

# NUTRIENT MANAGEMENT GUIDELINES FOR SUGARCANE IN THE MAREEBA AND DIMBULAH DISTRICTS

Ameliorants		Table 1 – Lime guidelines for acid soils (when pH water < 5.5)		Table 2 – Lime guidelines based on exchangeable soil calcium (Ca)		Table 3 – Magnesium (Mg) guidelines based on exchangeable Mg											
CEC (meq/100g)	Lime application (tonnes/ha)	Soil calcium (meq/100g)	Lime application (tonnes/ha)	Soil Mg (amm-acet) meq/100g	< 0.05	0.06 – 0.10	0.11 – 0.15	0.16 – 0.20	0.21 – 0.25	> 0.25							
< 2.0	1.25	< 0.20	4	Mg rate (kg/ha)	150	125	100	75	50	0							
2.0 – 4.0	2.5	0.2 – 0.40	3.5														
4.1 – 8.0	4	0.41 – 0.60	3														
> 8.0	5	0.61 – 0.80	2.5														
		0.81 – 1.20	2														
		1.21 – 1.60	1.5														
		1.61 – 2.00	1														
		> 2.00	0														
Table 4 – Gypsum guidelines for sodic soils		Table 5 – Silicate guidelines based on reserves and available soil silicon (Si)															
ESP (%)	Gypsum rate (tonnes/ha)	Si (BSES/sulphuric acid)		Si (CaCl)	Suggested application rate												
< 5	0	Si (mg/kg)	< 70	and	< 10	Mud/ash at 100-150 wet t/ha											
5 - 10	2																
10 - 15	4																
> 15	6																
Table 6 – Modifications to ameliorant application rates where mill by-products have been applied																	
Product	Application rate	Reduce the next lime application by:			Magnesium (Mg)												
Mill ash	100 - 150 wet tonnes/ha	2 t/ha			Sufficient Mg for one crop cycle												
Mill mud	100 - 150 wet tonnes/ha	2 t/ha			Sufficient Mg for one crop cycle												
Mud/ash mixture	100 - 150 wet tonnes/ha	2 t/ha			Sufficient Mg for one crop cycle												
Nitrogen (N)																	
Table 7 – Nitrogen (N) fertiliser guidelines																	
District Yield Potential	Crop	Organic C (%) range, N mineralisation index and N application rate (kg/ha)															
		< 0.40	0.41 – 0.80	0.81 – 1.20	1.21 – 1.60	1.61 – 2.00	2.01 – 2.40	> 2.40									
		VL	L	ML	M	MH	H	VH									
150 tc/ha	Plant after bare fallow	150	140	130	120	110	100	90									
	Replant and ratoon	190	180	170	160	150	140	130									
Table 8 – Calculation of Nitrogen (N) rate discount following a legume crop																	
Legume crop		N%	Crop dry mass (t/ha)	N discount if cover crop (kg/ha)	N discount if grain harvested (kg/ha)												
Soybean		3.5	8	360	120												
			6	270	90												
			4	180	60												
			2	90	30												
Peanut		3.0	8	125													
			6	100													
			4	65													
			2	25													
Cowpea		2.8	8	290	100												
			6	220	75												
			4	145	50												
			2	70	25												
Lablab		2.3	8	240	80												
			6	180	60												
			4	120	40												
			2	60	20												
Table 9 – Modifications to nitrogen (N) rate where mill by-products have been applied																	
Product	Application rate	To be subtracted from the appropriate N application rate															
		Year 1	Year 2	Year 3													
Mill ash	100 - 150 wet tonnes/ha	Nil	Nil	Nil													
Mill mud	100 - 150 wet tonnes/ha	80 kg N/ha	40 kg N/ha	20 kg N/ha													
Mud/ash mixture	100 - 150 wet tonnes/ha	50 kg N/ha	20 kg N/ha	10 kg N/ha													

#### Notes for determining appropriate N application rate

1. Determine baseline N rate from Table 7 by using the Organic C (%) value to determine N mineralisation index and N requirement for crop.
2. Calculate N rate discount for sugarcane crops that follow a legume crop, using Table 8.
3. If mill by-products were applied prior to planting, use Table 9 to determine N rate discount for the N contribution from mill mud and mud/ash mixture.

#### Example 1.

The Organic C value is 0.8%, the N mineralisation index is low (L), a crop of soybeans was grown with an estimated 6 t/ha dry mass that was harvested for grain. The calculation for the N requirement for a plant crop using the **replant** rate to establish baseline N:  $180 - 90 = 90$  kg N/ha

#### Example 2.

The Organic C value is 0.8%, the N mineralisation index is low (L) and a mud/ash mixture was applied to the fallow block at 150 wet tonnes/ha.

N requirement for year 1:  $140 - 50 = 90$  kg N/ha

N requirement for year 2:  $180 - 20 = 160$  kg N/ha

N requirement for year 3:  $180 - 10 = 170$  kg N/ha

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## Phosphorus (P)

Table 10 – Phosphorus (P) fertiliser guidelines

PBI	P sorption class	Crop	BSES P (mg/kg) range and P application rate kg/ha								
			< 5	5 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 120	> 120
> 420	Very high	Plant and replant	80	50	40	30	30	30	30	30	0
		Ratoon	40	40	30	25	20	20	20	20	0
281 - 420	High	Plant and replant	80	50	40	30	20	20	0	0	0
		Ratoon	40	40	30	25	20	10	0	0	0
140 - 280	Moderate	Plant and replant	60	40	30	20	20	20	0	0	0
		Ratoon	30	30	20	20	15	5	0	0	0
< 140	Low	Plant and replant	40	30	30	20	20	20	0	0	0
		Ratoon	20	20	15	10	10	0	0	0	0

Table 11 – Modifications to phosphorus (P) application rate where mill by-products have been applied

Product	Application rate	P contribution
Mill ash	100 - 150 wet tonnes/ha	Sufficient P for a plant crop and one ratoon
Mill mud	100 - 150 wet tonnes/ha	Sufficient P for two crop cycles
Mud/ash mixture	100 - 150 wet tonnes/ha	Sufficient P for two crop cycles

## Potassium (K)

Table 12 – Potassium (K) fertiliser guidelines

Nitric K (meq/100g)	Texture	Crop	Exchangeable K (meq/100g)						
			< 0.20	0.20 – 0.25	0.26 – 0.30	0.31 – 0.35	0.36 – 0.40	0.41 – 0.45	> 0.45
< 0.70	Sand	Plant	100	80	50	50	0	0	0
		Replant and ratoon	120	120	100	80	50	0	0
	Loam	Plant	120	100	80	50	0	0	0
		Replant and ratoon	120	120	100	100	80	50	0
> 0.70	Sand	Plant	80	50	0	0	0	0	0
		Replant and ratoon	100	100	80	50	0	0	0
	Loam	Plant	100	80	50	0	0	0	0
		Replant and ratoon	100	100	100	80	50	0	0
	Clay	Plant	100	100	100	80	50	0	0
		Replant and ratoon	100	120	100	100	100	80	0

Table 13 – Modifications to potassium (K) application rate where mill by-products have been applied

Product	Application rate	To be subtracted from the appropriate K application rate		
		Year 1	Year 2	Year 3
Mill ash	100 - 150 wet tonnes/ha	120kg K/ha	120kg K/ha	0
Mill mud	100 - 150 wet tonnes/ha	40 kg K/ha	0	0
Mud/ash mixture	100 - 150 wet tonnes/ha	120kg K/ha	0	0

## Sulphur (S)

Table 14 – Sulphur fertiliser guidelines (kg/ha) for plant and ratoon crops

Sulphate S (mg/kg)	N mineralisation index VL - L	N mineralisation index ML - M		N mineralisation index MH - VH
		25	20	
< 5	25	20	15	
5 – 10	15	10	5	
11 – 15	10	5	0	
> 15	0	0	0	

Table 15 – Modifications to sulphur (S) application rate where mill by-products have been applied

Product	Application rate	To be subtracted from the appropriate S application rate		
		Year 1	Year 2	Year 3
Mill ash	100 - 150 wet tonnes/ha	0	0	0
Mill mud	100 - 150 wet tonnes/ha	10kg S/ha	10kg S/ha	10kg S/ha
Mud/ash mixture	100 - 150 wet tonnes/ha	10kg S/ha	10kg S/ha	0

## Micronutrients

Table 16 – Copper (Cu) fertiliser guidelines

Copper (DTPA)	Application rate
< 0.2 mg Cu/kg	10 kg Cu/ha once per crop cycle

Table 17 – Zinc (Zn) fertiliser guidelines

Zinc (HCl)	Application rate
< 0.6 mg Zn/kg	10 kg Zn/ha once per crop cycle
Zinc (DTPA)	Application rate

< 0.3 mg Zn/kg 10 kg Zn/ha once per crop cycle

These guidelines summarise information contained in the SIX EASY STEPS® district specific Nutrient Management program.

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