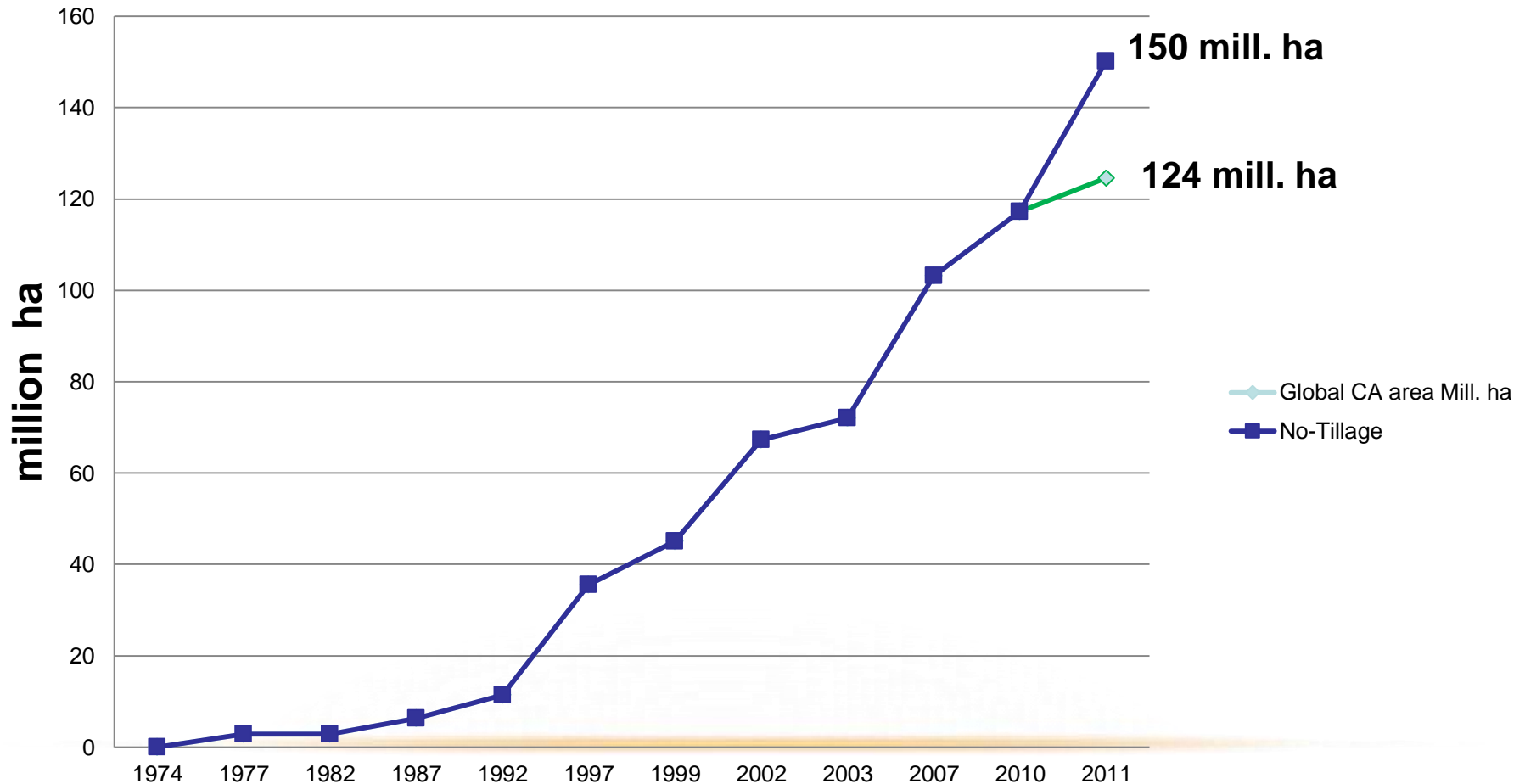
*Bare soil*



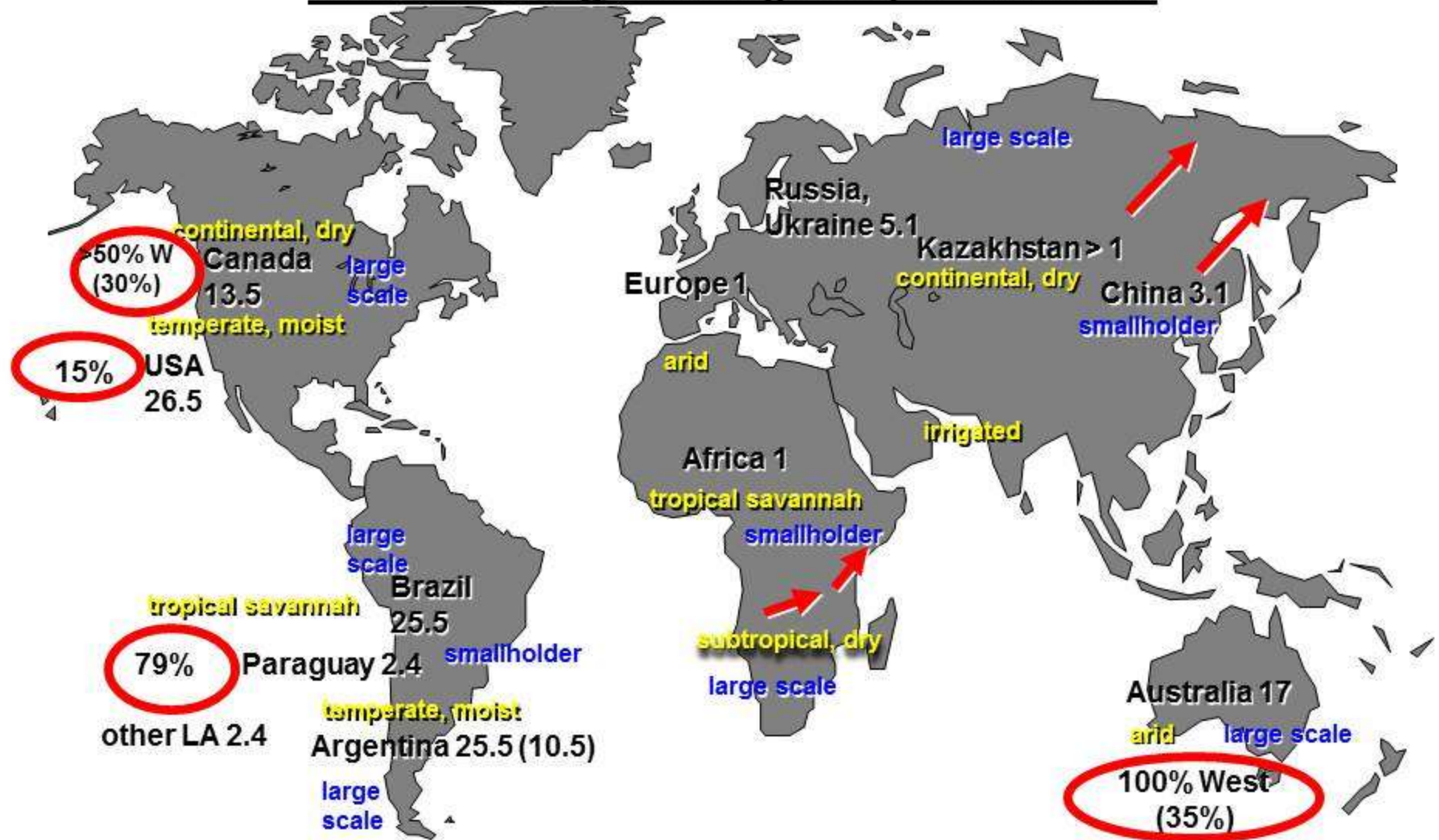
Conservation Agriculture  
does work successfully  
in all agro-ecologies



## Global Adoption of No-till/CA



## Conservation Agriculture globally 124 Million ha





Commercial uptake of no-till in some Western European countries in 2007–2008, together with the proportion of the total arable area allocated to no-till. For sources see references cited in footnotes.

Country	Area of no-till <sup>a</sup> (kha)	Total arable land (2008) <sup>b</sup> (kha)	Area of no-till as % of total arable area
Finland <sup>c</sup>	200	2256	8.86
Germany <sup>c</sup>	5	11933	0.42
France <sup>c</sup>	200	18260	1.09
Switzerland <sup>c</sup>	12.5	408	3.06
Spain <sup>c</sup>	650	12500	5.20
Portugal <sup>d</sup>	80	1050	7.62
Italy <sup>d</sup>	80	7132	1.12
Slovak Rep. <sup>d</sup>	37	1382	2.68

<sup>a</sup> Excluding orchard and tree crops.

<sup>b</sup> FAO Statistics Division 2010 ([www.fao.com](http://www.fao.com)).

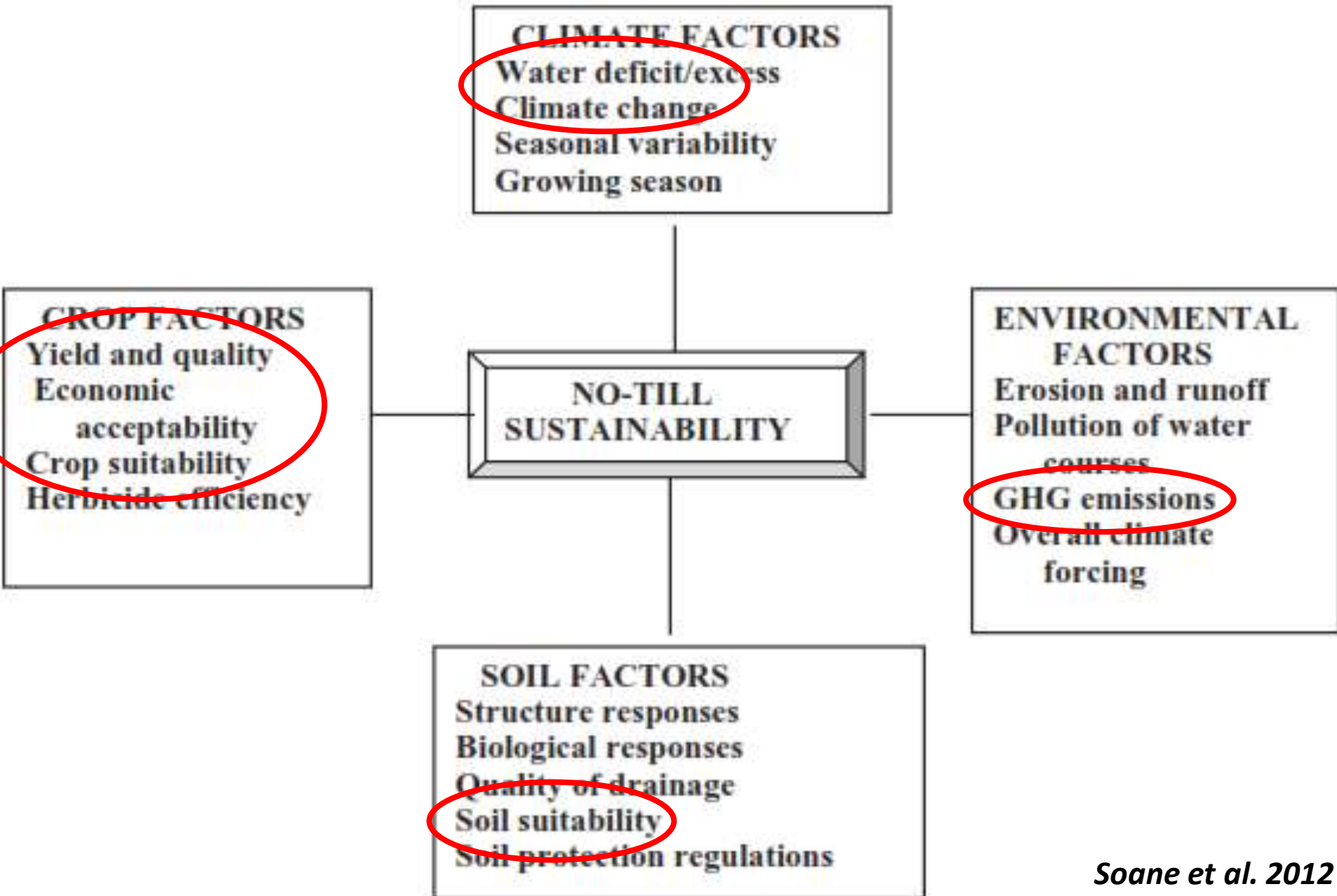
<sup>c</sup> Derpsch and Friedrich (2009).

<sup>d</sup> Basch et al. (2008).

# The case for CA in Eastern countries



# Suitability factors for uptake of CA



# ➤ Water deficit/Climate change

Total soil evaporation during 21 days

			Evaporative demand (mm d <sup>-1</sup> )					
	Residues (kg ha <sup>-1</sup> )		Corn			Wheat		
Soil type	Corn	Wheat	8	6	3	7	5.2	3
Loamy sand	0	0	74.2	82.0	57.2	59.2	68.0	47.9
Heavy clay	0	0	56.4	74.2	56.4	54.7	59.0	46.9
Loamy sand	5000	3500	40.2	28.9	19.0	38.0	28.4	18.5
Heavy clay	5000	3500	35.7	30.1	22.2	35.2	32.0	22.8
Loamy sand	10000	7000	20.4	19.8	18.6	20.6	20.0	16.5
Heavy clay	10000	7000	21.1	18.1	13.6	20.3	17.1	13.1

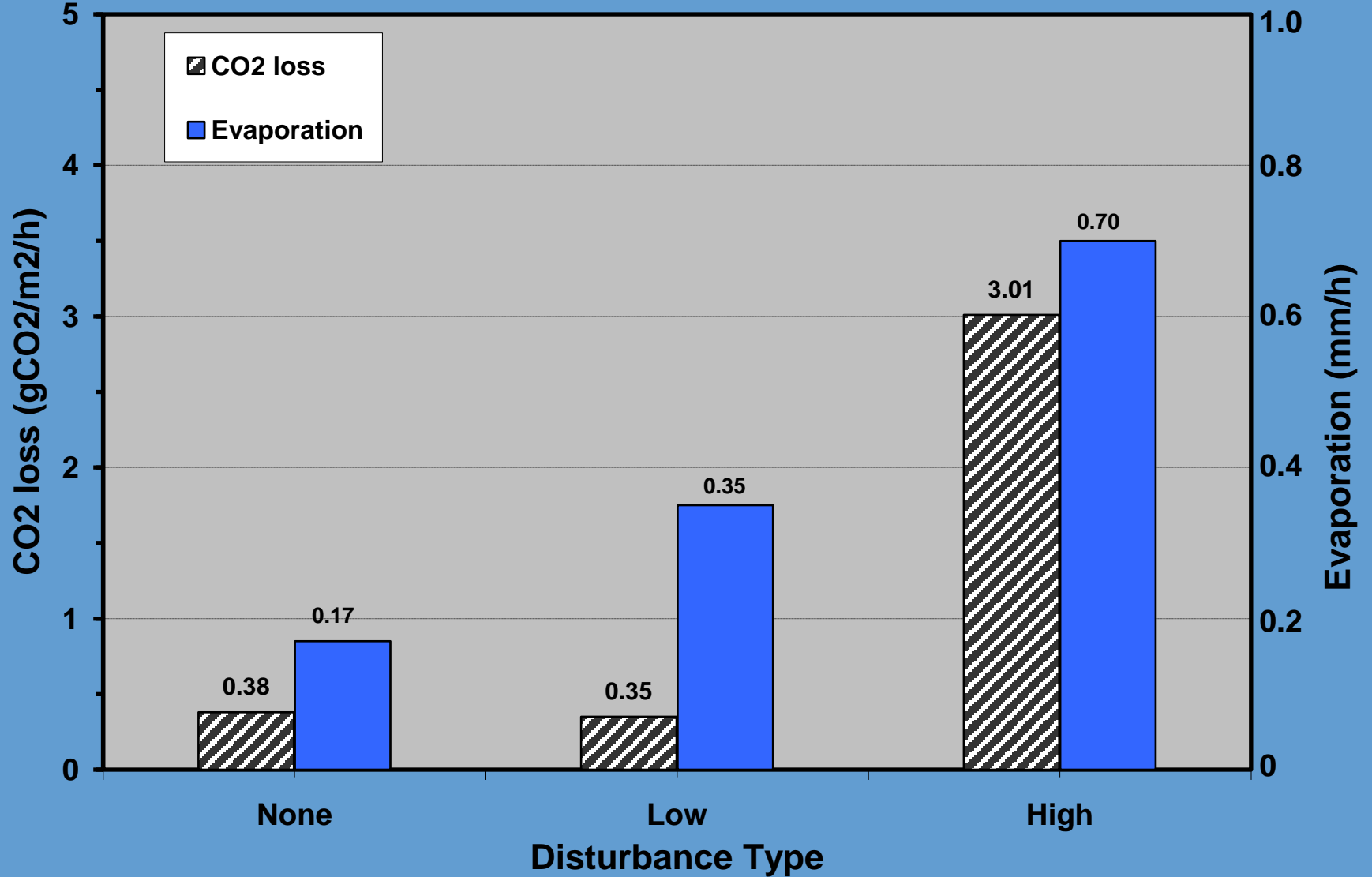
# ➤ Water deficit/Climate change

## Soil porosity and available water

Tillage	Depth (cm)	> 50 $\mu\text{m}$ (%)	50 -10 $\mu\text{m}$ (%)	10-0.2 $\mu\text{m}$ (%)	< 2 $\mu\text{m}$	Porosity Total (%)	Available water (%)
NT	10	3.2	2.22	2.7	38.37	46.52	4.92
	20	0.86	3.91	5.22	36.16	46.15	9.13
	30	1.86	2.63	11.48	29.44	45.4	14.11
Plough	10	15.08	2.34	4.36	29.95	51.73	6.71
	20	2.67	1.32	2.31	35.95	42.25	3.63
	30	1.47	1.56	3.29	35.62	41.94	4.85

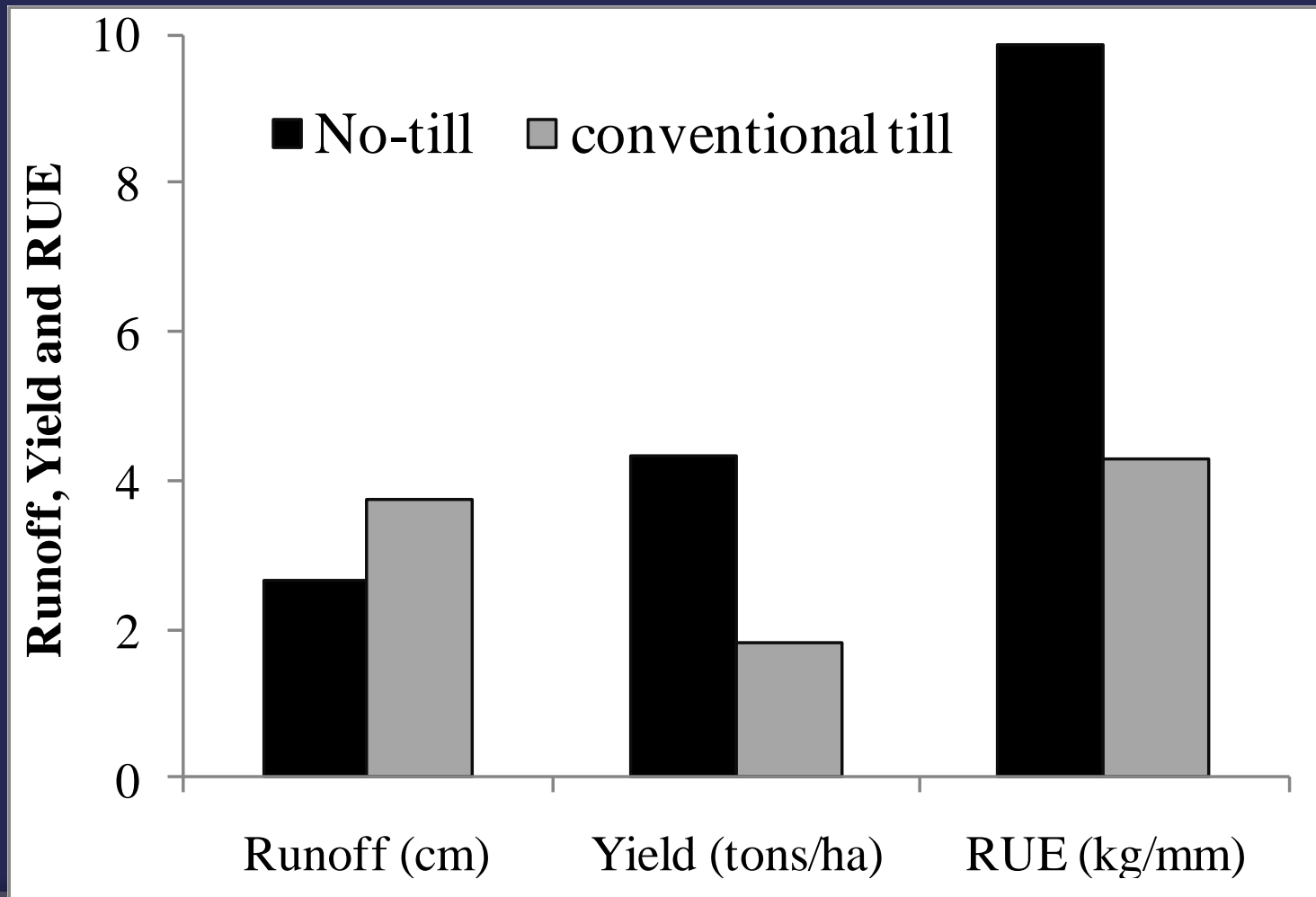


# CO<sub>2</sub> & H<sub>2</sub>O loss from Low vs High Disturbance Drills



# ➤ Water deficit/Climate change

Runoff, corn yields and Rain Use Efficiency in a semi-arid environment



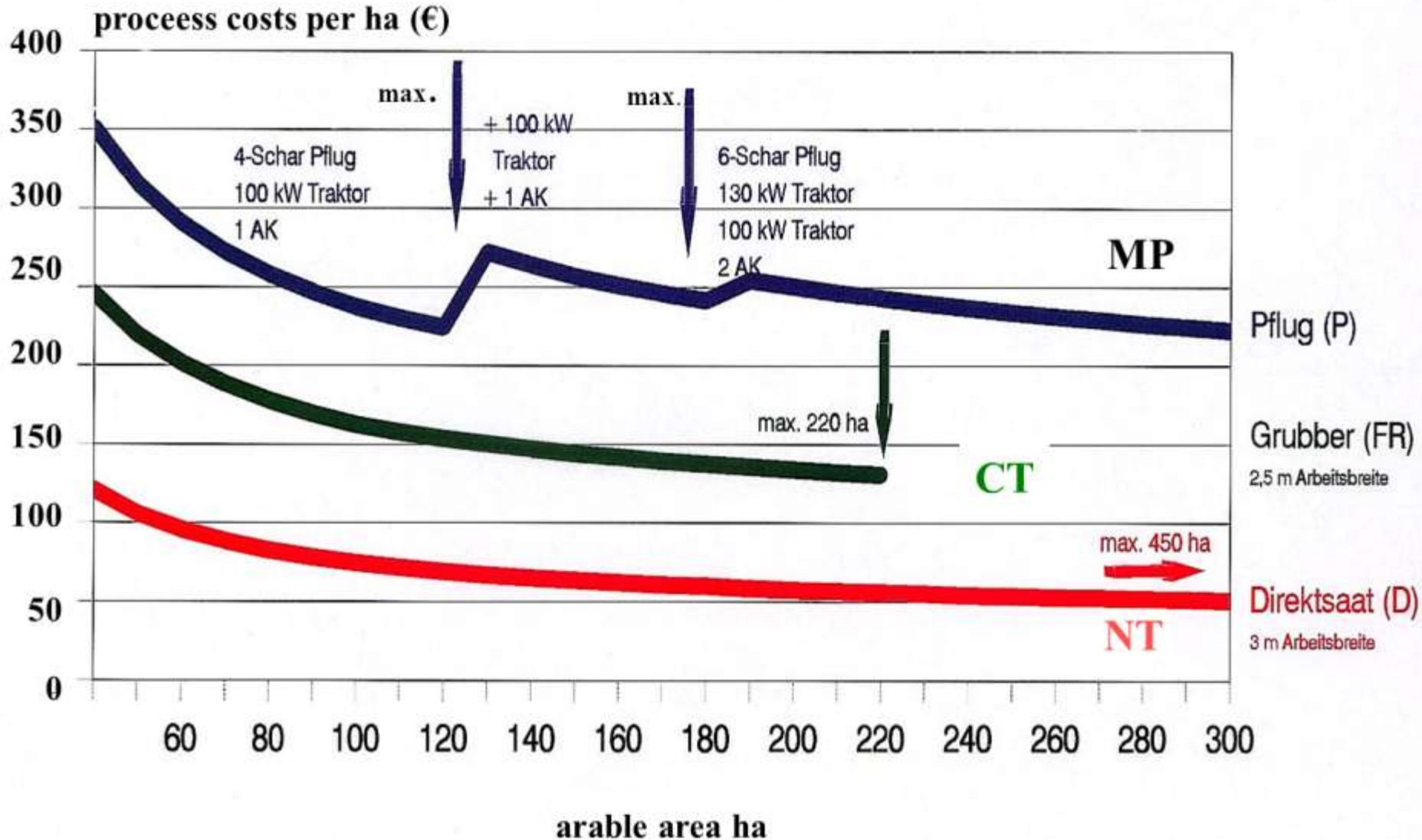
- Soil/Crop suitability
- Large areas





# Process costs of different tillage systems

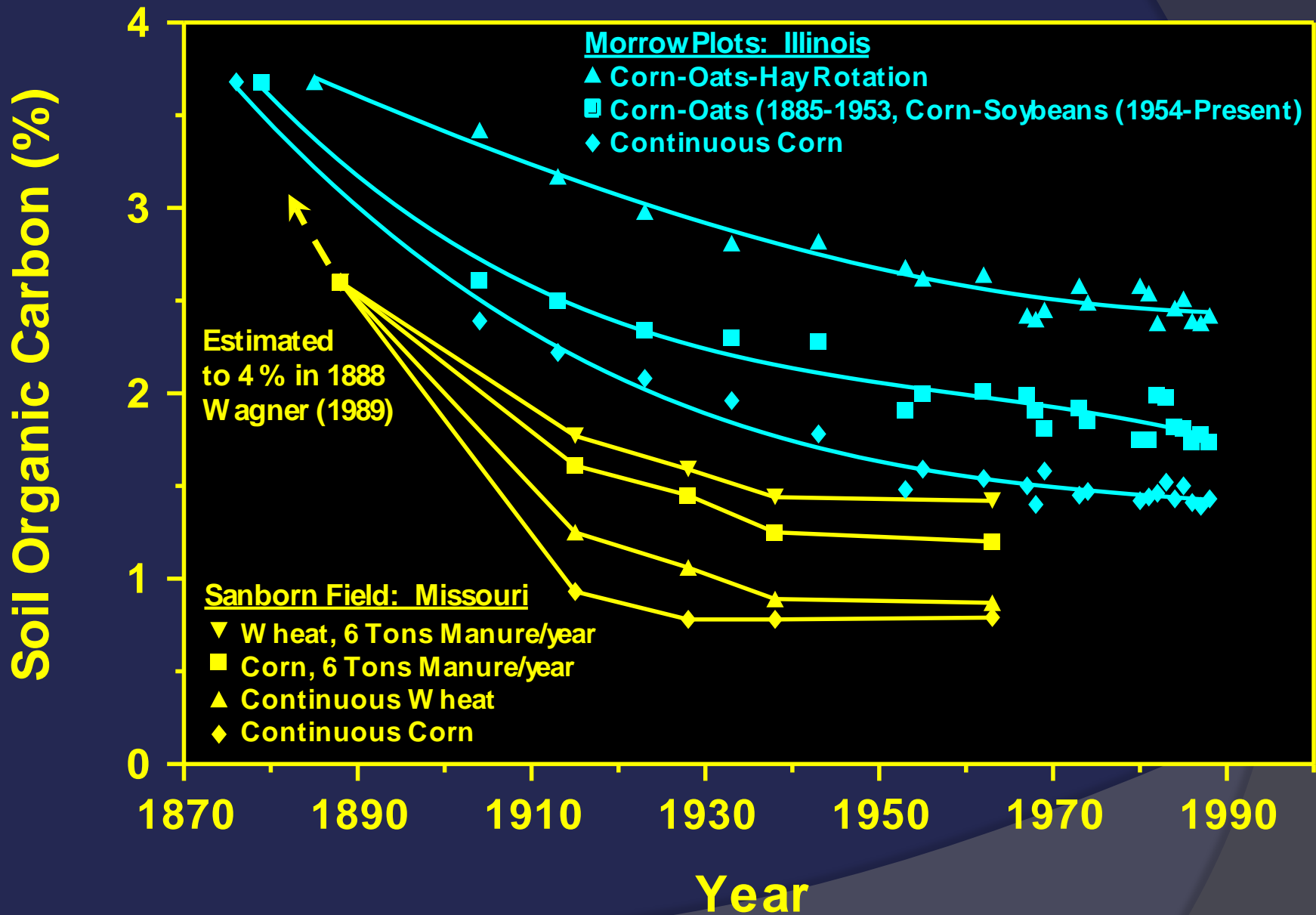
- 20 workable days and 10 hours per day -



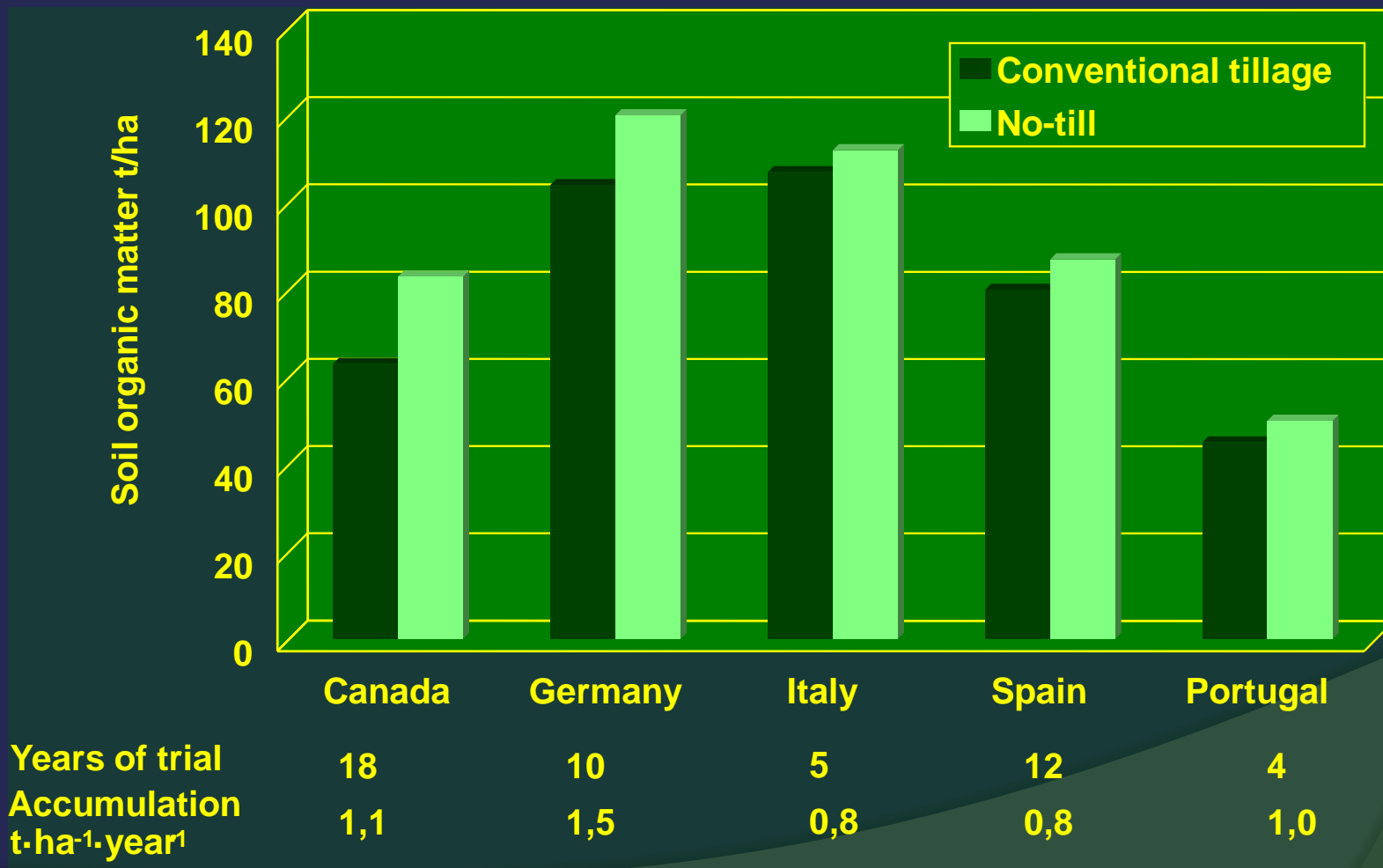
- Soil/Crop suitability
- Large areas
- Carbon farming



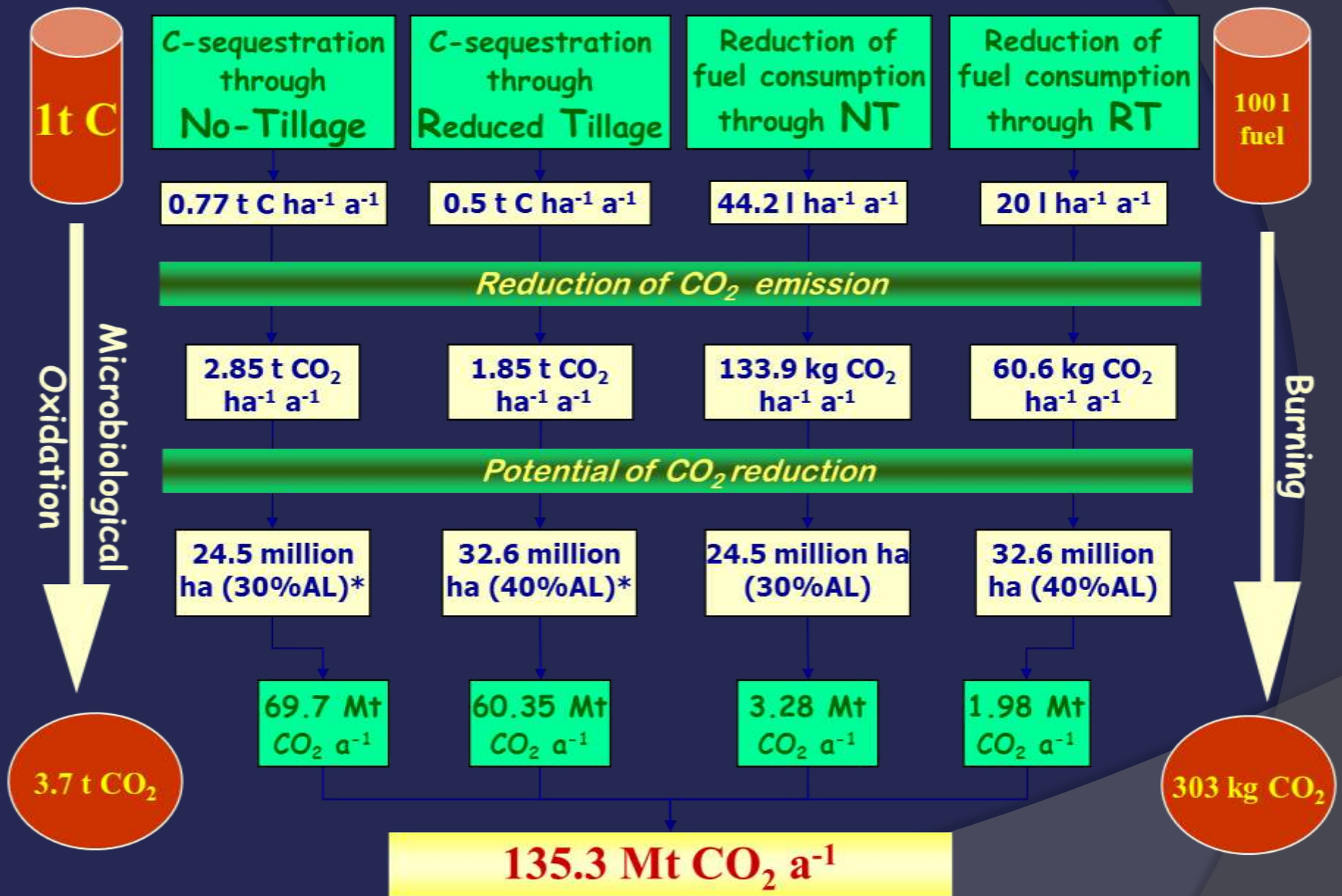
# Long Term Effects of Crop Rotations



# Evolution of SOM as a result of different tillage systems



# Estimation of CO<sub>2</sub> reduction by conservation tillage in EU-15



\* Applicable on 30% and 40% of total arable land (AL), respectively

- Soil/Crop suitability
- Large areas
- Carbon farming
- Economics



# Summary of variable annual expenses with tractors and drilling equipment (600 ha farm)

	CONVENTIONAL TILLAGE (Year 2000)	DIRECT DRILLING (Year 2003)	REDUCTION (%)
Maintenance and repair of tractors	10 450,47 €	1 507,15 €	85
Maintenance and repair of tillage/ drilling implements	8 158,41 €	1 840,40 €	77,5
Fuel	17 460 €	7 110 €	60
Labour	25 000 €	15 000 €	40
<b>TOTAL ANUAL</b>	<b><u>61 068,88 €</u></b>	<b><u>18 347,55 €</u></b>	<b><u>70</u></b>





*Thank you  
For your attention!*



# European Conservation Agriculture Federation (ECAAF)



[www.ecaf.org](http://www.ecaf.org)

