Future Proofing Farming

PRECISION PRINCIPLES IN VEGETABLE SYSTEMS

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Precision Principles

RIGHT

Thing

Amount

Place

Time

Things make it hard

“Vegetables” are very minor crops so don’t get tech investment

There are dozens of different crops with different signatures and needs

The things growers manage are already complex, don’t want more

Some crops are very rapid, not much time to measure and manage


3/2019
But
Same Recipe
Image © 2021 Planet.com
Google Earth

Tech Opportunities for Precision

Guidance – do things in the right place

Rate control – use the right amount

Sensors – get timely information

Data processing – do the right thing

Current Adoption of Precision Tools

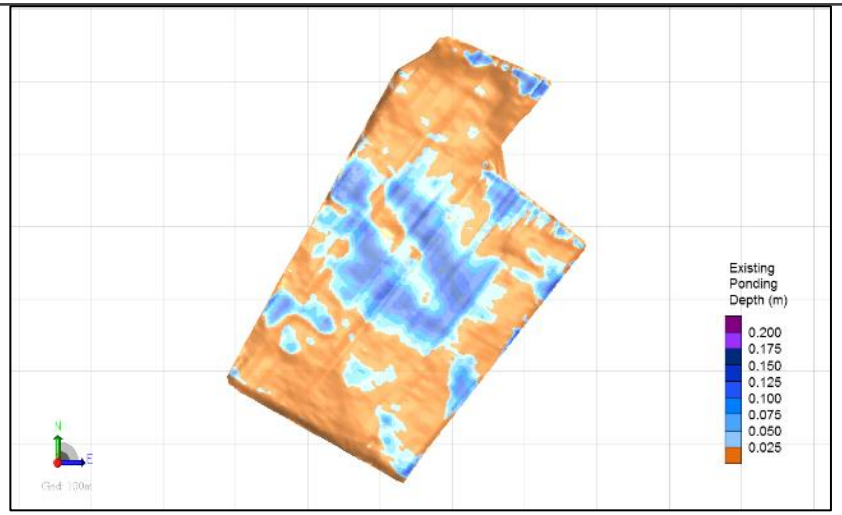
Video | First AgXeed robot tractor delivered in the Netherlands

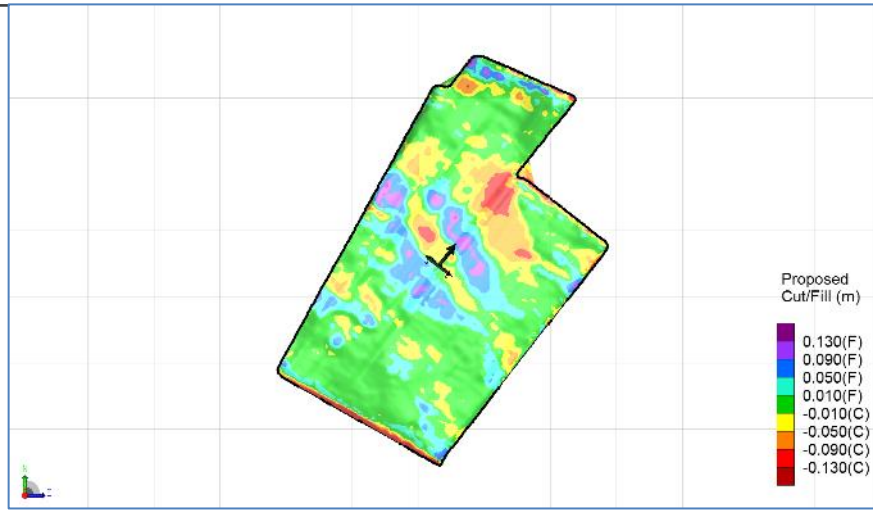
The first robot tractor developed in the Netherlands by manufacturer AgXeed was recently delivered to P. van Osch Groenteproducties. The vegetable grower wants to use the AgXeed robot tractor for intensive operations such as disc harrowing, deep cultivation and tilling at low speed.

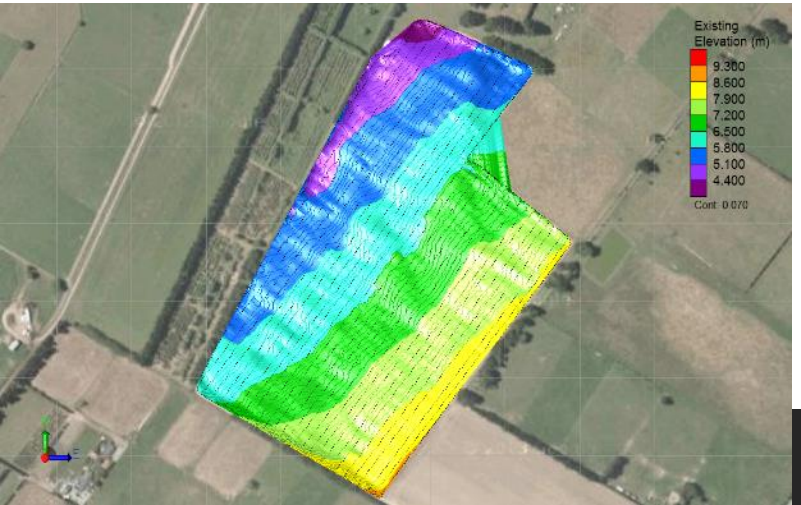
Source: Future Farming

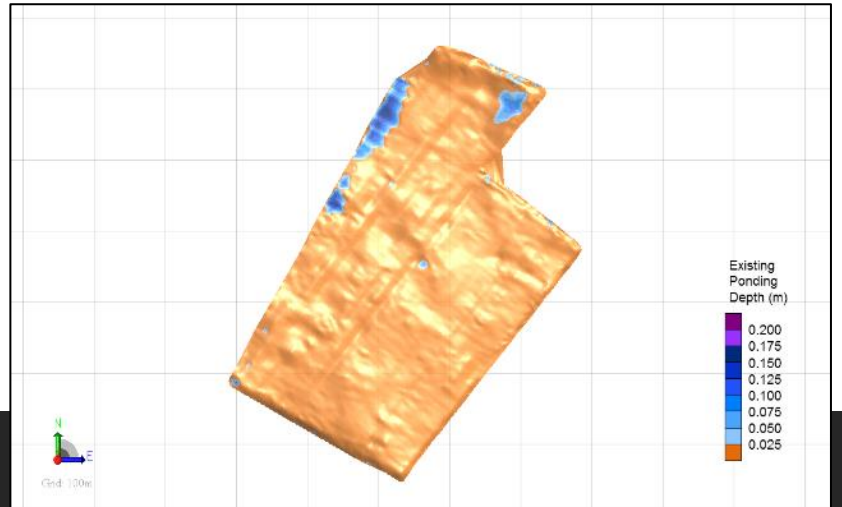
OptiSurface
Agricultural Earthworks Optimized

Precision levelling









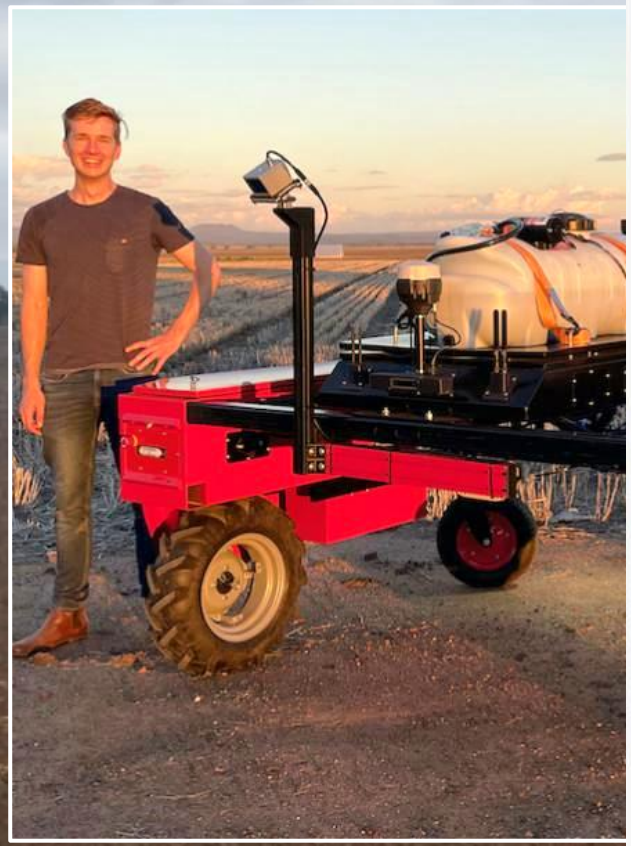
VR Nutrient application

But scale?

Stop throwing fert in the wheel tracks

Direct Placement

Section control, nozzle control



Wageningen researchers are developing a spot sprayer to combat, for example, volunteer potatoes in onions and beets. This in collaboration with a Robotti 150D field robot. Tests show that the spraying system needs to be even more robust.

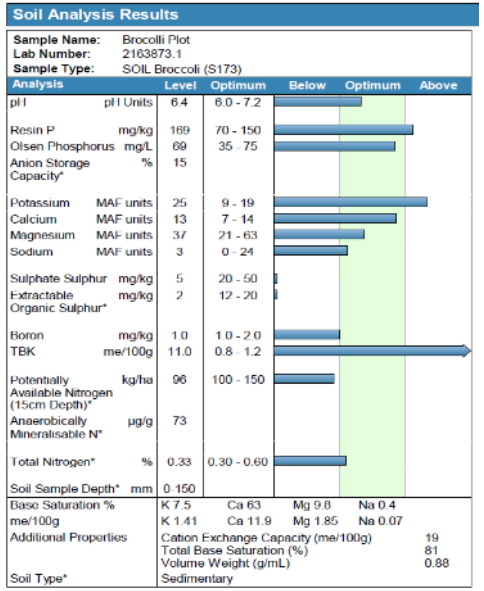
Source: Future Farming

Resson

Precise Prescription

How much Nitrogen is in the soil already?
How much additional fertiliser can we justify?

Need Suitable Tools

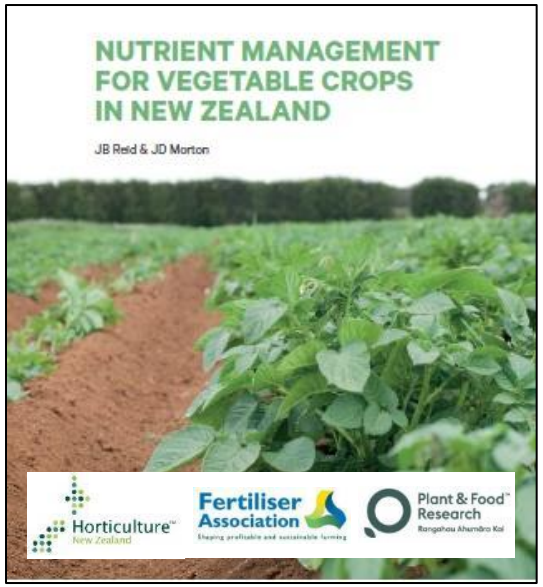


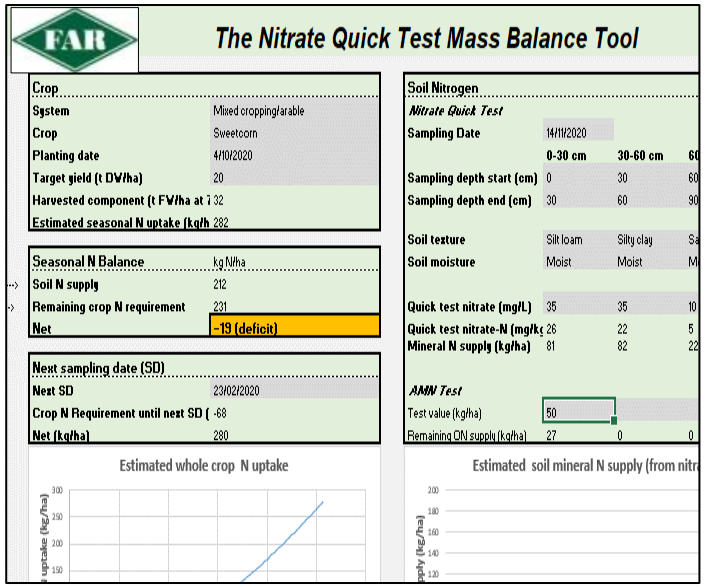
Soil Analysis Results

Sample Name: Brocolli Plot
Lab Number: 2163873.1
Sample Type: SOIL Broccoli (S173)

Analysis		Level	Optimum	Below Optimum Above
pH	pH Units	6.4	6.0 - 7.2	
Resin P	mg/kg	169	70 - 150	
Olsen Phosphorus	mg/L	69	35 - 75	
Anion Storage Capacity*	%	15		
Potassium	MAF units	25	9 - 19	
Calcium	MAF units	13	7 - 14	
Magnesium	MAF units	37	21 - 63	
Sodium	MAF units	3	0 - 24	
Sulphate Sulphur	mg/kg	5	20 - 50	
Extractable Organic Sulphur*	mg/kg	2	12 - 20	
Boron	mg/kg	1.0	1.0 - 2.0	
TBK	me/100g	11.0	0.8 - 1.2	
Potentially Available Nitrogen (15cm Depth)*	kg/ha	96	100 - 150	
Anaerobically Mineralisable N*	µg/g	73		
Total Nitrogen*	%	0.33	0.30 - 0.60	
Soil Sample Depth*	mm	0-150		

Base Saturation %	K 7.5	Ca 63	Mg 9.8	Na 0.4
me/100g	K 1.41	Ca 11.9	Mg 1.85	Na 0.07
Additional Properties	Cation Exchange Capacity (me/100g)			19
	Total Base Saturation (%)			81
	Volume Weight (g/mL)			0.88
Soil Type*	Sedimentary			

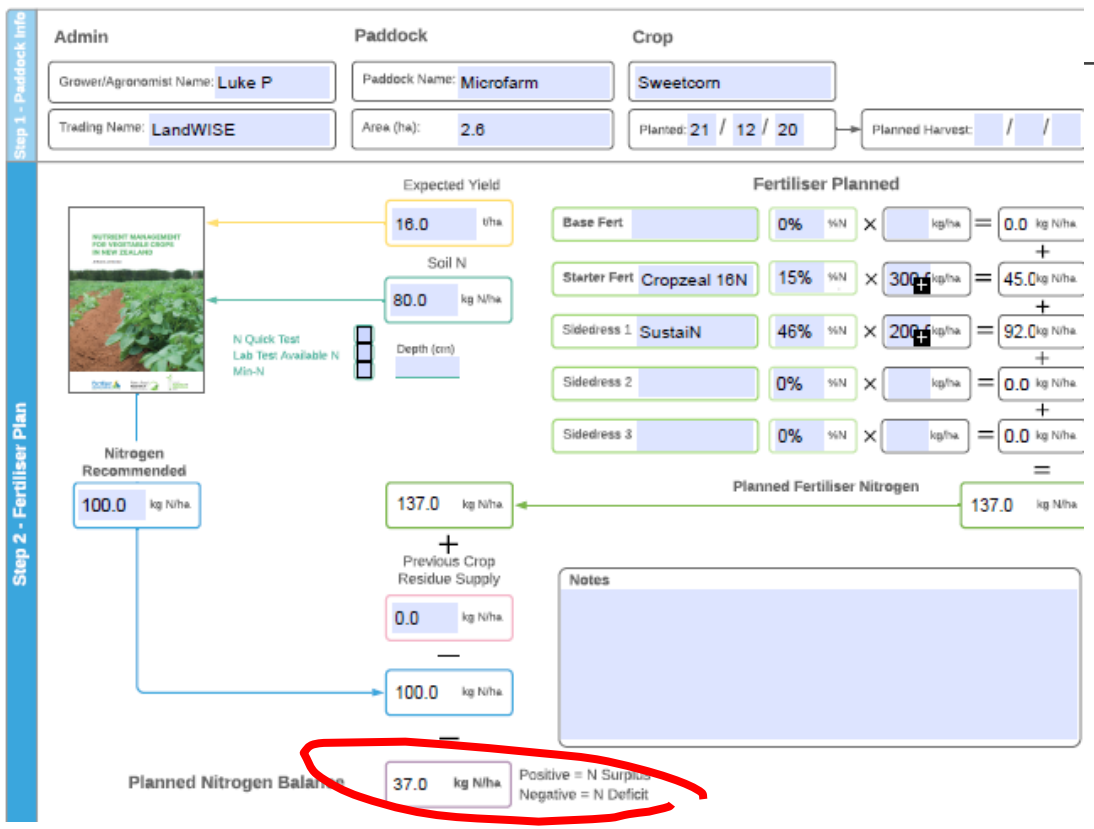


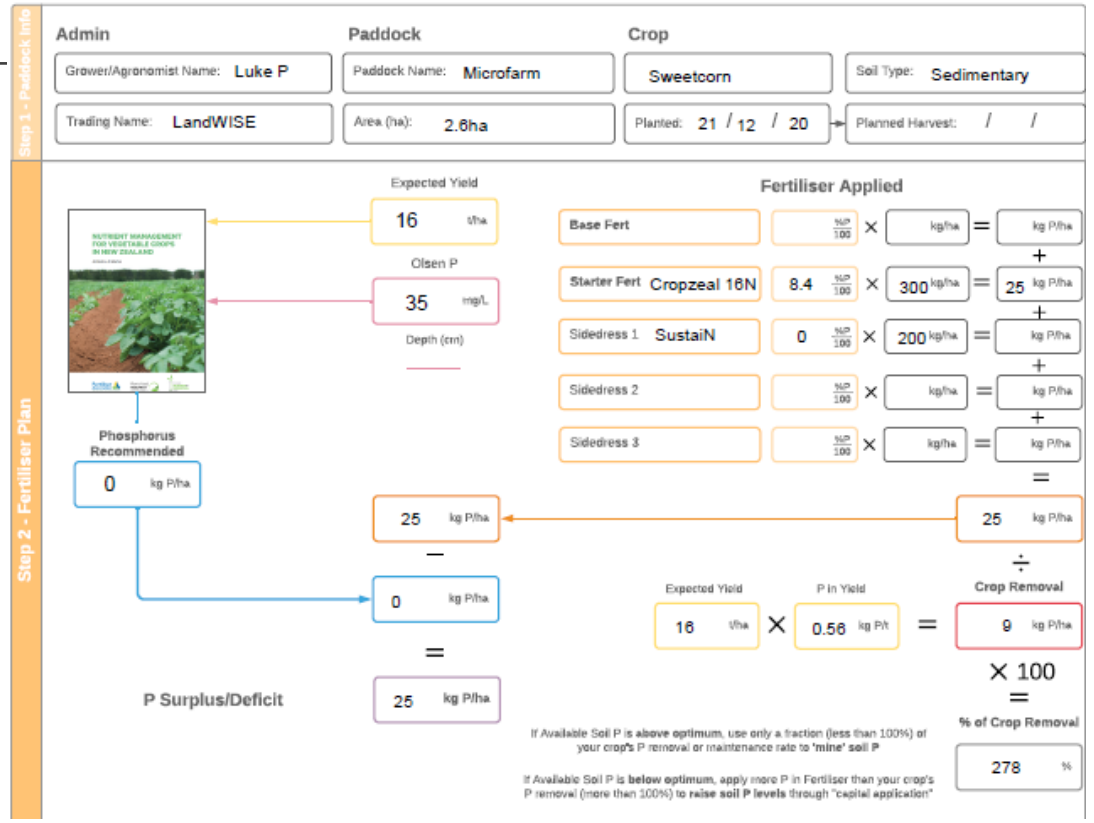


Info Sources

- Soil Tests
- Nutrient Management for Vegetable Crops in NZ
- FAR Nitrate Mass Balance Calculator

Nutrient Budgets – Fertiliser Plans



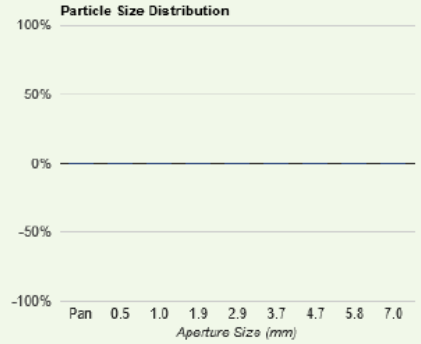


www.nutrient.landwise.org.nz

Precise Application

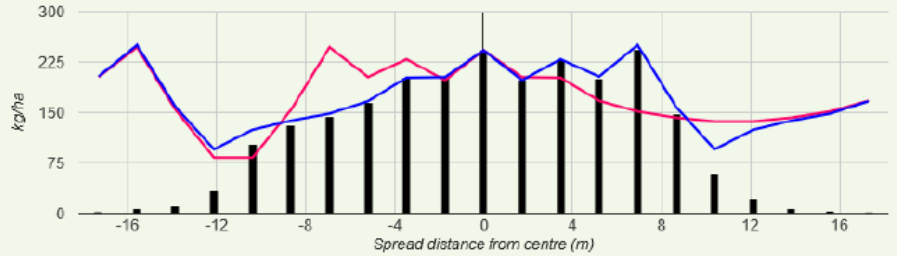
Fertiliser Spread Analysis & Calibration Report

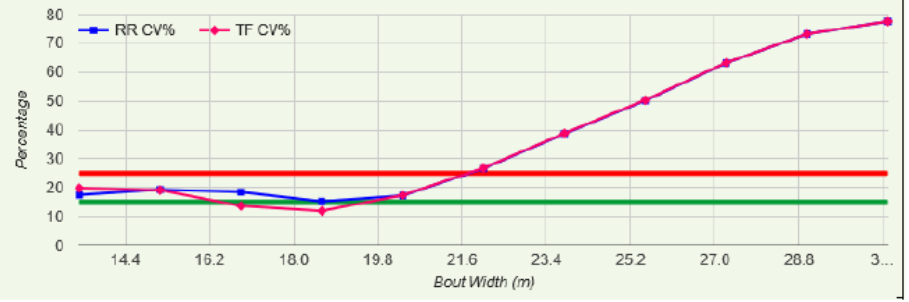
Company Name: Pescini Bros	**Product:** YaraMila Complex (from Ballance) 12.4-5.2-15.0-8.0	Particle Size Distribution
Site Tested: Pescini potatoes behind shed	**Nitrogen:** Y	
Test Date: 2019-01-08	**Bulk Density:** 0.00 kg/L	
Tested By: Chris	**Particle Size Distribution**	
Wind Speed: 10.00 m/s	**Pan:** 0 %	
Wind Direction: 200 deg	**0.5 mm:** 0 %	
Vehicle: Case IH 5150	**1.0 mm:** 0 %	
Registration #:	**1.9 mm:** 0 %	
Spreader Make: Vicon	**2.9 mm:** 0 %	
Spreader Model: Rota Flow - twin disc	**3.7 mm:** 0 %	
Spreader Age: 0	**4.7 mm:** 0 %	
Spreader Condition: Used	**5.8 mm:** 0 %	
Discharge Height: 0	**7.0 mm:** 0 %	
Spinner Revs: 0	**SGN:** 0	
Door:	**UI:** 0	
Vane:		



Set Bout: 22.49 m **Tray Size:** 0.25 m2 **CVs at Set Bout:** **RR%:** 26.6766 **TF%:** 26.8018

Set Rate: 200 kg/ha **Tray Spacing:** 1.73 m **Measured Rate:** 174 kg/ha **Left %:** 47.37 **Right %:** 52.63





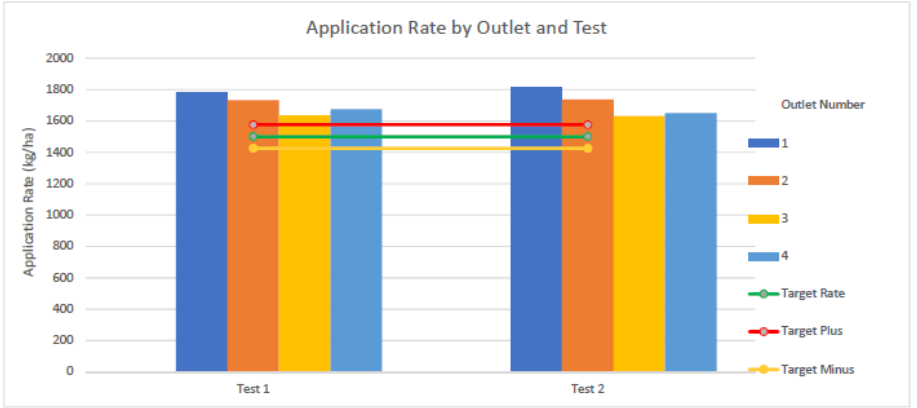
Fertiliser Spread Analysis & Calibration Report

Fertiliser Equipment Application Testing

Client		Test Details	
Company Name	Pescini Bros	Test Name	Potato Planter
Contact Name	Chris Pescini	Test Date	8-Jan-19
Email Address	pescinibrosltd@gmail.com	Test Site	55 Kimberley Rd
Phone Number	0274 302 602		Levin 5510
Address	650 State Highway 57 Levin 5510	No. of Repeats	2
		Vehicle/Tractor Registration No	
Tester Name	Pip, Dan and Georgia	Applicator Make	Potato Planter
Test Organisation	LandWISE	Applicator Model	
Email	pip.mcv@pagebloomer.co.nz	Driving Speed	5.66 km/h

Summary	Based on fertiliser product		YaraMila Complex (Bal)	
Target Application Rate	1500 kg/ha	=> Fert required for block	960 kg	
Measured Application Rate	1708 kg/ha	=> Fert required for block	1093 kg	
Maximum Application Rate	1817 kg/ha	121 % of Target	=>	**Over-applying by 17%**
Average Application Rate	1708 kg/ha	114 % of Target	=>	**Over-applying by 12%**
Minimum Application Rate	1631 kg/ha	109 % of Target	=>	**Over-applying by 8%**
Overall Variability SD	70.8 kg/ha			
Overall Variability CV	4.1 %		=>	**Variability within acceptable limits**

The Coefficient of Variation should be <15% for nitrogen fertilisers and <25% for other fertilisers
Variation greater than this is likely to reduce profits from agronomic crops.
The Outlet Coefficient of Variation is 3.9 % so the outlets are applying fertiliser evenly



This testing was carried out for LandWISE Incorporated under MPI SFF Project 405649 "Future Proofing Vegetable Production"

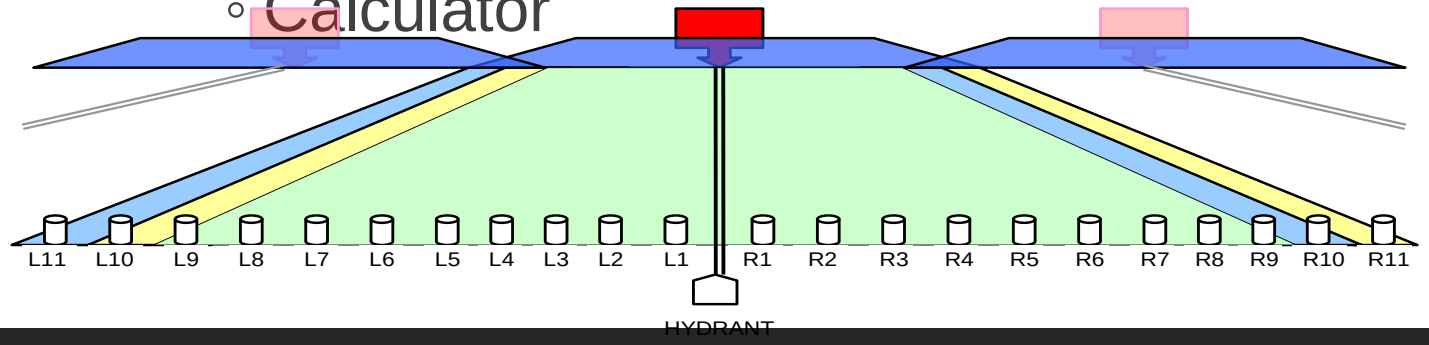
www.fertspread.nz

IRRIG8 Quick and IRRIG8 Lite

Quick assessment for farmers

- How to make measurements
- Where to make measurements
- How to calculate key values

- Guidelines
- Worksheets
- Calculator



Measurement Procedure

What equipment will you need?

This guide and the worksheet

24 Collectors of the same diameter (at least 150 mm) – 9 Litre plastic buckets are good

1 Measuring cylinder (about 2 Litre)

1 5 m tape

2 Electric fence standards

1 Stop watch

1 Pen or pencil

Application test

1 Set your 24 buckets in a row across the direction of irrigator travel [**T1** in Diagram 1]

2 Arrange two buckets at even spacing between the left hand edge of the lane (i.e. half way to the next hydrant 'a') and the extent of obvious wetting [see '**L12,11**' in Diagram 2]

3 Mirror this inside the edge of the lane, with two buckets arranged at the same spacing from the edge of the lane [see '**L10,9**' in Diagram 2]

4 Arrange eight more buckets at even spacing to cover the area back to the centre line (the hose or cable) [see '**L8-L1**' in Diagram 2]. The spacing may be different to the first four buckets

5 Repeat 2, 3 & 4 on the right hand side

6 Start the irrigator away from (before any water can reach) the line of buckets

7 Run the irrigator keeping it going until it is well past wetting the buckets. Measure the irrigator speed as it passes over the test buckets

8 Measure the volume of water caught in each bucket and record on the Record Sheet

Speed test

1 Set two markers (electric fence standards) 5.0m apart along the hose or cable

2 The markers should be in line with the collectors

3 Measure the time for the irrigator to travel between markers – they move when the carriage hits them

Field test layout

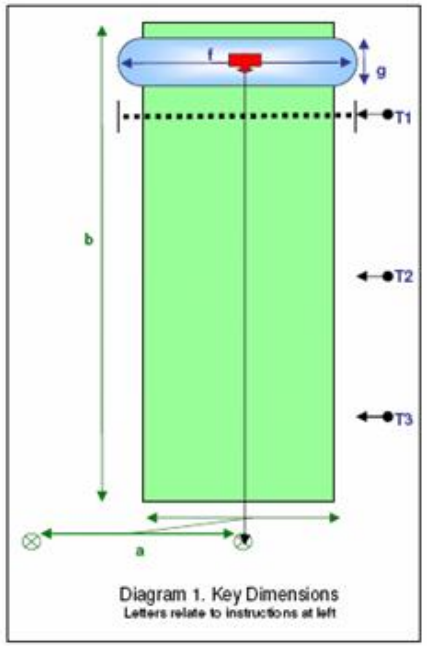


Diagram 1. Key Dimensions
Letters relate to instructions at left

IRRIG8Lite : C:\Users\Dan Bloomer\Page Bloomer Associates\Page Bloomer - Documents\Company\Resources\Irrigation\IRRIG8Lite\IRRIG8Lite13032014.IRRIG8Lite © 2007-2020 IRRIGATION NEW ZEA...

File Report Help

General Info | Pump Efficiency | Delivery Efficiency | Centre Pivot | Linear Move | Travelling Irrigator | Sprayline Irrigator | Drip Micro

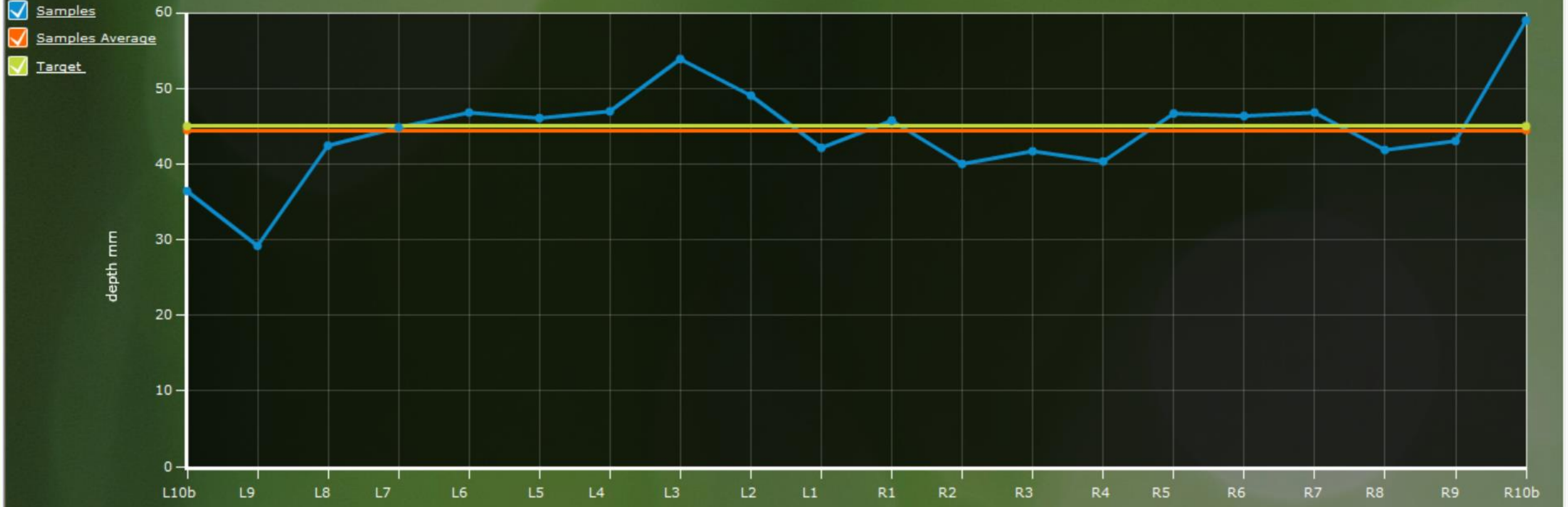
Background Info | Test Details | Field Details | Collected Volumes | Results | Distribution Graph

Traveller fixed boom

Irrigation Event - Applied Depth

-mm-

Help



LANDWISE INC - WWW.LANDWISE.ORG.NZ

Drivers of Adoption

Compliance

Capability

Complexity

Connectedness

Confidence

Conscience

Capacity

Convenience

Champions

Cost

Compliance
Conscience

Drivers of On-Farm Change

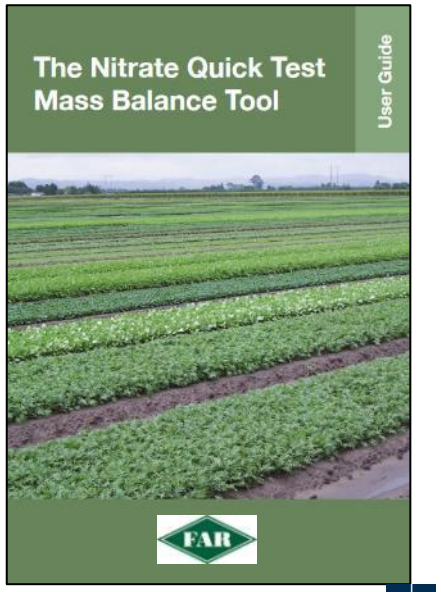
Compliance - Conscience - Convenience - Complexity - Cost - Capacity - Capability - Champions -

CGTrader

REDUCE
Inconvenience
Complexity
Cost

Drivers of On-Farm Change

Convenience - Complexity - Cost - Capacity - Capability - Champions - Compliance - Conscience -



Capacity - Capability - Champions - Complexity - Cost - Compliance - Conscience - Convenience -

Drivers of On-Farm Change

INCREASE
Capability
Capacity
Confidence
Connectedness
Champions

LandWISE
INCORPORATED

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