02 Jan 2019 11:59

Stocking rate analysis - Wethers @ Hamilton VIC

1/01/1980 - 31/12/2012

Analysis Summary Stocking rate report

Gross margin

Long term average gross margin. For selected financial year *[1 Jan - 31 Dec, 1980-2012]*

Stocking rate		20/ha	30/ha	40/ha
Net wool income - main flock	$/ha	612	851	1095
Net wool income - young stock	$/ha	0	0	0
Sale income - young stock	$/ha	0	0	0
Sale income - cast-for-age	$/ha	233	305	371
Sale income - sold at foot	$/ha	0	0	0
Hay sales	$/ha	0	0	0
TOTAL INCOME	$/ha	845	1156	1467
Maintenance supplement	$/ha	20	177	393
Production supplement	$/ha	0	0	0
Shearing costs	$/ha	117	175	233
Animal husbandry	$/ha	39	59	79
Replacements purchased	$/ha	310	464	618
Rams purchased	$/ha	0	0	0
Sale costs	$/ha	24	34	44
Hay - harvesting costs	$/ha	0	0	0
Hay - variable costs	$/ha	0	0	0
Pasture costs	$/ha	50	50	50
TOTAL EXPENSES	$/ha	560	959	1418
GROSS MARGIN	$/ha	285	197	49

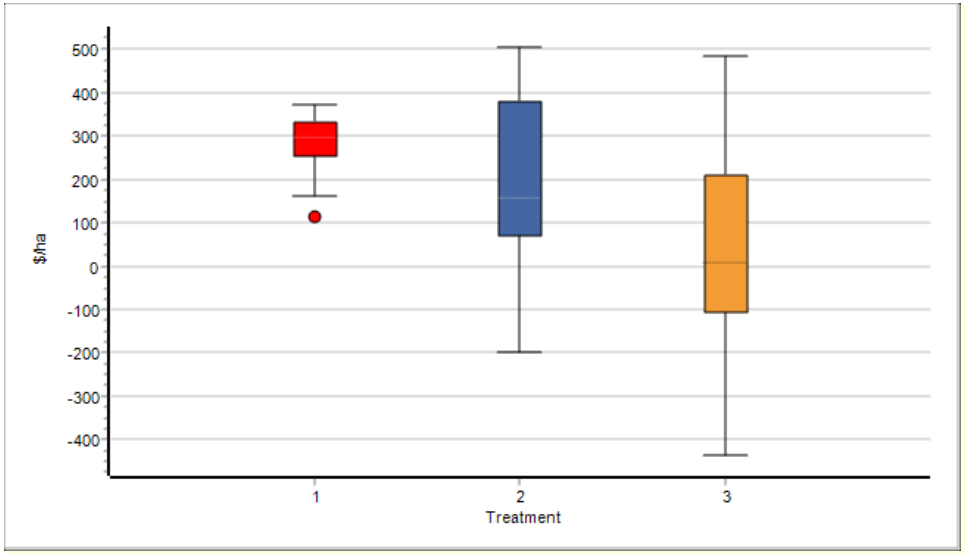
Variability of Gross Margin

Long term standard deviation of the annual gross margin ($/ha) *[1 Jan - 31 Dec, 1980-2012]*

Stocking rate		20/ha	30/ha	40/ha
Total income	$/ha	37.60	64.50	42.66
Total expense	$/ha	34.46	137.60	201.31
Gross margin	$/ha	62.90	192.93	232.62

Boxplots for gross margins for all treatments.

Annual gross margin ($/ha) for financial year *[1 Jan - 31 Dec, 1980-2012]*



Treatment	*Stocking rate*
1	20/ha
2	30/ha
3	40/ha

Interpretation of boxplots

The box shows the middle 50% of values (the interquartile range). The horizontal line inside the box is the median. The lines extending above and below the box (whiskers) show the upper and lower quartiles (25% of values). Beyond the whiskers, outlying values are shown by dots and extreme values are shown by asterisks. "Outlying values" lie more than 1.5 times the interquartile range beyond the upper and lower quartiles. "Extreme values" lie more than 3.0 times the interquartile range beyond the upper and lower quartiles.

Production summary

Long term averages for financial year *[1 Jan - 31 Dec, 1980-2012]*

Stocking rate		20/ha	30/ha	40/ha
Dry sheep equivalents (av.)	dse/ha	23.0	28.9	34.2
Wool cut - total flock (sum)	kg CFW/ha	61.7	79.3	91.7
Wool cut - lambs (sum)	kg CFW/ha	0.0	0.0	0.0
Shorn fibre diameter - ewe adults (av.)	microns	n/a	n/a	n/a
Shorn fibre diameter - wether adults (av.)	microns	17.7	17.3	16.8
Shorn fibre diameter - lambs (av.)	microns	n/a	n/a	n/a
Meat sold - total flock (sum)	kg LW/ha	376	484	582
Meat sold - young stock (sum)	kg LW/ha	0	0	0

Sustainability

Long term average annual production (NPP) and minimum mass of pasture, water balance and methane production *[1 Jan - 31 Dec, 1980-2012]*

Stocking rate		20/ha	30/ha	40/ha
Annual pasture production (P1) (sum)	kg/ha	10821	9532	8841
Minimum total herbage mass (P1) (min)	kg/ha	1057	409	203
Ground cover (P1) (min)	m2/m2	0.53	0.25	0.13
Rainfall (sum)	mm	644	644	644
Runoff (P1) (sum)	mm	0	0	0
Actual evapotranspiration (P1) (sum)	mm	550	545	543
Drainage below rooting zone (P1) (sum)	mm	95	99	101
Methane production -main group (sum)	g/head	8850	7403	6579
Methane production -young stock (sum)	g/head	n/a	n/a	n/a

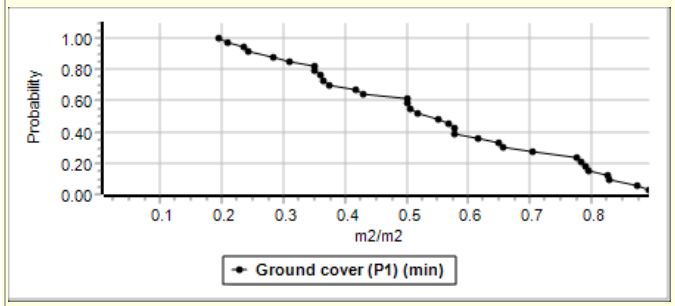
Ground cover threshold over entire period

Long term average over all years of percentage of the year when ground cover is < 0.7 *[1 Jul - 30 Jun, 1980/1981 - 2011/2012]*

Stocking rate	Proportion of year (P1)	Proportion of year (P2)	Proportion of year (P3)	Proportion of year (P4)	Proportion of year (P5)
	%	%	%	%	%
20/ha	23.31	n/a	n/a	n/a	n/a
30/ha	65.55	n/a	n/a	n/a	n/a
40/ha	87.16	n/a	n/a	n/a	n/a

Cumulative distribution function for minimum ground cover [20/ha]

The probability (shown on the vertical axis) of the minimum ground cover in a year exceeding the value shown on the horizontal axis *[1 Jan - 31 Dec, 1980-2012]*

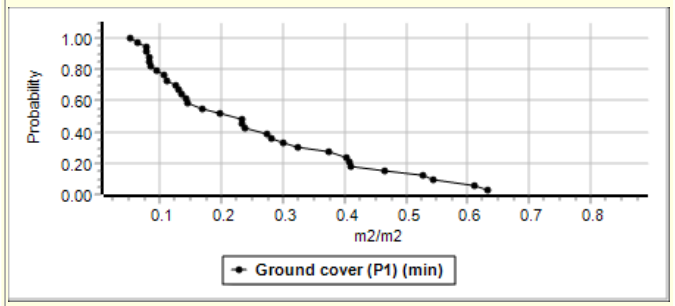


Cumulative distribution function for deep drainage [20/ha]

The probability (shown on the vertical axis) of the total amount of soil

Cumulative distribution function for minimum ground cover [30/ha]

The probability (shown on the vertical axis) of the minimum ground cover in a year exceeding the value shown on the horizontal axis *[1 Jan - 31 Dec, 1980-2012]*

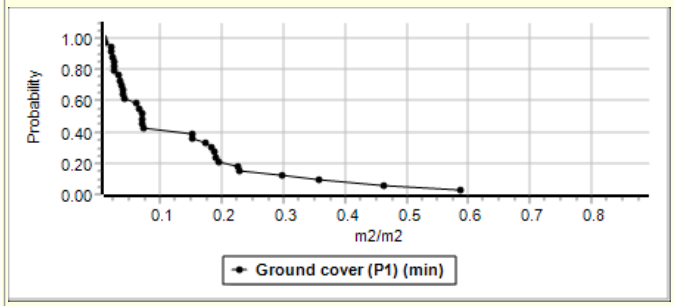


Cumulative distribution function for deep drainage [30/ha]

The probability (shown on the vertical axis) of the total amount of soil

Cumulative distribution function for minimum ground cover [40/ha]

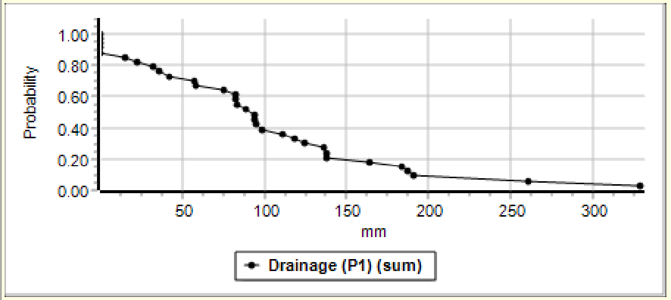
The probability (shown on the vertical axis) of the minimum ground cover in a year exceeding the value shown on the horizontal axis *[1 Jan - 31 Dec, 1980-2012]*



Cumulative distribution function for deep drainage [40/ha]

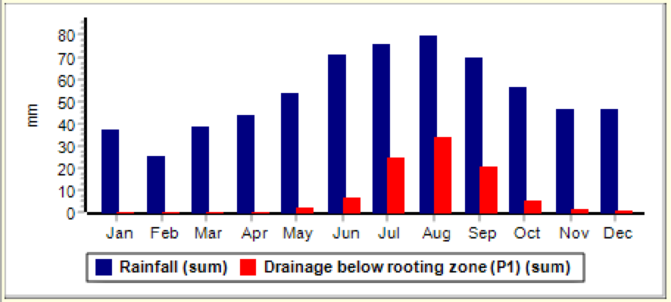
The probability (shown on the vertical axis) of the total amount of soil

water draining below the root zone each year exceeding the value shown on the horizontal axis (mm/y) *[1 Jan - 31 Dec, 1980-2012]*

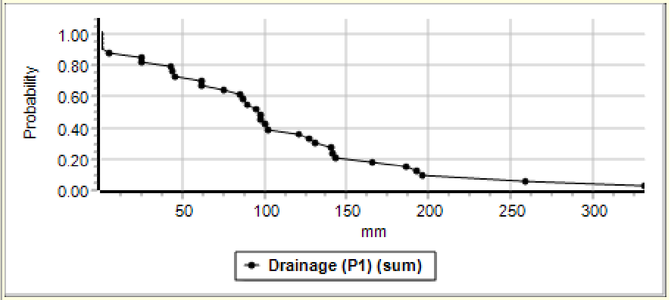


Timing of drainage [20/ha]

Long term average monthly rainfall (mm/month) and drainage of water below the root zone (mm/month)
Note: distributions are typically highly skewed *[1 Jan - 31 Dec, 1980-2012]*

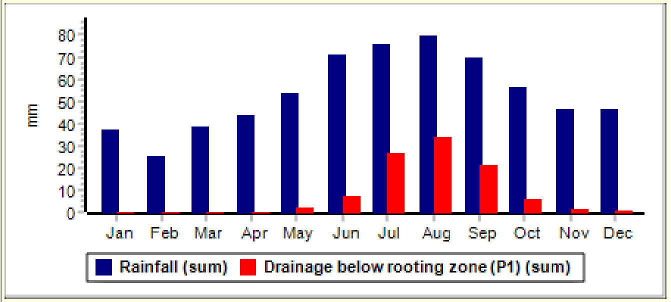


water draining below the root zone each year exceeding the value shown on the horizontal axis (mm/y) *[1 Jan - 31 Dec, 1980-2012]*

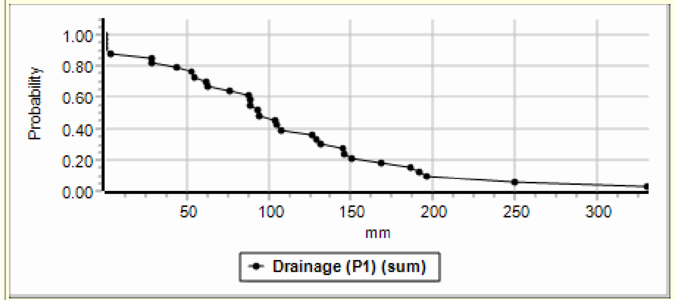


Timing of drainage [30/ha]

Long term average monthly rainfall (mm/month) and drainage of water below the root zone (mm/month)
Note: distributions are typically highly skewed *[1 Jan - 31 Dec, 1980-2012]*

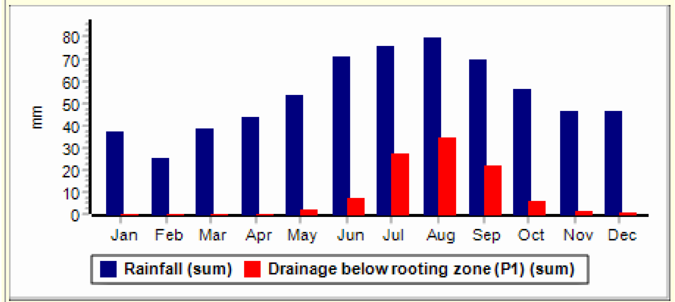


water draining below the root zone each year exceeding the value shown on the horizontal axis (mm/y) *[1 Jan - 31 Dec, 1980-2012]*



Timing of drainage [40/ha]

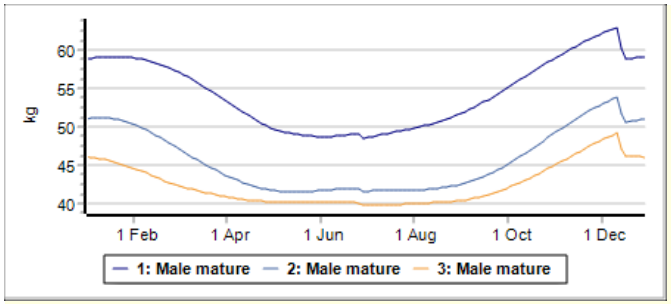
Long term average monthly rainfall (mm/month) and drainage of water below the root zone (mm/month)
Note: distributions are typically highly skewed *[1 Jan - 31 Dec, 1980-2012]*



Average differences between treatments

Live weight of mature male sheep for all treatments.

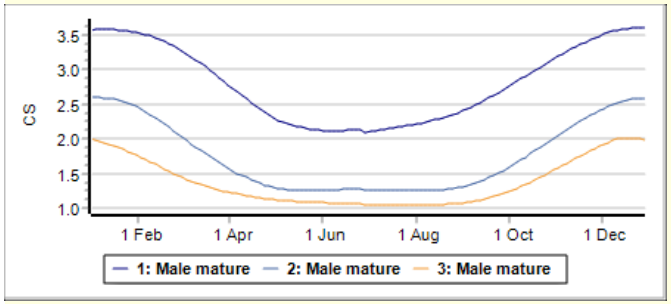
Long term average live weight, including fleece (kg/head) *[1 Jan - 31 Dec, 1980-2012]*



Treatment	*Stocking rate*
1	20/ha
2	30/ha
3	40/ha

Body condition of mature male sheep for all treatments.

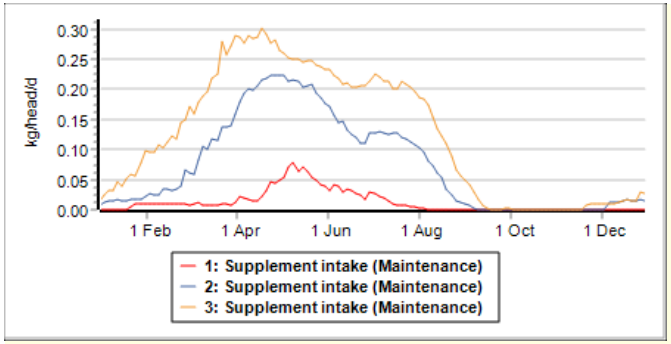
Long term average (condition score) *[1 Jan - 31 Dec, 1980-2012]*



Treatment	*Stocking rate*
1	20/ha
2	30/ha
3	40/ha

Supplement intake of main flock for all treatments.

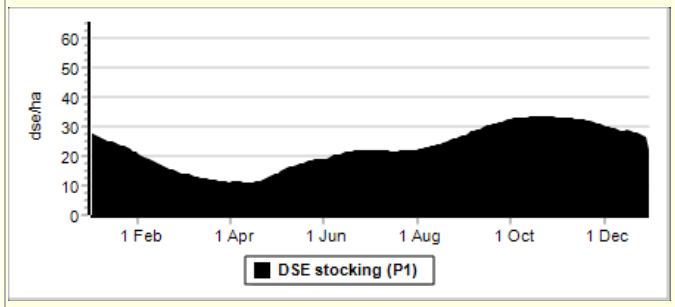
Long term average daily supplement intake (kg/head/d) *[1 Jan - 31 Dec, 1980-2012]*



Treatment	*Stocking rate*
1	20/ha
2	30/ha
3	40/ha

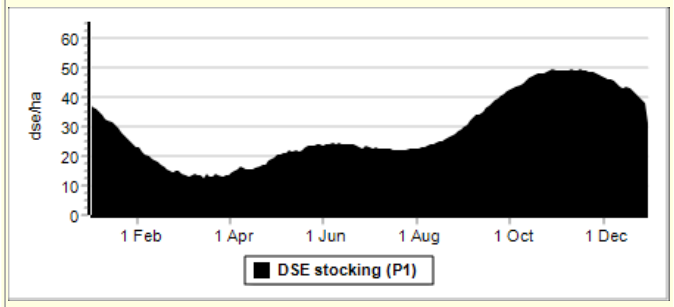
Stocking rate for each paddock [20/ha]

Long term average stocking rate in DSE for each paddock *[1 Jan - 31 Dec, 1980-2012]*



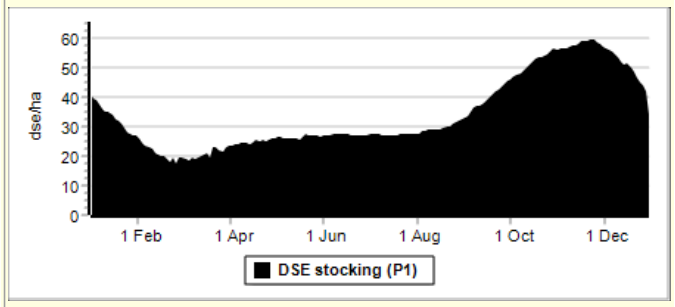
Stocking rate for each paddock [30/ha]

Long term average stocking rate in DSE for each paddock *[1 Jan - 31 Dec, 1980-2012]*



Stocking rate for each paddock [40/ha]

Long term average stocking rate in DSE for each paddock *[1 Jan - 31 Dec, 1980-2012]*



Wool growth per head by age class

Long term average clean fleece weight per head (kg/head) *[1 Jan - 31 Dec, 1980-2012]*

Stocking rate		20/ha	30/ha	40/ha
Wool growth (Female weaners)	kg/head	n/a	n/a	n/a
Wool growth (Female 1-2 y.o.)	kg/head	n/a	n/a	n/a
Wool growth (Female mature)	kg/head	n/a	n/a	n/a
Wool growth (Male weaners)	kg/head	n/a	n/a	n/a
Wool growth (Male 1-2 y.o.)	kg/head	1.42	1.20	1.10

Wool growth (Male mature)	kg/head	3.17	2.72	2.36
Wool cut/ha - total	kg CFW/ha	61.7	79.3	91.7

Summary of variability of each treatment

Pasture utilization rate

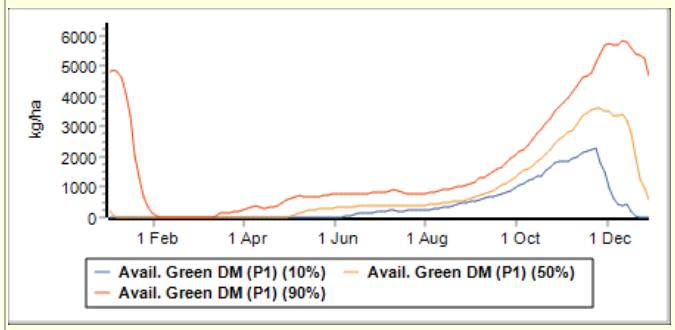
The long term average amount of pasture consumed by all stock as a proportion of the amount of pasture grown over the period analysed (%) *[31 Dec - 31 Dec, 2012-2012]*

Stocking rate	Utilization rate
	%
20/ha	64
30/ha	83
40/ha	93

Pasture details for the first 5 paddocks

Pasture supply -green - Paddock 1 [20/ha]

Percentiles for available green herbage (kg DM/ha) *[1 Jan - 31 Dec, 1980-2012]*



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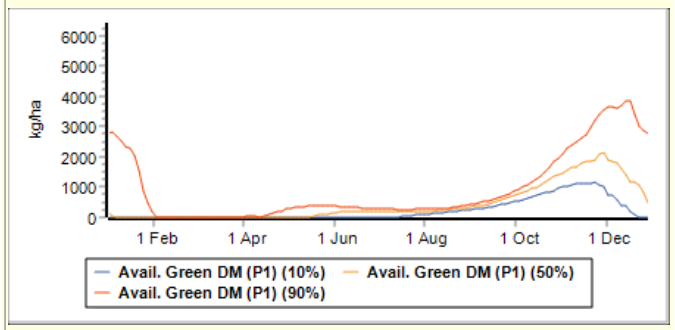
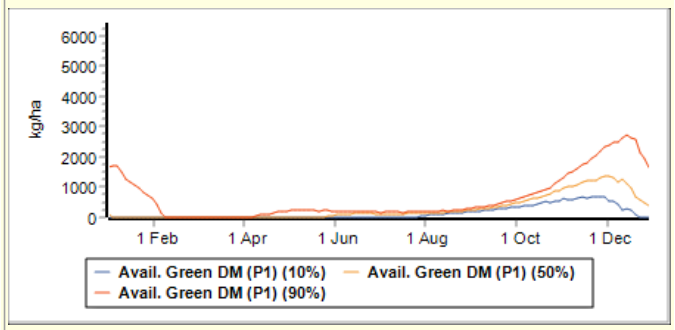
Percentiles for available green herbage (kg DM/ha) *[1 Jan - 31 Dec, 1980-2012]*



Pasture supply -green - Paddock 1 [40/ha]

Percentiles for available green herbage (kg DM/ha) *[1 Jan - 31 Dec, 1980-2012]*



Pasture supply -dead+litter - Paddock 1 [20/ha]

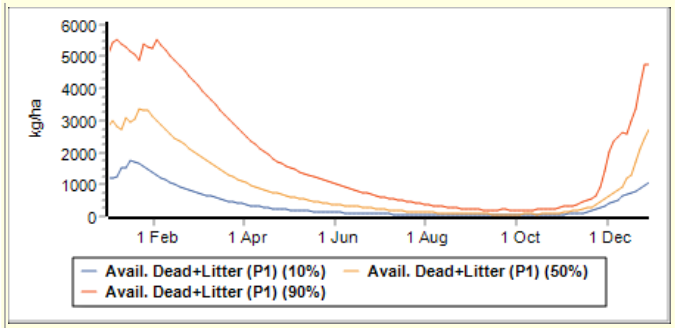
Percentiles for available dead herbage and litter (kg DM/ha) *[1 Jan - 31 Dec, 1980-2012]*

Pasture supply -dead+litter - Paddock 1 [30/ha]

Percentiles for available dead herbage and litter (kg DM/ha) *[1 Jan - 31 Dec, 1980-2012]*

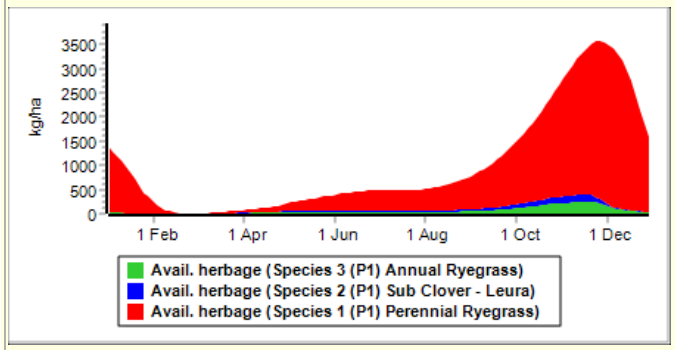
Pasture supply -dead+litter - Paddock 1 [40/ha]

Percentiles for available dead herbage and litter (kg DM/ha) *[1 Jan - 31 Dec, 1980-2012]*



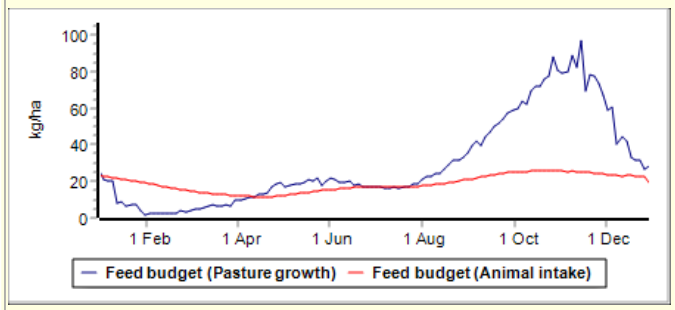
Pasture composition - Paddock 1 [20/ha]

Long term average green available herbage by species (kg DM/ha) *[1 Jan - 31 Dec, 1980-2012]*

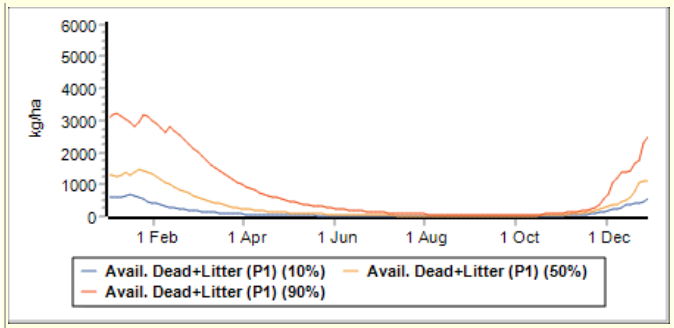


Feed budget for whole enterprise [20/ha]

Long term average pasture growth and pasture intake (kg DM/ha/d) *[1 Jan - 31 Dec, 1980-2012]*

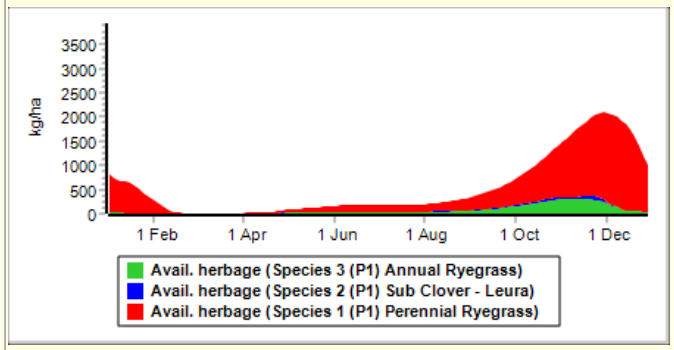


Livestock live weight - main male flock



Pasture composition - Paddock 1 [30/ha]

Long term average green available herbage by species (kg DM/ha) *[1 Jan - 31 Dec, 1980-2012]*



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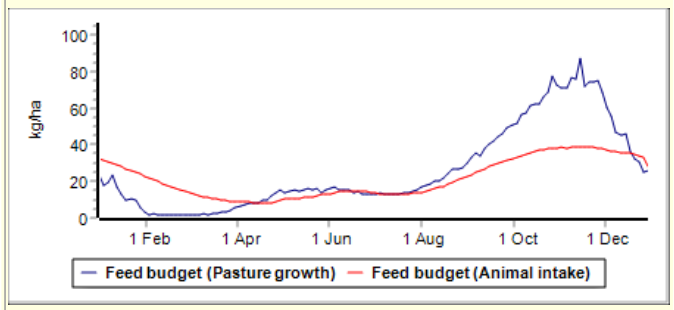
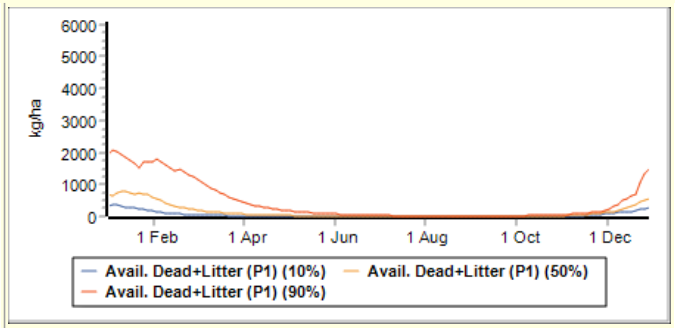
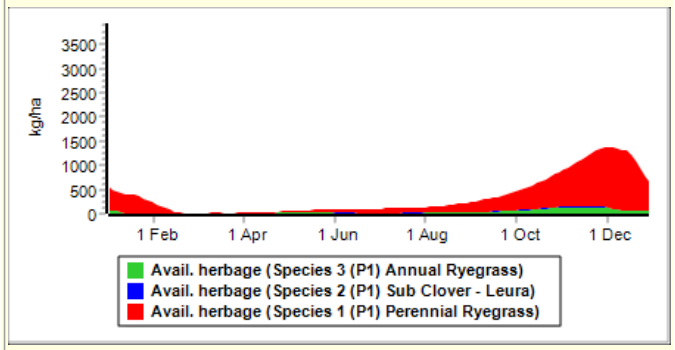


Livestock live weight - main male flock



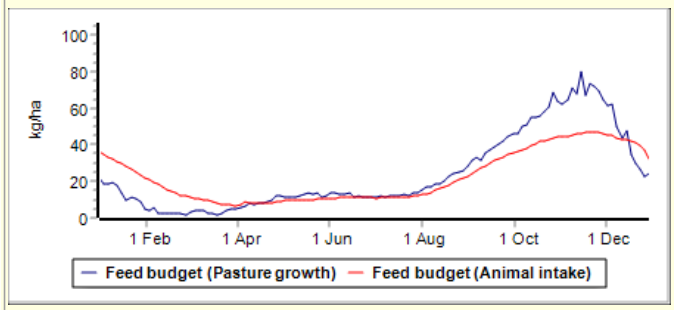
Pasture composition - Paddock 1 [40/ha]

Long term average green available herbage by species (kg DM/ha) *[1 Jan - 31 Dec, 1980-2012]*



Feed budget for whole enterprise [40/ha]

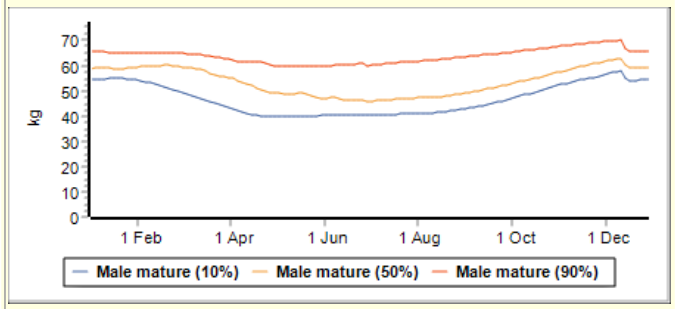
Long term average pasture growth and pasture intake (kg DM/ha/d) *[1 Jan - 31 Dec, 1980-2012]*



Livestock live weight - main male flock

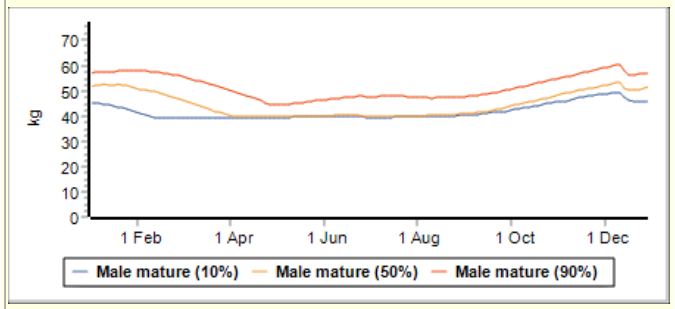
[20/ha]

Percentiles for live weight of mature sheep (kg/head) *[1 Jan - 31 Dec, 1980-2012]*



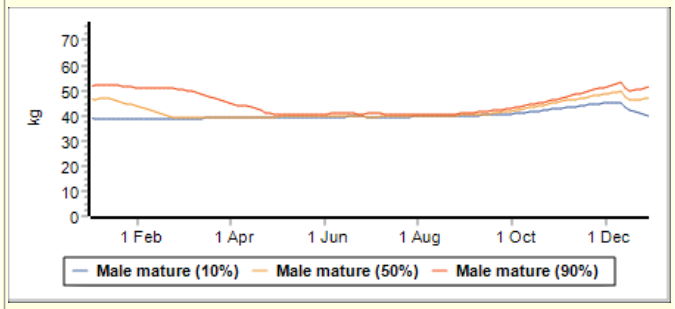
[30/ha]

Percentiles for live weight of mature sheep (kg/head) *[1 Jan - 31 Dec, 1980-2012]*



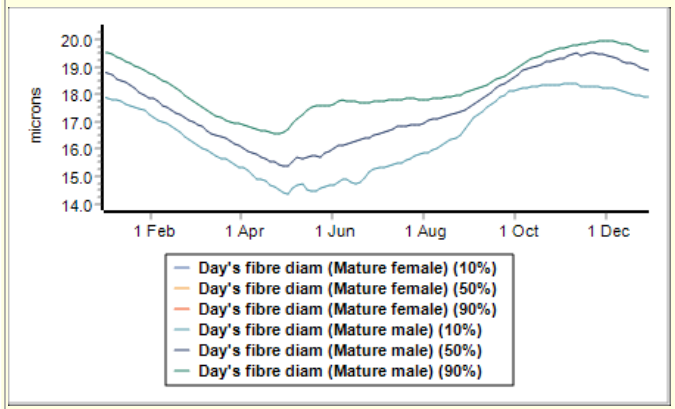
[40/ha]

Percentiles for live weight of mature sheep (kg/head) *[1 Jan - 31 Dec, 1980-2012]*



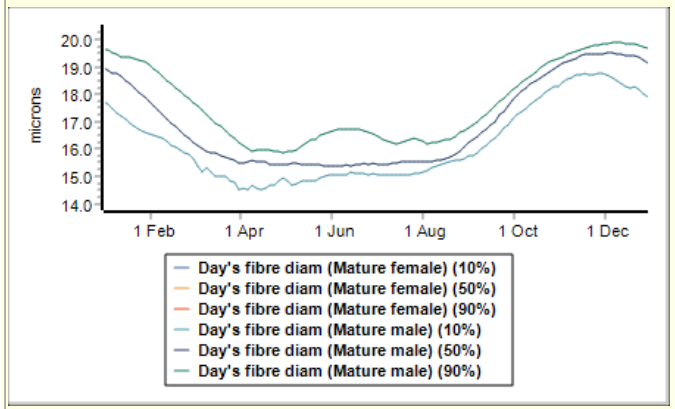
Wool fibre diameter profile of mature sheep [20/ha]

Percentiles for fibre diameter of each day's wool growth (micron) *[1 Jan - 31 Dec, 1980-2012]*



Wool fibre diameter profile of mature sheep [30/ha]

Percentiles for fibre diameter of each day's wool growth (micron) *[1 Jan - 31 Dec, 1980-2012]*



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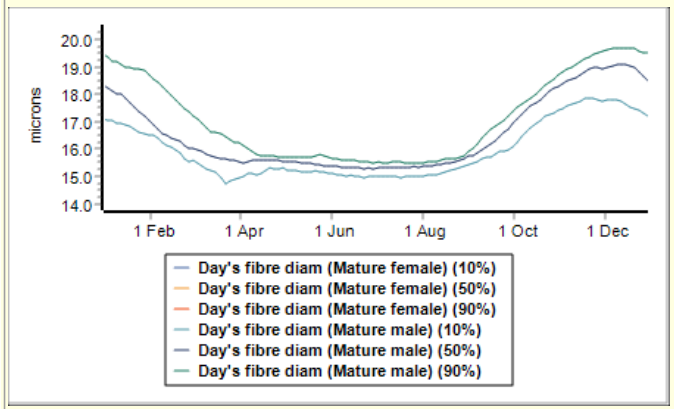


Comparisons of treatments over years

Pasture details for the first 5 paddocks

Annual rainfall [20/ha]

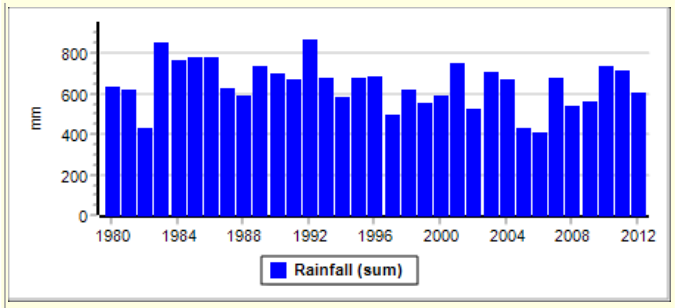
[1 Jan - 31 Dec, 1980-2012]

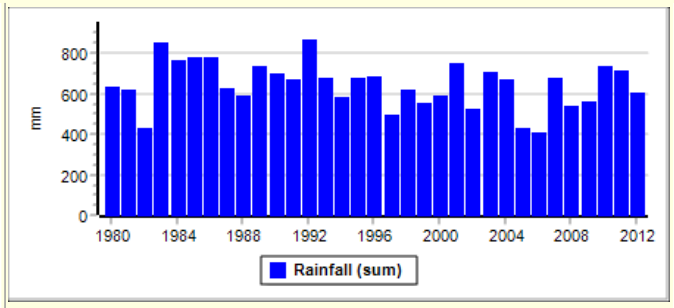
Annual rainfall [30/ha]

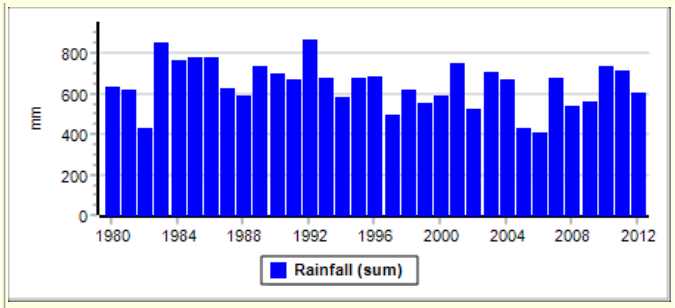
[1 Jan - 31 Dec, 1980-2012]

Annual rainfall [40/ha]

[1 Jan - 31 Dec, 1980-2012]

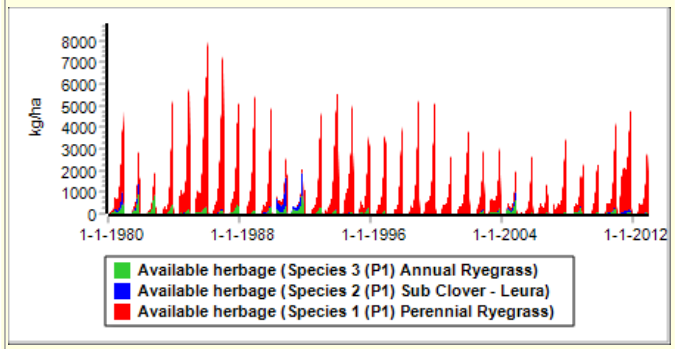






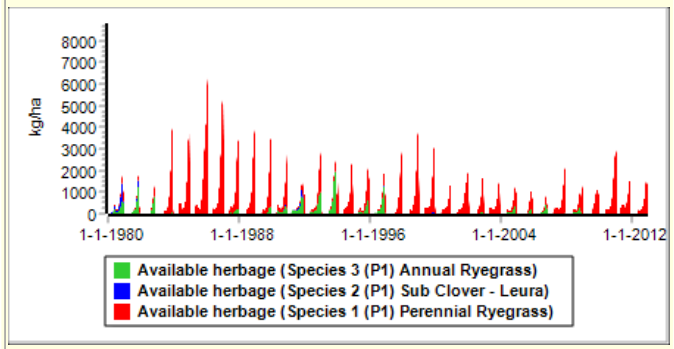
Pasture composition - Paddock 1 [20/ha]

Green available herbage by species (kg DM/ha) *[1/01/1980 - 31/12/2012]*



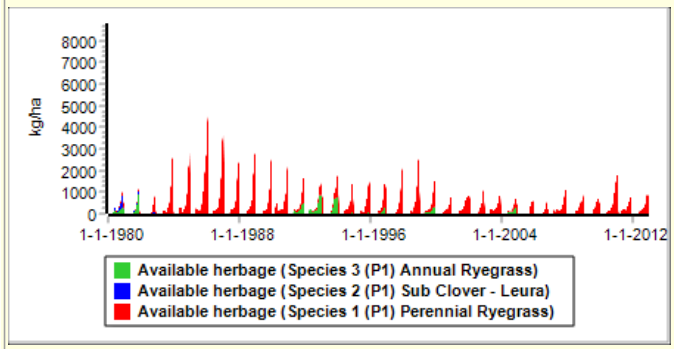
Pasture composition - Paddock 1 [30/ha]

Green available herbage by species (kg DM/ha) *[1/01/1980 - 31/12/2012]*



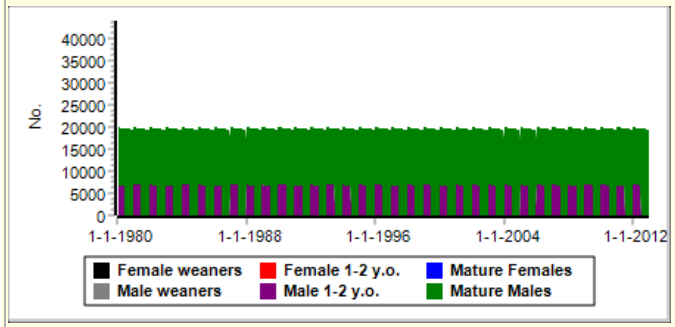
Pasture composition - Paddock 1 [40/ha]

Green available herbage by species (kg DM/ha) *[1/01/1980 - 31/12/2012]*



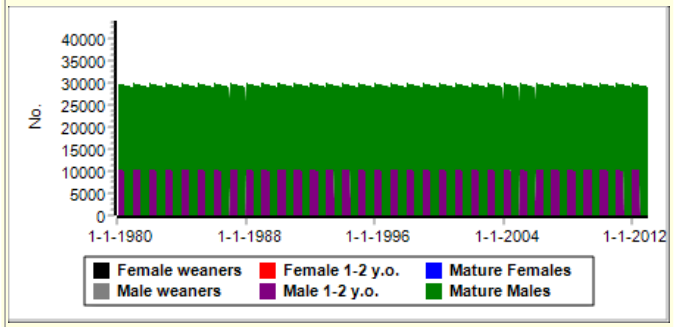
Stock numbers - main flock [20/ha]

Total number of head *[1/01/1980 - 31/12/2012]*



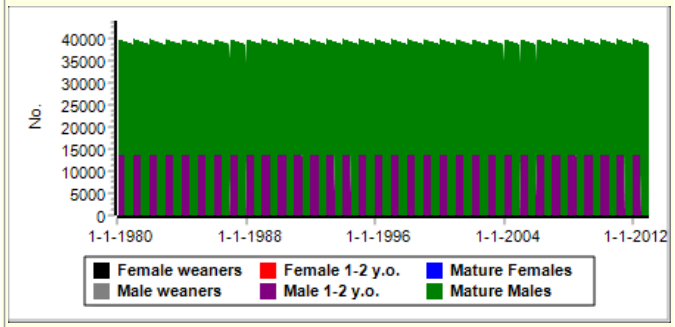
Stock numbers - main flock [30/ha]

Total number of head *[1/01/1980 - 31/12/2012]*



Stock numbers - main flock [40/ha]

Total number of head *[1/01/1980 - 31/12/2012]*

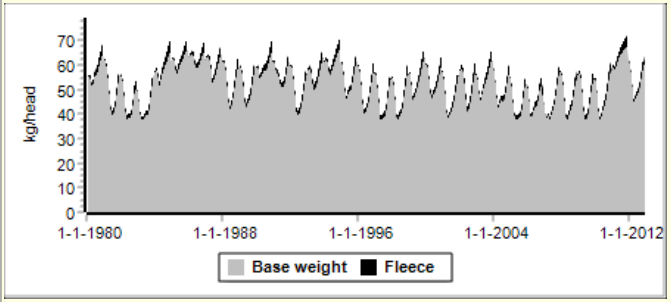


Livestock live weight - main flock [20/ha]

Livestock live weight - main flock [30/ha]

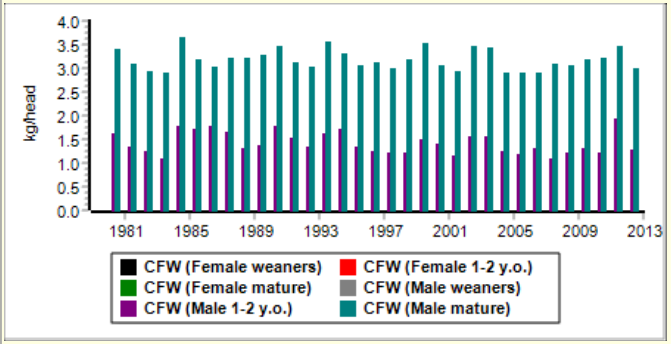
Livestock live weight - main flock [40/ha]

Livestock - live weight (kg/head) *[1/01/1980 - 31/12/2012]*



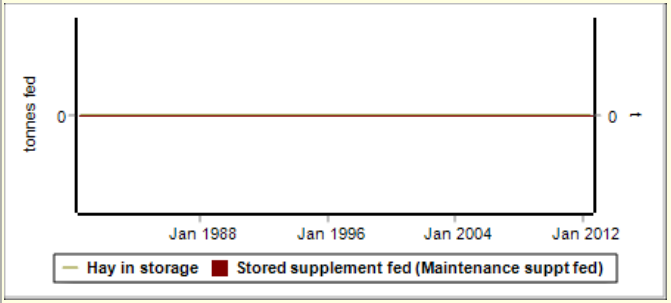
Fleece weight of main flock [20/ha]

Clean fleece weight shorn for each year (kg/head) *[1 Jan - 31 Dec, 1980-2012]*



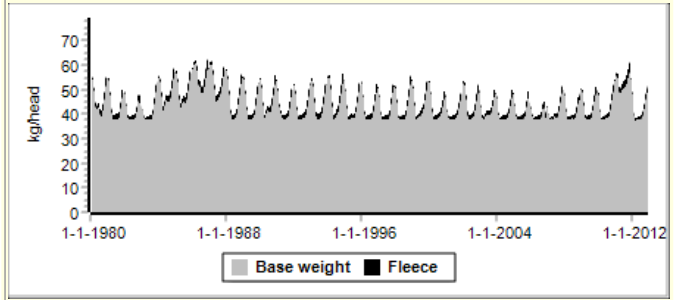
Fodder in storage [20/ha]

Fodder storage and monthly amount fed *[1/07/1980 - 31/07/2012]*



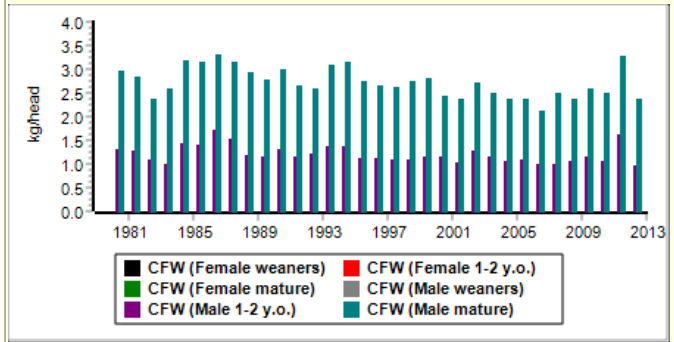
Supplement intake of main flock by type

Livestock - live weight (kg/head) *[1/01/1980 - 31/12/2012]*



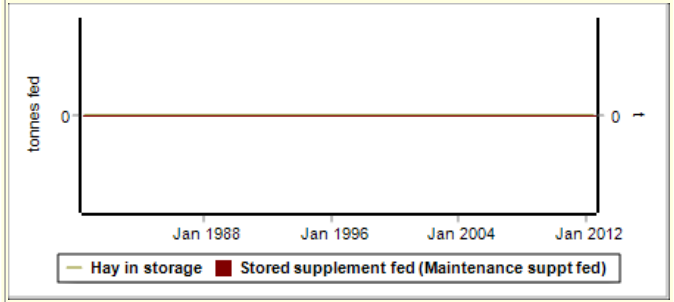
Fleece weight of main flock [30/ha]

Clean fleece weight shorn for each year (kg/head) *[1 Jan - 31 Dec, 1980-2012]*



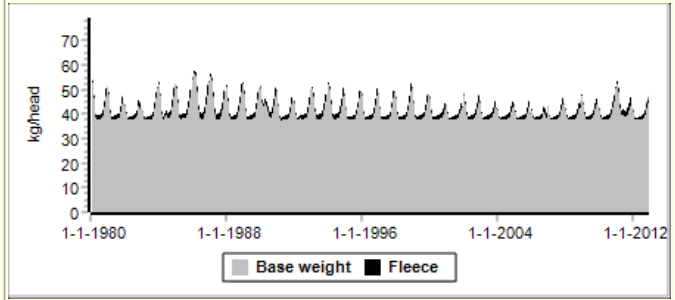
Fodder in storage [30/ha]

Fodder storage and monthly amount fed *[1/07/1980 - 31/07/2012]*



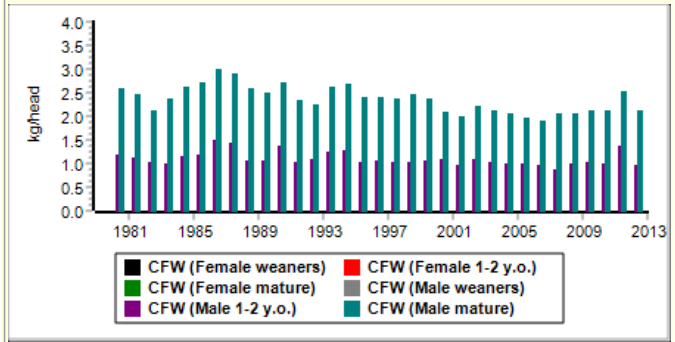
Supplement intake of main flock by type

Livestock - live weight (kg/head) *[1/01/1980 - 31/12/2012]*



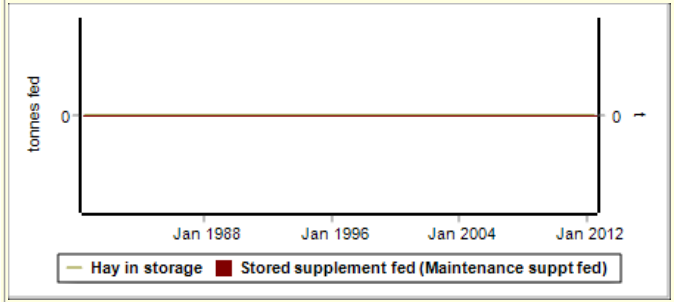
Fleece weight of main flock [40/ha]

Clean fleece weight shorn for each year (kg/head) *[1 Jan - 31 Dec, 1980-2012]*



Fodder in storage [40/ha]

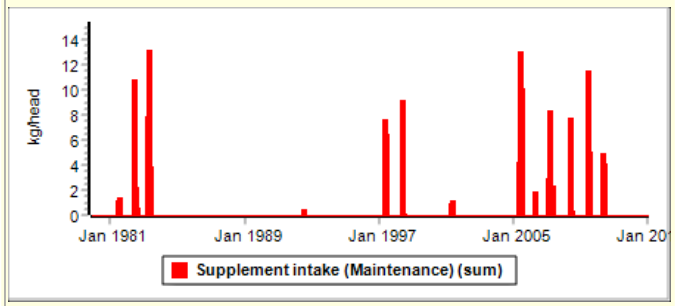
Fodder storage and monthly amount fed *[1/07/1980 - 31/07/2012]*



Supplement intake of main flock by type

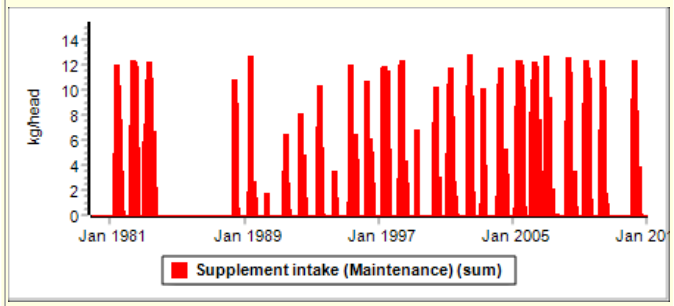
[20/ha]

Total monthly intake of supplement (kg/head/month) *[1/01/1980 - 31/12/2012]*



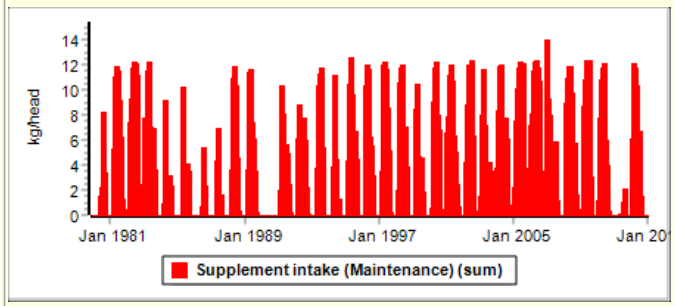
[30/ha]

Total monthly intake of supplement (kg/head/month) *[1/01/1980 - 31/12/2012]*



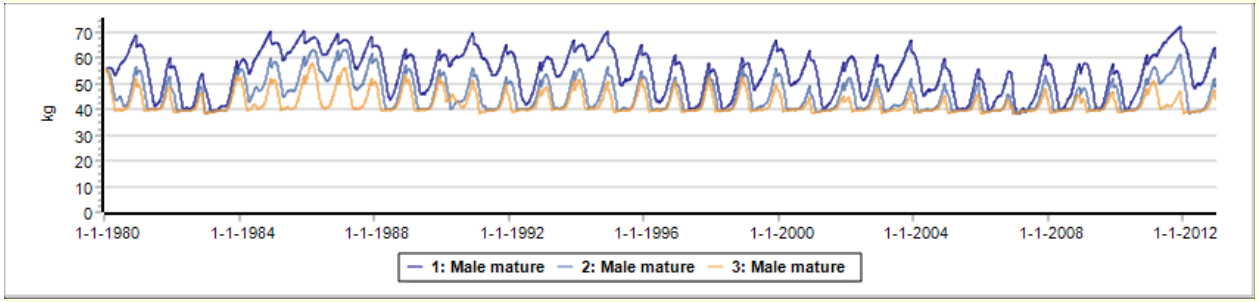
[40/ha]

Total monthly intake of supplement (kg/head/month) *[1/01/1980 - 31/12/2012]*



Livestock male live weight - main flock for all treatments.

Live weight of mature animals *[1/01/1980 - 31/12/2012]*



Treatment	*Stocking rate*
1	20/ha
2	30/ha
3	40/ha

Farm system description

Initial values for base Farm System used in this analysis

	Farm System
Name	Wethers @ Hamilton VIC
Description	Stock: Finewool Merino wethers
Enterprise type	Wether
Initial state	1 Jan 1980
Tested	Over 1 Jan 1980 to 31 Dec 2008

Passed	Yes
Pasture parameters	*standard*, last edited 30 Jan 2013 by Andrew Moore
Animal parameters	*standard*, last edited 30 Jan 2013 by Andrew Moore

Property: Hamilton PVI

Number of paddocks	1
Total area	1000 ha
No initial fodder store	

Weather: Hamilton (VIC)

Weather station	Hamilton (VIC)
Latitude	37°50'S
Longitude	142°04'E
Data period	1 Jan 1957 to 31 Dec 2017
Last edited	15 Feb 2018
CO2 concentration	350.0 ppm (default)

Paddock: Paddock 1

Area	1000.0 ha
Steepness	Level
Fertility	0.80
Reduce wind to	100%

Soil: Hamilton PVI

Description	Silty clay loam over clay (White)
Soil albedo	0.17
Soil evaporation	3.5 mm/d^{½}
SCS runoff curve no.	Using default

	Topsoil	**Subsoil**
Cumulative depth (mm)	250	1000
Field capacity (m^3/m^3)	0.32	0.48
Wilting point (m^3/m^3)	0.13	0.33
Bulk density (Mg/m^3)	1.06	1.33
Saturated conductivity (mm/hr)	8.30	1.00
Initial water (m^3/m^3)	0.15	0.38

Pasture: Perennial ryegrass - sub clover-annual grass

Population	**Perennial Ryegrass**	**Sub Clover - Leura**	**Annual Ryegrass**
Phenology	S. Dormant (0)	Senescent	Senescent
Live DM (kg/ha)	0	0	0
Standing dead DM (kg/ha)	4002	2000	500
Litter DM (kg/ha)	500	200	200
Below ground DM (kg/ha)	200	0	0
Max. rooting depth (mm)	700	400	500
Seed DM (kg/ha)	-	100	150

Livestock: Finewool Merino wethers

Breed	Small Merino

Standard reference weight	45.0	kg
Greasy fleece weight	4.00	kg
Fibre diameter	18.0	microns
Fleece yield	73	%
Death rate: adults	3.0	%/year
Death rate: weaners	3.0	%/year

Using default values for initial animal and fleece weights

Management policy: Wethers

Stocking rate		
	Description	20 wethers/ha
	Rate	20.0/ha
Shearing date		
	Description	15 Dec
	Main flock	15 Dec
Replacement rule		
	Description	Cull Dec, buy Jan
	Purchase	Purchase wethers on 1 Jan at age 18 months, live weight 55 kg and C.S. 3.0
	Cast for age	Sell stock aged 4 to 5 years on 31 Dec

Maintenance Feeding rule: Wether Maintenance Feeding rule

Description	Maintain condition when < score 1.0 (weaners < score 2.0)
Main flock/herd	
Mature Males	Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to 31 Dec feed to maintain condition of the thinnest animals
Immature Males	Feed in paddock, applying the rule: If animal condition falls to 1.0 during 1 Jan to 31 Dec feed to maintain condition of the thinnest animals
Weaner flock/herd	
Weaners	Feed in paddock, applying the rule: If animal condition falls to 2.0 during 1 Jan to 31 Dec feed to maintain condition of the thinnest animals
Supplement	**Supplement: Wheat, whole**

Ingredient	**Wheat, whole**
Proportion of mix (%)	100
Dry matter content (%)	89
Dry matter digestibility (%)	90
ME:DM (MJ/kg)	13.8
Crude protein (%)	14
Rumen-degradable protein (%)	92

Production Feeding rule: Nil Production Feeding

Feeding rule	none

Pasture rule

Description	reset 5 Apr
Reset on	5 Apr
No irrigation	

Costs: Sheep costs -Merino

Wether Shearing		$6.00	/head
Wether Husbandry		$2.00	/head
Wether Replacement		$45.00	/head
Sheep sales commission		5.00	%
Sheep sales cost		$2.00	/head
Hay Fixed cost		$0.00	/ha cut
Hay Variable cost		$0.00	/tonne FW stored
Pasture costs	Fertilty scalar = 0.60	$30.00	/ha
	Fertilty scalar = 0.70	$40.00	/ha
	Fertilty scalar = 0.80	$50.00	/ha
	Fertilty scalar = 0.90	$60.00	/ha
Irrigation water		$0.00	/ML
Supplement costs	Barley, whole	$185.00	/t
	Canola meal	$270.00	/t
	Cottonseed meal	$250.00	/t
	Cottonseed, whole	$170.00	/t
	Peas	$190.00	/t
	Hay	$95.00	/t
	Lupins	$230.00	/t
	Molasses	$47.00	/t
	Oats, whole	$170.00	/t
	Sorghum, whole	$180.00	/t
	Triticale, whole	$190.00	/t
	Wheat, whole	$195.00	/t
	Pea straw	$95.00	/t

Prices: Merino prices -fine wool

Description	Fine wool prices 2002-07 (50%ile) 75-84mm, 35-39 N/ktex (Independent Commodity Services P/L)		
Wool prices for wethers	16 micron	1915	c/kg
	17 micron	1375	c/kg
	19 micron	990	c/kg
	20 micron	885	c/kg
	Av. Fleece Price	85.0	%
	Wool commission	5.0	%
Wether sales	Base price	120.0	c/kg
	Dressing percentage	46.0	%
	Skin price	$4.00	/head
Hay sales	Price	$0.00	/tonne

GrassGro 3.3.9. Build 29 Nov 2018