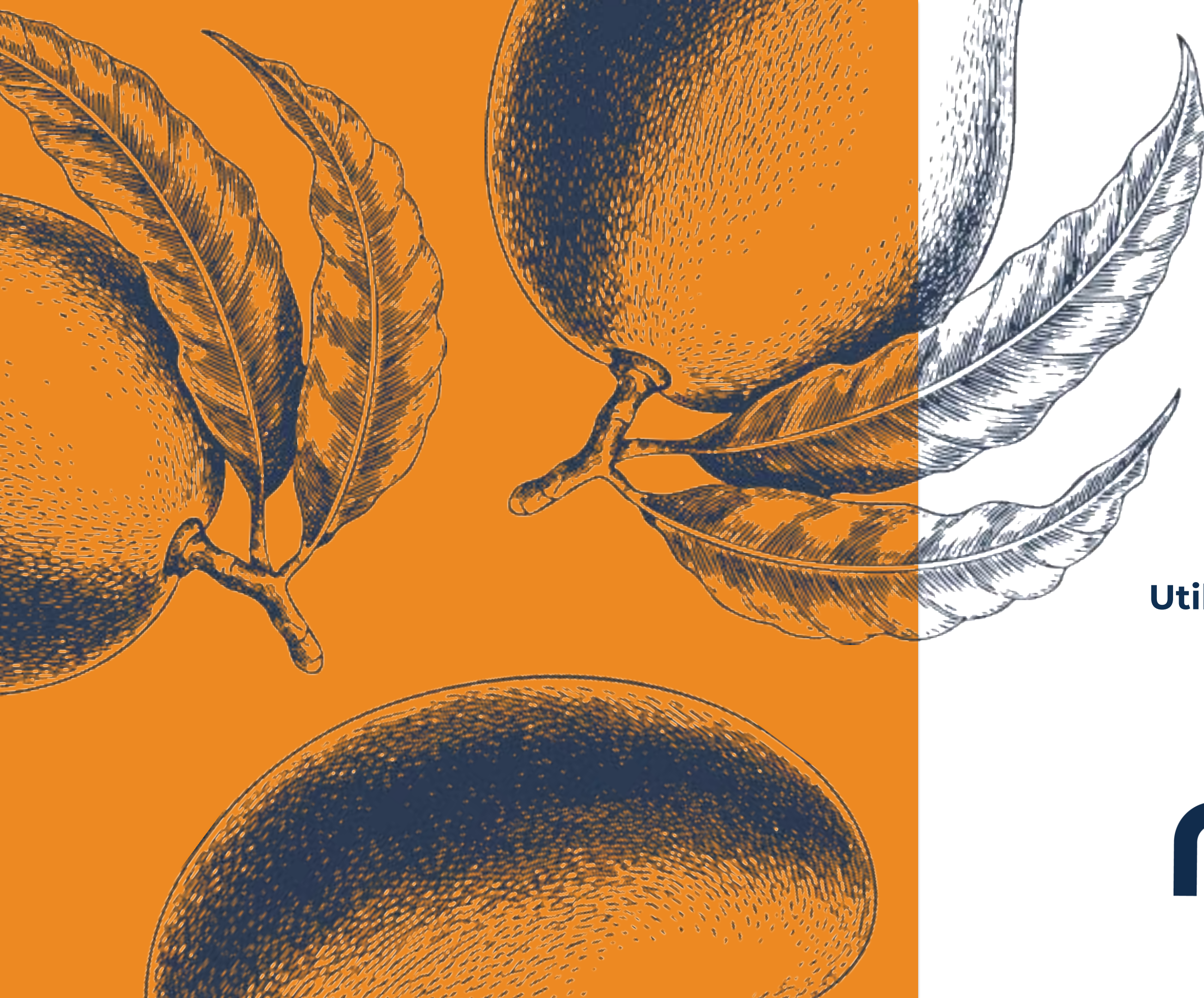
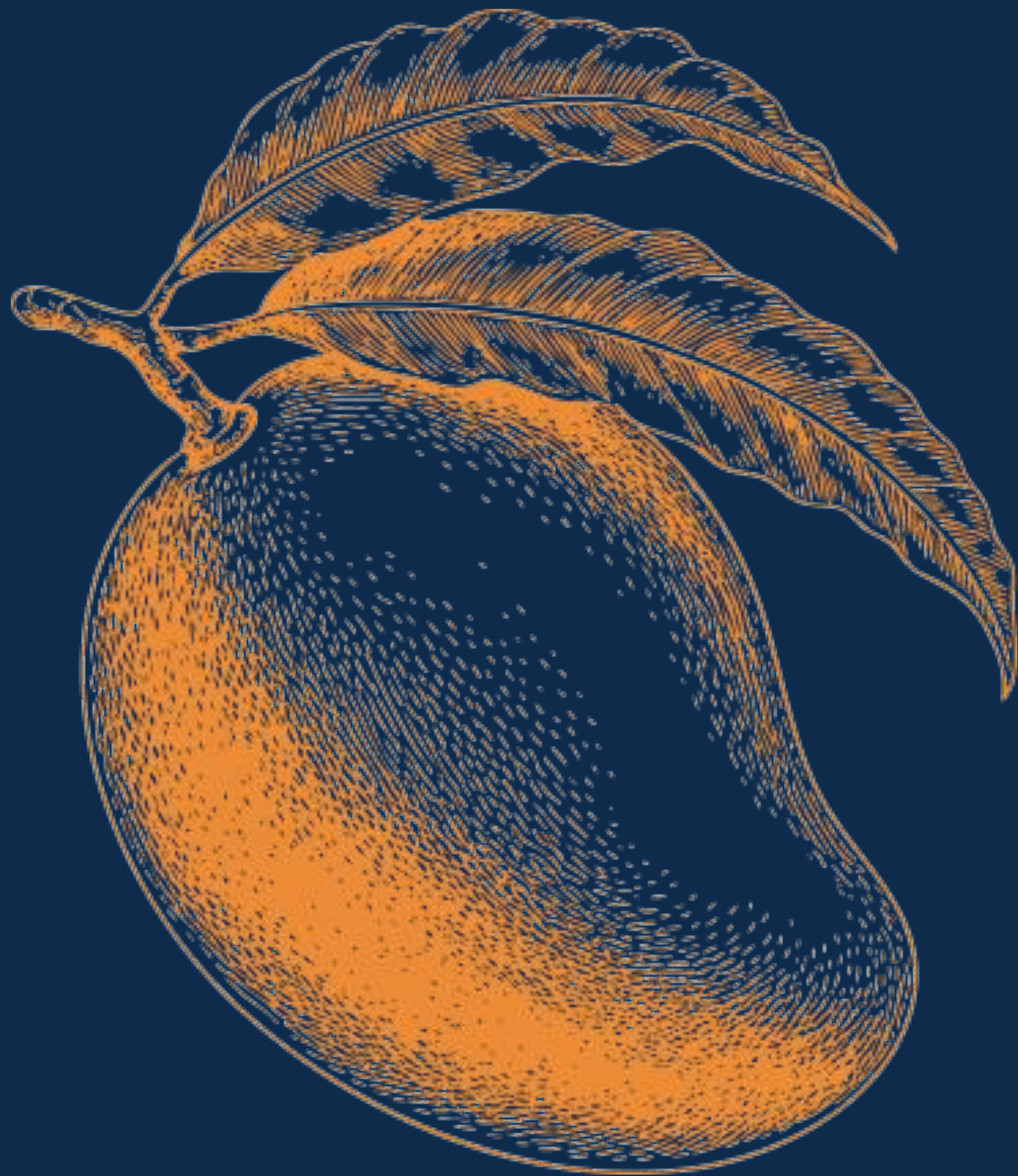


23 July 2026
Hantie Muller

**Utilising Additional Sampling
Methods to Optimise
Nutritional Management**

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[me.li.or] • *noun*



Melior comes from the Latin meliora,
meaning **to make better or improve.**

Who is Melior?

- Established in 2022.
- Founded by the team behind AgriSol.
- A **multi-disciplinary** team of agronomists and advisors.
- Coordination centers in **Potchefstroom** and **Pretoria**.
- **Nationwide network** of Melior businesses and representatives.
- **Science, technology** and **data**.
- Helping growers achieve **optimal crop** and **financial yields, season after season**.



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The Challenge Facing Modern Growers

Modern nutritional management has become increasingly complex.

Growers are faced with:

- **Rising** input costs
- Information **overload**
- **Conflicting** advice
- **Increasing** quality demands
- Climate **variability**



The Challenge Facing Modern Growers

The solution is not simply to apply more fertiliser.

It's ensuring that the right nutrients are applied at the right rate, at the right time.

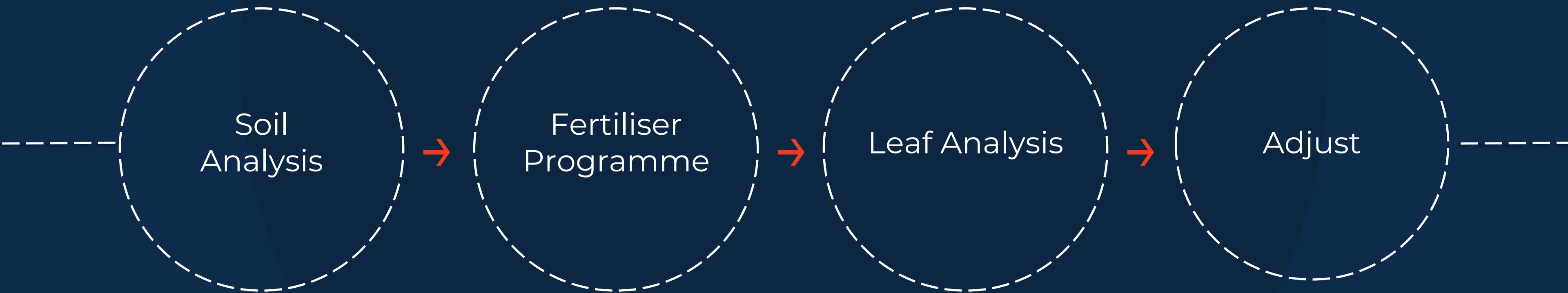
How confident are we that our nutritional programme is delivering the nutrients the tree needs, when it needs them?

No single test can provide the complete picture.

Traditional Nutritional Management

Nutritional management has evolved considerably over the past few decades.

Traditional approach consists of :



Provides a solid foundation for nutritional management.

Standard Soil Analysis

Question 1:

Is the soil chemically capable of supporting the crop?

It helps us evaluate:

- Soil pH
- Soil nutrient status
- Ca : Mg balance (Lime and gypsum requirements)
- Salinity constraints

Provides the foundation for every sound fertiliser programme.

If the chemical foundation is wrong, no amount of expensive "silver bullets" will compensate for it.

Haney Soil Health Test

Question 2:

Is the soil biologically active and functioning well enough to supply nutrients to the crop?

Why does it add value?

- Estimates the soil's natural nutrient-supplying capacity
- Estimates nitrogen mineralisation potential
- Measures soil respiration and microbial activity
- Evaluates carbon cycling
- Provides an overall Soil Health Score

Complements standard soil analysis by measuring how well the soil functions as a living system to supply nutrients.



Example of a Haney Soil Health Test

SAMPLED DATE	21 Apr 2021	29 Jul 2022	20 May 2023	12 May 2025
PLAN	SOMER 2021_22	Somer 2022/23	Somer 2023/24	Mielies 2025/26
SAMPLE NAME	34512	97879	8771	Irrigation
SAMPLE DESCRIPTION				koring
SAMPLE METHOD	Composite Grid (2ha)	Composite Grid (2ha)	Composite Grid (1ha)	Composite Grid (2ha)
SAMPLING DEPTH	0-15cm	0-15cm	0-15cm	0-15cm
	   	   	   	   
NPK				
Nitrate (kg/ha)	11.65	12.32	17.92	11.65
Ammonium (kg/ha)	8.96	6.05	14.56	3.14
Inorganic Nitrogen (kg/ha)	20.61	18.37	32.48	14.78
Organic Nitrogen (kg/ha)	33.15	18.37	18.82	26.88
TOTAL AVAILABLE NITROGEN (kg/ha) 	53.76	36.74	51.30	41.66
Usable % of Organic Nitrogen	100.00	100.00	100.00	100.00
TOTAL USABLE NITROGEN (kg/ha) 	53.76	36.74	51.30	41.66
Inorganic Phosphorous (kg/ha)	15.01	2.24	2.24	7.39
Organic Phosphorous (kg/ha)	16.35	10.83	4.48	1.57
TOTAL AVAILABLE PHOSPHOROUS (kg/ha) 	31.36	13.07	6.72	8.96
TOTAL AVAILABLE POTASSIUM (kg/ha) 	226.00	156.00	92.00	92.00
SOIL HEALTH				
Respiration (Solvita CO ₂ -C) (ppm) 	-	-	-	-
Respiration (IRGA CO ₂ -C) (ppm) 	112.30	39.30	47.70	45.10
Water Extractable Organic Carbon (ppm) 	192.50	146.30	126.60	92.30
Water Extractable Organic Nitrogen (ppm) 	14.80	8.20	8.40	12.00
Organic C:N 	13.01	17.84	15.07	7.69
Organic N:P 	2.03	1.37	4.20	17.14
% Microbially Active Carbon 	58.34	26.86	37.68	48.86
Soil Health Calculation 	14.69	7.68	8.14	7.56
Cover Crop Mix	30% Legume 70% Grass	50% Legume 50% Grass	50% Legume 50% Grass	50% Legume 50% Grass

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NUTRIENTS				
Calcium (kg/ha) 	1019.15	1149.06	638.37	739.16
Ca % for Plant Effective CEC 	57.04	61.00	63.50	67.97
Magnesium (kg/ha) 	174.71	194.87	120.95	116.47
Mg % for Plant Effective CEC 	9.78	10.35	12.03	10.71
Sodium (kg/ha) 	24.64	35.84	17.92	20.16
Sulfur (ppm) 	7.00	8.00	4.00	4.00
Boron (ppm) 	0.27	0.31	0.20	0.20
Iron (ppm) 	136.00	111.00	35.00	21.00
Manganese (ppm) 	7.00	3.00	1.00	5.00
Copper (ppm) 	0.27	0.20	0.20	0.78
Zinc (ppm) 	1.49	1.04	0.73	2.21
Aluminum (ppm) 	198.00	176.00	59.00	51.00
Plant Effective CEC (meq/100g) 	3.99	4.20	2.24	2.43
RATIOS				
Ca:Mg 	5.83	5.90	5.28	6.35
Mg:K 	0.69	1.12	1.17	1.13
P:S 	0.96	0.13	0.25	0.82
P:Zn 	4.50	0.96	1.37	1.49
K:Na 	6.06	2.88	3.39	3.01
Fe:Mn 	19.43	37.00	35.00	4.20
Ca + Mg : Al 	2.69	3.41	5.75	7.49
% P Saturation Fe + Al 	2.01	0.35	1.06	4.58
% P Saturation Ca 	1.47	0.19	0.35	1.00
RECOMMENDATIONS				
Ca needed (kg/ha) 	195.87	131.85	45.23	0.29

Example of a Haney Soil Health Test



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Field:	P1b	Sample Numbers:	AS57219	Sampled On:	2 Jun 2025
Name:	Irrigation	Description:	Wheat	Sampled By:	Righardt Van Den Berg
■ Soil					
NH ₄	1.1	kg/ha			
Ammonium					
NO ₃	11.2	kg/ha			
Nitrate					
NH ₄ :NO ₃	0.1				
Inorganic N	12.3	kg/ha			
Inorganic Nitrogen					
Organic N	16.1	kg/ha			
Organic Nitrogen					
Total N	28.4	kg/ha			
Total Available Nitrogen					
Inorganic P	2.2	kg/ha			
Inorganic Phosphorous					
Organic P	9.0	kg/ha			
Organic Phosphorous					
Total P	11.2	kg/ha			
Total Available Phosphorous					
Total K	86	kg/ha			
Total Available Potassium					
Ca	332	kg/ha			
Calcium					
Ca	46	%			
Ca % for Plant Effective CEC					
Mg	94	kg/ha			
Magnesium					
Mg	13	%			
Mg % for Plant Effective CEC					
Na	22	kg/ha			
Sodium					
S	4	ppm			
Sulphur					
B	0.20	ppm			
Boron					
Fe	84	ppm			
Iron					
Mn	2	ppm			
Manganese					
Al	103	ppm			
Aluminium					
Cu	0.40	ppm			
Copper					
Zn	1.56	ppm			
Zinc					
PE CEC	1.6	meq/100g			
Plant Effective CEC					
Ca:Mg	3.5				
Mg:K	1.0				
P:S	0.2				
P:Zn	0.6				
K:Na	2.5				
Fe:Mn	42				
Ca+Mg:Al	1.8				
%P Sat:Fe+Al	0.5	%			
% P Saturation : Fe + Al					
%P Sat:Ca	0.7	%			
% P Saturation : Ca					

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■ Soil	
Ca needed	162 kg/ha
Respiration	20 ppm
IRGA CO ₂ -C	
WEOC	47 ppm
Water Extractable Organic Carbon	
WEON	7 ppm
Water Extractable Organic Nitrogen	
C:N	6.5
Organic C:N	
N:P	1.8
Organic N:P	
% MAC	41.4 %
% Microbially Active Carbon	
Soil Health	3.6
Soil Health Calculation	

NOTES

REMARKS

- Soil Health score is low.
This soil must be limed for better cation balance
Water extractable C is low. Improve by planting cover crops or increase root exudates.
C:N is low. Too much organic N.
- A lot of N is available to the microbes, but very little energy to help carry out important functions.
 - N credit can be high if WEON is high.
 - Increase carbon inputs to improve C:N. Plant grass cover crop.

- Respiration is very low.
- Low microbial activity.
 - Slow nutrient cycling and residue decomposition can be expected.
 - Additional N may be required due to microbial immobilization.

Na is high. It will can have a negative effect on other cations.
Lime will lower Na.
B is low in soil. It is more effective to apply B to the soil than as a foliar application.
Mn is low
High Fe:Mn can have a negative effect on Mn. Consider Mn application.

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Soil2Sap™

Question 3:

Is the tree taking up and utilising nutrients as expected?

Integrates soil and plant measurements into one assessment

- Nutrient availability in the root zone
- Nutrient uptake by the plant
- Nutrient redistribution between tissues
- Plant physiological status
- In-season nutritional decision-making

■ QuickSoil → 🌿 Mature Leaf Sap → 🌱 Young Leaf Sap

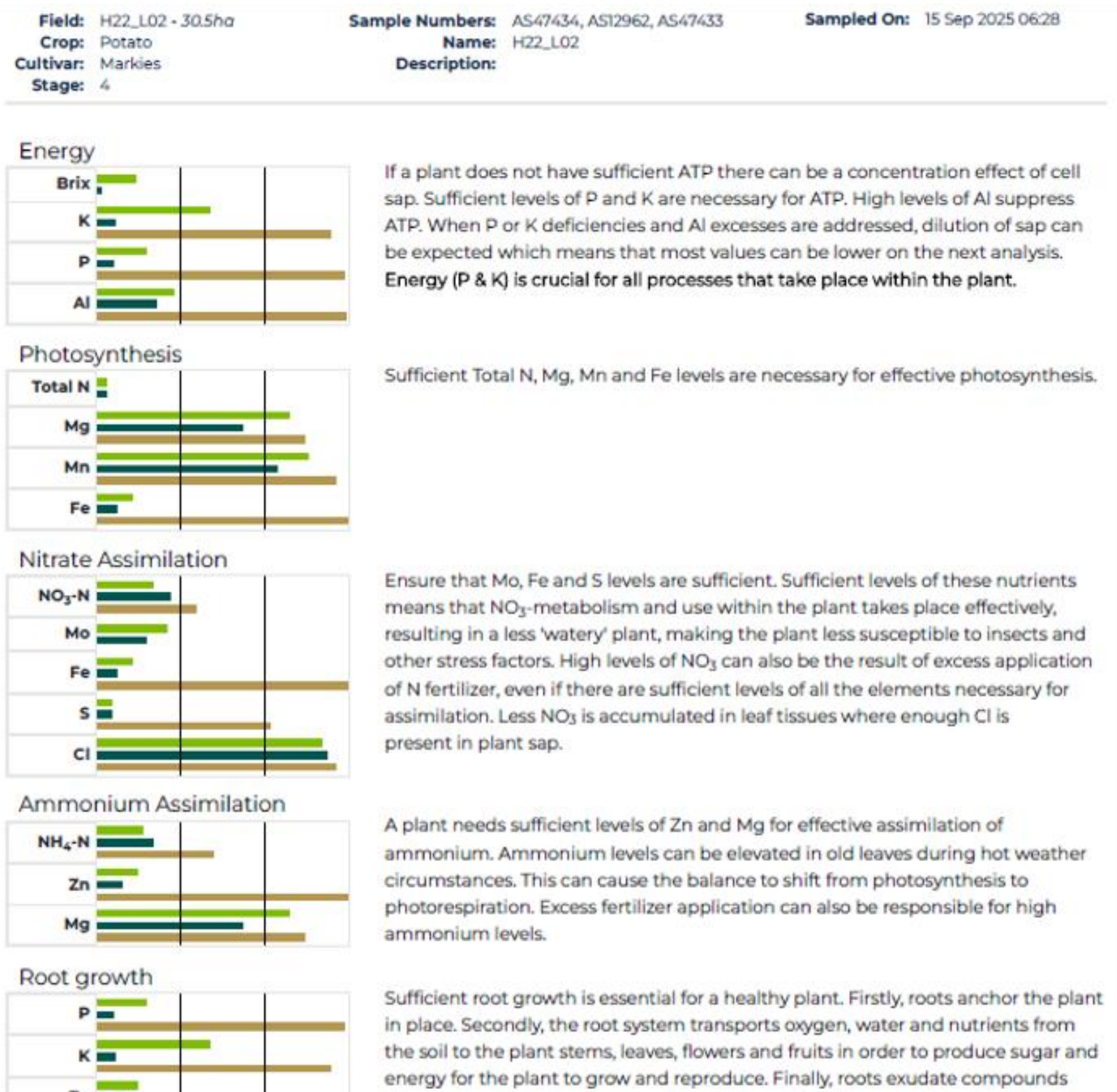
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Example of a Soil2Sap™ Report



Example of a Soil2Sap™ Report



Interpreting Soil2Sap™ Results

Soil2Sap and conventional tissue analysis measure different fractions of the plant.

- Fresh sap reflects the plant's current physiological and nutritional status
- Conventional tissue analysis measures nutrients accumulated in dried leaf tissue, including structural nutrients
- Different plant fractions require different reference values
- Soil2Sap™ reference values are developed from thousands of commercial sap analyses linked to crop performance
- Continuously refined as the database expands



Sap Analysis vs Standard Leaf Analysis



FEATURE	SAP ANALYSIS (Soil2Sap™)	STANDARD LEAF ANALYSIS
Sample Type	Fresh sap extracted from xylem and phloem of fresh leaves	Dried, ground leaf tissue
What is Measured?	Nutrients currently dissolved in the sap and available for transport and metabolism	Total nutrient content of the leaf, including nutrients already incorporated into plant structures
Sample Preparation	Sap is extracted from fresh leaves using linear pressure; no drying or ashing	Leaves are dried, ground, and digested (ashed or acid-digested) before analysis
What Does it Tell Us?	The plant's current physiological and nutritional status	The plant's accumulated nutritional status over time
Response to Change	Responds rapidly to changes in nutrient uptake and plant metabolism	Responds more slowly because structural nutrients are also measured
Reference Values	Developed specifically for fresh sap analysis; not directly comparable with tissue analysis norms	Established reference values for dried leaf tissue

From Measurements to Trends



Monitor nutrient status throughout the season



Identify deficiencies, excesses and imbalances



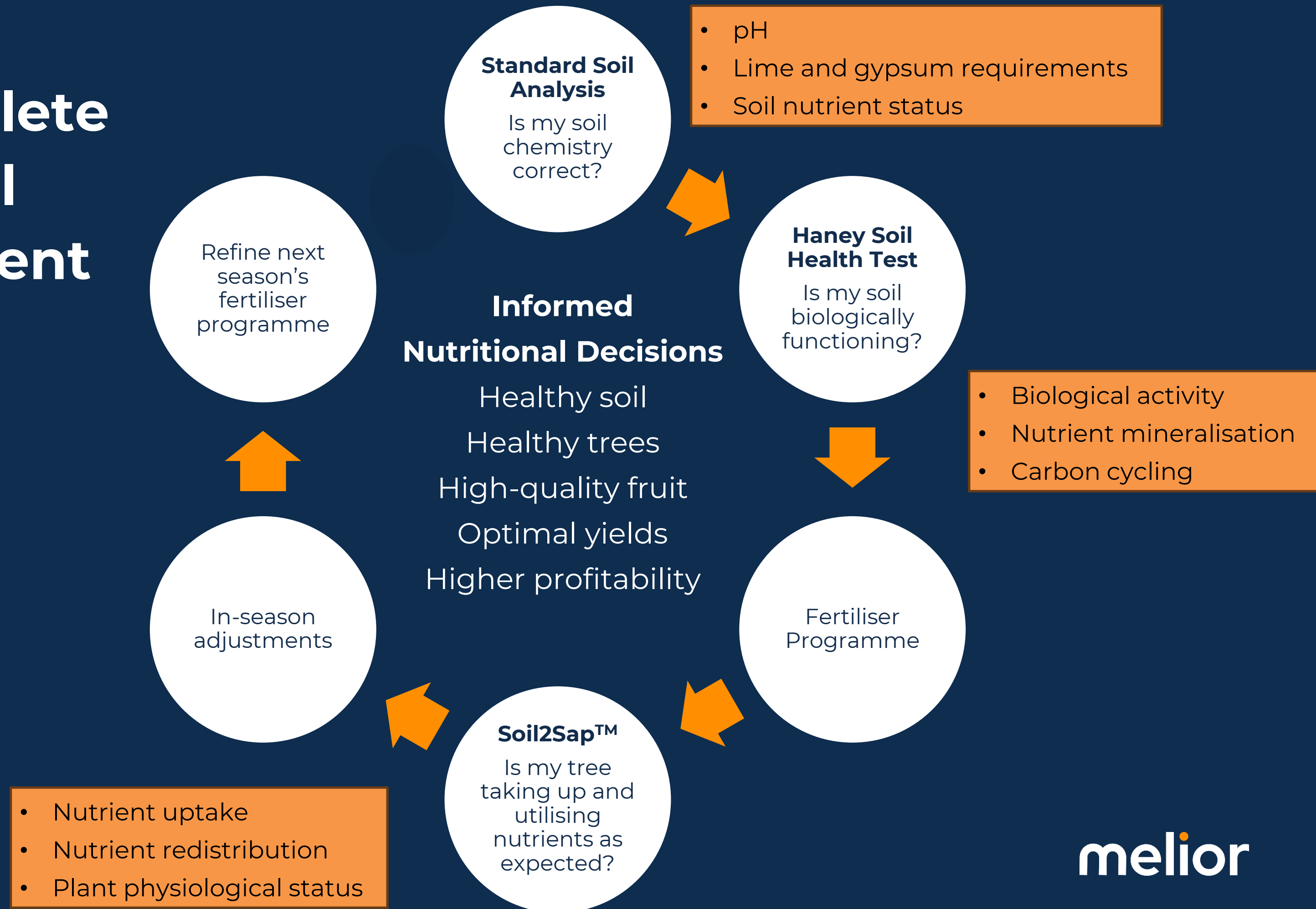
Spot trends across fields



Optimise next season's fertiliser programme



The Complete Nutritional Management Cycle



Economic Benefits



Better information prevents expensive mistakes.

Lower costs

- More efficient fertiliser use
- Fewer unnecessary applications
- Fewer corrective interventions

Higher Returns

- Healthier, more resilient orchards
- Improved fruit quality and pack-outs
- Higher profitability

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**Better decisions.
Better returns.**

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