



Cultivations - can Carbon be preserved?



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What's coming?

- Cultivations - carbon levels - impact?
- Other influences
- Soils and commercial cultivations
- Efficient cultivations
- Energy inputs
- Best practice with all inputs - technique, cost, time and energy

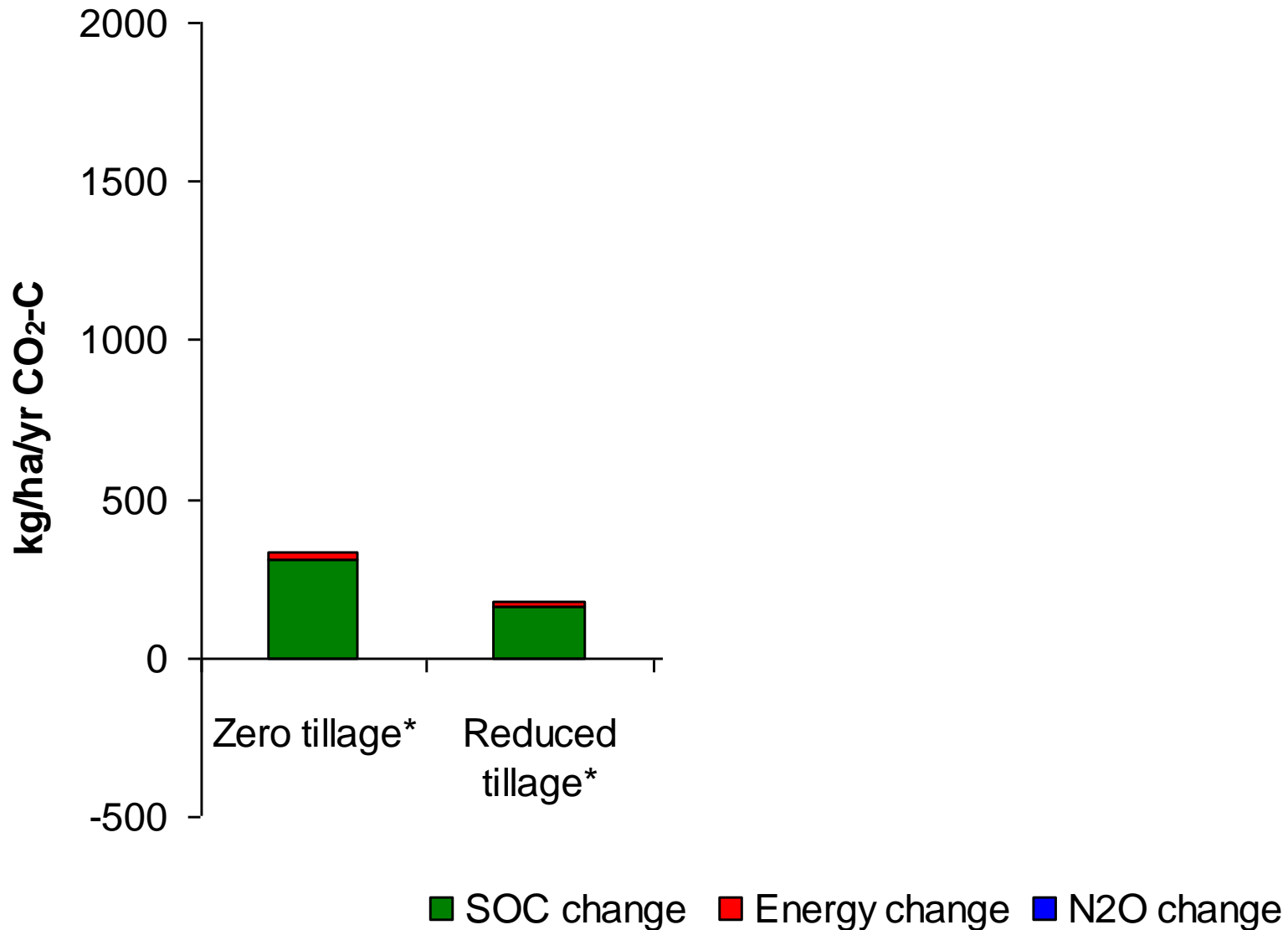
Cultivations - Carbon levels

- Carbon - small amounts - small % changes
- The more the soil is disturbed the more SOC decomposes
- Proof of levels - In UK, few studies. Recent study for Defra, 108 references, few in UK, Zero tillage being main subject compared to 'plough systems'
- UK 50% plough, 43% reduced tillage, 7 % zero tillage - East Anglia different?

Carbon levels?

- Assumes 28gC per kg soil in top 25 cm
- Storage potential
 - Zero tillage - **310** (+ or - 180) kgC/ha/year
 - Red. Tillage - **160** kgC/ha/year
- Change C potential per year
 - Zero Till **0.7 %** C per year - UP TO 20 YEARS
 - or down to **0.35%** C depending on experiment
 - Difficult to check in field
- Accumulates with system until **CHANGE**

Max. CO₂-C 'savings' from zero/reduced tillage and organic materials to arable land.



CHANGE in CULTIVATION

- **Rotations** - roots, special seedbeds / bed forming
- **Weed / disease control** - e.g. reduced cultivation build up - zero till issues?
- **Season e.g.- 2008**, more ploughing to correct shallow compaction
- **Correct issues** - sad land, move water, freshen up etc,

OTHER ISSUES - SOM and SOC

- Reduced tillage protects from water / wind erosion
- Reduced pollution
- Decreased leaching - less soil N mineralisation - decreased N_2O (not clear?)
- Reduced compaction
- Energy savings - more later
- Shallower working - plus on work rates, timeliness, energy etc

Summary of Cultivation Costs

Savings - over Plough based systems - where suited

Costs 25%

Time 40%

Energy 30%

Biggest input?

150 l =now £60/ha!

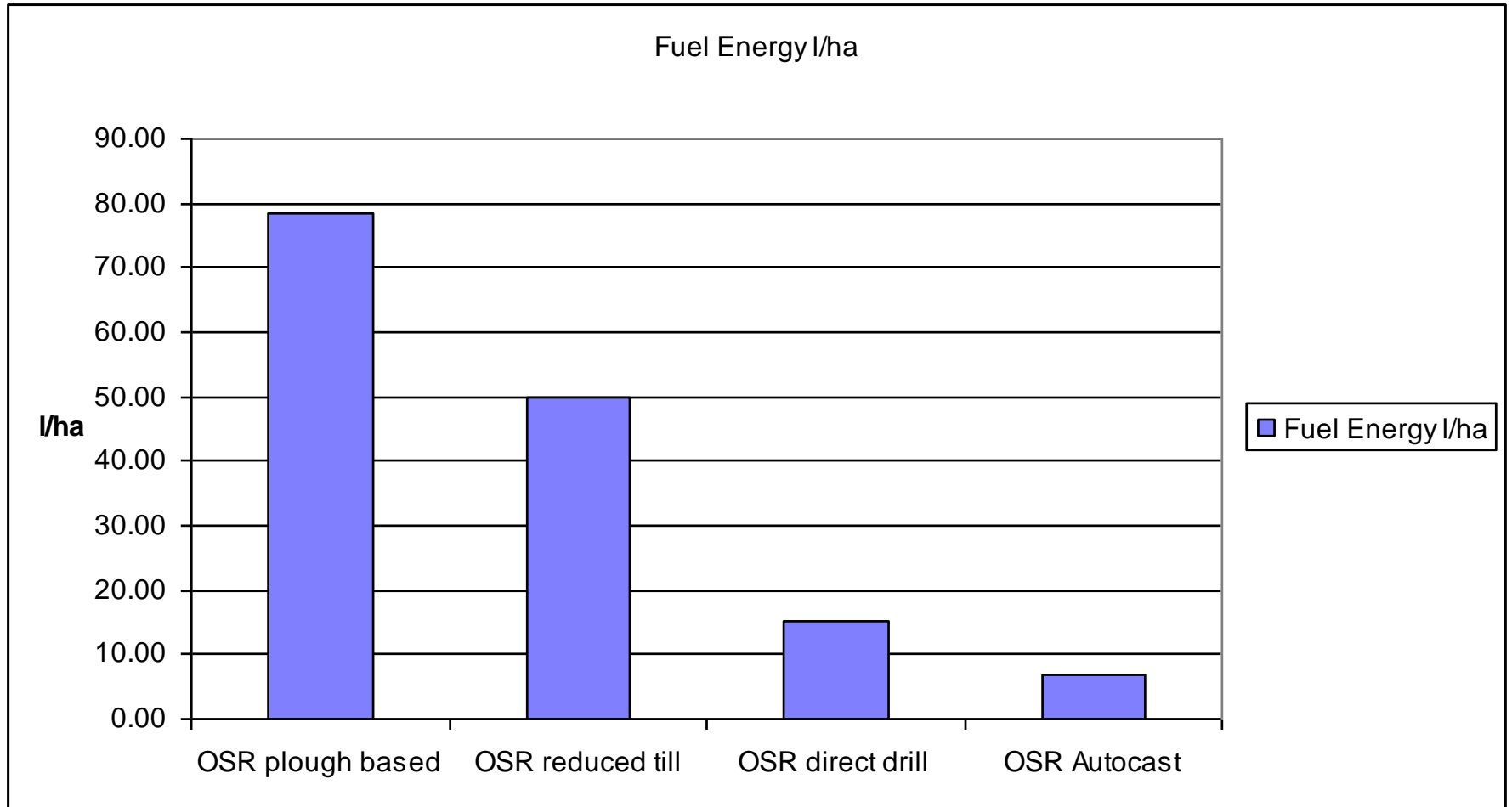
Energy inputs to agriculture

150 l/ha - 400 ha farm

= 162 tonnes CO₂

emmission per year

Fuel Energy litre / ha





3 passes - 37 l/ha ?

2 passes - 39 l/ha ?



Cultivate to preserve **SOM**

**All aspects preserve
Soil Organic Matter and
thus Soil Carbon**

**As well as promoting commercial
savings to encourage adoption**

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