Innovation in Practice

Karen Covey, Cambs Farms Growers, G's

G's Fast Facts

- Established 1952

- £500m turnover

- 7,000 employees

- 24 farmers and growers

- 13,142 hectares

- c. £20m invested p.a.

- Supplying all major UK retailers

- Supplying major supermarkets across the EU and USA

The G's Group

- A group of marketing led family farming businesses
- Growing across 13,142 hectares in Europe and Africa

UK
6,201 ha

Spain
5,853 ha

Czech
330ha

Senegal
384 ha

Poland
374 ha

- Dedicated to quality and service; underpinned by strong values

Full Vertical Integration

Crop establishment & Plant Raising

↓

Farming

↓

Further Process & Packing

↓

Sales & Marketing

Trust | Efficiency | Quality | Expertise | Can do

Crop Portfolio

Lettuce

Baby Leaf

Celery

Radish

Beetroot

Mushrooms

Onions

Garlic

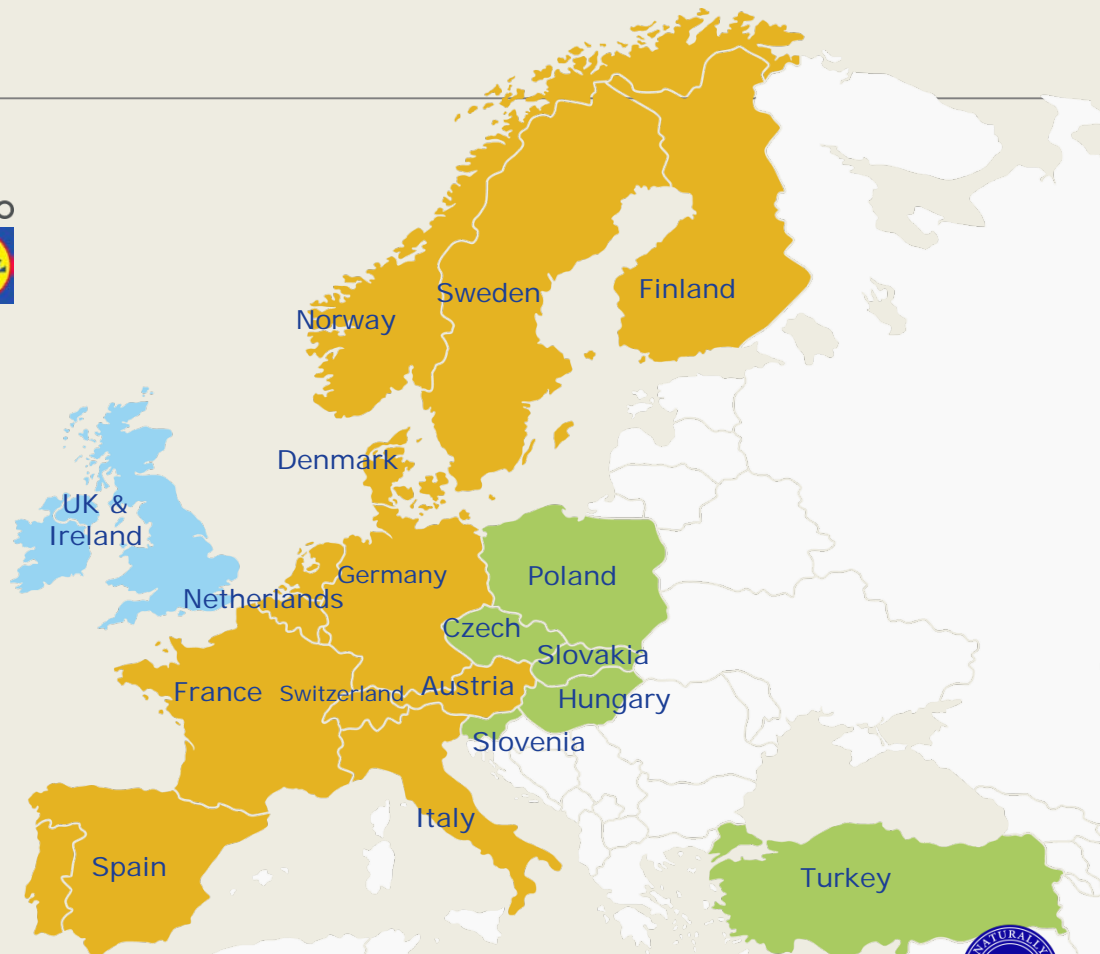Spring Onions

Brassicas

Asparagus & Legumes

Melons

Tomatoes

Citrus

Flowers

Trust | Efficiency | Quality | Expertise | Can do

Customer Base

TESCO · Sainsbury's · Waitrose · ocado
Morrisons · M&S EST. 1884 · ASDA · CO OP · ALDI · LIDL
P I Side Salads · Reynolds · BAKKAVOR
Kanes Foods · natures way foods · MyFresh

Carrefour · EROSKI · el árbol · EDEKA · LIDL
Consum COOPERATIVA · Auchan · REWE · ICA
METRO GROUP · COOP · T · coop
bama · Verdifresh · Netto Marken-Discount · SPAR · C1000

TESCO · Biedronka Codziennie niskie ceny · OBI · albert
makro · Kaufland · BILLA · LIDL

Norway · Sweden · Finland
Denmark
UK & Ireland
Netherlands · Germany · Poland
Czech
Slovakia
France · Switzerland · Austria · Hungary
Slovenia
Italy
Spain
Turkey

G's NATURALLY FRESH

Innovation & Investment

Laser Land Levelling

24 Row Iceberg Planter

Reservoir Development

Mushroom Farm & AD Plant

Infield Rig Packing

Investment in the UK business is replicated in Spain & Czech

Plant Raising

Reservoir Development

90 ha of state-of-the-art Greenhouses

Trust | Efficiency | Quality | Expertise | Can do

G's UK Growing Base

Lancashire
(Strategic Partners)
Celery
Iceberg

Shropshire
Spring Onions
Organic Beetroot

Warwickshire
Spring Onions
Asparagus
Legumes

Gloucestershire
Mushrooms

Dorset
Mushrooms

Lincolnshire
Organic Veg

Norfolk
Iceberg, Romaine
Onions
Celery
Radish

Norfolk Coast
Baby Leaf
Celery
Iceberg, Romaine, Gem
Onions

Suffolk
Onions

Cambridgeshire
Celery, Fenland Celery
Iceberg, Romaine, Gem
Mushrooms
Onions
Beetroot

Kent
Spring Onions

Sussex
Iceberg
Baby Leaf
Romaine

Research and Development - Fast Facts

- 50 current R&D projects (including 15 PhDs)

- 5 strategic themes (quality, nutrition, precision growing, packaging, sustainability)

- 5 sources of research funding (G's farms, EU, AHDB, InnovateUK & PhD sources)

Growing Innovation at Cambs Farms Growers

- Collaboration with a range of external organisations

- Research projects with academic institutions
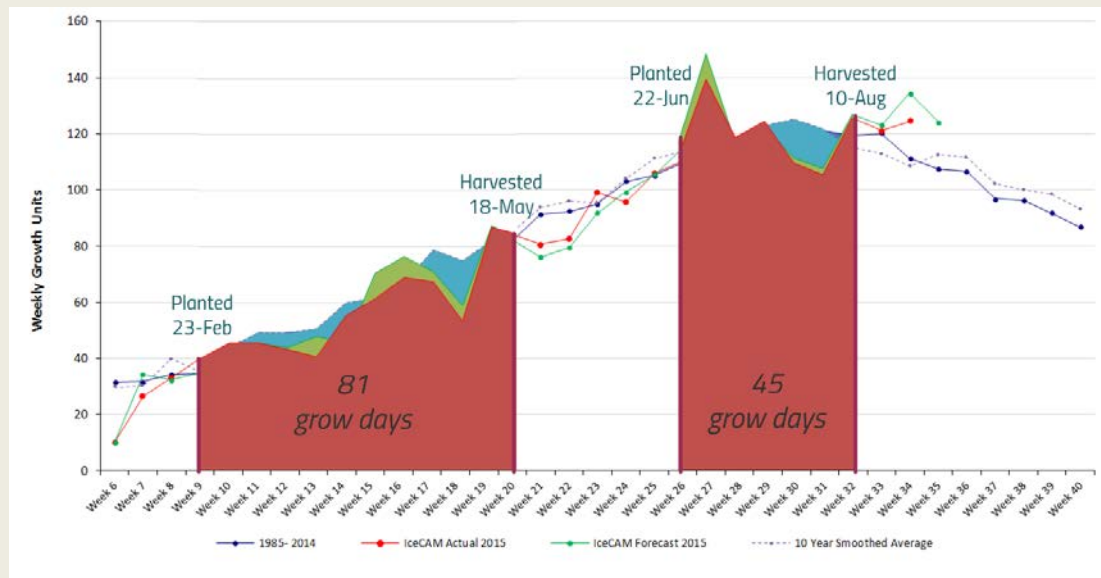
- Sharing of knowledge across the business

- Can-do attitude

Trust | Efficiency | Quality | Expertise | Can do

Case Study - IceCAM

Goal

Increase yield and reduce waste by dynamically sowing crop with the weather to match availability to demand.

How

Mathematical modelling of crop growth to enable better planning and forecasting of availability.

Trust | Efficiency | Quality | Expertise | Can do

- Basic HU model built over 30 years ago. New approach was needed.

- Initial internal review identified opportunities for development.

- Partnership with Microsoft Research developed a new algorithm with improved accuracy.

- Now working with the Smith Institute to further optimise the algorithm;

  – this will enable faster, more robust supply chain decisions to be made through combining the analysis of multiple variables such as weather patterns, crop grow days.
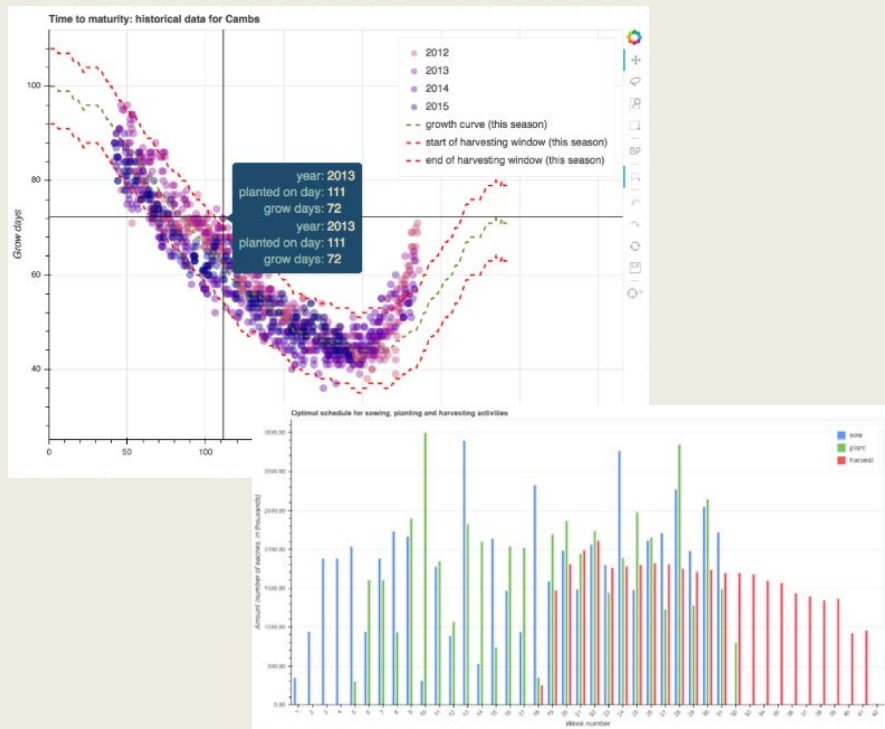
The Weather Challenge
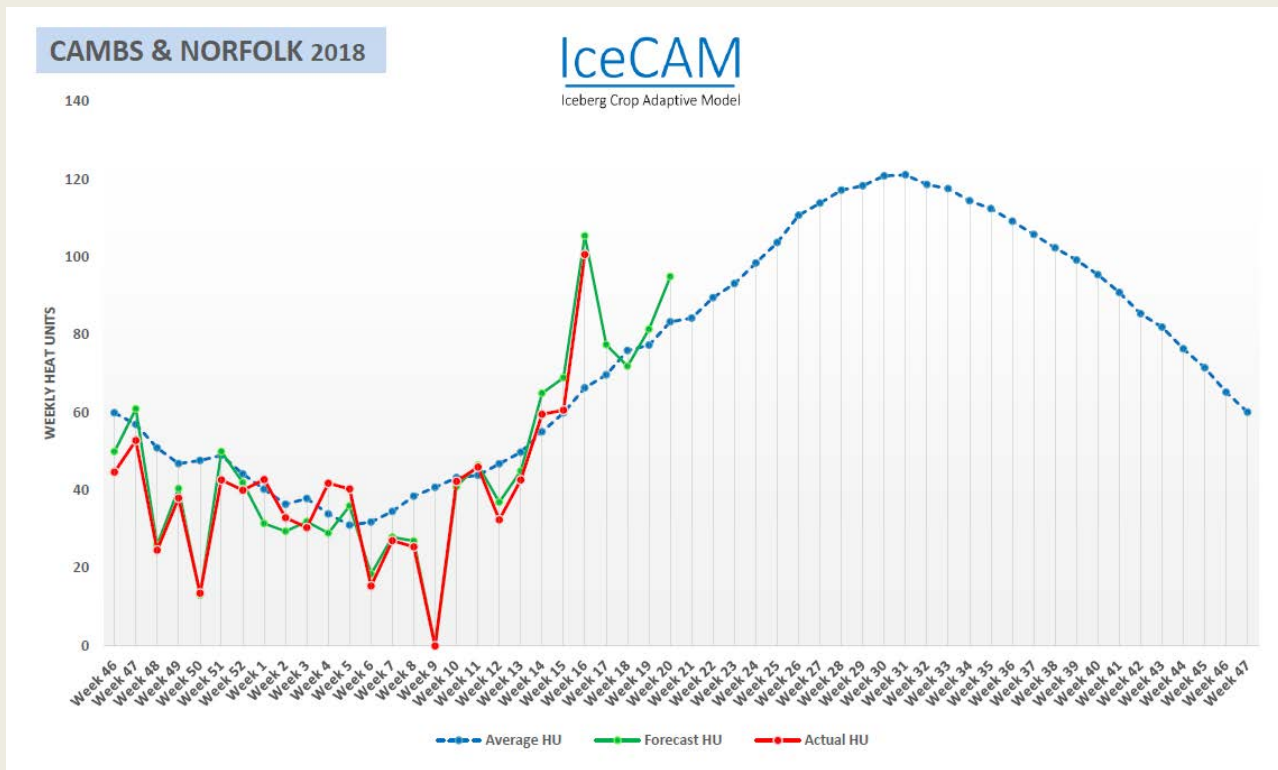
The Weather Challenge

Average HUs means evenly spaced Harvest

Above average HUs means bunching then spreading at Harvest

Average HUs means evenly spaced Harvest

Temperature Spike Scenario

HU Accumulation / Plant Growth

TIME
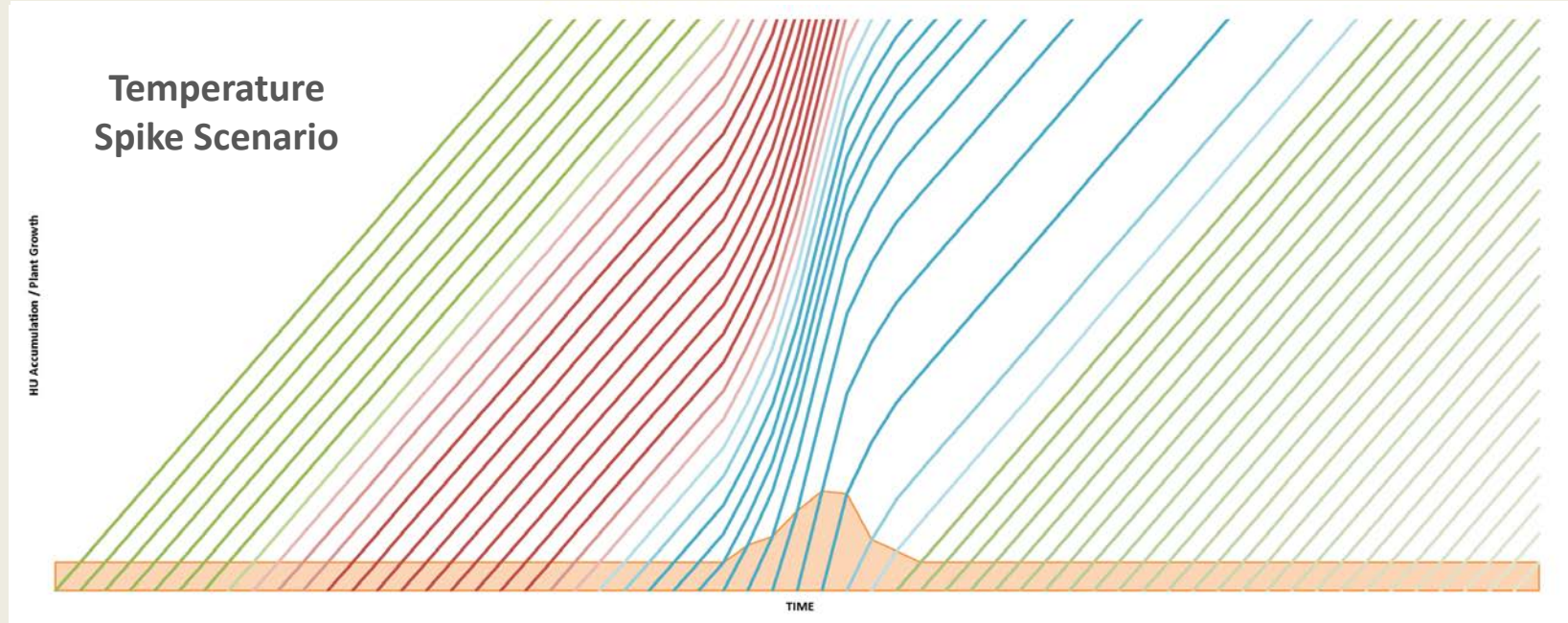
Growth rate increases as HUs accumulate faster than average

The Weather Challenge
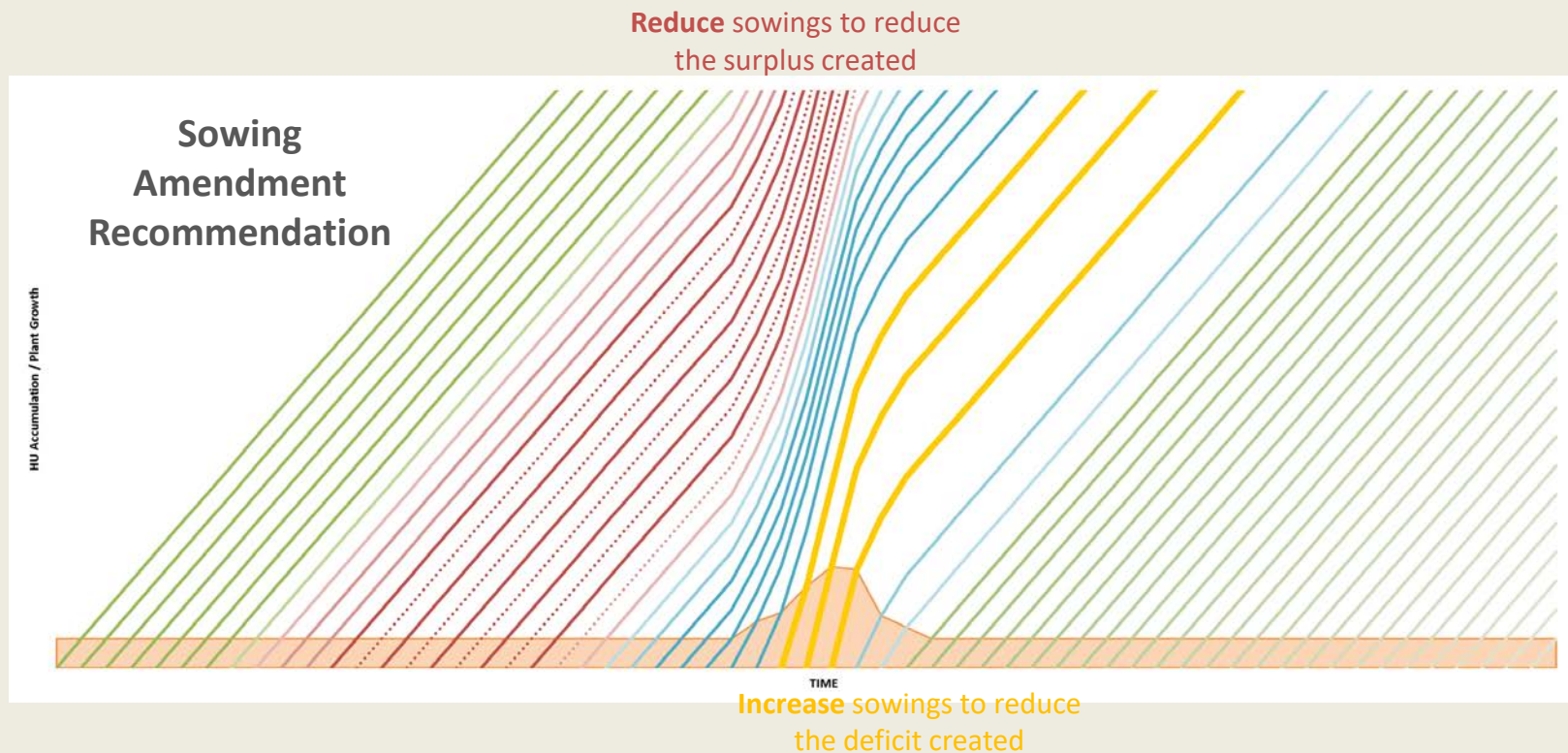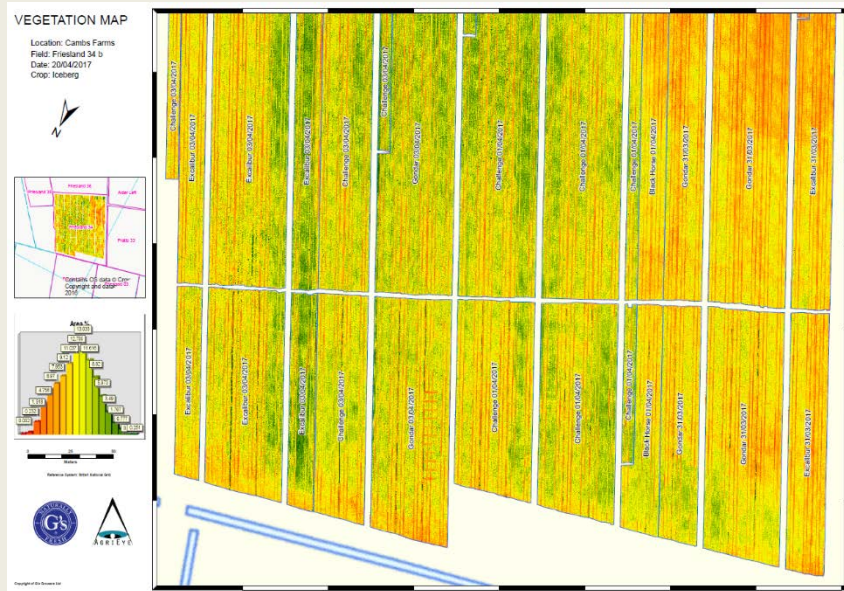
CAMBS & NORFOLK 2018

IceCAM
Iceberg Crop Adaptive Model

Average HU · Forecast HU · Actual HU
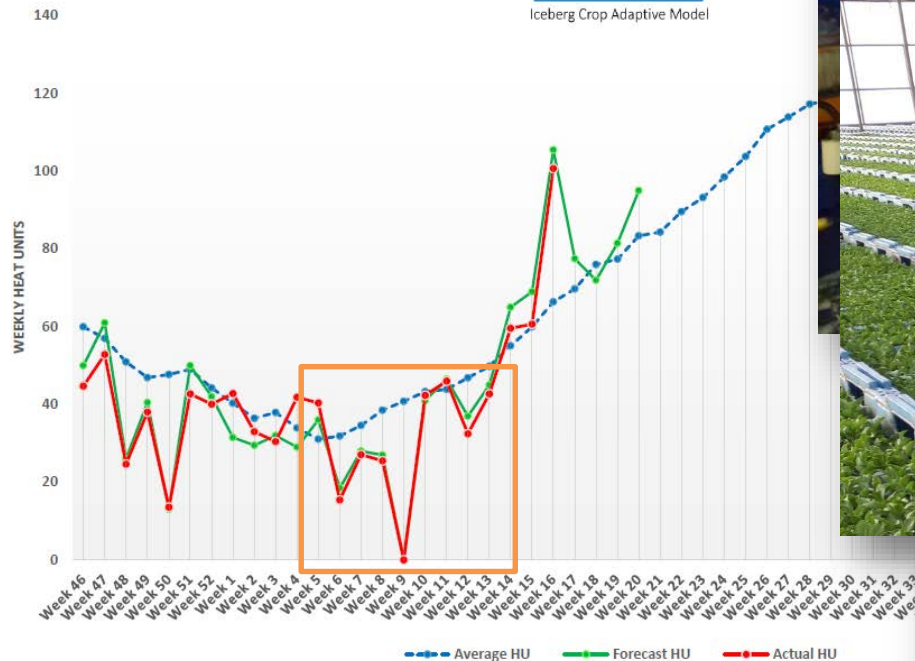
Case Study - AgriEye

Goal

Increase yield by identification and reduction of in-field crop variability.

How

Aerial imaging of crop to identify and quantify problem areas, and enable precision applications.

Trust | Efficiency | Quality | Expertise | Can do

The AgriEye Story

- G's first explored remote sensing through a KTP project with Cranfield University in 2013.

- Development continued in partnership with Cranfield to develop counting and sizing algorithms.

- Ongoing development with various partners to develop new applications, e.g. disease identification.

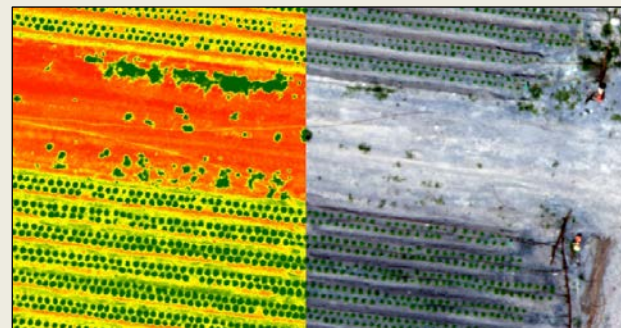**Manned aircraft**

Spectrum Aviation
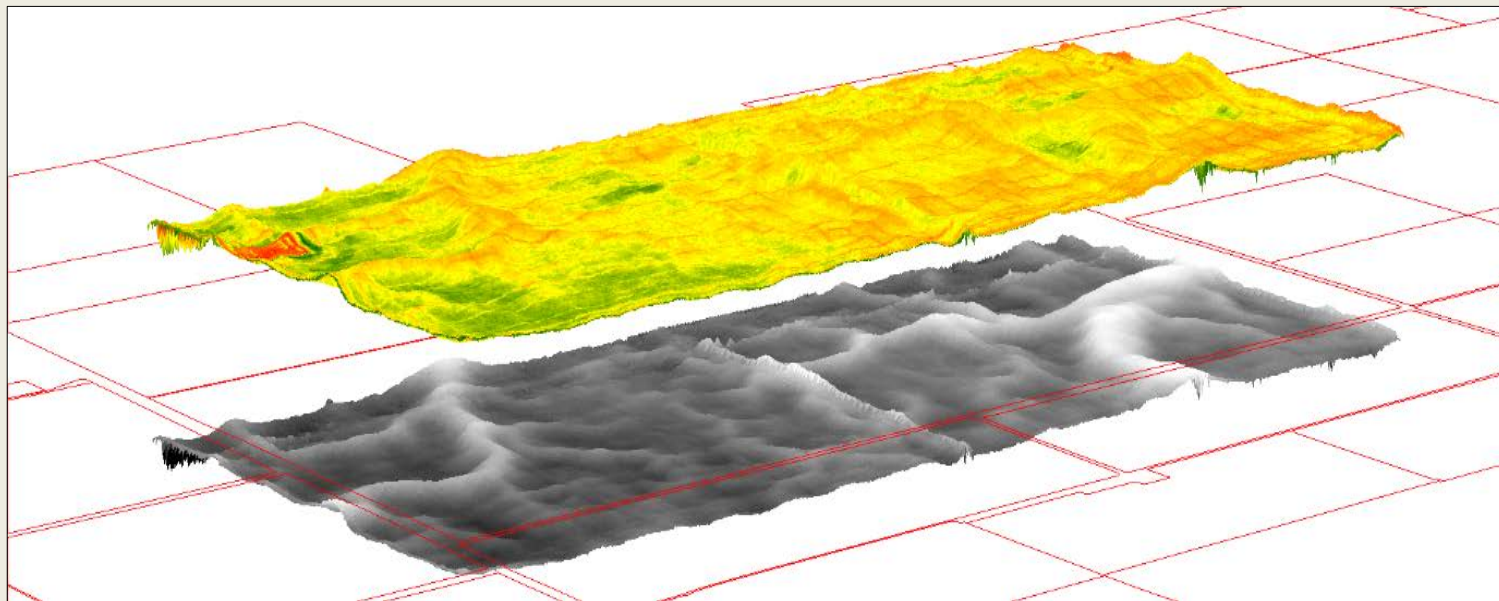
Unmanned Aerial Vehicles

Hemav

Satellites

Environment Systems

Georeferenced multispectral imagery (3cm/pixel), being able to locate individual plants

Farming with Precision to Optimise Inputs

- Input data: Yield, elevation, soils, vegetation indices, water, etc.
- Objective: Field segmentation into management zones for variable rate crop inputs e.g. fertiliser to maximise crop yield while minimising environmental impacts


Other uses of AgriEye maps:

- Crop scouting
- Wind damage
- Poor planting /drilling
- Weed patches
- Diseases
- Pest damage
- Compaction issues
- Water-logging
- Over spraying
- Compost amendments
- Non-destructive trials assessments (i.e. starter fertiliser)

3D representation of Vegetation Map (red/green) and elevation map (grey) data of a maize crop at Big Square field (Plantation farm – G's Growers 2016). Field boundaries in red.

Trust | Efficiency | Quality | Expertise | Can do

Variable Rate Fertiliser Application
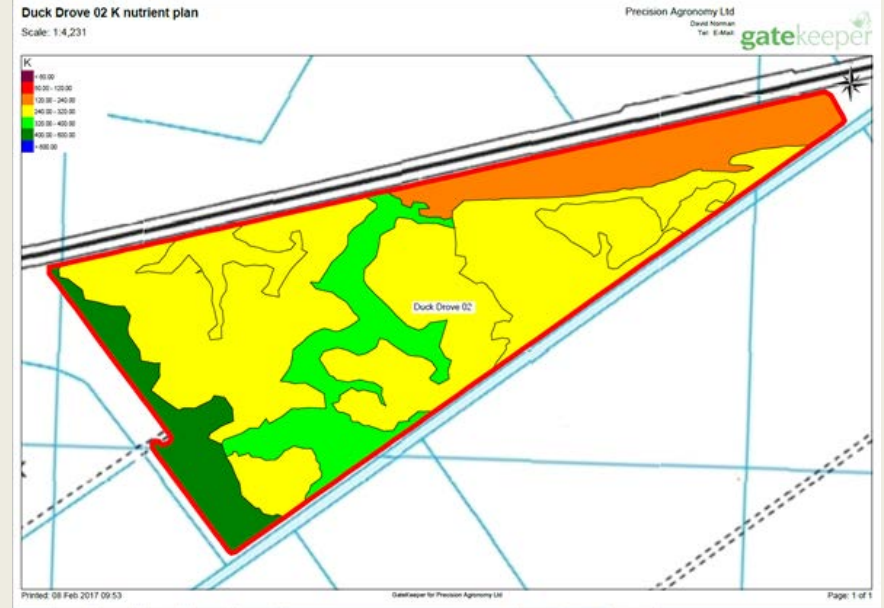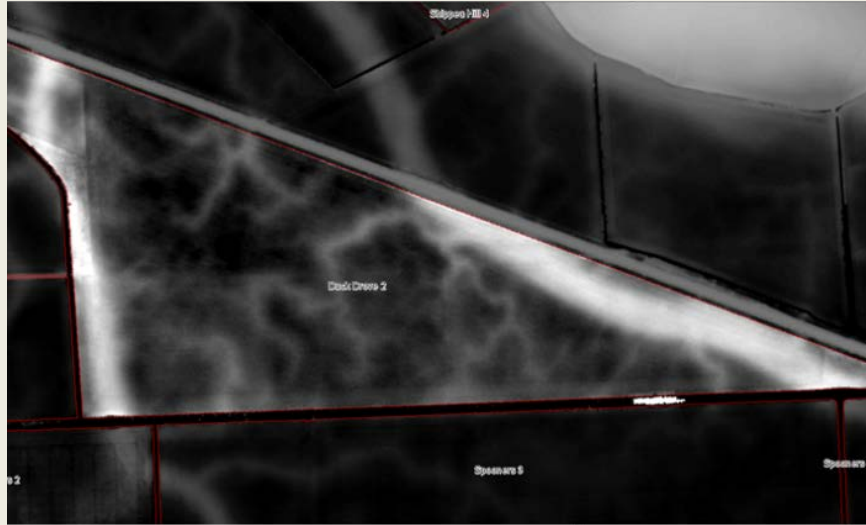
Plant Counting

- Spatial location of each of the plants determining Number of surviving plants

- From localized surviving plants, extract Ground Area Covered and assess greenness index range
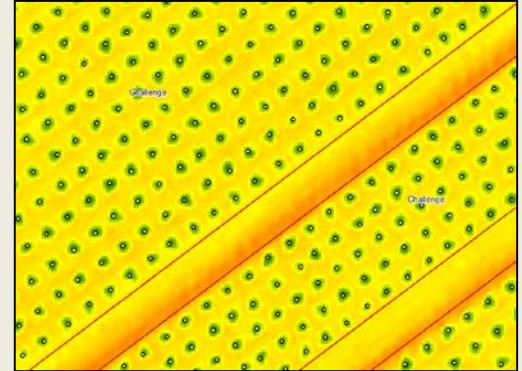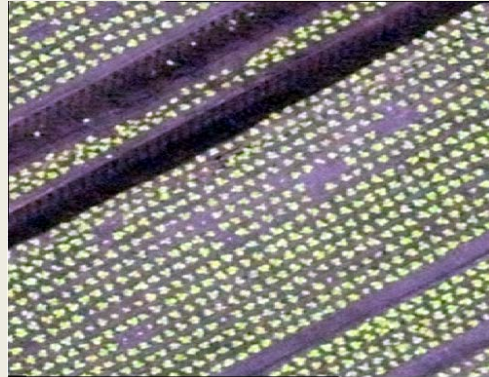
Plant Sizing and Yield Forecasting

Determine the **number of plants established after transplanting** (>98% accuracy)
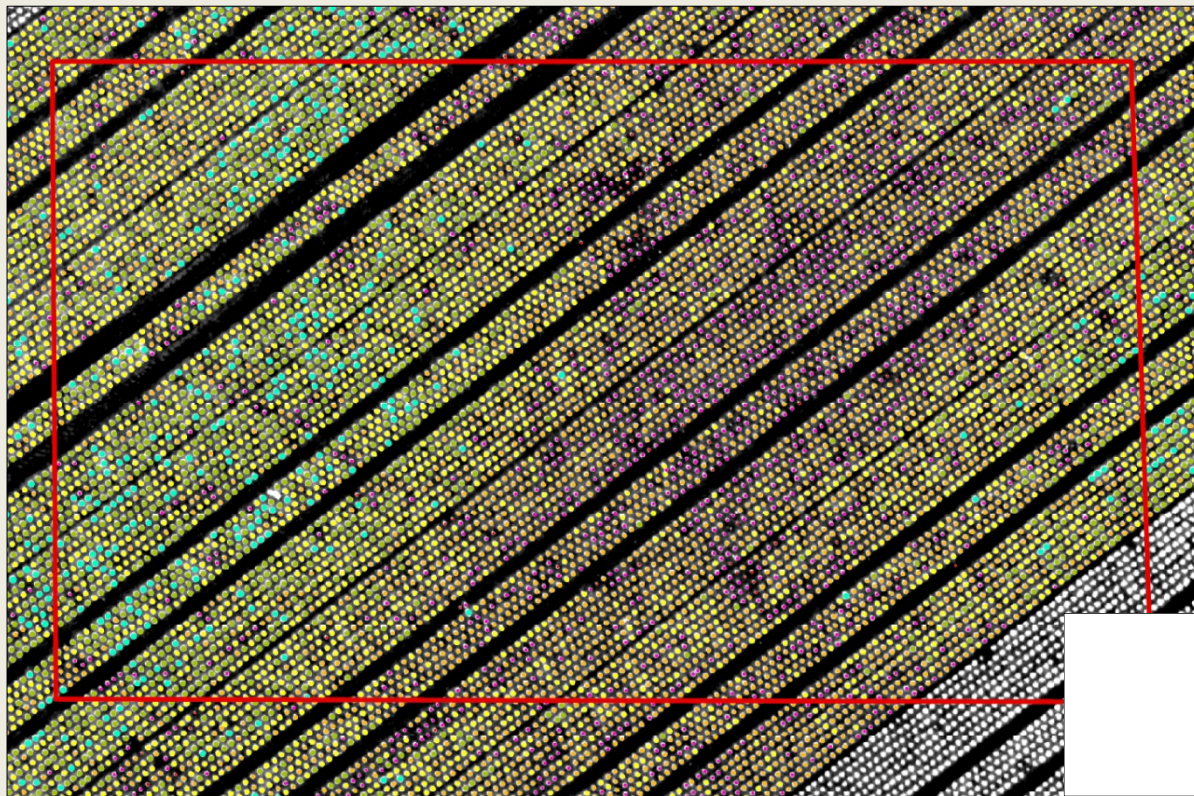
Measure size of individual plants and assess **size range**

Outputs
-Deliver lettuce and celery establishment KPIs on weekly basis
-Correlating plant size with product specifications (potential yield)
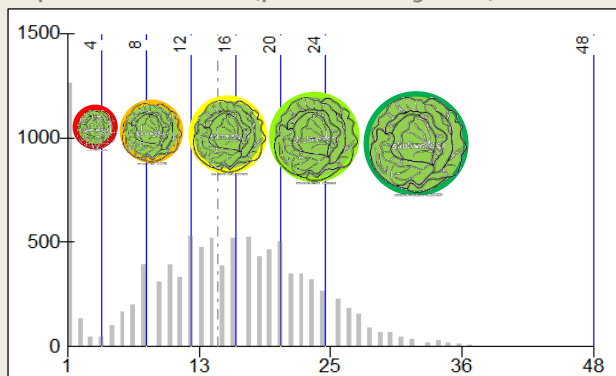
Iceberg population with classes based on pixel sizes.

Iceberg at Bank Farm 3 over a 'roddon' (old waterway). Area of interest in red. (G's Growers UK 2017)

Other Projects and Challenges

- Plant tape

- SmartProp

- Hyperweeding

- Soil sustainability

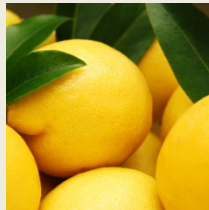- Harvest automation

- Disease monitoring

- ...and many more!

Trust | Efficiency | Quality | Expertise | Can do

What have we learned?

Collaboration

Communication

Can-do

Thank you

karen.covey@gs-growers.com

Trust | Efficiency | Quality | Expertise | Can do