SIDDC
South Island Dairying Development Centre

Partners Networking To Advance South Island Dairying

Lincoln University
Te Whare Wānaka o Aoraki
CHRISTCHURCH•NEW ZEALAND

DairyNZ

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LIC

Plant & Food RESEARCH
RANGAHAU AHUMĀRA KAI

agresearch

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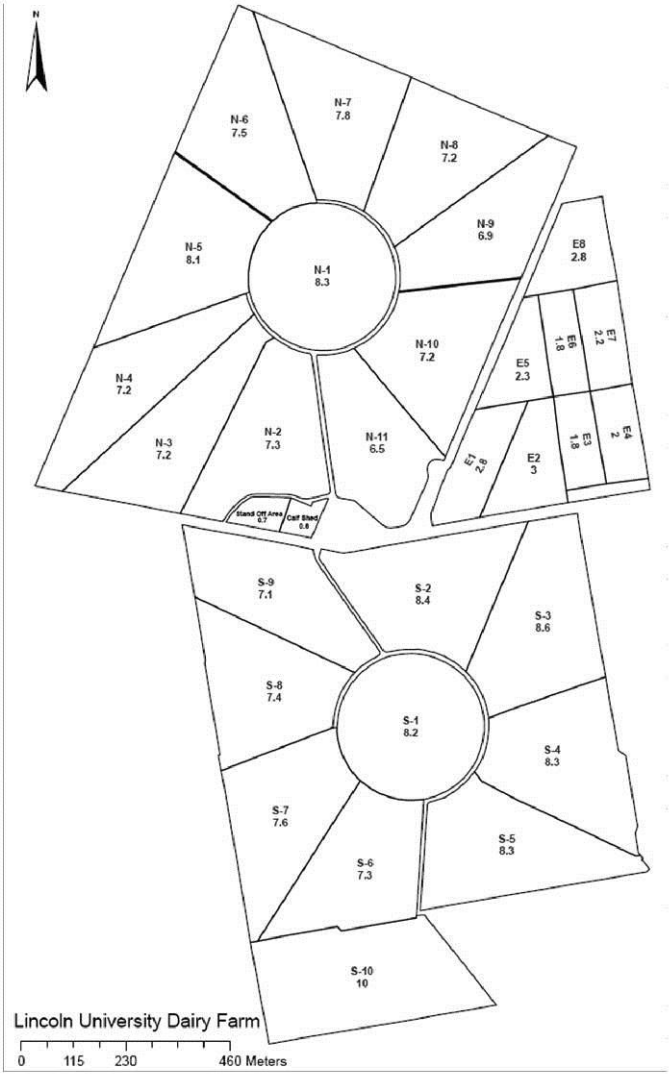
Lincoln University Dairy Farm Focus Day 12 July 2012



Staff

Peter Hancox – Farm Manager
Glen Trayner – Farm Assistant
Adam Vollebregt – Farm Assistant
Isaac Vollebregt – Farm Assistant

LUDF Hazards Notification

1. Children are the responsibility of their parent or guardian
2. Normal hazards associated with a dairy farm
3. Other vehicle traffic on farm roads and races
4. Crossing public roads
5. Underpass may be slippery

Please follow instructions given by event organisers or farm staff

Introduction

The 186 hectare irrigated property, of which 160 hectares is the milking platform, was a former University sheep farm until conversion in 2001. The spray irrigation system includes two centre pivots, small hand shifted lateral sprinklers, and k-lines. The different soil types on the farm represent most of the common soil types in Canterbury.

LUDF Strategic objective 2011-2015:

To maximise sustainable profit embracing the whole farm system through:

- *increasing productivity;*
- *without increasing the farm's total environmental footprint;*
- *while operating within definable and acceptable animal welfare targets; and*
- *remaining relevant to Canterbury (and South Island) dairy farmers by demonstrating practices achievable by leading and progressive farmers.*
- *LUDF is to accept a higher level of risk (than may be acceptable to many farmers) in the initial or transition phase of this project.*

Additional objectives

- To develop and demonstrate world-best practice pasture based dairy farming systems and to transfer them to dairy farms throughout the South Island.
- To consider the farms full environmental footprint, land requirement, resource use and efficiency in system decision making and reporting
- To use the best environmental monitoring and irrigation management systems in the development and implementation of practices, that achieve sustainable growth in profit from productivity and protection of the wider environment.
- To ensure optimal use of all nutrients on farm, including effluent, fertiliser, nutrients imported from supplements and atmospheric nitrogen; through storage where necessary, distribution according to plant needs and retention in the root zone.
- To continue the environmental monitoring programme and demonstrate technologies and farming practices that will ensure the average annual concentration of nitrate-N in drainage water from below the plant root zone remains below the critical value [16 mg N/L] specified in ECan's proposed regional rule in order for LUDF to remain a 'permitted activity' [Rule WQL20].
- To store and apply effluent such that there is no significant microbial contamination of the shallow aquifers.
- To manage pastures and grazing so per hectare energy production is optimised and milkers consume as much metabolisable energy [ME] as practicable.
- To optimize the use of the farm automation systems and demonstrate / document improved efficiencies and subsequent effect on the business.
- To achieve industry targets for mating performance within a 10 week mating period, including a 6 week in-calf rate of 79% and 10 week in calf rate greater than 89% i.e. empty rate of less than 11%.
- To continue to document and measure LUDF's influence on changes to defined management practices on other dairy farms.
- To ensure specific training is adequate and appropriate to enable staff members to contribute effectively in meeting the objectives of the farm.
- To operate an efficient and well organised business unit.
- To generate profit through tight cost control with appropriate re-investment and maintenance of the resources.
- To create and maintain an effective team environment at policy, management and operational levels.
- To actively seek labour productivity gains through adoption of technologies and practices that reduces labour requirements or makes the work environment more satisfying.
- To assist Lincoln University to attract top quality domestic and international students into the New Zealand dairy industry.

Ongoing research

- The effect of fertilisers & other farm inputs on groundwater. 10 groundwater monitoring wells sunk to monitor and manage the effect of fertiliser, grazing, irrigation and effluent inputs over a variety of contrasting soil types.
- Effects of eco-n on nitrate leaching and pasture production.
- Pasture growth rates, pests and weeds monitoring.
- The role of nutrition in lameness in Canterbury.
- Resource Inventory and Greenhouse Gas Footprint

Climate

Men Annual Maximum Temperature	32 °C
Mean Annual Minimum Temperature	4 °C
Average Days of Screen Frost	36 Days per annum
Mean Average Bright Sunshine	2040 Hours per annum
Average Annual Rainfall	666 mm

Farm area

Milking Platform	160 ha
Runoff [East Block]	14 ha

Soil types

	% Milking Platform
Free-draining shallow stony soils (Eyre soils)	5
Deep sandy soils (Paparua and Templeton soils)	45
Imperfectly drained soils (Wakanui soils)	30
Heavy, poorly-drained soils (Temuka soils)	20

Soil test results

Date	pH	P	K	S	Ca	Mg	Na
Dec – 01	5.8	30	11	34	8	23	12
Jul – 02	5.8	31	14	35	9	22	12
Oct – 02	5.9	35	8	29	8	21	12
Jun – 03	6.1	37	12	7	9	23	9
Jun – 04	6.4	37	13	11	9	22	10
Jun – 05	6.1	35	13	10	9	22	8
Jun – 06	6.3	33	15	9	10	27	11
Jun – 07	6.3	39	16	17	10	29	13
Jun – 08	6.1	36	12.4	9	10	29	12
Jun – 09	6.1	32	11	11	9	30	9
Jun - 10	6.0	32	10	6	10	32	10
Jun - 11	6.1	39	13	12	11	33	11
Target Soil Test	5.8 – 6.2	30 – 40	5 – 8	10 – 12	4 – 5	20+	5 – 50

Soil Reserve K = 4.5 (Target = 0.8 – 1.2)

Fertiliser history

Date	Dressing	N	P	K	S	Mg	Ca
Season 2001/02		200	168	-	130	-	94
Season 2002/03		200	45	-	2	-	90
Season 2003/04		200	45	-	64	-	46
Season 2004/05		200	46	-	47	-	57
Season 2005/06	Non-Effluent	200	48	-	76	-	107
Season 2005/06	Effluent	0	30	-	53	-	67
Season 2006/07	Non-Effluent	200	49	-	89	-	110
Season 2006/07	Effluent	0	20	-	52	-	45
Season 2007/08	Non-effluent	200	44	-	73	-	96
Season 2007/08	North Effluent	12	22	-	37	-	48
Season 2008/09	Non-Effluent	245	53	-	88	-	115
Season 2008/09	North Effluent	0	22	-	37	-	48
Season 2009/10	Non-Effluent	225	45	-	47	-	20
Season 2009/10	Effluent	-	5	-	47	-	20
Season 2010/11	Non-Effluent	325	50	-	95	-	111
Season 2010/11	Effluent	-	20	-	57	-	45

Pasture

- The milking platform was sown at conversion [March 2001] in a mix of 50/50 Bronsyn/Impact ryegrasses with Aran & Sustain white clovers, and 1kg/ha of Timothy.
- Individual paddocks are monitored weekly, & 12 paddocks [57% of area] have been renovated to maintain pasture performance. Pasture mixes on farm now include: 2 paddocks of Arrow plus Alto perennial ryegrasses, 5 paddocks of Bealey, 2 paddocks of Alto perennial ryegrass and 1 paddock Trojan - all with Kotare/Sustain white clovers.
- Annual Pasture consumption for 04/05 season calculated at 15.9t DM/ha,05/06 -16.1t DM/ha, and 06/07 - 16.4t DM/ha,
- Pasture and Crop Eaten (calculated via DairyBase) - 07/08 – 17.9 tDM/ha, 08/09 – 17.2 tDM/ha, 09/10 – 16.2 tDM/ha.

Irrigation and effluent system

Centre-pivots	127 ha
Long Laterals	24 ha
K-Lines	10 ha
Hard Hose Gun	14 ha
Total irrigated	175 ha
Irrigation System Capacity	5.5 mm/day
Length of basic pivot	402
Well depth	90m

Statistics

- A full rotation completed in 20.8 hours for 5.5 mm [at 100% of maximum speed].
- Average Annual Rainfall = 666 mm. Average irrigation input applies an additional 450 mm. Average Evapotranspiration for Lincoln is 870 mm/year.

Effluent

- Sump capable of holding 33,000 litres and a 300,000 litre enviro saucer.
- 100 mm PVC pipe to base of North Block centre pivot, distribution through pot spray applicators.
- System being developed to also apply effluent on to the South Block and outside the pivot.

Mating programme - Spring 2011

950 straws DNA proven Kiwicross [including heifers] plus additional straws short gestation Jersey to AI mate for 6 weeks. Expect to rear 190 heifers [5 straws per heifer] then follow with Jersey bulls. 10 weeks total mating [herd].

Herd details – July 2011

Breeding Worth (rel%) / Production Worth (rel%)	114 / 47% 141 / 58%
Recorded Ancestry	98%
Average weight / cow (Dec) – Herd monitored walk over weighing	471 kg [Dec 2011]
Calving start date	Heifers – 20 July, Herd 2 August 2012
Mid calving date	18 August 2012 (16 days)
Mating start date	25 October 2011
Empty rate (nil induction policy) after 10 weeks mating	14% 2011/12 [6 weeks in-calf rate 73%]

	2002/03	**Average 03/04 - 06/07**	2007/08	2008/09	2009/10	2010/11	2011/12
Total kg/MS supplied	228,420	**277,204**	278,560	261,423	273,605	264,460	297,740
Average kg/MS/cow	381	**425**	409	384	415	395	471
Average kg/MS/ha	1414	**1720**	1744	1634	1710	1653	1861
Farm Working Expenses / kgMS	$2.98	**$2.68**	$3.37	$3.88	$3.38	$3.86	$3.92
Dairy Operating Profit/ha	$1,164	**$2,534**	$8,284	$2,004	$4,696	$7,323	$4,619
Payout [excl. levy] $/kg [Milk price + div.]	$4.10	**$4.33**	$7.87	$5.25	$6.37	$7.90	$6.35
Return on Assets	4.4%	**6.18%**	14.6%	4.8%	7%	7%	6%

Stock numbers	2002/03	**Average 03/04 - 06/07**	2007/08	2008/09	2009/10	2010/11	2011/12
1 July cow numbers	631	**675**	704	704	685	694	665
Max. cows milked	604	**654**	680	683	660	669	632
Days in milk			263	254	266	271	272
Stocking rate Cow equiv. / ha	3.75	**4.05**	4.2	4.3	4.13	4.18	3.95
Stocking rate Kg liveweight / ha	1,838	**1964**	2,058	2,107	1,941	1914	1860
Cows wintered off No. Cows / Weeks	500 / 8	**515 / 7.8**	546 / 9	547 / 7	570 / 9	652 / 8.4	
No. Yearlings grazed On / Off	0/118	**0/157**	0/171	0/200	0/160	0/166	0/141
No. Calves grazed On / Off	0/141	**0/163**	0/200	0/170	0/160	0/194	0/190
Est. Pasture Eaten (Dairybase) (tDM/ha)			17.9	17.2	16.2	16.9	17.3
Purch. Suppl - fed [kgDM/cow]	550	**317**	415	342	259	463	359
Made on dairy/platform [kgDM/cow]	0	**194**	95	64	144	160	154
Applied N / 160 eff. ha			164	200	185	260	350

Staffing & Management

Roster System – 8 days on 2 off 8 days on 3 off

Milking Times – Morning: cups on 5.00 am
– Afternoon: cups on 2.30 pm

Contents

LUDF Production and Financial Comparison

Production Results

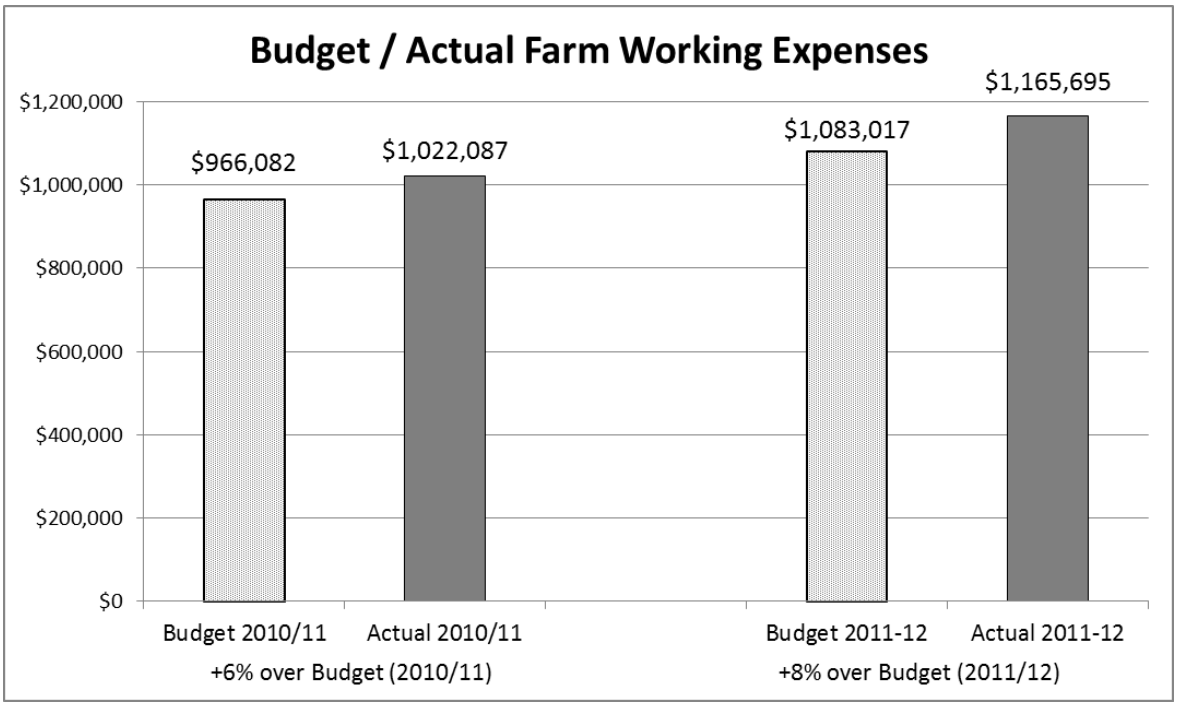
Lincoln University Dairy Farm	Actual 2010/11	Budget 2012	Actual to 31 May 2012
Land area	160	160	160
Peak Cow Numbers	667	640	632
Total Milk Production	264,460	281,600	297,740
Milk Production per ha	1653	1760	1861
Milk Production per cow	396	440	471

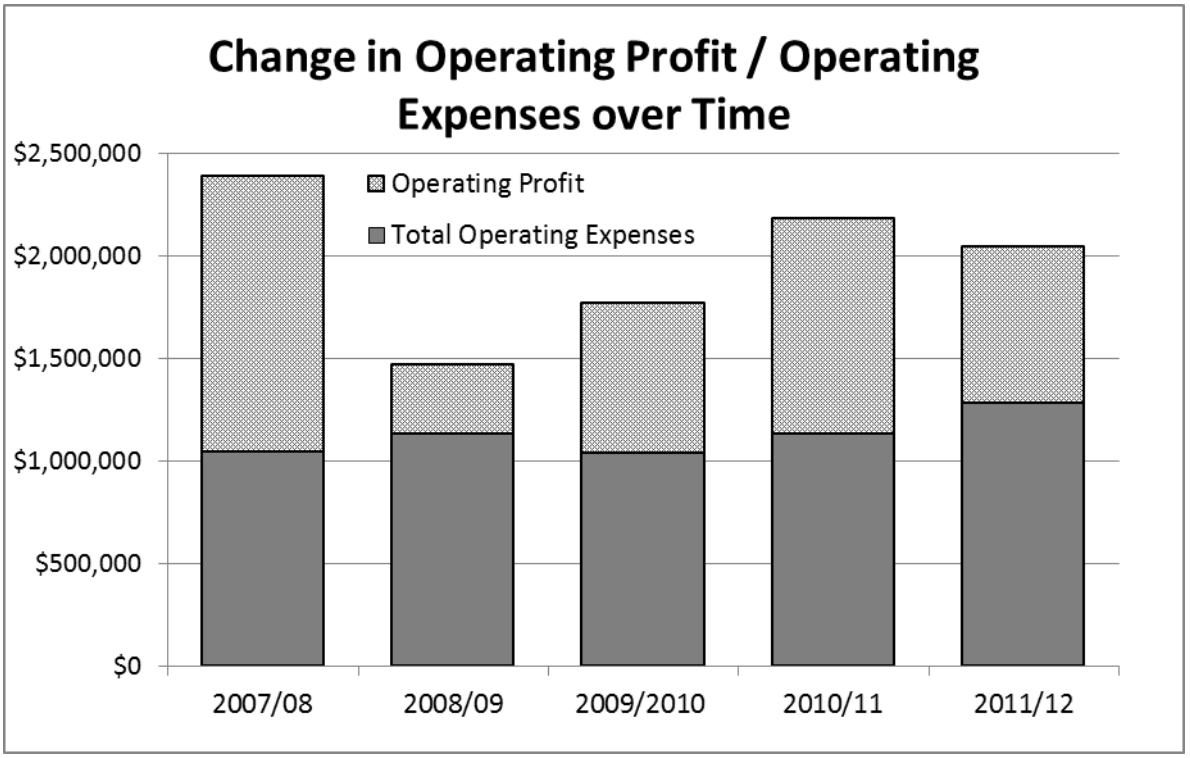
Stock Numbers, Supplements, Grazing Off

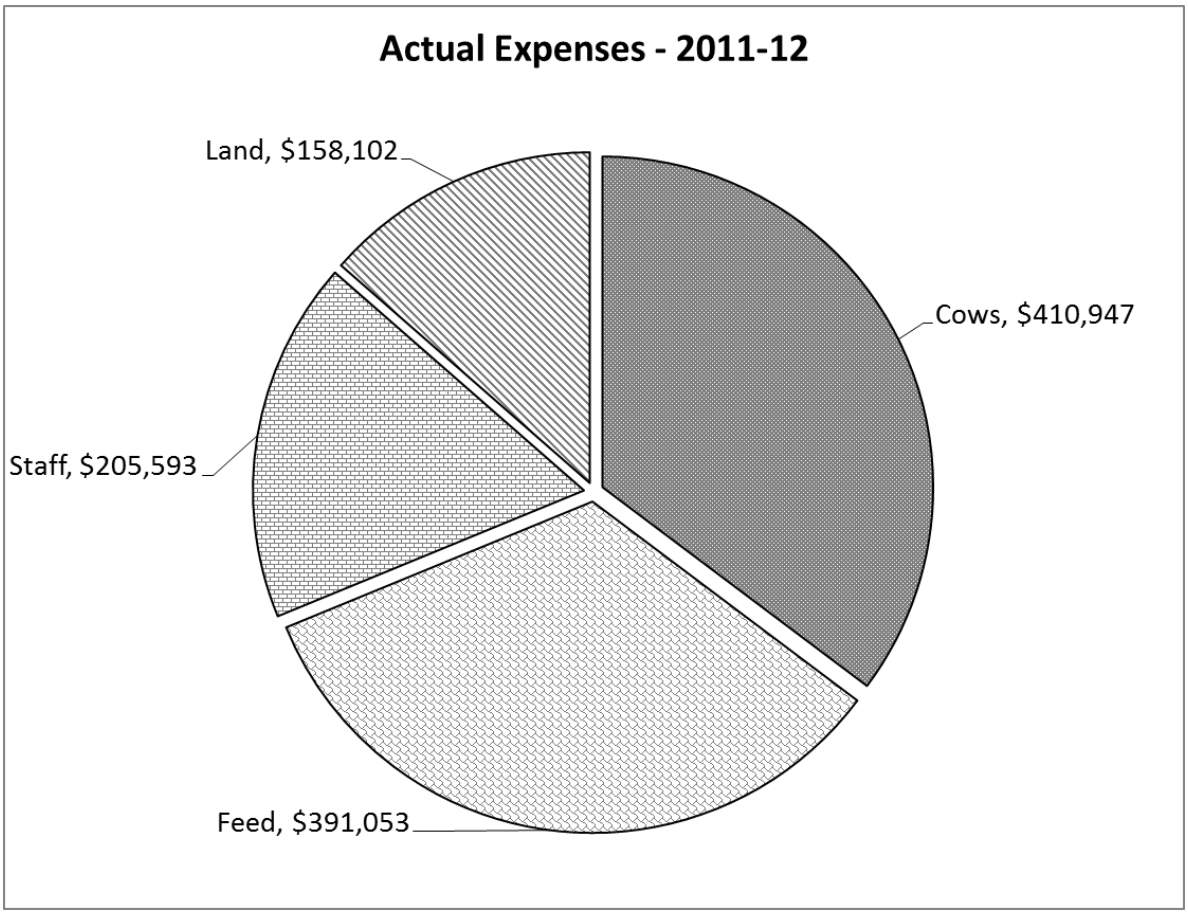
Stock numbers	2007/08	2008/09	2009/10	2010/11	2011/12
1 July cow numbers	704	704	685	694	665
Max. cows milked	680	683	660	669	632
Days in milk	263	254	266	271	272
Stocking rate Cow equiv. / ha	4.2	4.3	4.13	4.18	3.95
Stocking rate Kg liveweight / ha (Dec LWT)	2,058	2,107	1,941	1889	1860
Est. Pasture Eaten (Dairybase) (tDM/ha)	17.9	17.2	16.2	16.9	17.3
Purch. Suppl - fed [kgDM/cow]	415	342	259	463	359
Tonnes DM purchased supplement [tDM]	282	234	171	310	227
Applied N / 160 eff. ha	164	200	185	260	350
No Winter Cow Grazing Days – off farm	34398	26803	35910	38338	41713
Suppl Made on dairy/platform [kgDM/ha]	404	273	594	669	608
Suppl Made on dairy/platform [kgDM/cow]	95	64	144	160	154
No. Yearlings grazed Off	171	200	160	166	141
No. Calves grazed Off	200	170	160	194	190
Total numbers livestock wintered	1075	1074	1005	1054	996

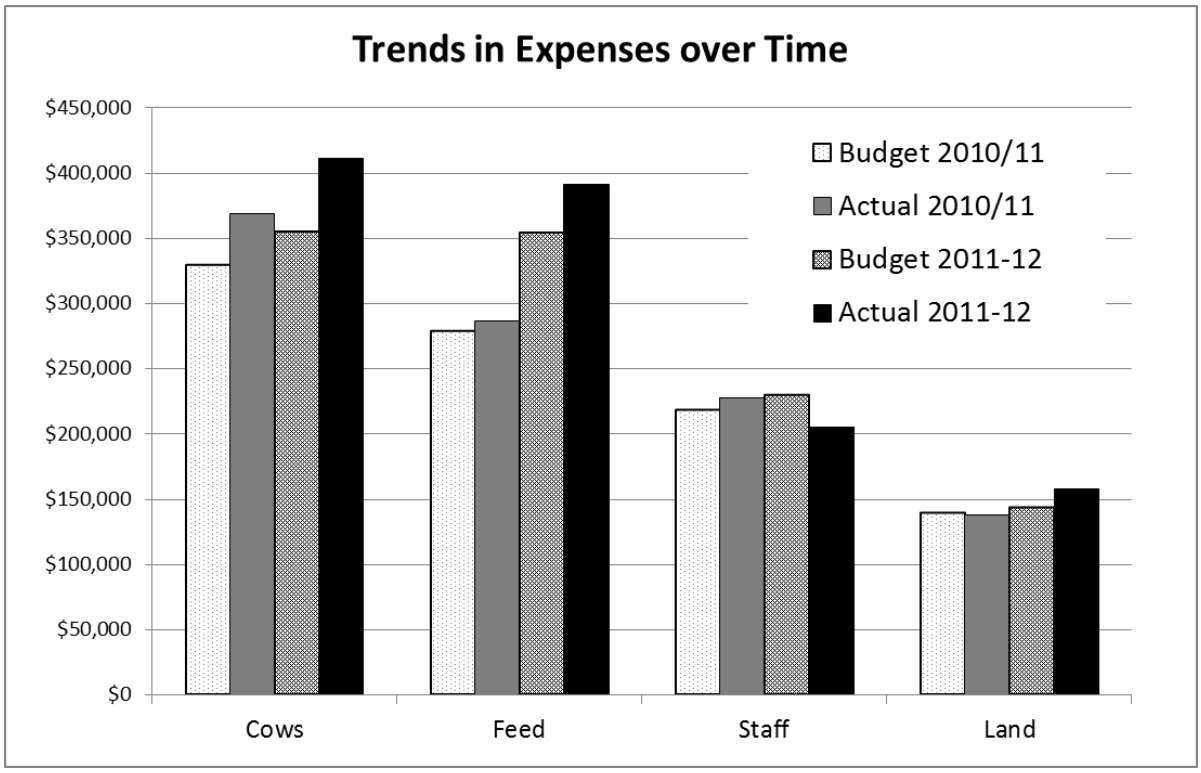
Financial Results -2010/11 vs 2011/12 Budget and 2011/12 Actual

Income		**Actual 2010/11**	**Budget 2011/12**	**Actual 2011/12**
Milk-price		$1,983,450	$1,914,880	$1,801,327
Dividend		$79,338	$84,480	$89,322
Net Milk Price		$7.80	$7.10	$6.35
Livestock sales		$161,177	$134,248	$152,415
Less Stock Purchases		$21,600	$21,600	$22,400
Gross Farm Revenue		**$2,202,373**	**$2,112,015**	**$2,020,670**
Expenses				
Cow Costs	Animal Health	$59,577	$55,331	$59,775
	Breeding Expenses	$49,310	$43,905	$53,895
	Replacement grazing & meal	$133,743	$133,343	$173,982
	Winter grazing - Herd incl. Freight	$126,678	$122,687	$123,295
Feed	Grass silage purchase	$57,358	$73,950	$69,720
	Silage making & delivery	$12,014	$26,880	$11,902
	Eco-n & GA	$31,000	$51,200	$74,620
	Nitrogen	$68,158	$76,344	$112,916
	Fertiliser & Lime	$32,262	$38,197	$43,405
	Irrigation - Electricity / R&M	$63,806	$61,996	$49,041
	Re-grassing	$22,490	$26,130	$29,449
Employment		$228,011	$229,493	$205,593
Land	Electricity - Farm	$19,802	$19,500	$23,397
	Administration	$20,170	$24,048	$19,315
	Freight & Cartage	$23	$796	$0
	Rates & Insurance	$16,262	$19,020	$19,020
	Repairs & Maintenance	$52,109	$51,493	$61,936
	Shed Expenses excl. Power	$5,535	$8,204	$11,091
	Vehicle Expenses	$22,140	$20,000	$22,371
	Weed & Pest	$1,639	$500	$972
Cash Farm Working Expenses		**$1,022,087**	**$1,083,017**	**$1,165,695**
	FWE $/kgMS	**$3.86**	**$3.85**	**$3.92**
	Depreciation est	$105,000	$116,000	$116,000
Total Operating Expenses		**$1,127,087**	**$1,199,017**	**$1,281,695**
Profit / Cash Operating Surplus				
	Dairy Operating Profit	$1,075,286	$912,998	$738,975
	DOP/ha	$6,721	$5,706	$4,619
	Cash Operating Surplus	$1,180,286	$1,028,998	$854,975
	Cash Operating Surplus /ha	**$7,377**	**$6,431**	**$5,344**


Budget / Actual Farm Working Expenses
$1,200,000
$1,000,000
$800,000
$600,000
$400,000
$200,000
$0
$966,082
$1,022,087
$1,083,017
$1,165,695
Budget 2010/11
Actual 2010/11
Budget 2011-12
Actual 2011-12
+6% over Budget (2010/11)
+8% over Budget (2011/12)


Change in Operating Profit / Operating Expenses over Time
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$0
Operating Profit
Total Operating Expenses
2007/08
2008/09
2009/2010
2010/11
2011/12


Actual Expenses - 2011-12
Land, $158,102
Cows, $410,947
Staff, $205,593
Feed, $391,053


Trends in Expenses over Time
$450,000
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$0
Budget 2010/11
Actual 2010/11
Budget 2011-12
Actual 2011-12
Cows
Feed
Staff
Land

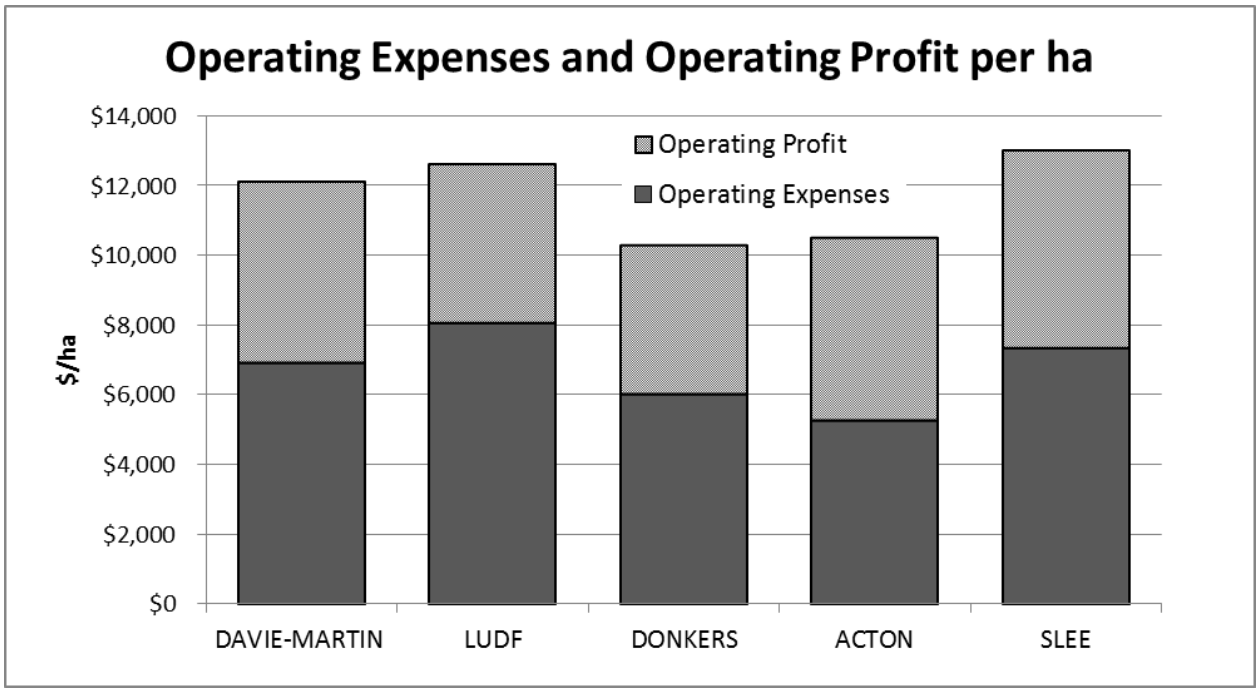
Five farm profitability comparison for season 2011 -2012

This year we continue the annual farm profitability comparison. There are 2 new farms joining the group in place of Jefferson's and Lister's who are not in a position to participate this year. The new farms are owner operators Mark and Devon Slee from Hinds [Slee] and David and Lee Luff from Rakaia - 50:50 sharemilkers for Dairy Holdings Ltd [Acton]. We thank all participants, past and present, for their generous sharing and contribution to South island dairying.

The profitability analyses sets out to compare farms down to operating profit level. We have a good range of farm systems and pasture growth potential across this group of very well managed farms. Whilst it is interesting to see who is most profitable, the greatest value is in understanding how profitability is attained and taking that knowledge to improve our own business performance.

Brief outline of the participating farms

SEASON 2011-2012	DAVIE -MARTIN	LUDF	DONKERS	ACTON	SLEE
Effective ha (Milking Platform)	141	159	306	193	624
Run Off	-	-	-	-	175
Cows	520	632	1060	725	2507
Total Kg MS	258,301	297,740	458,417	309,782	1,213,777
Kg MS/Cow	497	471	432	427	484
kg MS/ha	1,832	1,872	1,498	1,605	1,945
Cows/ha	3.69	3.97	3.46	3.76	4.02
Imported feed (Milking Supplement) tDM/ha	1.86	1.54	2.2	0.31	3.1
N use kg/ha	350	350	261	323	195



Comparison to last season [2010- 2011]

This comparison covers only those farms for which we have data for both years.

SEASON 2010/2011	DAVIE- MARTIN	LUDF	DONKERS	SLEE
Effective ha (MP)	141	159	306	601
Run Off	-	-	-	199
Cows	500	667	1069	2320
Kg MS	229808	262113	441775	1011959
KG MS/Cow	460	393	413	436
kg MS/ha	1630	1647	1444	1684
Cows/ha	3.55	4.19	3.49	3.86
Imported feed t/ha	2.1	1.3	2.4	1.6
N use kg/ha	320	261	270	204
Exps $/kg MS	4.43	4.30	3.93	3.66
Profit/ha	5805	6558	5942	6714

Season to Season Changes

Changes season to season	DAVIE-MARTIN	LUDF	DONKERS	SLEE
Effective area	0	0	0	+23
run off	0	0	0	-24
Cows	+20	-35	-9	+187
kgMS/ha	+202	+225	+54	+261
kg MS/cow	+37	+78	+19	+48
Stocking Rate	+0.14	-0.22	-0.03	+0.16
Imported feed t/ha	-0.2	+0.2	-0.2	+1.5
N use kg/ha	+30.0	+89.0	-9.0	-9.0
Operating exps $/kg MS	-0.66	-0.06	+0.08	+0.11
Operating Profit change $/ha	-586	-1708	-1641	-1018

Per Hectare Income for 2011 – 2012

INCOME (Season 2011- 2012)	DAVIE-MARTIN	LUDF	DONKERS	ACTON	SLEE
Milk price [$6.05] - levy	11017	11261	9010	9653	11698
Dividend [$0.30 est]	550	562	449	482	584
Stock Sales	649	959	512	587	1020
Stock Purchased	79	141	0	464	324
Stock Adjustment	-19	0	266	269	0
Net Stock Income	551	818	778	392	695
Other Income	5	0	67	0	55
Total Income	12123	12640	10303	10527	13031

2011-2012 Profitability Analysis per effective milking ha

2011-12 Analysis $/ha effective milking area	DAVIE-MARTIN	LUDF	DONKERS	ACTON	SLEE
Total income/ha	12123	12640	10303	10527	13031
Cow Costs					
Animal Health	382	376	200	191	466
Breeding/testing	58	339	156	138	137
Dry cows / Young stock grazing	1376	1710	1294	1011	373
Feed					
Net Feed (made +purchased, incl calf feed)	726	672	728	255	1459
Run Off Adjustment /lease	0	0	0	0	365
Fertilizers (inc N)	942	1452	703	835	780
Irrigation	42	194	459	209	174
Regrassing	111	185	37	7	62
Wages	1440	1293	1065	1256	1404
Land					
Electricity	296	122	57	111	94
Administration	225	121	178	226	84
Freight General	67	33	1	32	0
Rates and Insurance	111	120	117	98	222
R&M	318	495	286	412	519
Shed Expenses	43	70	61	79	121
Vehicle Expenses	268	141	115	150	109
Weed and pest/spraying	58	6	28	22	93
Depreciation	439	730	516	246	875
Operating Expenses	**6903**	**8059**	**6002**	**5278**	**7336**
F.W.E	**6160**	**7330**	**5499**	**4670**	**6361**
Operating Profit	**5219**	**4581**	**4301**	**5249**	**5696**

Summary by Cost Category

Cow Costs	1816	2425	1651	1341	976
Feed	1822	2503	1927	1306	2840
Staff	1440	1293	1065	1256	1404
Land	1825	1838	1359	1375	2117

2011-2012 Profitability Analysis expressed per kg Milksolids

2011-12 Analysis $/kg MS	DAVIE-MARTIN	LUDF	DONKERS	ACTON	SLEE
Total income/kgMS	6.62	6.75	6.88	6.56	6.70
Cow Costs					
Animal Health	0.21	0.20	0.13	0.12	0.24
Breeding/testing	0.03	0.18	0.10	0.09	0.07
Dry cows / Young stock grazing	0.75	0.91	0.86	0.63	0.19
Feed					
Net Feed (made +purchased, incl calf feed)	0.40	0.36	0.49	0.16	0.75
Run Off Adjustment /lease	0.00	0.00	0.00	0.00	0.19
Fertilizers (inc N)	0.51	0.78	0.47	0.52	0.40
Irrigation	0.02	0.10	0.31	0.13	0.09
Regrassing	0.06	0.10	0.03	0.00	0.03
Wages	0.79	0.69	0.71	0.78	0.72
Land					
Electricity	0.16	0.07	0.04	0.07	0.05
Administration	0.12	0.06	0.12	0.14	0.04
Freight General	0.04	0.02	0.00	0.02	0.00
Rates and Insurance	0.06	0.06	0.08	0.06	0.11
R&M	0.17	0.26	0.19	0.26	0.27
Shed Expenses	0.02	0.04	0.04	0.05	0.06
Vehicle Expenses	0.15	0.08	0.08	0.09	0.06
Weed and pest/spraying	0.03	0.00	0.02	0.01	0.05
Depreciation	0.24	0.39	0.34	0.15	0.45
Operating Expenses	**3.77**	**4.30**	**4.01**	**3.29**	**3.77**
F.W.E	**3.36**	**3.91**	**3.67**	**2.91**	**3.27**
Operating Profit	**2.85**	**2.45**	**2.87**	**3.27**	**2.93**

Summary by Cost Category

Cow Costs	0.99	1.30	1.10	0.84	0.50
Feed	0.99	1.34	1.29	0.81	1.46
Staff	0.79	0.69	0.71	0.78	0.72
Land	1.00	0.98	0.91	0.86	1.09

2011-2012 Profitability Analysis expressed per cow

2011-12 Analysis per cow	DAVIE- MARTIN	LUDF	DONKERS	ACTON	SLEE
Total income/cow	3287	3180	2974	2802	3244
Cow Costs					
Animal Health	104	95	58	51	116
Breeding/testing	16	85	45	37	34
Dry cows / Young stock grazing	373	430	374	269	93
Feed					
Net Feed (made +purchased, incl calf feed)	197	169	210	68	363
Run Off Adjustment /lease	0	0	0	0	91
Fertilizers (incl. N)	256	365	203	222	194
Irrigation	11	49	133	56	43
Re-grassing	30	47	11	2	15
Wages	391	325	308	334	349
Land					
Electricity	80	31	17	29	23
Administration	61	31	51	60	21
Freight General	18	8	0	9	0
Rates and Insurance	30	30	34	26	55
R&M	86	125	83	110	129
Shed Expenses	12	18	18	21	30
Vehicle Expenses	73	35	33	40	27
Weed and pest/spraying	16	2	8	6	23
Depreciation	119	184	149	65	218
Operating Expenses	**1872**	**2028**	**1733**	**1405**	**1826**
F.W.E	**1670**	**1844**	**1587**	**1243**	**1583**
Operating Profit	**1415**	**1153**	**1242**	**1397**	**1418**

Summary by Cost Category

Cow Costs	492	610	477	357	243
Feed	494	630	556	348	707
Staff	391	325	308	334	349
Land	495	462	392	366	527

LUDF Budget – 2012/13

Base Assumptions:

1. 160 ha Milking Platform
2. Focus Increasing Profit through Productivity without increasing the farms environmental footprint
3. Maintain the farms assets for the long term
4. 655 cows wintered, 630 peak milk
5. 500kgMS/cow, 1969kgMS/ha, 315,000kgMS total
6. Milk Price - $5.50/kgMS + Dividend $0.33/kgMS
7. 444kgDM Silage/cow purchased in (280 tonne DM) (as high quality balage)
8. 96 tonne DM (grass silage) made on farm (balage)
9. Irrigation costs include power, R&M and maintenance of pivot ruts
10. 450 cows off farm 9 weeks over winter, plus heifers 7 weeks and late calving cows as required. Cows fed over winter to lift from average BCS 4.5 to all cows at 5 and Heifers / R3yrs at 5.5
11. 196 heifer calves reared, grazed off farm Dec – May
12. DNA proof of parentage to retain highest quality heifer calves
13. Surplus heifers sold as R1yrs and after heifer incalf details confirmed as R2yrs
14. 20-22% replacements entering the herd
15. 160 R1ys grazed off - June – May
16. 142 R2yrs grazed off 7 weeks - June – July
17. Heifer grazing to achieve Genetic Liveweight targets
18. Calf milk powder used when colostrum finished
19. 350 kg N applied to milking platform, 3 applications eco-n, Phosphate and Sulphur applied to maintenance requirements
20. 1.5 applications Express Gibberellic Acid (early Spring and autumn)
21. 4 herd tests (plus further 4 as part of wintering research)
22. Heifers AI mated first 3 weeks (daily)
23. 6 weeks (DNA proven) AI , 1.5 straws x total cows
24. 4 weeks bulls – 10 weeks total mating
25. No Inductions, no CIDR's, nil intervention,
26. Pregnancy test herd twice and heifers 3 times
27. Blood Test Calves BVD and vaccinate herd
28. Dry Cow and teal seal whole herd
29. 3.6 full time staff (Manager and 3 assistants, Manager time discounted for non 'farm management' activity). Limited casual staff as required
30. Housing allowance for rent included
31. Regrass 3 paddocks (15% of farm). Includes aerating, surface cultivation and roller drilling and post emergence weed control
32. Over drill 2-3 paddocks or part thereof if required post calving
33. Admin and related costs estimated for similar size 'commercial farm'
34. R&M to maintain standard of farm including drainage, maintenance of shelter trees etc

Lincoln University Dairy Farm				Budget for 2012 - 2013			@ 10/07/2012		
Year ending May 31		160.0ha	**Budget**		**2012/13**		**Actual 11 - 12**	**Difference**	
Milk production		Milksolids	$5.50/kgms	1,969/ha	*315,075*	297,740	1,861/ha	17,335 kgms	
Cows	Peak number &prodn		630cows	3.94/ha	*500/cow*				
Staff	3.70	FTE's	170cows/FTE		85,155ms/FTE				
Income					*$/kgMS*	*$/kgMS*		$ change	
Milksolids	$5.50/kgms	88%	1,732,912		*5.50*	*6.05*	1,801,327	- 68,415	-4%
Dividend	$0.33/share	5%	103,975		*0.33*	*0.30*	89,322	14,653	
Surplus dairy stock		3%	50,750		*0.16*	*0.51*	152,415	-101,665	-67%
Other stock sales		4%	88,281		*0.28*	*0.00*		88,281	
		0%			-	*0.00*		0	
		0%			-			0	
		100%	**1,975,917**		***6.27***	***6.86***	2,043,064	-67,147	-3%
Stock Purchases			21,600			*0.08*	22,400	-800	
Gross Farm Revenue			**1,954,317**	**12,214/ha**		***6.79***	**2,020,664**	**-66,347**	**-3%**
Expenses					***2012/13***	***2011-12***	**Actual**	$ change in expense	% change in expense
				$/cow	***$/kgMS***	***$/kgMS***	$		
Administration			24,700	39.2	**0.08**	**0.06**	19,315	5,385	28%
Animal Health			62,462	99.1	**0.20**	**0.20**	59,775	2,687	4%
Breeding Expenses			41,900	66.5	**0.13**	**0.18**	53,895	-11,995	-22%
Electricity-farm			23,500	37.3	**0.07**	**0.08**	23,397	103	0%
Employment			241,341	383.0	**0.77**	**0.69**	205,593	35,748	17%
Grass silage purchased		444 kgDM/cow	86,800	137.7	**0.28**	**0.23**	69,720	17,080	24%
Silage making & delivery			12,480	19.8	**0.04**	**0.04**	11,902	578	5%
Replacement grazing & meal			151,493	240.4	**0.48**	**0.58**	173,982	-22,489	-13%
Winter grazing - Herd incl freight			141,126	224.0	**0.45**	**0.41**	123,295	17,831	14%
EcoN & Giberillin			60,240	95.6	**0.19**	**0.25**	74,620	-14,380	-19%
Nitrogen			116,740	185.3	**0.37**	**0.38**	112,916	3,824	3%
Fertiliser & Lime			28,670	45.5	**0.09**	**0.15**	43,405	-14,735	-34%
Freight & Cartage			800	1.3	**0.00**	**0.00**	-	800	
Irrigation - All Costs			70,600	112.0	**0.22**	**0.16**	49,041	21,559	44%
Rates & Insurance			21,020	33.4	**0.07**	**0.06**	19,020	2,000	11%
Regrassing			29,688	47.1	**0.09**	**0.10**	29,449	239	1%
Repairs & Maintenance			48,500	77.0	**0.15**	**0.21**	61,936	-13,436	-22%
Shed Expenses excld power			11,850	18.8	**0.04**	**0.04**	11,091	759	7%
Vehicle Expenses			23,550	37.4	**0.07**	**0.08**	22,371	1,179	5%
Weed & Pest			500	0.8	**0.00**	**0.00**	972	-472	-49%
				0.0	-				
Cash Farm Working Expenses			**1,197,959**	**1,901**	**3.80**	**3.92**	**1,165,695**	**32,264**	**2.8%**
Depreciation est			116,000		***0.37***	**0.35**	105,000		
Total Operating Expenses			1,313,959		***4.17***	**4.27**	1,270,695		
Dairy Operating Profit			**640,358**		**2.03**	**2.52**	**749,969**	-109,611	
DOP			**4,002/ha**				**4,687/ha**	- 685	
Cash Operating Surplus			**756,358**		**2.40**	**2.87**	**854,969**	**- 98,611**	
			4,727/ha				**5,344/ha**		
					2012/13	***2011-12***			

Lincoln University Dairy Farm - Farm Walk notes

Tuesday, 3rd July 2012

CRITICAL ISSUES FOR THE SHORT TERM

1. **Monitor cows on winter feed.**
2. **Maintain consistent post grazing residuals to ensure pasture quality at the next grazing targeting 7-8 rising plate meter height for remaining cows on farm.**
3. **Monitor average pasture cover and respond to surplus or deficit.**
4. **Use back-fences on all herds whenever paddock grazing takes more than 24 hours.**
5. **Continue Mg supplementation via water system.**

Herd Management

6. Final dry off date was 24th May, seasons production was 297,720 kg/MS, 471 kg MS/cow, 1861 kg MS/ha from 632 [peak number] cows.
7. All cows left the farm by 28th May except 81 mostly BCS 5.0 dry cows which were expected to remain on the platform [see point 11]. They will be used to clean out any paddocks that need close grazing and to manage cover on the platform over winter. This number may be adjusted according to conditions. All other cows have gone to grazing: 300 to Ashley Dene [av BCS 4.5] where they will be involved in a P21 wintering trial, the balance of the herd, 138 slightly lighter condition cows have gone to grazing at Macleans Island.

Growing Conditions

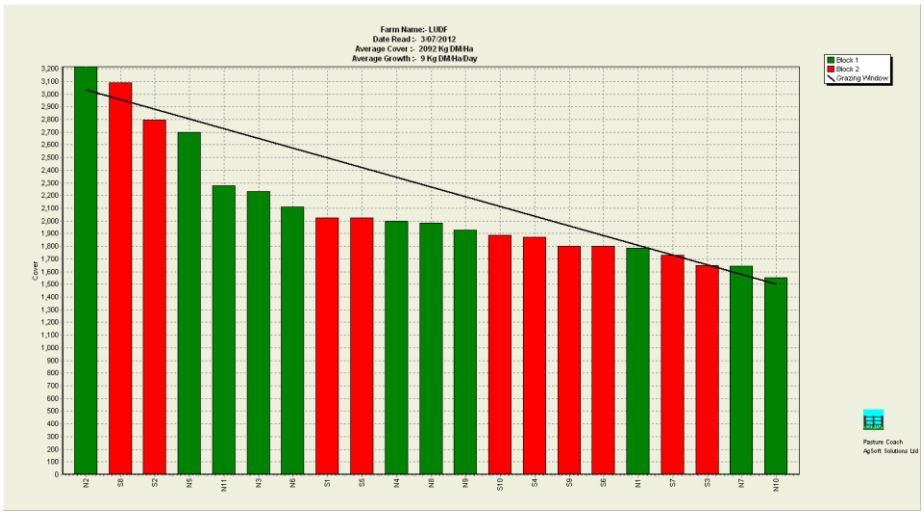
8. Pasture growth over the last 2 weeks has been 9kg DM/ha/day, 0kg DM/ha was recorded in the previous two weeks.
9. Soil temperatures at 9 am have averaged 5°C [over the past two weeks] which is similar to the previous period [5.1°C]. The weather has been very cold with rain, hard frosts, fog and very little sunshine.
10. We have had 7mm rain in the last 2 weeks. The Aquaflex soil moisture meters indicate that soil moisture levels are now at or slightly below field capacity.

Feeding Management

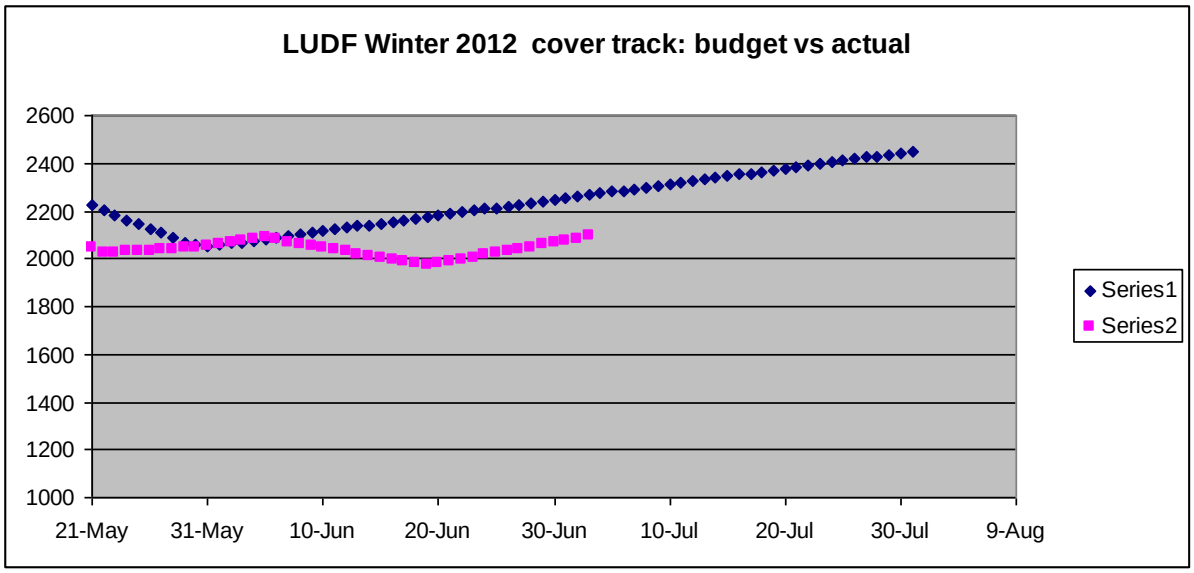
11. The 95 cows that were on farm were removed two weeks ago as the farm was not growing enough to support them on the platform. They are now grazing close by on support land.
12. The cows grazing off farm have generally settled very well on to their winter feeding.

Pasture Production and Management

This week's wedge is printed below.



13. Average cover is 2092kg DM/ha, a small increase from two weeks ago 1970 kg DM/ha. Visually there appears to be more cover on paddocks than what the plate meters are reading. We will take some grass samples tomorrow to see what the DMs are as this may have a big impact on our current covers.



14. The whole farm has had 2 rounds of eco-n this autumn.
15. The 300 cows wintering at Ashley Dene [started wintering at ave BCS 4.5] were condition scored on 19th June when the average was BCS 4.7.
16. Below the data sheet has begun again for the new season, the first column shows totals accumulated during the 2011-2012 season. The second third and fourth columns reflect the start of the new 2012-2013 season.

LUDF Weekly Report	29-May-12	5-Jun-12	19-Jun-12	3-Jul-12
Farm grazing ha (available to milkers)	160	160	160	160
Dry Cows on farm / East blk / other	0/0/538	71/0/579	95/0/555	0/81/579
Culls (Includes culls put down & empties)	2			
Culls total to date	124			
Deaths (Includes cows put down)	0			
Deaths total to date	0			
Calved Cows available (Peak Number 632…)	220			
Treatment / Sick mob total	2			
Mastitis clinical treatment	0			
Mastitis clinical YTD (tgt below 64 yr end)	81			
Bulk milk SCC (tgt Ave below 150)	135			
Lame new cases	1			
Lame ytd	191			
Lame days YTD (Tgt below 1000 yr end)	2103			
Other/Colostrum	0/0			
Milking twice a day into vat	220			
Milking once a day into vat	0			
Small herd	0			
Main Herd	380			
MS/cow/day (Actual kg / Cows into vat only)	1.27			
MS/cow to date (total kgs / Peak Cows 632	471			
MS/ha/day (total kgs / ha used	3.01			
Herd Average Cond'n Score	4.50		4.7	4.9

	29-May-12	5-Jun-12	19-Jun-12	3-Jul-12
Monitor grp LW kg WOW 157 early MA calvers				
Soil Temp Ave Aquaflex	8.0	6.9	5.1	4.0
Growth Rate (kgDM/ha/day)	16	20	0	9
Plate meter height - ave half-cms	11.0	0.0	10.5	11.4
Ave Pasture Cover (x140 + 500)	2042	2086	1970	2092
Surplus/[deficit] on feed wedge- tonnes	0.6	2.4	[30]	[26.6]
Pre Grazing cover (ave for week)	2800	2750	2850	
Post Grazing cover (ave for week)	1500	1500	1500	
Highest pre-grazing cover	2800	2750	2850	
Area grazed / day (ave for week)	0.90	0.61		
Grazing Interval	178	261		
Milkers Offered/grazed kg DM pasture				
Estimated intake pasture MJME				
Milkers offered kg DM Grass silage				
Silage MJME/cow offered				
Estimated intake Silage MJME				
Estimated total intake MJME				
Tgt total MJME Offered/eaten (incls 6% waste)				
Pasture ME (pre grazing sample)				
Pasture % Protein				
Pasture % DM - Concern below 16%				
Pasture % NDF Concern < 33				
Mowed pre or post grazing YTD	197.2			
Total area mowed YTD	242.8			
Supplements fed to date kg per cow (632 peak)	513.3			
Supplements Made Kg DM / ha cumulative	609			
Units N applied/ha and % of farm				
Kgs N to Date (whole farm)	354			
Rainfall (mm)	12		63	
Aquaflex topsoil relative to fill point tgt 60 - 80%	30-50	20-40	100	90-100

The next weekly farm walk will be on Tuesday 17th July at 9.00 am.
Farmers or their managers and staff are always welcome to walk with us. Please call to notify us of your intention and bring your plate meter. Phone SIDDC – 03 325 3629.

Pastoral 21

Next Generation Dairy Systems for Canterbury

Increased production comes with a cost

New Zealand is able to produce milk at low cost and is therefore competitive on the world market. Canterbury has a good potential to produce more milk than at present, but growth needs to be sustainable. Dairy farming has an effect on water and air quality and current low cost winter feed systems come with potential animal welfare issues and nutrient losses.

What do we know already?

- Environmental impact of dairy systems extends beyond the milking platform and lactating cows.
- Urinary nitrogen (N) is the major source of nitrate leaching in a pastoral system. Reducing cows per hectare and N content of urine reduces nitrate leaching.
- A high genetic merit cow gives the option to reduce the number of cows per hectare without decreasing milk production per hectare.
- A high genetic merit cow requires good quality feed to achieve her potential.
- Urinary N content can be reduced by improving protein/energy balance in the ration.
- More lactations per cow decreases the need for replacement stock, hence lowers environmental impact of dairy systems.
- In current systems:
  - Higher N input on pastures gives higher pasture production per ha, but also higher N losses and less N-fixation by clover
  - Intensive winter grazing systems come with high nitrate leaching losses
  - Crop rotations increase N losses as compared to permanent pastures; also organic matter decreases
  - Higher external inputs decrease direct but increase indirect environmental footprint per kg MS

High involvement of stakeholders, cutting edge results on combining profitability, low nutrient losses and high animal welfare.

Pastoral 21 is a collaborative venture among DairyNZ, Fonterra, Dairy Companies Association of New Zealand, Beef + Lamb New Zealand and the Ministry of Science & Innovation. Its twin goals are: (1) a $110/ha/year increase in average profitability from dairy production, with a 30% reduction in nitrogen and phosphorous losses to water; (2) a 3% annual meat productivity increase, while containing or reducing environmental footprint. The collaborating research organisations in the various projects include AgResearch, DairyNZ, Massey University, Lincoln University/Telford [a Division of Lincoln University], NIWA, Plant & Food Research, Landcare Research and On-farm Research.

We need to re-design our milking and wintering systems, combining more milk with low emissions and high animal welfare. Our targets are:

- All cows return to the milking platform with a body condition score of 5; heifers and 3-year olds at 5.5.
- The milk solid production increases from 1,500 (Canterbury benchmark) to 1,600 – 2,200 kg MS/ha/year.
- Operating profit increases from $3,300/ha (Canterbury benchmark) to $4,300 - $4,800/ha.
- Nitrate-N leaching losses are reduced from around 45-50 kg N/ha (all hectares counted, Canterbury benchmark) to 25-35 kg N/ha (all hectares counted).

What are we looking at?

Farm scale:
- N and P balance at farm gate
- Nitrate leaching
- Water use efficiency
- Economics

Pasture and crops:
- Production
- Composition, quality
- Animal intake
- Soil structure
- Soil fertility
- Insect damage

Animals:
- Milk solids production
- Welfare: body condition, weight, health, fertility
- Replacement rate
- N partitioning (milk, faeces, urine and blood)

Milking Platform and Wintering Strategies

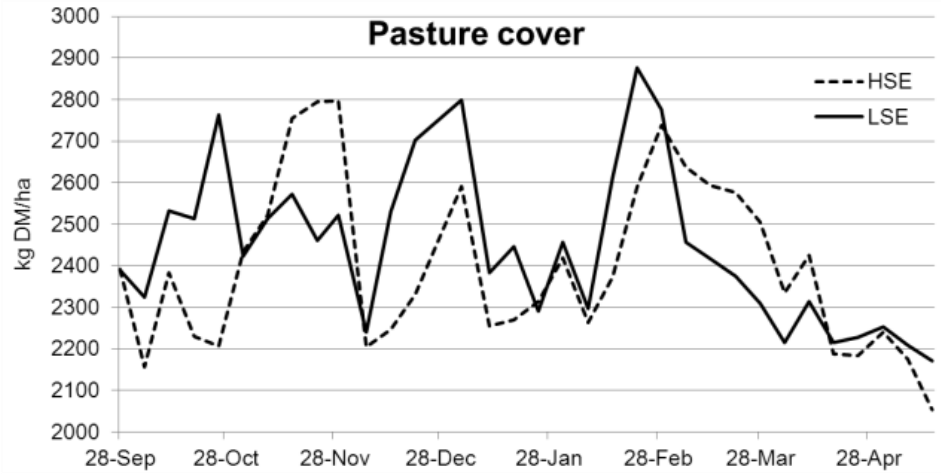
High Stocking rate Efficient (HSE)	Low Stocking rate Efficient (LSE)
Milking platform, Lincoln University Research Dairy Farm	
5.0 cows/ha	3.5 cows/ha
BW 108	BW 122
320 kg N/ha/year	170 kg N/ha/year
18 paddocks on milking platform. Mixtures of white clover and perennial ryegrass: 8 paddocks with diploid Arrow AR1 sown April 2009, 8 with tetraploid AR37 and 2 with diploid Expo AR1, sown April 2011.	22 paddocks on milking platform. Mixtures of white clover and perennial ryegrass: 8 with diploid Arrow AR1, 8 with tetraploid AR37 and 6 with a diverse pasture mix, including chicory, plantain and prairie grass, sown April 2011
Nitrification inhibitor 2 applications	Nitrification inhibitor 2 applications
Winter support block, Ashley Dene	
Fodder beet + pasture silage	Kale + green chop silage

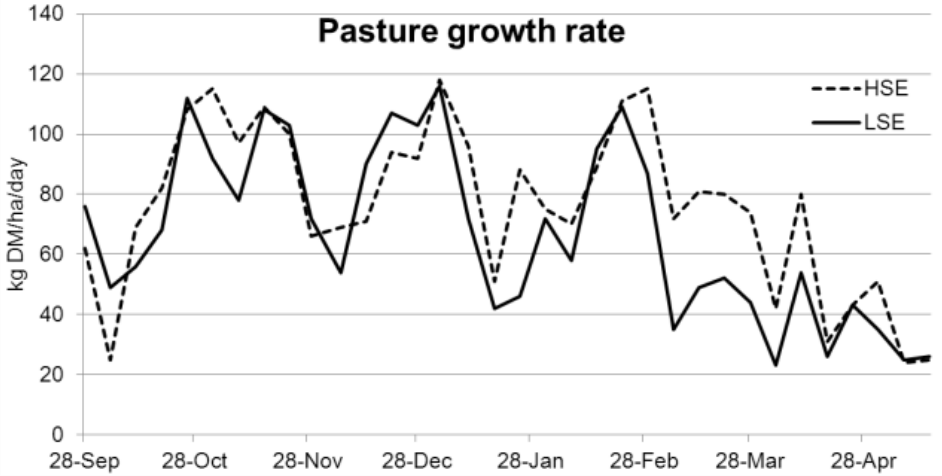
Results of modelling

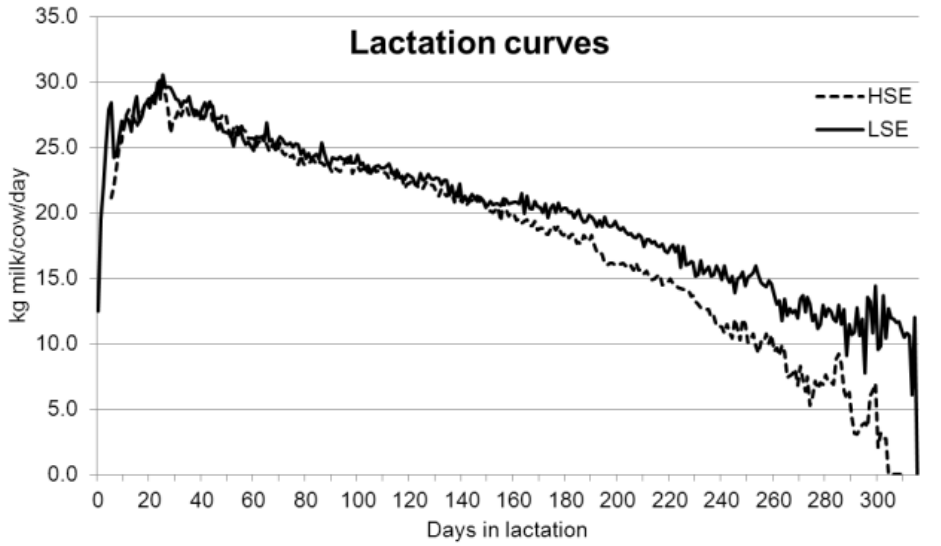
	HSE	LSE
Stocking rate (cows/ha)	5.0	3.5
Breeding worth (BW)	150	180
N fertiliser application (kg N/ha/year)	400	150
Supplemented grain (kg/cow/year)	800	100
Total pasture harvested (t DM/ha/year)	18.1	16.0
Purchased feed (kg DM/cow) (type)	800 (grain)	100 (grain)
Herd entering as heifers (%)	20	15
MS produced (kg/cow/year)	437	453
MS produced (kg/ha/year)	2,184	1,588
Operating profit ($/ha)	4,810	4,334
Farm gate N surplus (kg/ha)	339	154
N leached (kg N/ha)	38	24

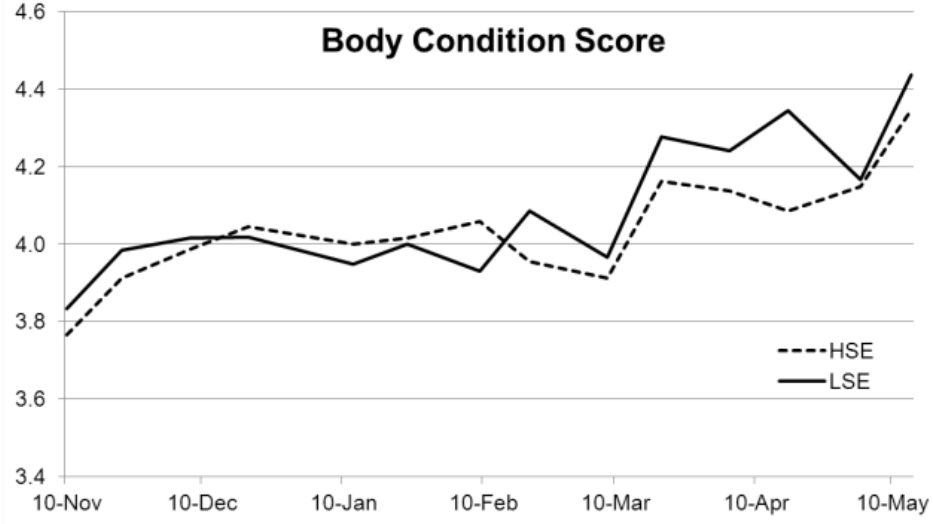
First year preliminary results, from 26 September 2011 onwards

	HSE	LSE
Total pasture grown (t DM/ha)	17.6	15.4
Supplemented feed (kg DM/cow)		
Silage	285	340
Grain	70	20
Number of days in trial (days/cow)	214	226
Lactation length (days/cow)	254	264
MS produced (kg/cow from 26 Sept 2011)	385	427
MS produced (kg/ha from 26 Sept 2011)	1,940	1,503


Pasture cover
kg DM/ha
3000
2900
2800
2700
2600
2500
2400
2300
2200
2100
2000
28-Sep
28-Oct
28-Nov
28-Dec
28-Jan
28-Feb
28-Mar
28-Apr
HSE
LSE


Pasture growth rate
kg DM/ha/day
140
120
100
80
60
40
20
0
28-Sep
28-Oct
28-Nov
28-Dec
28-Jan
28-Feb
28-Mar
28-Apr
HSE
LSE


Lactation curves
kg milk/cow/day
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Days in lactation
HSE
LSE


Body Condition Score
4.6
4.4
4.2
4.0
3.8
3.6
3.4
10-Nov
10-Dec
10-Jan
10-Feb
10-Mar
10-Apr
10-May
HSE
LSE

Ashley Dene: Comparing Wintering Crops

Three strategies of crop and pasture (perennial ryegrass Prospect, AR37).

1) Fodder beet (FB and FG)

- Cultivar Rivage
- Sown 1 Oct 2011 with 80,000 seeds/ha
- 200 kg/ha Serpentine super (6.7 : 8.6 : 5.5 : 5; P:S:Mg:Ca), 100 kg/ha Calcium ammonium nitrate (27 : 8; N:Ca), 350 kg/ha NaCl (AgSalt), and 15 kg/ha boronate (10% B) at sowing, then a further 100 kg urea/ha
- Two applications of Betanal Forte+ Goltix + Nortron herbicides
- Allowance 8 kg DM fodder beet + 6 kg DM grass silage/cow/day

2) Early kale (HK and HG)

- Cultivar Regal
- Sown 20 October 2011, 4kg/ha,
- Treflan application pre sowing
- 200kg/ha DAP at sowing, then a further 330 kg urea/ha
- Allowance 14 kg DM kale + 3 kg DM barley straw/cow/day

3) Late kale (MK and MG)

- Cultivar Regal
- Sown 15 December 2011, 4.5 kg/ha
- Treflan application pre sowing
- 200 kg DAP/ha at sowing, then a further 180 kg urea/ha
- In rotation with Milton oats for whole crop silage. Oats to be sown in August 2012, after the kale is grazed, and harvested late November 2012
  Allowance 12 kg DM kale + 6 kg DM green chop oats silage/cow/day

Allowances are estimated to provide for 150 MJ ME/cow/day consumed. This should allow for maintenance and an increase in body condition score of 0.5 BCS units over an 8 week feeding period.

Crop Yields, Utilisation and Nutritive Value

	Pre-grazing yield (t DM/ha)*	Post grazing yield (t DM/ha)	Utilisation %	WSC %	ADF %	NDF %	DOMD %	CP %	DM %
Early Kale (HK)	15.5 (13.1-16.5	1.8	89%	31.1	23.6		77.5	17.5	**15.8**
Late Kale (MK)	14.2 (11.5-16.1)	1.7	88%	32.2	24.1		78.5	17.6	**15.0**
Fodderbeet (FB)	19.8 (13.7-22.7)	0	100%		-		-	11.8	**18.8**
Barley Straw				3.0	48.7	84.6	36.4	3.2	**89**
WC Silage				-	43.8	73.3	43.4	7.3	**36**
Grass Silage				**12.5**	**26.9**	**51.5**	**69.7**	**13.1**	**35**

* Mean and range across paddocks

Body Condition Score Summary

	Treatment Average BCS			Percentage < BCS 5.0		
	24 May	**19 June**	**4 July**	24 May	19 June	4 July
High Kale (HK)	**4.5**	**4.7**	**4.9**	69	47	31 (36 cows)
Late Kale (MK)	**4.5**	**4.7**	**4.9**	74	57	27 (31 cows)
Fodderbeet (FB)	**4.5**	**4.6**	**4.9**	74	72	37 (25 cows)

Environmental Research

- Lysimeters collected and managed in the same way as each milking platform and winter platform system.
- Lysimeters treated with urine, with and without nitrification inhibitors, and measurements made of nitrate leaching.
- Models used to scale lysimeter results to farm scale and produce total footprint for across both milking platform and dairy support land.