

Does the SIX EASY STEPS provide enough nitrogen for high yielding blocks?

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There has been some concern that the SIX EASY STEPS nutrient management program does not provide sufficient nitrogen for high yielding blocks of cane in the Mackay region. The SIX EASY STEPS recommendations are linked to a district yield potential (DYP) of 130 t/ha, and importantly, are consistent with the optimum nitrogen rate calculated from nitrogen response trials. However, while there are few farms or blocks that average 130 t/ha, there are blocks or zones within blocks that exceed 130 t/ha in some seasons.

During the development of the SIX EASY STEPS program, nutrient recommendations were tested in a series of strip trials across the Mackay region between 2006 and 2009. Eight trials were conducted comparing the SIX EASY STEPS rates to what the grower was using at the time (prior to legislation). While yields in this series of trials were good, averaging 96 t/ha, only one trial exceeded 130 t/ha. This trial (Table 1) was on a fertile block with a history of mill-mud application. The reduced nutrient input using the SIX EASY STEPS system had no impact on cane or sugar yields and resulted in much higher net return due to lower fertiliser cost. Unfortunately this trial could not be continued. Two other trials where yields were around 100 t/ha are included in Table 1. In both cases yields were not affected by the lower rates recommended by the SIX EASY STEPS system, and resulted in increased net revenue for the grower. It should be noted that yields were from large strips and it is likely that there would have been zones within them that yielded higher than the strip average.

Table 1. High yielding strip trials conducted in the Mackay region

Trial	Crop	Year	Treatment	N	P	K	S	TCH	CCS	TSH	Net revenue*	
				(kg/ha)							\$/ha	
1	1R	2006	Six Easy Steps	105	0	0	0	137	9.5	13.0	1641	
			Grower	180	0	113	20	139	9.4	13.1	1367	
2	1R	2006	Six Easy Steps	161	0	94	22	104	15.5	16.0	3294	
			Grower	205	0	98	26	104	15.5	16.1	3248	
	2R	2007	Six Easy Steps	161	0	92	14	91	14.2	12.9	2352	
			Grower	205	0	95	14	92	14.2	13.1	2333	
	3R	2008	Six Easy Steps	160	0	91	15	98	14.8	14.5	2532	
			Grower	205	0	97	18	100	14.9	14.9	2495	
Average			Six Easy Steps	161	0	92	17	98	14.8	14.5	2726	
			Grower	205	0	97	19	99	14.8	14.7	2692	
3	1R	2006	Six Easy Steps	153	0	123	10	108	14.1	15.2	2822	
			Grower	189	25	90	21	107	14.2	15.2	2751	
	2R	2007	Six Easy Steps	153	0	123	10	104	14.6	15.2	2823	
			Grower	189	25	90	21	109	13.9	15.2	2601	
	3R	2008	Six Easy Steps	153	0	123	10	75	15.8	11.8	1847	
			Grower	189	25	90	21	79	15.8	12.5	1802	
	Average			Six Easy Steps	153	0	123	10	96	14.8	14.1	2497
				Grower	189	25	90	21	98	14.6	14.3	2385

* Net revenue = Gross revenue (\$400/t sugar) - harvesting cost - fertiliser cost

More recently, a similar question was addressed through strip trials in the Burdekin region. The project, RP20, was funded by the Queensland Government. A number of trials in this project produced yields that were higher than the Burdekin district yield potential of 180 t/ha. In all cases, there was no evidence that N rates higher than what was recommended by the SIX EASY STEPS system were required. One trial in particular stood out, where 258 t/ha was produced with an application of 160 kg N/ha. While trial 2 appears to have an advantage with the highest N rate, these differences were not statistically significant. Trial 3 also showed that reducing N rates following a good legume crop, as recommended by the SIX EASY STEPS, had no effect on plant crop yields.

Table 2. High yielding strip trials in the Burdekin region (RP20 project)

Trial	Crop	Year	Treatment	N rate (kg/ha)	TCH	CCS	TSH	Net revenue (\$/ha)**
1	P	2016	Six Easy Steps (DYP180)	160	258	12.9	33.3	7474
			Grower	200	258	12.5	32.2	6977
			High	240	262	12.3	32.3	6908
2	P	2016	Six Easy Steps (DYP180)	150	193	15.0	28.8	5790
			Grower	190	193	14.7	28.4	5575
			High	230	202	15.2	30.6	6161
3	P	2015	Six Easy Steps (DYP180)	50*	200	13.4	26.9	5409
			Grower	100*	202	13.1	26.3	5091
			High	150*	203	13.4	27.2	5317
	1R	2016	Six Easy Steps (DYP180)	170	183	13.4	24.4	4597
			Grower	210	179	13.2	23.5	4297
			High	250	184	13.1	24.1	4350
4	P	2014	Six Easy Steps (DYP180)	150	197	13.4	26.2	5951
			Grower	190	201	12.8	25.7	5624
			High	230	198	12.9	25.5	5550
	1R	2015	Six Easy Steps (DYP 150)	150	186	12.1	22.5	5353
			Six Easy Steps (DYP180)	190	192	12.0	23.1	5394
			Grower	230	185	11.9	22.0	5012
	2R	2016	Six Easy Steps (DYP 150)	150	163	13.2	21.6	4013
			Six Easy Steps (DYP180)	190	167	13.0	21.7	3912
			Grower	230	167	12.6	21.0	3571
* Plant cane followed a well grown soybean crop								
** Net revenue = Gross revenue (\$424/t sugar) - harvesting cost (\$7.3/t) - levies (\$0.81/t) - fertiliser cost								
Burdekin region has two district yield potentials DYP150 and DYP180								

Further work is likely to occur in Mackay where nitrogen rates on high yielding blocks are assessed. Farmacist is looking to establish some sites to investigate the issue.