WHAT IS SECOND-GENERATION NO-TILLAGE?

(No-Tillage 2.0)

It is "*Regenerative Agriculture*"!

- **Bill Ritchie**

  Baker No-Tillage Limited

  and
- **Paul Alexander**

  Primewest Limited

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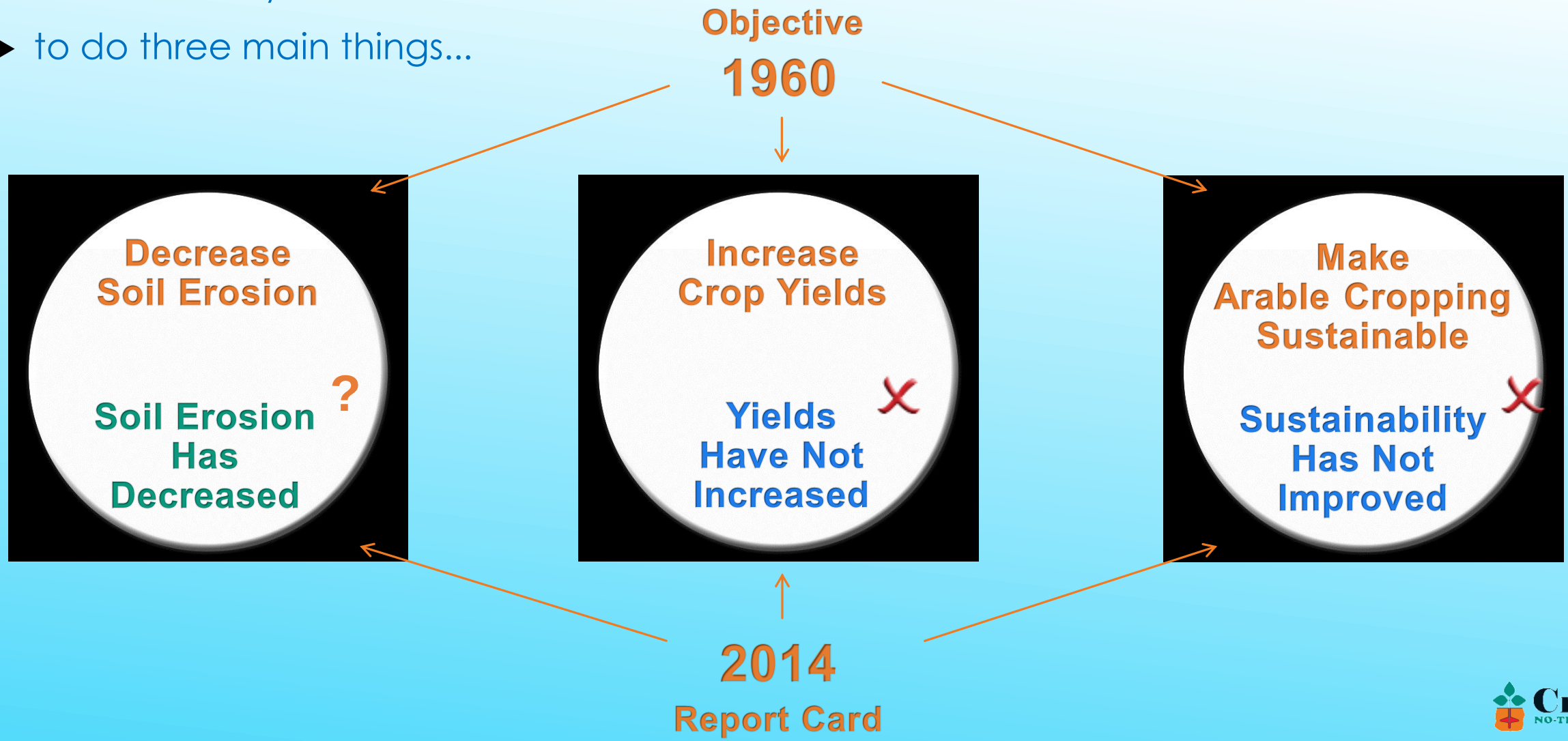
No-Tillage was first introduced:

- internationally in the 1960's.
- to do three main things...



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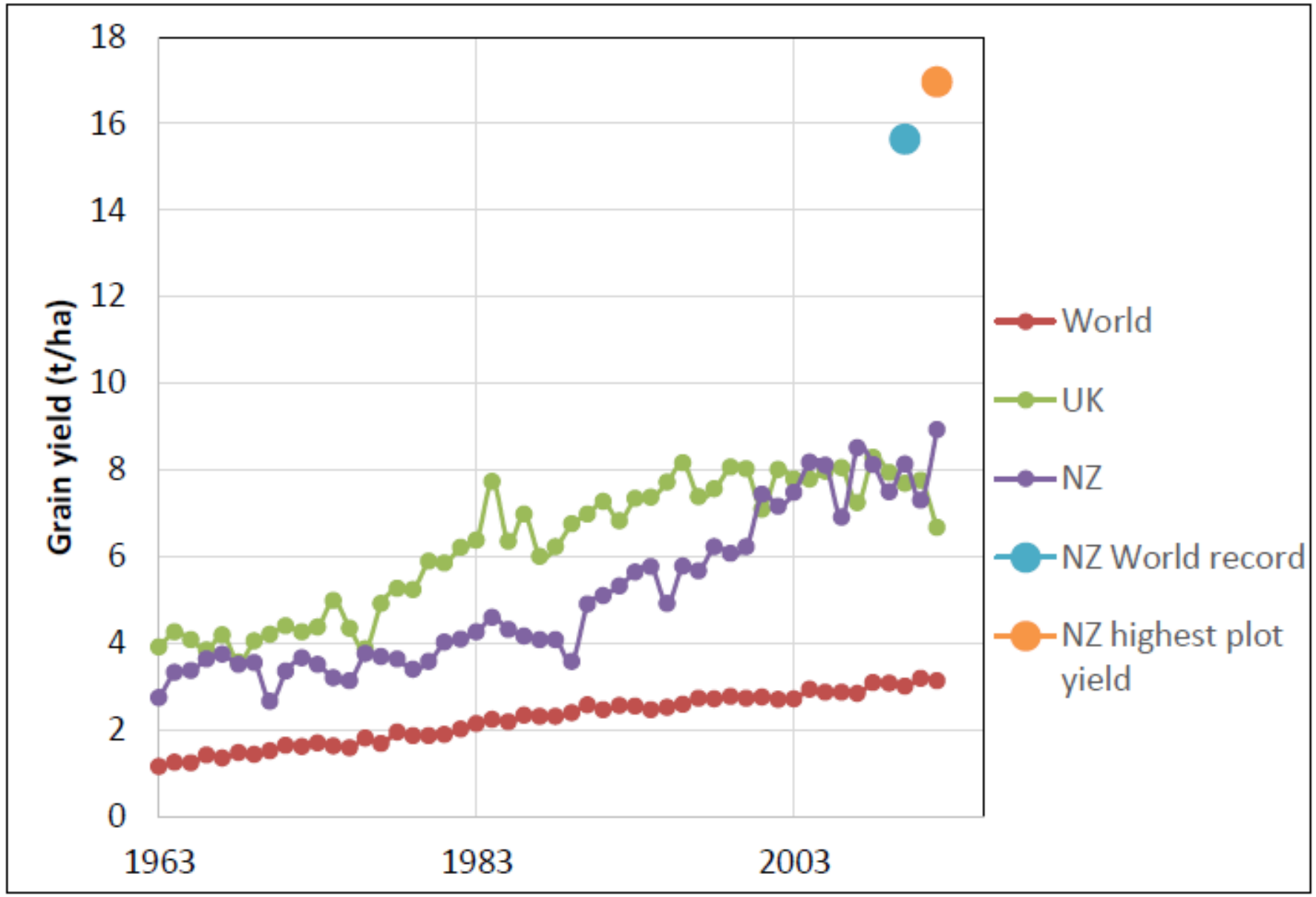
Graph Showing the Comparison Wheat Yields 1963-2013



Source: Foundation For Arable Research

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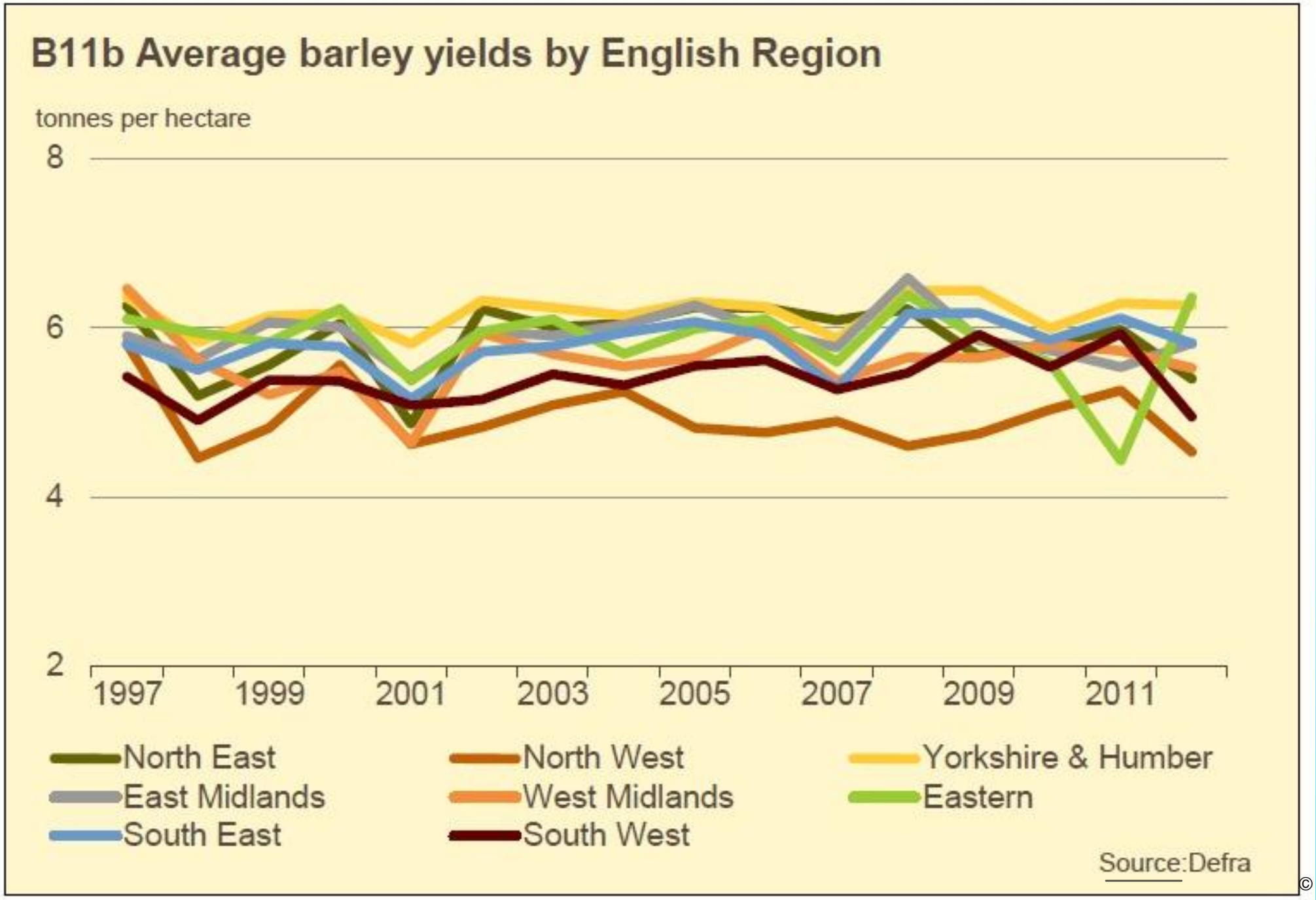

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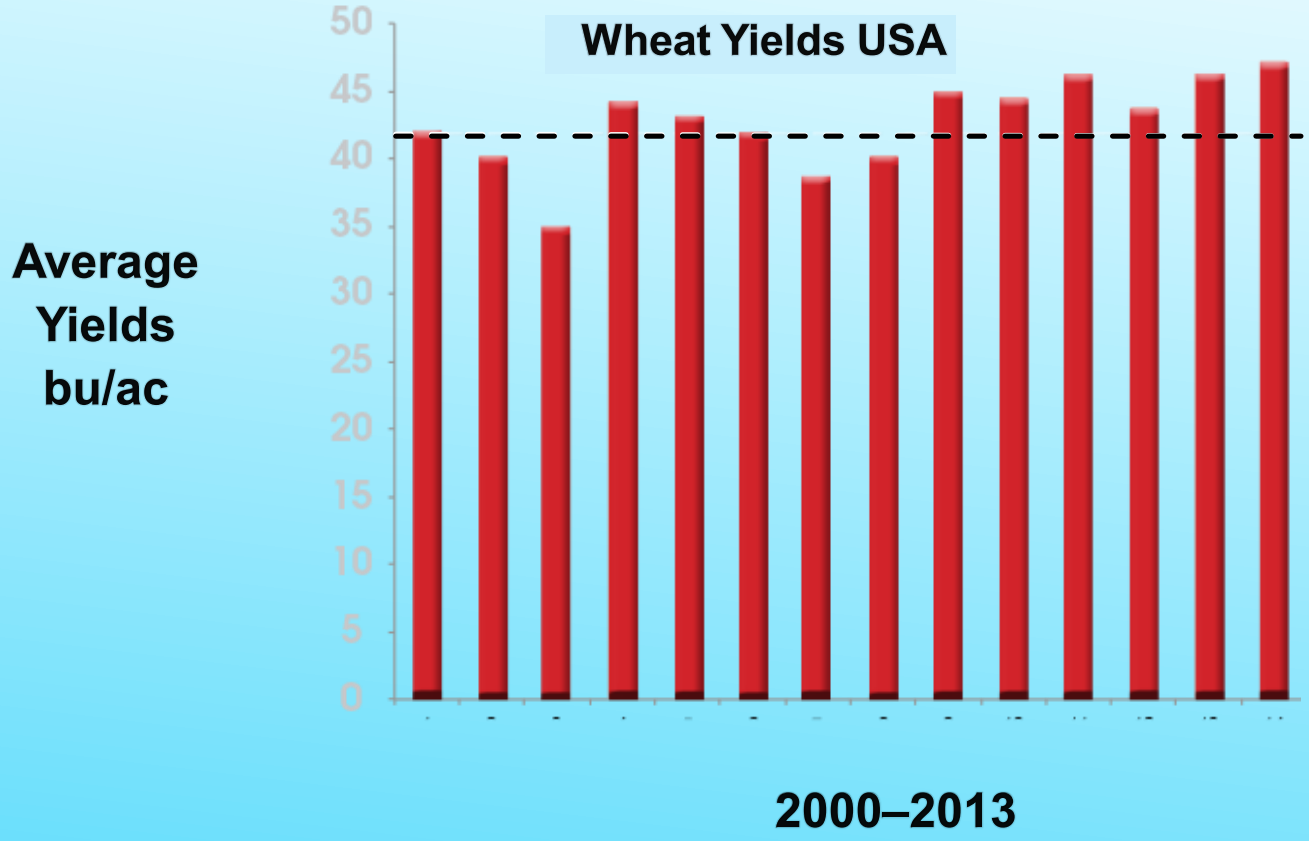
Average USA Grain Yields



Source: USDA

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Parameters	1992	2014	% Change
Total population (10^9)	5.49	7.24	31.8
Urban population (10^9)	2.57	3.88	51.0
Energy use (EJ)	365	600	64.4
Fossil fuel emission (Pg C)	6.2	10.1	62.9
Emission from tropical deforestation (Pg C)	2.18	0.8	-63.3
Water use (km^3)	0.56	0.70	25.0
Fertilizer use (10^6 Mg)	125	190	52.0
Per capita arable land (ha)	0.26	0.19	**-26.9**
Atmospheric carbon dioxide concentration (ppm)	354	400	13.0
Atmospheric methane concentration (ppm)	1,720	1,831	6.5
Atmospheric nitrous oxide concentration (ppm)	310	327	5.5
Per capita grain production (kg)	359	344	**-4.2**
Poverty (10^9; US$1.25 d^{-1})	1.9	1.5	-21.1
Ethanol production (10^9 L)	17	120	605.9
Hunger prone population (10^6)	1,000	842	-15.8
Lack of clean drinking water (people 10^9)	1.32	0.81	-51.0
Lack of access to sanitation (people 10^9)	2.90	2.60	-10.3

Source: Lal 2014

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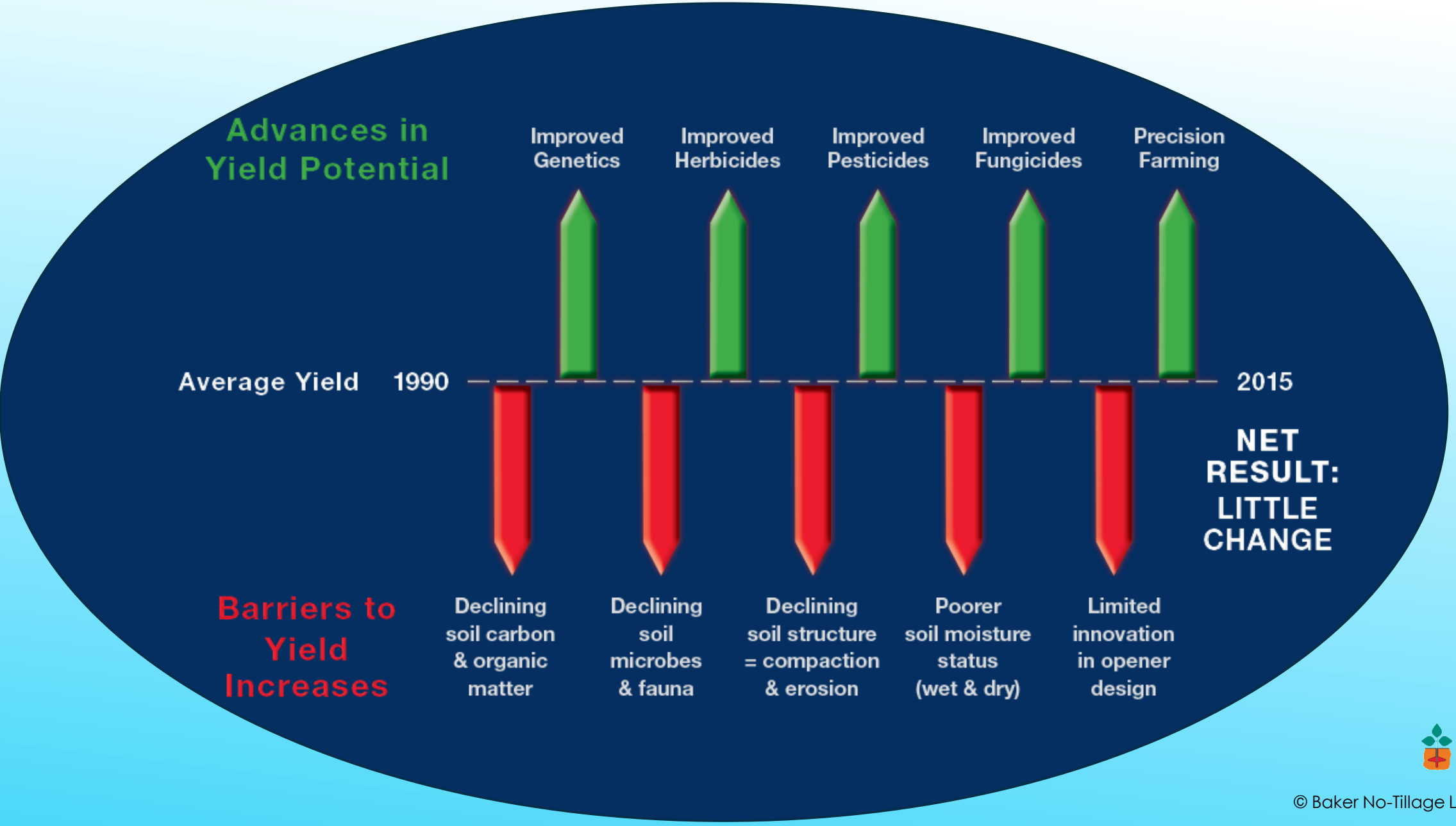
So, what happened?



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What will No-till 2.0 look like?

- More diverse crop rotations.
- Greater use of cover crops.
- Greater integration of animals (greater bio-diversity).
- Greater emphasis on soil micro- and macro-organisms.
- Greater utilisation/retention of surface residues.
- Different emphasis on creating the “right” seed environment.
- Greater emphasis on the seed micro-environment versus the field macro-environment.
- Greater emphasis on decreased soil disturbance.

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What's the problem with soil disturbance?

Plus:

- Moisture loss
- Natural drainage disruption
- Micro-biological disruption
- Macro-biological disruption
- Soil erosion
- CO_2 loss
- Soil structure impact
- Cost
- All the same "problems" as with tillage but concentrated in the seed zone!

Photo source: Anonymous

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What new “tools” will be needed?

- A better understanding of soil micro-biology and it’s role in crop production.
- A better appreciation of soil as a biological entity.
- Ability to recognise that a true no-tillage system is radically different to traditional or even minimum-tillage systems.
- Ability to embrace change based on sound scientific principles.
- Confidence to challenge traditional practices and thinking.
- Ability to communicate effectively with like-minded farmers.
- Willingness to be criticised, not necessarily in a rational way!
- Confidence to identify the technologies required to achieve your long-term goals.
- An influential entity/company to support/promote the change.

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What do you want for your farm?

Factor	No-Tillage	Who benefits?	Who loses?	Who promotes?
Reduced fuel	☑	You	Fuel companies	No-one
Reduced machinery	☑	You	Machinery companies	No-one
Reduced chemicals	☑	You	Chemical companies	No-one
Reduced labour	☑	You	Farm employees	No-one
Efficient fertiliser use	☑	You	Fertiliser companies	No-one
Improved soil health	☑	You and future generations	No-one	Public organisations
Less erosion	☑	You and future generations	No-one	Public organisations
Increased yields	☑	You and future generatiuons	Other farmers (?)	No-one
More profit	☑	You	No-one	No-one

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What are the equipment specifications for Gen 2.0 No-Tillage?

- Technologies that can "harvest" the unique characteristics of undisturbed soils.
- Technologies designed to accommodate the unique features of no-till:
  - to minimise soil disturbance (ULD).
  - to manage/utilise a wider range of soil moisture.
  - to manage variable soil texture and hardness (down-force control (ADF)).
  - to manage variable surface smoothness (micro-contour following).
  - to meet the requirement for higher rates of placed fertiliser.
  - capable of managing/utilising greater quantities of residues/cover crops.

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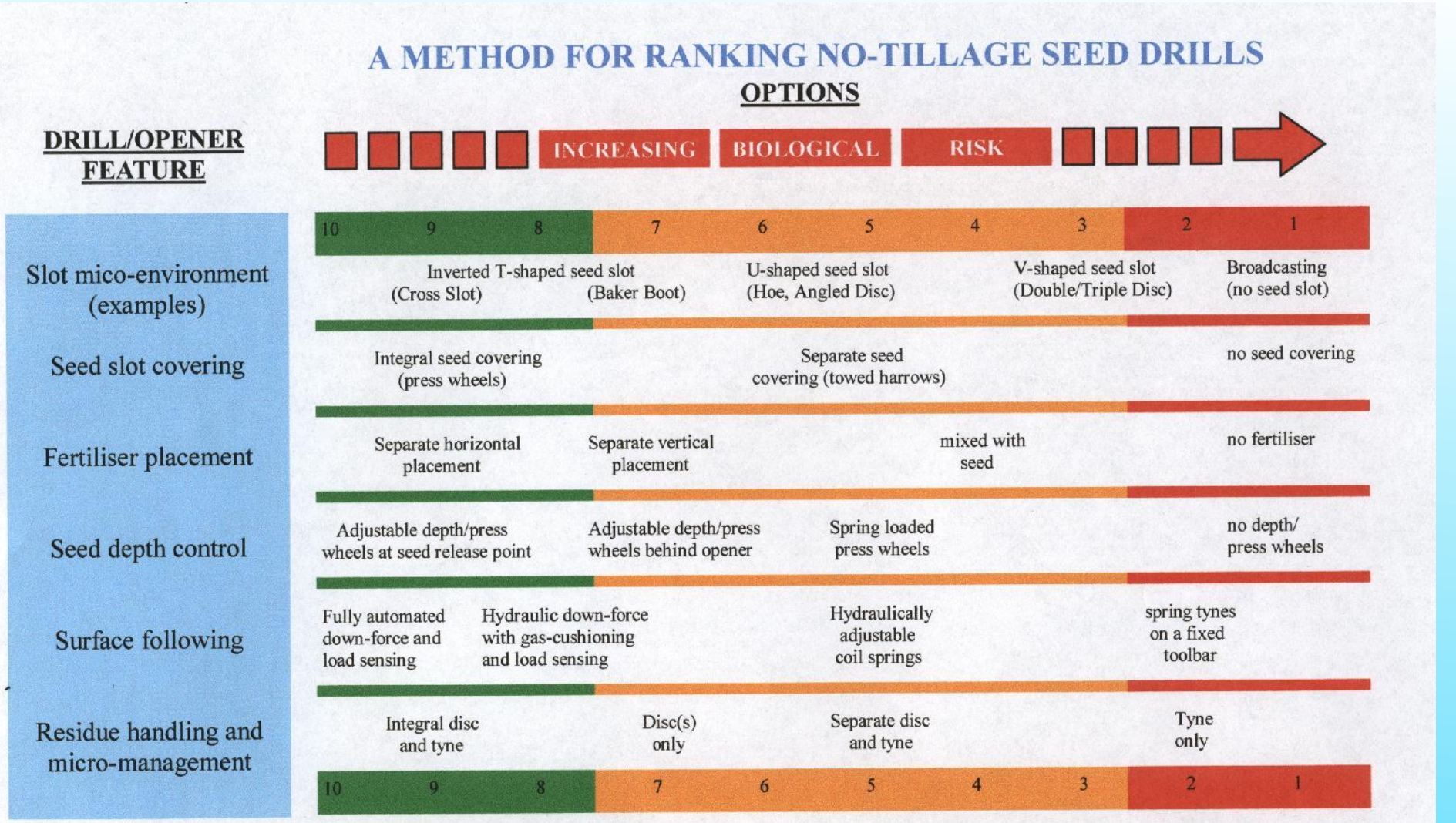
Can we objectively compare drills?



Source: *Successful No-Tillage in Crop and Pasture Establishment (Ritchie et al.)*

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Getting no-tillage past the “tipping point”…

- Maintaining our current position (sustainability) is not good enough.
- Why do we cultivate (including minimum tillage or strip tillage)?
- Why do we prepare the ground for seeding (to accommodate the seed drill)?
- Crop yields have to improve and this will require regeneration of soil biological, physical and chemical properties to levels higher than at present (***regenerative agriculture***).
- In doing so we will unlock the potential of existing complimentary above-ground technologies.
- The next generation of ULD no-tillage technology is poised to present this opportunity.

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Source: Kevin Larson (ND, USA)

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Source: Kevin Larson (ND, USA)

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Source: Tom Sewell (UK) via Twitter

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And now…

A message from our sponsors…

(you knew it had to come!)

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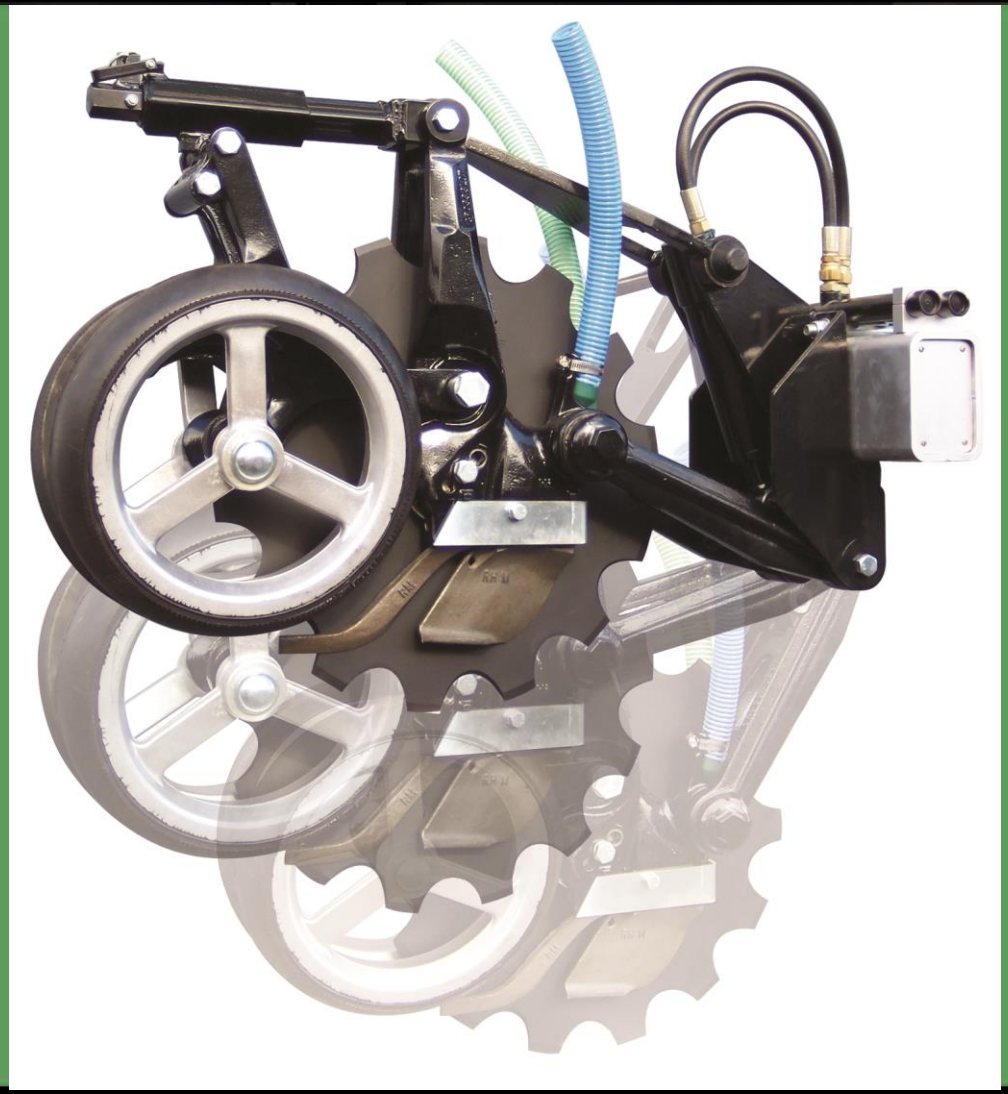
THE TECHNOLOGY TO MAKE THIS HAPPEN

The Cross Slot No-Tillage Opener



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Do the same thing today…

don't expect a different result tomorrow!!!

Source: Unknown

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None of us like change…

But we all want things to get better!

Source: Unknown

Let's discuss this…

Thank you!

For more information: Visit www.CrossSlot.com

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