**BETTER farm**
crops programme

Farm Details

- **Kevin and Una Nolan**
- **465 hectares – 70 ha located here**
- **Fragmented holding**
  - **Land leased**
  - **Share Farming**
  - **Different Conacre methods**
- **Operating as Sole Trader**
- **Total Labour 2.5 FTE**

Issues and Direction

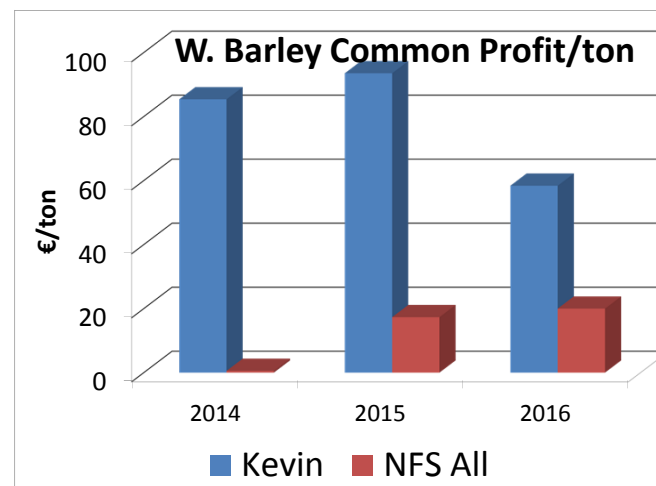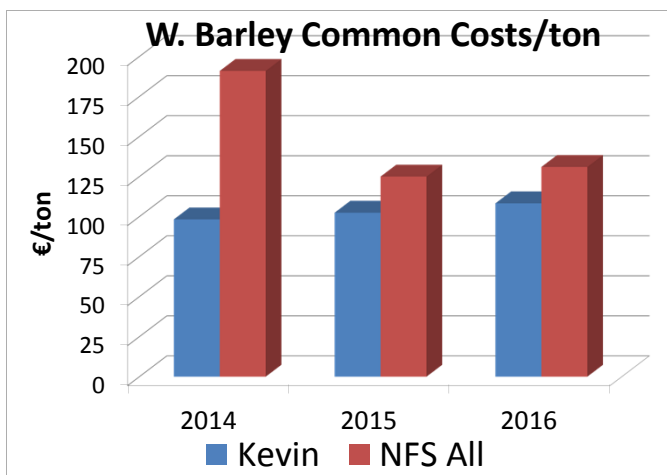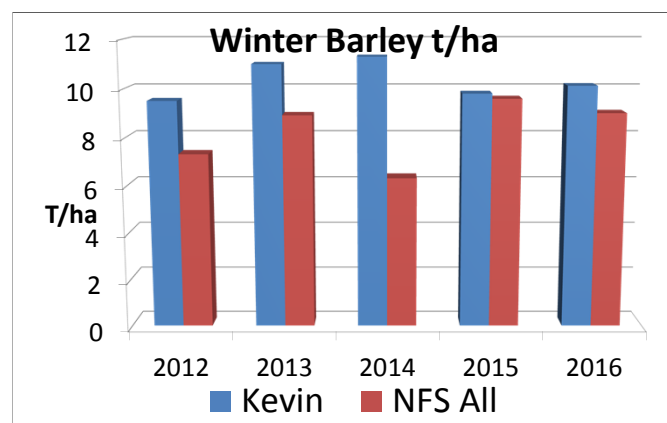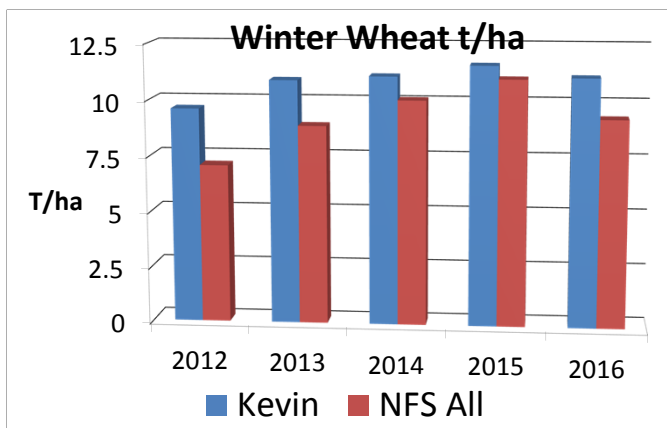- **Scale & Land Tenure**
- **Crops/Markets/Premium Prices**
- **Rotations, soil quality & org matter**
- **Field operation recording**
- **Use of GPS technology and soils**
- **Alternatives income streams**
- **Schemes – GLAS, Tillage TAMS II**

Innovations on the Farm

- "Nolan Farming" brand
- Precision Farming
- Share Farming
- Machinery sharing
- Grain storage
- Farmer of the Year 2014
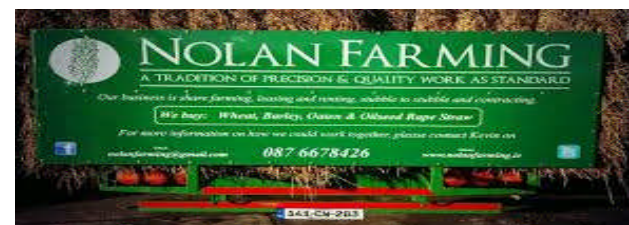
Yields and Performance

Key Points
- Common Profit/Ton well above National Farm Survey average
- Common Profit does not include Land lease, Labour and Interest

Precision Equipment on the Farm

Machines

-John Deere Universal auto steer kit

- SF2 receiver *(American & Russian satellites)*
  - Accuracy of +/- 5 cm
  - Removable steering wheel for any machine
    - John Deere tractors & Combine

Other Machines using GPS Guidance

- Amazone Trailed Spreader *(ZGB Ultra)*
  - Variable rate spreading capable.
- Horsch Trailed Sprayer *(Leeb GS 6000)*
  - Auto shut off
- CLAAS Combine - telematics
  - Yield recording
  - Machine output recorded
- Built in RTK auto steer on the Fendt tractor.

Benefits
1. Necessity on larger scale
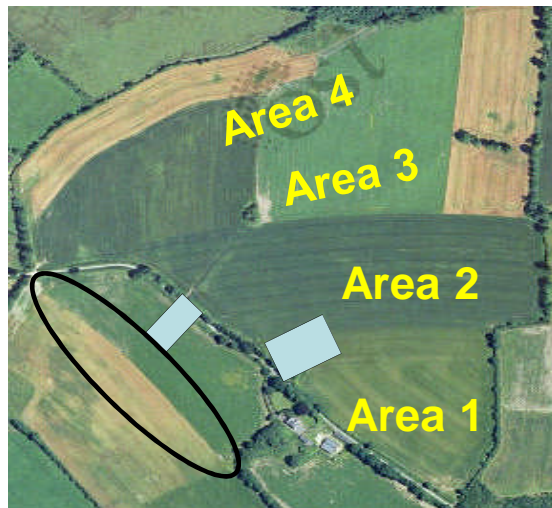2. Accuracy of use
3. Support getting better
4. Ease of use

Challenges
1. Initial costs
2. Loss of signal
3. Device Connectivity
4. Occasional loss of data

Next steps: Link Soils – Yield Maps – Variable rate application

Carlow Field Maps

2005

Teagasc measurements 2017

- Consulted with the farmer
- Multiple measurements within each zone
- Seed depth issue
- Big variations between zones & within zones
- Average yield 2017 - 10.0 T/ha

2016
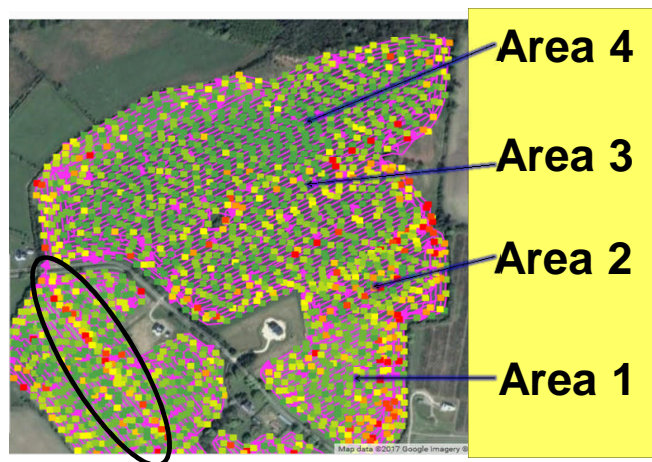
Area	Tiller no./m²	Head no./m²	*Spot yield T/ha	Diff. %
1	1010	680	15.4	-3.75
2	920	737	16.0	0
3		620	12.4	-22
4	1068	692	13.8	-14

* Yields recorded are hand sampled yields

Teagasc Crop BETTER Farm

Cappoquin Estate, Waterford
- Farming 233 ha (578ac)
- Divided into 4 farms (10Km)
- Land: medium soil type
- Labour unit: John Collins + part time
- W. Wheat, W. Barley, OSR, Oats (porridge) spring barley and maize (for sale)

Challenges for future
• Labour
• Securing skilled part time labour
• Matching machinery to labour
• Fixed costs:
• Matching land base to machinery
• Land rental options
• Reduce production costs

Winter Wheat Performance
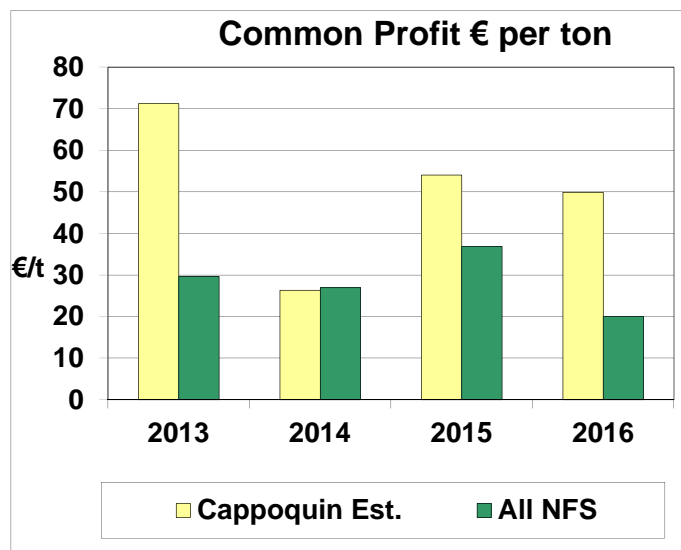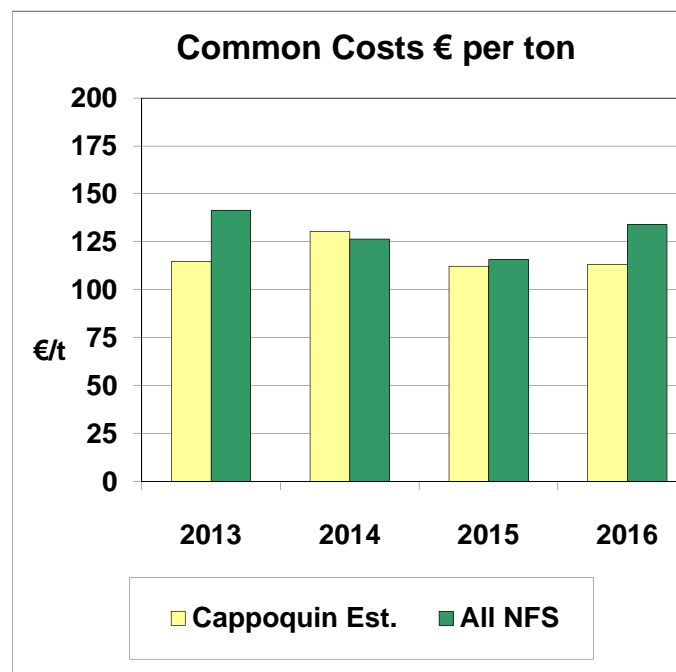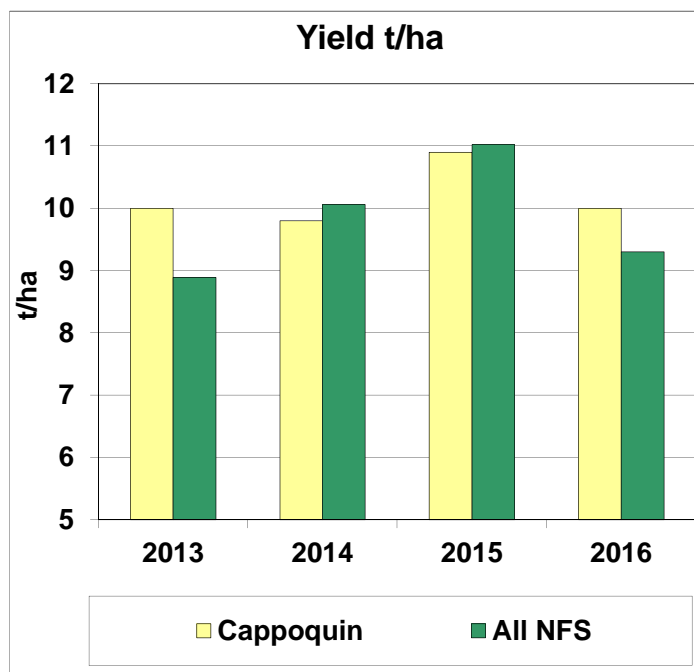
Key Points

- All 1st wheat
- Consistent performance
- Returns higher then average

Common costs exclude land rental, labour and interest

Precision Ag on the Farm

History on Farm

- Early 1990's Crop Records on excel

- 1995/96 Yield monitor

- 1997 Otimix Crop Recording Programme

- 2005 Farmade + mapping

- 2009 to Present – Gate keeper with mapping
- 2011 – Yara N Sensor – Due to Organic Matter
- 2014 – Updated Yield monitor

Other Precision Technology

- Sprayer (GPS with full auto section control)
- Amazone Spreader (variable rate capability)
    - But..
- Auto steer (Demo)
    - But…

Benefits
1. Necessity on larger scale
2. Accuracy of use
3. Support getting better
4. Input saving?

Challenges
1. Initial costs
2. Complex but..
3. Time consuming?
4. Occasional loss of data

Waterford Field Maps

- Area 1 & 2 top of field
- Area 3 & 4 bottom of field

Area	Tiller no./m²	Head no./m²	*Spot yield T/ha	Diff. %
1	856	446	14.8	-5.7
2	843	454	13.2	-16
3	821	482	15.7	0
4	813	488	14.1	-10

2017 Yield Map

2016 Yield Map
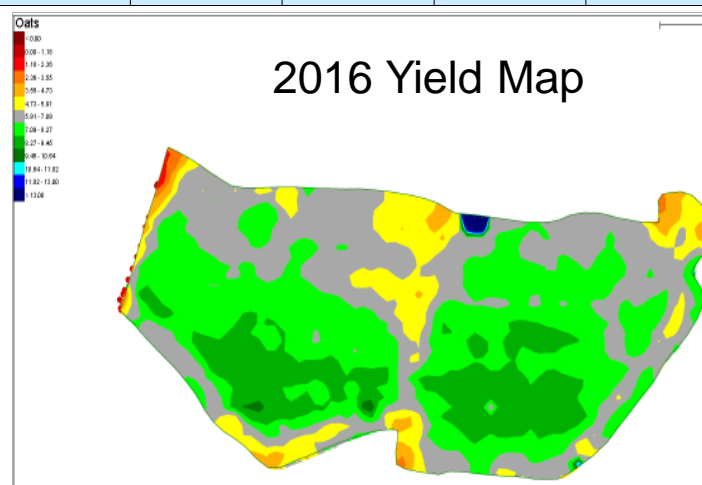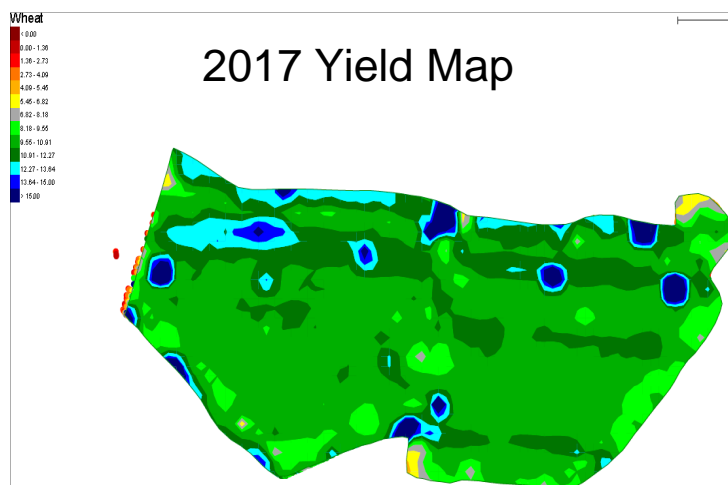
* Yields recorded are hand sampled yields

Introduction

Farm Details

- **Derek Keeling (father and son)**

- **390 hectares**

- **Fragmented holding**

  - **Owned 4 divisions (12 miles)**

  - **Land rotation (potatoes)**

  - **Conacre (Small area)**

- **Total Labour 4 FTE**

- **High input high output farm**

Innovations on the Farm

- **Drying & storing grain for 30 years**
- **Have used liquid urea as main source of nitrogen**
- **Has GPS capability**
- **Yield recording (Low tech)**
- **Use records for decision making**
- **Use rotation for more 1st wheats**

Issues and Direction

- **Scale & Land Tenure**

- **Crops/Markets/Premium Prices**

- **Labour availability**

- **Field operation recording**

- **Use of GPS technology and soils**

- **Schemes – TAMS**

- **Role of organic manures**

- **Where do you stop spending?**

Yields and Performance
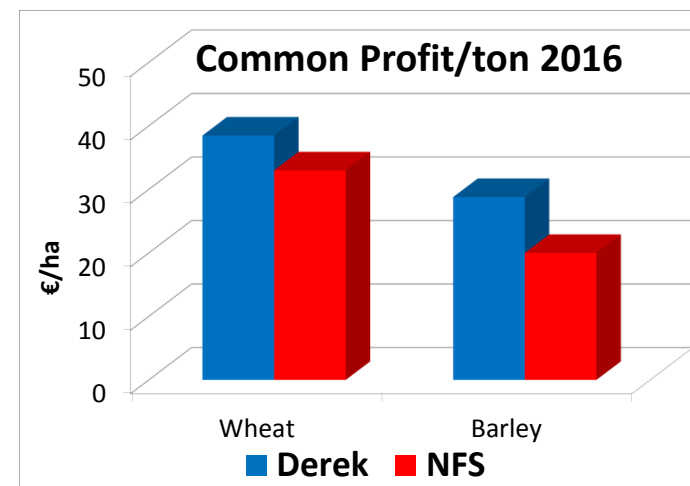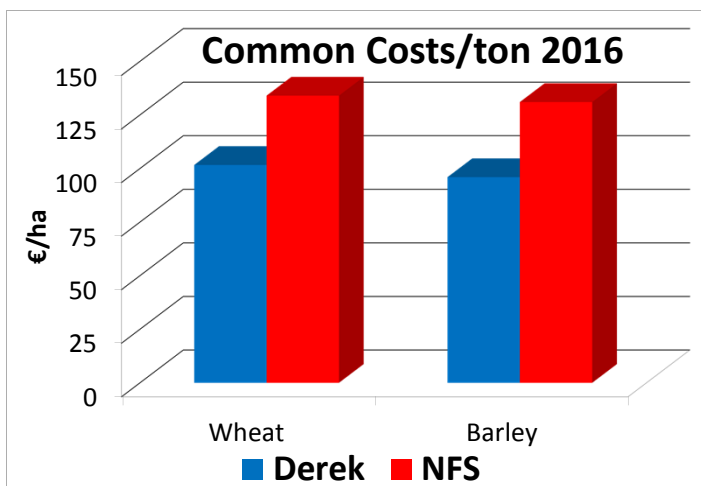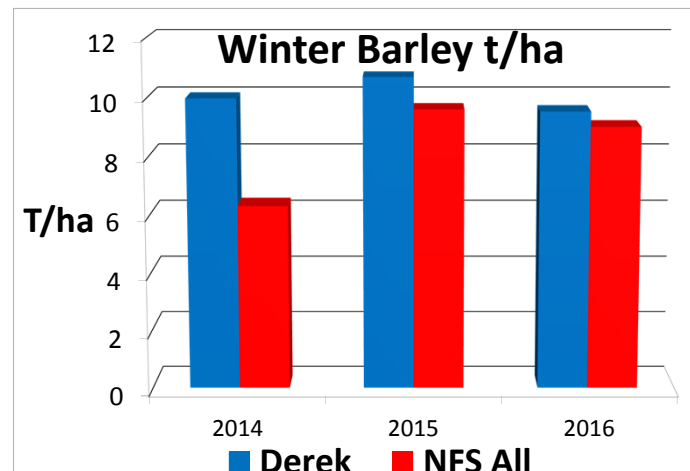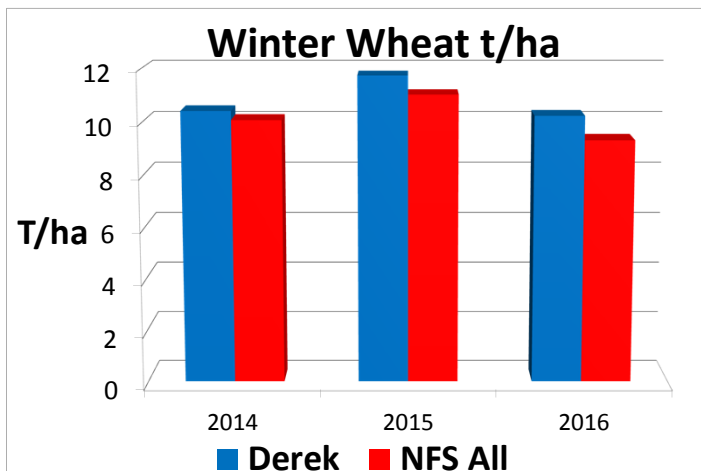
Key Points
- Common Profit/t well above National Farm Survey
- Common Profit does not include Land lease, Labour and Interest

Identifying Variation

Farmer Field observations
Identified the different zones
Historical information
Historical Maps to confirm variation

Crop observations

Plant counts
Head counts
Pot. Yield

All individual trailers weighed and yields recorded

DATE	DOCKET NUMBER	GROWER ID	GRAIN TYPE	VARIETY	MOISTURE	KPH	PROTEIN	WEIGHT	OPERATOR INITIALS
1	DK 1	Graveyard Field	Wheat	JB Diego	19	78		12.58	DK
2	DK 2	Graveyard Field	Wheat	JB Diego	18.5	76		13.56	DK
3	DK 3	Graveyard Field	Wheat	JB Diego	18.9	76		14.44	DK

Dublin Field Maps

Winter Barley

Area 1

Area 2

Area 3

Av. yield / ha; 10.77t
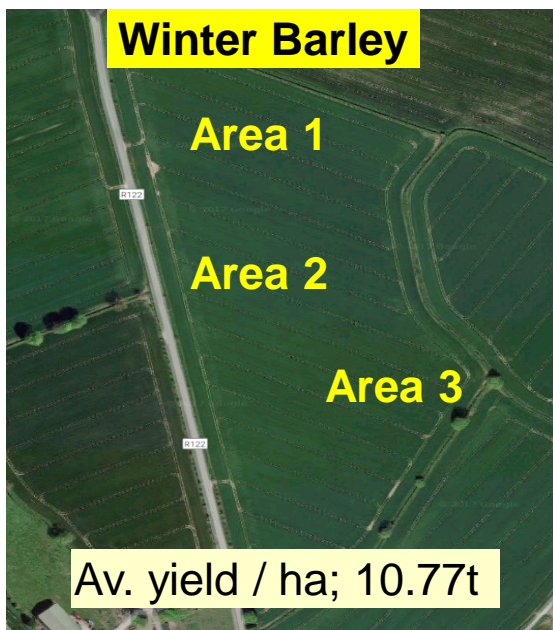
- Area 1 – Lower than average yield
- Area 2 – Best part of the field
- Area 3 – Needs two cultivations

Area	Tiller no./m²	Head no./m²	*Spot yield T/ha	Diff. %
1	1055	942	11.0	-8.3
2	1442	1020	12.0	0
3	1103	997	11.2	-6.6

Winter Wheat

Area 2

Area 1

Area 3

Av. Yield / ha; 10.72t

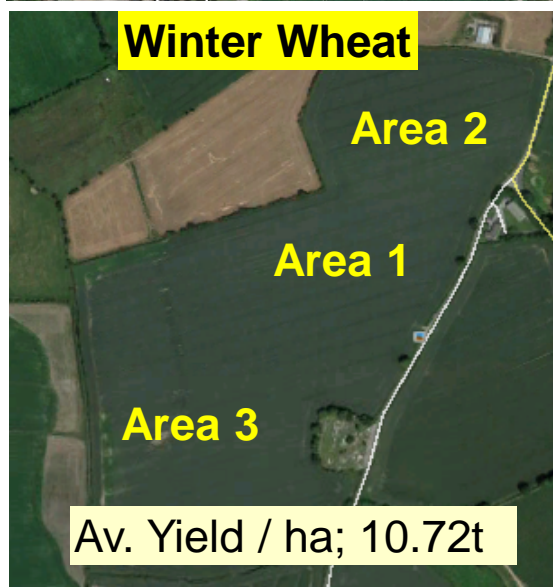- Area 1 – Best part of field
- Area 2 – Poorer yielding
- Area 3 – Low lying

Area	Tiller no./m²	Head no./m²	*Spot yield T/ha*	Diff. %
1	678	510	18.8	0
2	461	354	14.8	-21
3	626	387	14.4	-23

* Yields recorded are hand sampled yields

Understanding Field Variability – 'Tool Box'

BETTER farm
crops programme

Field Knowledge/ Yield Maps

Soil Analysis

Crop Walking

Soil Texture / Type / Drainage

Soil Structure (VESS)

Soil Examination

Yield Maps

Zone 1
Soil Type – Loam
Well drained
Soil Fertility
VESS -

pH 6.1 , P - 4 , K 3,
SOM 7%

14.8t/ha

18.8t/ha

14.2t/ha

Zone 2
Soil Type Loam
Well Drained
Soil Fertility
VESS -

pH 5.7 , P - 2 , K 4,
SOM 6.6% Low Zn
Plant low in P

Field Yield – 10.7 t/ha

Zone 3
Soil Type – Clay Loam
Soil Fertility
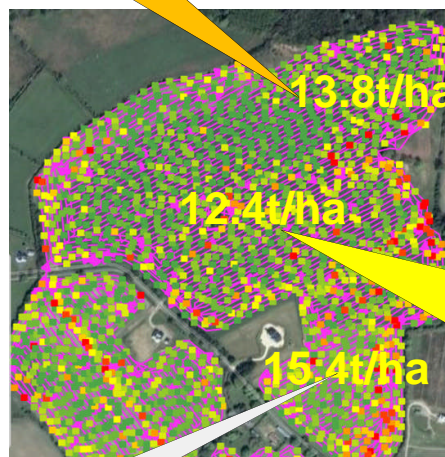Poorly Drainage
VESS -

pH 6.1 , P - 3 , K 3,
SOM 8.4%

Dublin

Yield Maps

Zone 3
Soil Type – Sandy Loam
Soil Fertility
Poorly Drainage
VESS -

pH 7.6, P - 4 , K 1,
SOM 7% Low Zn,
Plant Low P, Mn

pH 7 , P - 4 , K 2,
SOM 4.9%

Zone 2
Soil Type Sandy Loam
Well Drained
Soil Fertility
VESS -

13.8t/ha

12.4t/ha

15.4t/ha

Field Yield – 10 t/ha

Zone 1
Soil Type – Sandy Loam
Soil Fertility
Poorly Drainage
VESS -

pH 6.4 , P - 3 , K 2,
SOM 4.8%

Carlow

Yield Map

Zone 4 – 14.1t/ha
Soil Type – Loam
Well drained
Soil Fertility
VESS – 1.8

pH 6.2, P - 1, K 2,
SOM 4.1%

Zone1 – 14.8t/ha
Soil Type Sandy Loam
Well Drained
Soil Fertility
VESS - 2.6

Field Yield –   t/ha

pH 6.3, P - 2 , K 2,
SOM 4.1%

4

1

Zone 2 – 13.2t/ha
Soil Type - Loam
Well Drained
Soil Fertility
VESS - 2.2

3

2

Zone 3 – 15.7t/ha
Soil Type - Loam
Well Drained
Soil Fertility
VESS - 1.9

pH 5.9, P - 2, K 2,
SOM 4.2%

pH 6.4, P - 2, K 2,
SOM 4.2%

Waterford

Benefits of Organic Manure on Tillage Farms

Manure Type	Available Nutrients (units)			
	N	P	K	Value €
Pig slurry (1,000gal)	19	7	20	€25/1,000gal
Cattle Slurry (1,000gal)	6	7	32	€20/1,000gal
Broiler Manure (ton)	11	12	24	€28/t
Layer Manure (ton)	23	11	24	€32/t
SMC (ton)	3	3	17	€11/t

"Test manures & adjust N, P & K"

Efficient use comes from
- Applying to low fertility soils / SOM
- Match manure type to crop – Use high N manure in spring
- Mix well / spread evenly & accurately
- Incorporate within 3 to 6 hours

Other Benefits
- Organic matter / Org N
- Cu, Mn, Zn, Mg, Ca, S
- Feeding the soil life
- Soil structure improvements

Cost effective way to build soil fertility

Managing Variability

- Determine Cause (Toolbox)
- Categorise:
  - Can we 'correct' it ?
  - Can we 'manage' it ?
  - Do we leave it alone ?

- Yield stability
  - Can vary from year to year
  - Often soil moisture related
  - Very difficult to manage

- Fixable:
  - Nutrient deficiency: Apply nutrient
  - Spatial weed problems: Herbicide / Cultural

- Challenging
  - Soil compaction
    - Subsoiling - only in conjunction with plan
    - Change headland management
    - Change cropping
    - Control traffic: timing and ground-pressure
  - Soil type: e.g. areas of light texture
    - Match crops: e.g. avoid beans if large areas
    - Realistic yield expectations
    - Spare inputs