FOUR ARROWS ETHANOL PTY LTD : *Nutrient balances*

Booth Associates

Nutrients generated

Manure recovered to spread on rural lands 29,952 t @ 12.5% moisture with following analyses

Manure	2.50%	nitrogen	Reclaimed water	0.015%	nitrogen
	0.80%	phosphorus		0.004%	phosphorus
	2.00%	potassium		0.046%	potassium
	2.00%	salt		0.060%	salt
	12.0%	organic carbon			

Sources - interpreted from the ranges depicted in
1. Feedlot waste management conference, Qld, 1995
2. Feedpad guidelines for the Goulburn Broken CMA, 2002
3. The NSW Feedlot manual, 1997

Nutrient Balances : *maize for silage*

silage		water		manure		nutrient export		other salts export	
65.0	t/ha wet	8.0	ML/ha	12.0	t/ha	0.22%	P	0.5%	other salts
35%	DM	0%	reclaimed	100%	appl'n eff	1.50%	K		
22.8	t/ha DM	0.0	ML/ha	12.0	t/ha net	10.0%	protein		
						17.5%	as N		

	manure	recl'd water	fertiliser (input)	Total sources	OM b'down	soil lockup	seasonal loss kg/ha		silage	Total sinks	Net balance	
Nitrogen	300	0	0	300	25	0	20%	60	398	483	-183	kg/ha
Phosphorus	96	0	0	96	0	40	0	0	50	90	6	
Potassium	240	0	0	240	0	20	0	0	341	361	-121	
Other salts	240	0	0	240	0	30	0	0	114	144	96	

Notes : Both N & K are net exports & hence artificial fertilser will need to be added to prevent soil rundown
P is inherently deficient in these and all Riverina soils. Thus remaining P is used to build up soil reserves
Other salts include Ca, Mg, S, Na, Bo, Cu, Mo, etc..

Nutrient Balances : *maize for grain*

grain		water		manure		nutrient export		other salts export	
12.0	t/ha wet	9.0	ML/ha	12.0	t/ha	0.32%	P	0.5%	other salts
100%	DM	0%	reclaimed	100%	appl'n eff	0.41%	K		
12.0	t/ha DM	0.0	ML/ha	12.0	t/ha net	12.0%	protein		
						17.5%	as N		

	manure	recl'd water	fertiliser (input)	Total sources	OM b'down	soil lockup	seasonal loss kg/ha		silage	Total sinks	Net balance	
Nitrogen	300	0	0	300	50	0	20%	60	252	362	-62	kg/ha
Phosphorus	96	0	0	96	0	40	0	0	38	78	18	
Potassium	240	0	0	240	0	20	0	0	49	69	171	
Other salts	240	0	0	240	0	30	0	0	60	90	150	

Notes : Only N is a net export
P is inherently deficient & extra P will add to soil reserves. K will accumulate until next silage crop
Other salts include Ca, Mg, S, Na, Bo, Cu, Mo, etc..

Nutrient Balances : winter cereals for silage

silage		water		manure		nutrient export		other salts export	
28.0	t/ha wet	4.0	ML/ha	12.0	t/ha	0.30%	P	3.0%	other salts
32%	DM	0%	reclaimed	100%	appl'n eff	0.20%	K		
9.0	t/ha DM	0.0	ML/ha	12.0	t/ha net	14.0%	protein		
						16.0%	as N		

	manure	recl'd water	fertiliser (input)	Total sources	OM b'down	soil lockup	seasonal loss kg/ha		silage	Total sinks	Net balance	
Nitrogen	300	0	0	300	20	0	20%	60	201	281	19	kg/ha
Phosphorus	96	0	0	96	0	40	0	0	27	67	29	
Potassium	240	0	0	240	0	20	0	0	18	38	202	
Other salts	240	0	0	240	0	20	0	0	269	289	-49	

Notes : Only N is a net export
P is inherently deficient & extra P will add to soil reserves. K will accumulate until next silage crop
Other salts include Ca, Mg, S, Na, Bo, Cu, Mo, etc.. The high reported export rate for winter cereals is noted

Sources : From a combination of the following

1. "Successful Silage Manual" NSW DPI
2. "Australian Maize" Dairy RDC & Kondinin Group
3. "Australian Soil Fertiliy Manual" JS Glendinning
4. "Hybrid Corn Agronomy Guide 2005" Pacific Seeds
5. "Use of Effluent by Irrigation" NSW DEC

NB - There is no absolute consistency in the data. Best professional judgement has been made for the site & situation specific circumstanceas