

# **Fertilizer Recommendations Based on Soil Test Results**

Recommended Methods for Soil,  
Plant and Water Analysis  
(SPACNET METHOD)

# Soil Analysis

What Are We Trying To Do?



# Reasons

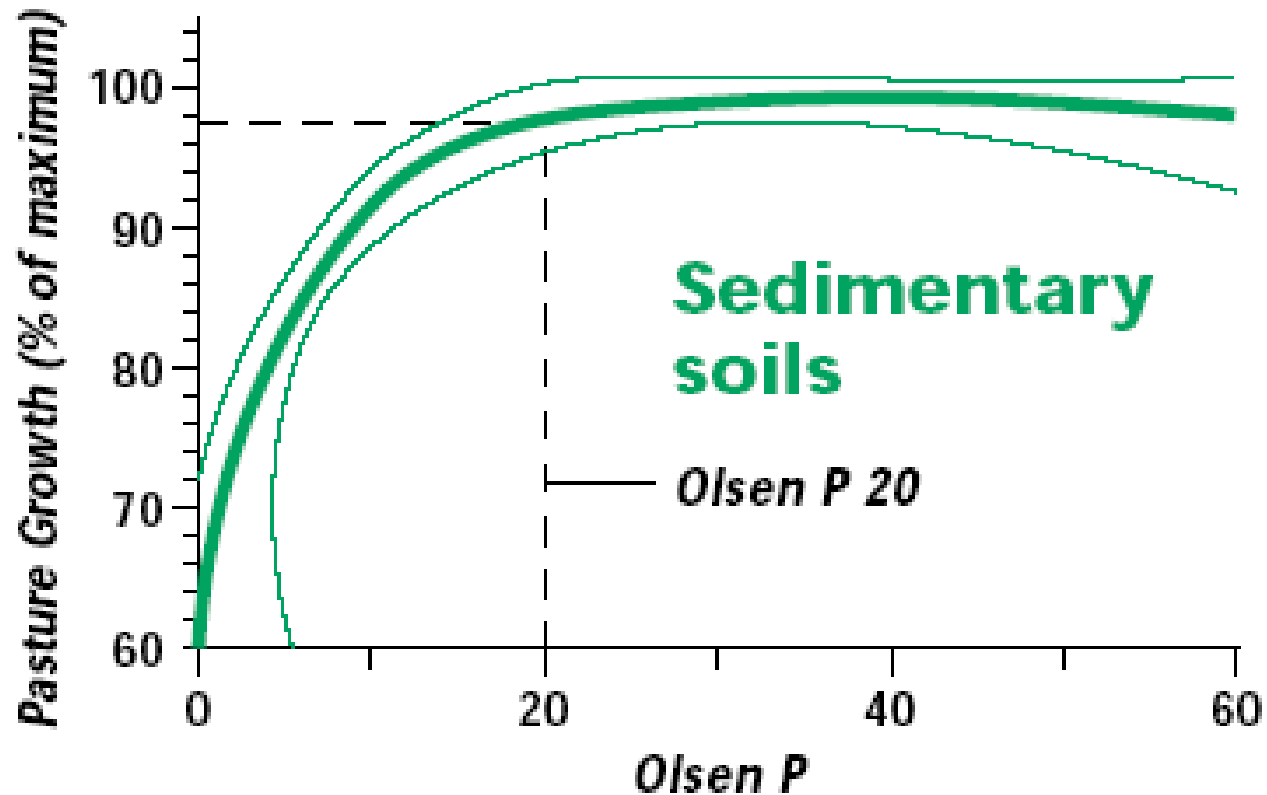
- Assessing fertility by measuring plant available nutrients
- Measuring soil properties to characterise and classify the soil
- Monitoring pollution
- Monitoring Soil Quality – important for organic farming and ‘green’ fertilisers

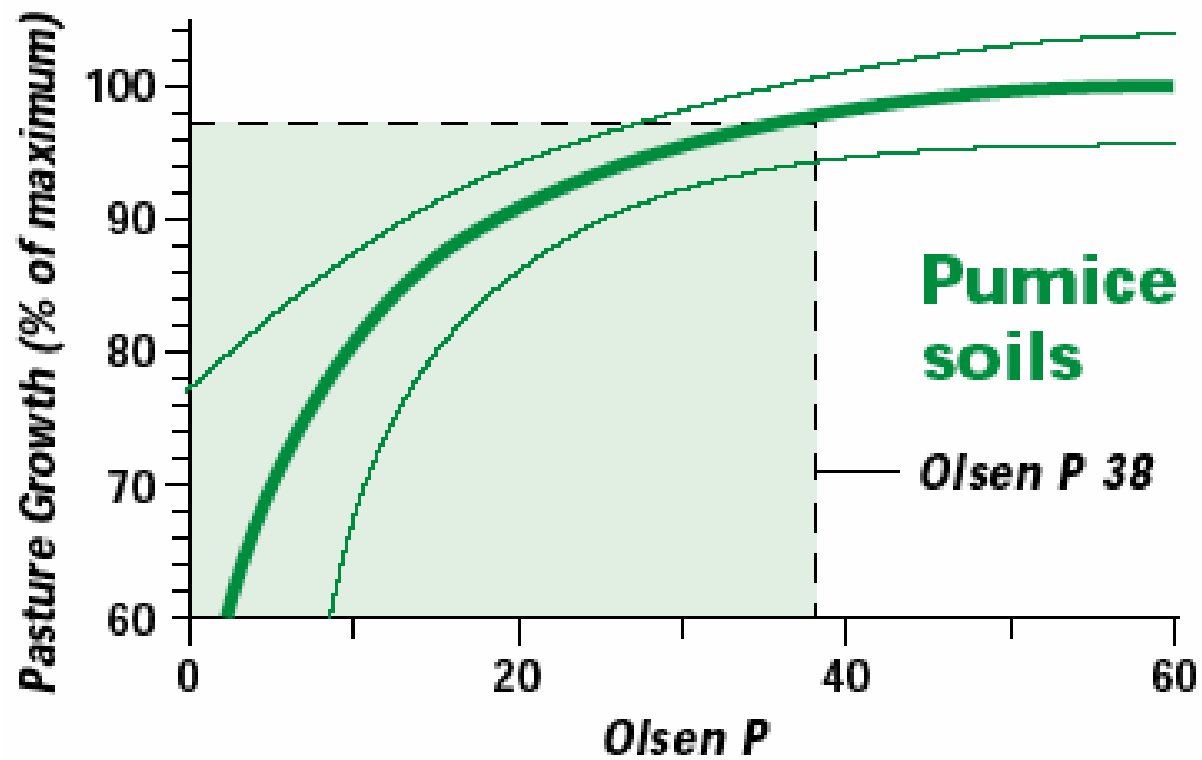


# Methods

Method	ASPAC (R&H) Code	SPACNET Method No.	Comments
pH water	4A1	106	1:5 ratio, 1 hour shake, read after settling
pH CaCl <sub>2</sub>	4B1	106	As above
Total Organic C	6A1	112	Walkley Black
Total N	7A1	116	Kjeldahl followed by steam distillation
Nitrate N	7B1	n/a	Water soluble (1:5), automated colorimetric
Extractable P	9C1	122	Olsen, 1:20, 30 minutes, manual colour
Extractable B	12C1	136	Hot CaCl <sub>2</sub> extr, azomethine colorimetric finish
Extractable Cu, Fe, Mn & Zn	12A1	134	DTPA 1:2, 2 hours, AAS or ICP
Exchangeable Ca, Mg, K & Na	15A1	n/a	1 M Ammonium Chloride, no pretreatment for soluble salts, 1:20, 1 hour shake, AAS
Exchangeable Al	15G1	132	M KCl, 1:10, titration

# Soil calibration during SCEP





# Critical Range

		mg/kg	me/100g			me/100g	mS/cm	%	
	pH	P	K	Ca	Mg	Ex.Acidity	EC	C	N
very high	7.9	> 50	> 1.2	> 20	> 7	> 5	>2	> 20	> 1.0
high	6.7 - 7.8	30 - 50	0.6 - 1.2	(10 - 20)	(3 - 7)	(2 - 5)	0.8 - 2	10 -20	0.6 - 1.0
medium	5.6 - 6.6	20 - 30	0.3 - 0.6	(2 - 10)	(1 - 3)	0.5 - 2	0.4 - 0.8	4 - 10	0.3 - 0.6
low	4.4 - 5.5	(10 - 20)	0.1 - 0.3	(1 - 2)	0.5 - 1	0.1 - 0.5	0.15 - 0.4	2 - 4	0.1 - 0.3
very low	< 4.4	< 10	< 0.1	< 1	< 0.5	< 0.1	<0.15	< 2	< 0.1

# Result Summary

Ministry of Agriculture  
FIJI AGRICULTURAL CHEMISTRY LABORATORY

Koronivia Research Station. P O Box 77, Nausori. Phone: +679-3477044 Fax: +679-3400262/3477546

Savenaca Cuquma  
Agronomy Section  
Koronivia Research Station

Job No.: 1220180

Client  ID	Sample  No.	pH  (water)	EC  (mS/cm)	Total C (%)	Total N (%)	Olsen Available P (mg/kg)	Exchangeable		
							K	Ca	Mg
							(me/100g)		
Viliame Lesubula Sector 3 Lomaivuna - Block 1	22010655	4.7	0.05	2.5	0.34	21	0.23	2.47	1.30
Viliame Lesubula Sector 3 Lomaivuna - Block 2	22010656	4.7	0.05	1.3	0.24	7	0.58	4.36	1.74
Manasa Cama Raratabu Lot 51 Sector 3 Lomaivuna	22010657	4.6	0.05	1.5	0.25	5	0.26	4.18	1.68
Manasa Lomalagi Farmer 60 Lomaivuna	22010658	4.8	0.03	0.8	0.36	3	0.19	3.74	2.27

*Note: Results are reported oven dried basis.*

*To convert me/100g to mg/kg multiply results by the following factors: Ca by 200, Mg by 122, K by 391, Na by 230.*

**Ministry of Agriculture**

Fiji Agricultural Chemistry Laboratory

Koronivia Research Station, PO Box 77, Nausori. Phone: +679-3477044 Fax: +679-3400262/3477546

Client: Savenaca Cuquma  
Agronomy Section, KRS

Date of Analysis: 10/09/2020

**SAMPLE INFORMATION**

Client ID: Manasa Lomalagi Farmer 60 Lomaivuna

Lab Number: 22010658

Depth(cm): 20

**Soil Nutrient Status**

	pH	EC	C	N	P	K	Ca	Mg	
	1:5	mS/cm	%	%	mg / kg	cmol(+)/kg			
	4.8	0.03	0.8	0.4	2.5	0.2	3.7	2.3	
Excessive									
High									
Medium									
Low									
Very Low									
Nutrient status in the soil					5	147	1500	570	
					kg/ha				

Notes: Exchangeable Bases (K, Ca, Na and Mg) Ammonium Acetate Equiv. Extract.

Soil pH and conductivity(mS/cm), 1: 5 soil water ratio

DTPA Extractable trace elements (Fe, Mn, Cu and Zn) Chelating agents are used as extractant to estimate plant available trace elements.

**These nutrients are required to correct the deficiencies. Fertilizer Recommendation with 10% allowance for leaching and soil maintenance**

		<u>Fertilizer Require</u>	<u>Recommended application Rate</u>
Kg per hectare of Phosphorous needed	55	Phosphate	TSP (kg/ha) 134 or SSP (kg/ha) 318 (Basal application)
Kg per hectare of Potassium needed	320.7	Potash	SOP (kg/ha) 705 or MoP (kg/ha) 543
Kg per hectare of Calcium needed	2500	Lime (pH)	CaCO <sub>3</sub> (t/ha) 5
Kg per hectare of Magnesium needed	180		
Kg per hectare Nitrogen needed	110	Urea	Urea( kg/ha) 240 (split application)
		Organic matter	8-10 t/ha Poultry manure or other organic materials (mulch) to be supplemented with chemical fert to improve soil conditions and soil biology.

	Actual	Ideal (%)
Organic Matter	1.5	7 -15

**General Comments**

1. Poor soil, with very low organic matter content
2. Plant avail. Phosphorus is very low
3. Has low level of Potassium
4. Refer recommended fert. Application rates
5. Lime should be applied 4-6 weeks prior to planting.

**Fertilizer composition**

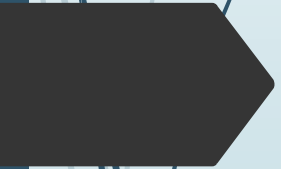
Single super phosphate (SSP) contains 12% S and 19% P and 21% Ca

Sulphate of Potash (SOP) contains 50%K and 18% S

Triple super phosphate (TSP) contains 45% P,

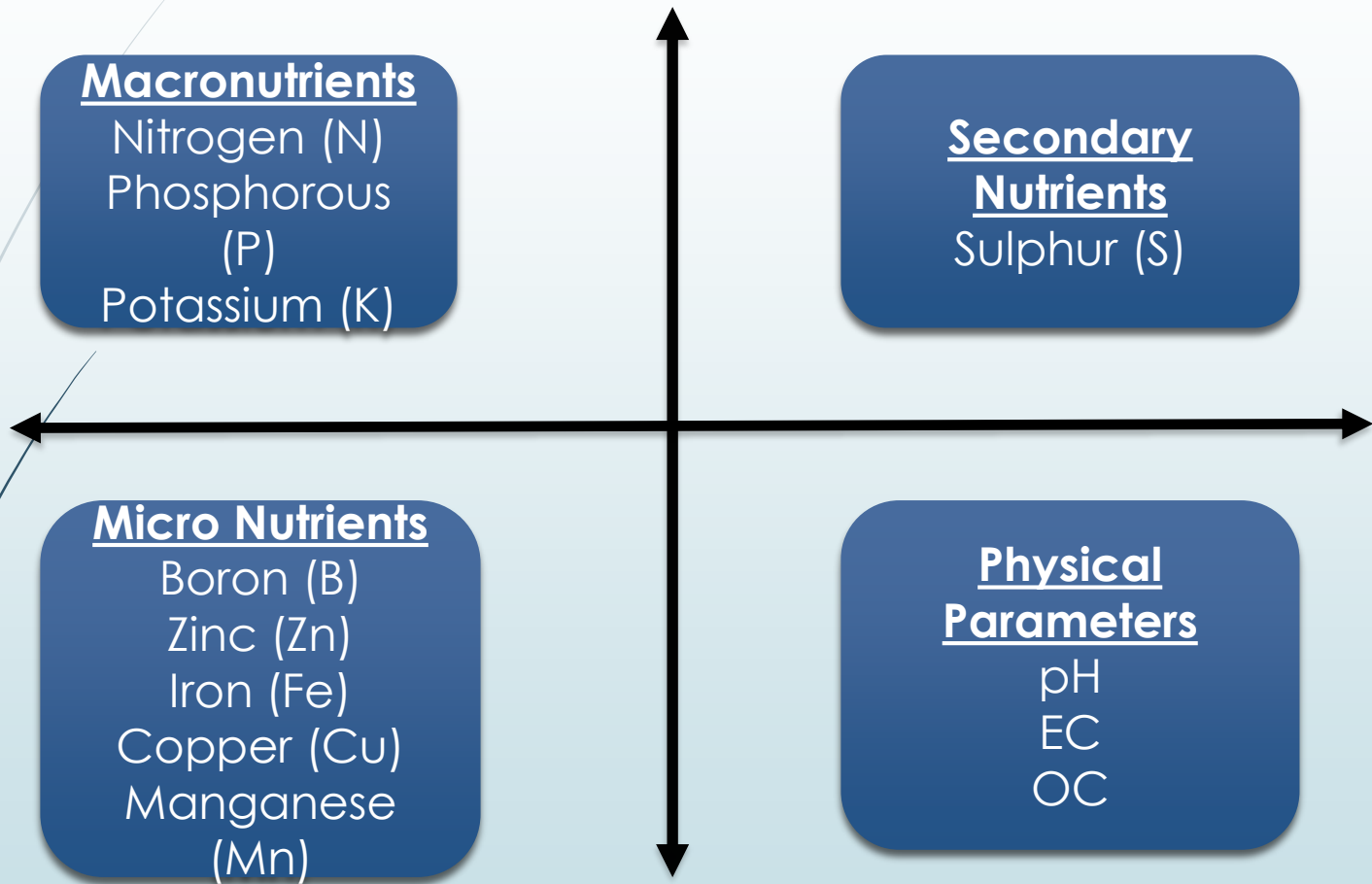
Urea - 46% N

# Soil Health Card – Initiative MoA- Fiji



# What is a Soil Health Card?

- SHC is a printed report that contains the status of the soil with respect to 12 parameters






- Based on this, the SHC indicates fertilizer recommendations and soil amendments if required for the farm.

# Overview of SHC Scheme

- Awareness on soil health and the use for the SHC will be conducted along with the soil testing for respective localities.
- promote soil test based and judicious use of fertilizers to enable farmers to realize optimal yields at lower cost through recommended dosage of fertilizer where required.
- aware growers about the appropriate amount of nutrients for the concerned crop depending on the quality of soil.
- is used to assess the current status of soil health, which overtime is used to determine variations that are introduced through soil management practice.
- Encourages better management of agronomic practices and efficient nutrient management enhancing yield and minimizes soil degradation.
- Conclude with a series of recommendations for action by policymakers and other stakeholders to develop soil management decisions on specific measures appropriate for local adoption using a global context.
- The program is aimed to continue as a routine 3 year cycle, thus engaging youths and extension officer in carrying out the program throughout Fiji.

# Soil Health Card

**SOIL HEALTH CARD**

Soil Health Card Number: \_\_\_\_\_

Name of Farmer: \_\_\_\_\_

Validity from: \_\_\_\_\_ To \_\_\_\_\_

SOIL HEALTH CARD			
Farmer's Details			
Name			
Address			
Village			
District/Province			
Farm Size (ha)			
Phone contact			
Email Contact			
MoA Officers			
Soil Sample Details			
Soil Job Number			
Laboratory ID			
Date of Collection			
Soil Depth (cm)			
GPS Position	Latitude:	Longitude	

Fertilizer Recommendation		
Sl No	Parameter	Recommendation
1	Urea (Kg/ha)	
2	Ammonium Sulphate (Kg/ha)	
3	Triple Superphosphate (Kg/ha)	
4	Sulphate of Potash	
5	NPK (13:13:21)	
6	Copper sulphate	
7	Zinc Sulphate	
8	Ferrous Sulphate	

General Recommendation		
1	Organic Manure (t/ha)	
2	Biofertiliser (L/ha)	
3	Lime / Gypsum (tons/ha)	

SOIL TEST RESULTS					
S No.	Parameter	Test Value	Unit	Rating	
1	pH				
2	EC				
3	Organic Carbon				
4	Available Nitrogen				
5	Available Phosphorous				
6	Available Potassium				
7	Available Sulphur				
8	Available Zinc				
9	Available Boron				
10	Available Iron				
11	Available Manganese				
12	Available Copper				

Fertilizer Recommendations for Reference Yield (with Organic Manure)					
Sl No.	Crop & Yield	Reference Yield	Fertilizer Combination - 1 for N P K		Fertilizer Combination—2 for N P K
1					
2					
3					
4					
5					
6					



2015  
International  
Year of Soils

*healthy soils for a healthy life*

