

# 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	
ESP (%)	Gypsum rate (tonnes/ha)
< 5	0
5 - 10	2
10 - 15	4
> 15	6

Table 5 – Silicate guidelines based on reserves and available soil silicon (Si)				
	Si (BSES/sulphuric acid)		Si (CaCl)	Suggested application rate
Si (mg/kg)	< 70	<b>and</b>	< 10	Mud/ash at 100-150 wet t/ha

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	N/A	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

- Determine baseline N rate from Table 7 by using the Organic C (%) value to determine N mineralisation index and N requirement for crop.
- Calculate N rate discount for sugarcane crops that follow a legume crop, using Table 8.
- 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

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



## 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
	Clay	Plant	120	120	100	80	50	0	0
		Replant and ratoon	120	120	100	100	100	80	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	80	50	0	0	0
		Replant and ratoon	100	100	100	100	80	50	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		N mineralisation index	
	VL - L	ML - M	MH - VH	
< 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.  
This resource is made available by the SIX EASY STEPS Research and Development team. It was developed through project funding from several sources over an extended period.