

Ameliorants

Table 1 – Lime guidelines for acid soils (when pH water < 5.0)		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
0 – 4.0	1.25	< 0.2	4	Mg rate (kg/ha)	150	125	100	75	50	0
4.0 – 8.0	2.5	0.2 – 0.4	3.5	Table 4 – Silicate guidelines based on reserves and available soil silicon (Si)						
8.0 – 16.0	4	0.4 – 0.6	3	Si (mg/kg)	Si (BSES/sulphuric acid) < 70	and	Si (CaCl) < 10	Suggested application rate		
> 16.0	5	0.6 – 0.8	2.5	Mud/ash at 100-150 wet t/ha						
		0.8 – 1.2	2	Table 6 – Modifications to ameliorant application rates where mill by-products have been applied						
		1.2 – 1.6	1.5	Product	Application rate	Reduce the next lime application by:			Magnesium (Mg)	
		1.6 – 2.0	1.0	Mill ash	150 wet tonnes/ha	2 t/ha			Sufficient Mg for one crop cycle	
		> 2	0	Mill mud	150 wet tonnes/ha	2 t/ha			Sufficient Mg for one crop cycle	
				Mud/ash mixture	150 wet tonnes/ha	2 t/ha			Sufficient Mg for one crop cycle	

Table 5 – Gypsum guidelines for sodic soils	
ESP (%)	Gypsum rate (tonnes/ha)
< 5	0
5 - 10	2
10 - 15	4
> 15	6

Nitrogen (N)

Table 7 – Nitrogen (N) fertiliser guidelines											
District Yield Potential	Crop	All soils except acid peat soils							Acid peat soils		
		Organic C (%), N mineralisation index and N application rate (kg/ha)									
		< 0.4	0.4 – 0.8	0.8 – 1.2	1.2 – 1.6	1.6 – 2.0	2.0 – 2.4	> 2.4	< 3.0	3.0 – 6.0	> 6.0
		VL	L	ML	M	MH	H	VH	L	M	H
140 tc/ha	Plant	160	150	140	130	120	110	100	160	150	140
	Replant and ratoon	180	170	160	150	140	130	120	180	170	160
180 tc/ha	Plant	200	190	180	170	160	150	140	200	190	180
	Replant and ratoon	220	210	200	190	180	170	160	220	210	200
220 tc/ha	Plant	240	230	220	210	200	190	180	240	230	220
	Replant and ratoon	260	250	240	230	220	210	200	260	250	240

Table 8 – Nitrogen (N) rate discounts following a well-nodulated, well-grown soybean crop		
Estimated soybean 'grain' yield (t/ha)	When 'grain' crop is harvested (kg N/ha)	When 'grain' crop is not harvested (kg N/ha)
1	45	70
2	60	115
3	70	155
4	85	200
5	100	240

Table 9 – Modifications to nitrogen (N) application 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	150 wet tonnes/ha	Nil	Nil	Nil
Mill mud	150 wet tonnes/ha	80 kg N/ha	40 kg N/ha	20 kg N/ha
Mud/ash mixture	150 wet tonnes/ha	50 kg N/ha	20 kg N/ha	10 kg N/ha

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	30	0
		Ratoon	40	40	30	25	20	20	20	20	20	0
281 - 420	High	Plant and replant	80	50	40	30	20	20	20	0	0	0
		Ratoon	40	40	30	25	20	10	0	0	0	0
140 - 280	Moderate	Plant and replant	60	40	30	20	20	20	0	0	0	0
		Ratoon	30	30	20	20	15	5	0	0	0	0
< 140	Low	Plant and replant	40	30	30	20	20	20	0	0	0	0
		Ratoon	20	20	15	10	10	0	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	150 wet tonnes/ha	Sufficient P for a plant crop and one ratoon
Mill mud	150 wet tonnes/ha	Sufficient P for two crop cycles
Mud/ash mixture	150 wet tonnes/ha	Sufficient P for two crop cycles

These guidelines are a summary of the tables that are included in the booklet *Soil-specific Management for Sugarcane Production in New South Wales* (John Panitz, SRA Ltd; Bernard Schroeder, SRA Ltd; Peter McGuire, NSW Sugar Milling Co-operative; Bob Aitken, formerly BSES Limited; Rick Beattie, NSW Sugar Milling Co-operative and Andrew Wood, Consultant).

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	80	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	150 wet tonnes/ha	120kg K/ha	120kg K/ha	0
Mill mud	150 wet tonnes/ha	40 kg K/ha	0	0
Mud/ash mixture	150 wet tonnes/ha	120kg K/ha	120kg K/ha	0

Sulphur (S)

Table 14 – Sulphur fertiliser guidelines				
For all soils except acid peat soils		Acid peat soils		
Sulphate S (mg/kg)	S application rate (kg/ha)	S application rate based on N mineralisation categories (kg/ha)		
		L	M	VH
< 5	25	25	20	15
5 – 10	15	15	10	5
11 – 15	10	10	5	0
> 15	0	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	150 wet tonnes/ha	0	0	0
Mill mud	150 wet tonnes/ha	10kg S/ha	10kg S/ha	10kg S/ha
Mud/ash mixture	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

*Notes:

1. Table 12 - Potassium (K) fertiliser guidelines aimed at sustaining soil K reserves. Economic K rates may be slightly lower.

These guidelines are a summary of the tables that are included in the SIX EASY STEPS Nutrient Management workshop manual. SIX EASY STEPS development team: Bernard Schroeder, John Panitz, Barry Salter, Danielle Skocaj, and Gavin Rodman (2018).