A Preliminary Nutrient Audit of the Australian Rice Industry

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SUMMARY

The nutrient balance sheet,for a rice crop which was grown with 13.3ML water/ha, average inputs of seed and fertiliser, achieved a yield of 9.3 t/ha, then the stubble burned, indicates -

- large negative balances for the elements N, P and K. A ratio of at least 1 year of legume pasture per rice crop is required to accumulate sufficient N to balance removals of N by rice. Larger rates of addition of P are required, either to each rice crop, or to the pastures or other crops in a rice-based rotation, to reduce the impact of rice on soil P. Losses of K are very large if stubbles are burnt, but as yet no K deficiencies have been reported for rice in Australia.
- positive balances for the elements Na, S, Mg and Ca. Irrigation waters make significant contributions of these elements to the rice system.

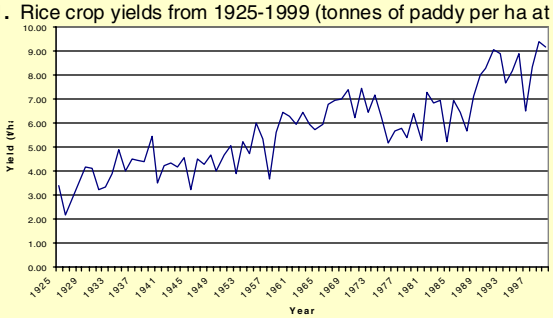
INTRODUCTION

The Australian Rice Industry started in southern NSW in 1925 and has shown continued growth in area sown, crop yield and hence total production throughout its history. Yields per hectare of rice in southern Australia are amongst the highest in the world. Australian farmers produce over one million tonnes of paddy rice each year from about 150 thousand hectares of land. At present, 10 commercial rice varieties are grown. Average yields for the variety Amaroo grown in the northern Murrumbidgee Irrigation Area have exceeded 10 tonnes per hectare in several years, with individual producers attaining yields as high as 15t/ha. These high yields result in significant removal of plant essential elements.

THE BALANCE SHEET

Information provided by Ricegrowers' Co-operative Limited, Murrumbidgee Irrigation and data in References 1 - 4 was used to calculate the nutrient budgets presented in Table 1.

Figure 1. Rice crop yields from 1925-1999 (tonnes of paddy per ha at 14% moisture)



Balance sheet for a crop grown with 13.3ML water to yield 9.3 t/ha

	N	S	P	K	Mg	Ca	Cu	Fe	Mn	Na
INPUTS										
SEED	1.50	0.12	0.37	0.47	0.16	0.04	0.001	0.004	0.014	0.011
FERTILISER	120.00	3.50	4.60	0.00	0.00	3.60	0.000	0.000	0.000	0.000
IRRIGATION WATER	4.60	18.00	0.67	3.86	15.30	24.50	*	*	*	42.4
Total Inputs	126.1	21.6	5.6	4.3	15.5	28.1	0.001	0.004	0.014	42.4
EXPORT										
GRAIN	93.1	7.7	23.1	29.1	9.7	2.2	0.033	0.233	0.891	0.664
STUBBLE BURNT	57.0	5.4	2.4	97.0	8.0	13.5	*	*	*	*
BALANCE STUBBLE INCORPORATED	33.0	13.9	**-17.4**	**-24.7**	5.7	25.9	**-0.033**	**-0.229**	**-0.877**	41.7
STUBBLE BURNT	**-24.0**	8.5	**-19.8**	**-121.7**	**-2.3**	12.4	*	*	*	*

insufficient data

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Stubble burning increases the rate of loss of all nutrients

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