

# Impact of possible environmental policy interventions on case study farms

## VOLUME 2 OF 2: APPENDICES

MRB final report to the Ministry for the Environment

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# 1. Appendices

## 1.1. Status Quo

### 1.1.1. Red meat / hill country

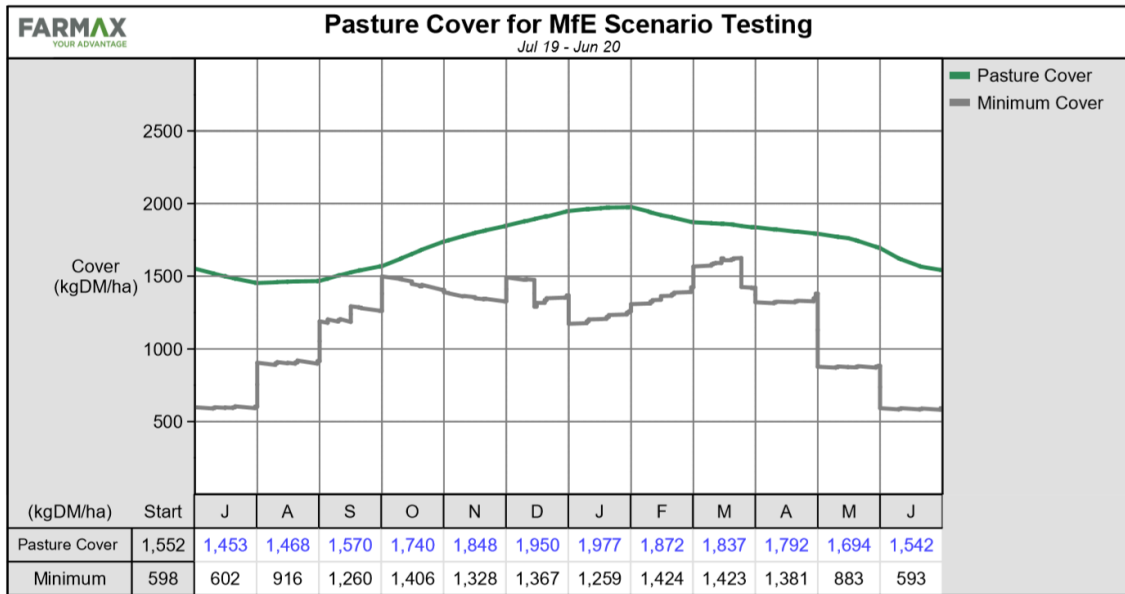
#### 1.1.1.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	MFE - Red Meat	File Name	Red Meat	
Business Year	Status Quo	Date Printed	24/05/2019	
Total Farm Area (ha)	598	Prepared By:	Mark Everest	
Total Effective Area (ha)	598	Stocking Rate:	5.4	
Total Stock Units Wintered:	3,228			
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes	1,100	Cows	130	
Ewe Hoggets	300	Heifers	30	
Male Hoggets		Heifer Calves	75	
Wethers		Male Calves	75	
Rams	15	Steers/Bulls		
		Bulls	5	
TOTAL SHEEP	1,415	TOTAL CATTLE	315	
Sheep stock units	1,631	Cattle stock units	1,598	
Lambing percentage	133.1	Calving percentage		
Wool/sheep S.U.	5.2	Cows in Milk		
Av. Wool Price/kg	364.0	kgMS /cow		
		kgMS /ha		
SHEEP INCOME/SU	136.4	CATTLE INCOME/SU	96.8	
<b>DEER</b>		<b>PRODUCE</b>		
M.A. Hinds		Crop	Area	Yield/Ha
R 2yr Hinds		M.Wheat		
R 1yr Hinds		F.Wheat		
R1yr Stags		Oats		
R 2yr Stags		Barley		
M.A. Stags		Peas		
		Other Grain		
TOTAL DEER		Grass Seed 1.		
Deer stock units		Grass Seed 2.		
Fawning percentage		Clover		
Velvet/stag		Other Small Seed		
Av. Velvet Price/kg				
		TOTAL AREA		
DEER INCOME/SU		PRODUCE INCOME/HA		
<b>FINANCIAL INDICES</b>				
	Total \$	\$/ha	\$/su	
Total Cash Farm Income	381,096	637	118.1	
Change in Value of Stock on Hand				
Change in Value of Produce on Hand				
Gross Farm Income	381,096	637	118.1	
Farm Working Expenses	274,065	458	84.9	
Earnings Before Interest, Drawings and Tax	107,031	179	33	
Total Debt Servicing	47,593	80	15	
Farm Working Expenses as a % of Gross Farm Income		71.9		
Debt Servicing as % of Gross Farm Income		12.5		
Debt Servicing as % of EBIT		44.5		

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY			
		3,228 Su or Ha			
	TOTAL \$	\$ per Su		TOTAL \$	\$ per Su
WAGES	90,500	28.0	SHEEP	224,278	
ANIMAL HEALTH	13,685	4.2	WOOL	26,983	
STOCKFEED PURCHASED			CATTLE	170,581	
OTHER STOCK EXPENSES	4,842	1.5	MILK		
FEED CONSERVATION	3,680	1.1	DEER		
CONTRACTING	16,000	5.0	VELVET		
CARTAGE	1,154	0.4	GRAIN AND PULSE PRODUCE		
FERTILISER & LIME	46,681	14.5	Previous Yr Sales		
SEEDS & TREATMENT	11,298	3.5	Current Yr Sales		
SACKS & SEED DRESSING			Unsold At Year End		
WEED & PEST CONTROL	21,483	6.7	SMALL SEED PRODUCE		
REPAIRS & MAINTENANCE	10,600	3.3	Previous Yr Sales		
VEHICLE EXPENSES	17,158	5.3	Current Yr Sales		
ELECTRICITY	7,360	2.3	Unsold At Year End		
OTHER WORKING EXPS			MISCELLANEOUS INCOME	4,055	
ADMINISTRATION	12,500	3.9			
STANDING CHARGES	17,125	5.3	STOCK PURCHASES		
			Sheep	-28,800	
			Cattle	-16,000	
			Deer		
			Other		
<b>CASH FARM WORKING EXPENSES</b>	<b>274,065</b>	<b>84.9</b>	<b>CASH FARM INCOME</b>	<b>381,096</b>	<b>118.1</b>
<b>CASH FARM WORKING PROFIT</b>	<b>107,031</b>	<b>33.2</b>			
DEBT SERVICING					
Mortgage	43,578	13.5			
Term Interest					
Current Account	4,015	1.2			
Rent					
Other					
<b>CASH OPERATING EXPENSES</b>	<b>321,659</b>	<b>99.6</b>	<b>CASH OPERATING INCOME</b>	<b>381,096</b>	<b>118.1</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>59,437</b>	<b>18.4</b>			
PERSONAL DRAWINGS			NON OPERATING INCOME		
OTHER PERSONAL					
TAXATION	6,506	2.0			
CAPITAL PURCHASES & PAYMENTS	37,750	11.7	INVESTMENT INCOME		
INVESTMENTS					
UNPAID ACCOUNTS					
<b>TOTAL CASH EXPENDITURE</b>	<b>365,915</b>	<b>113.4</b>	<b>TOTAL CASH INCOME</b>	<b>381,096</b>	<b>118.1</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>15,181</b>	<b>4.7</b>			
Change in value of stock on hand					
Change in value of produce on hand					
Depreciation					
<b>TRUE SURPLUS/DEFICIT</b>	<b>15,181</b>	<b>4.7</b>			

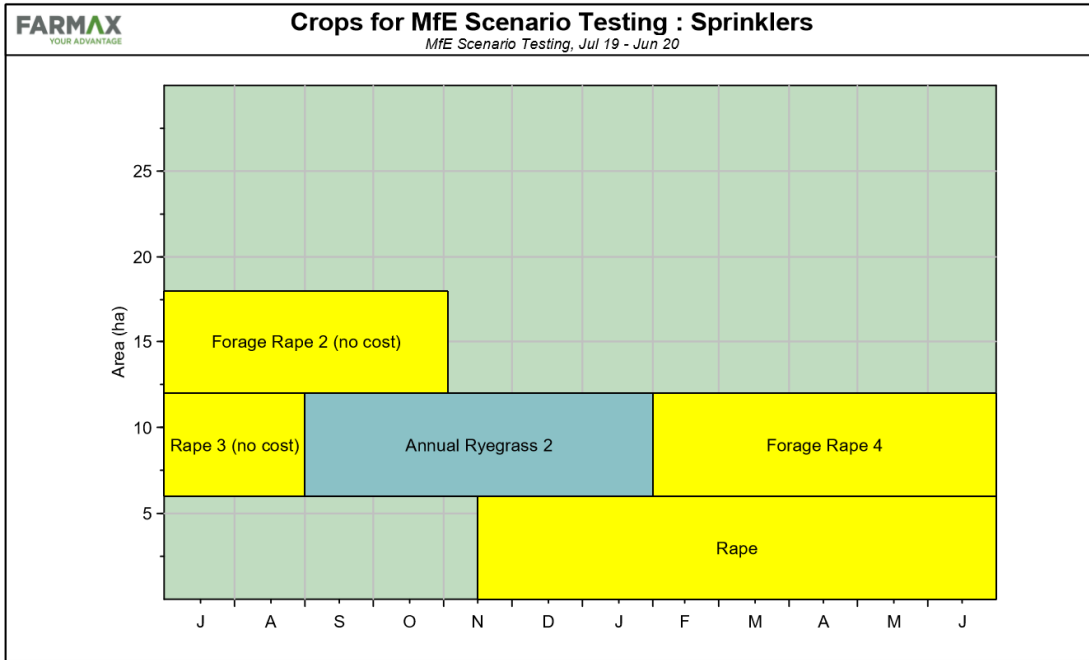
### 1.1.1.2. Farmax biophysical modelling

**Figure 1.1.1.2.1.** Red Meat / Hill Country: Status Quo. Average pasture covers, whole farm, long term steady-state basis.

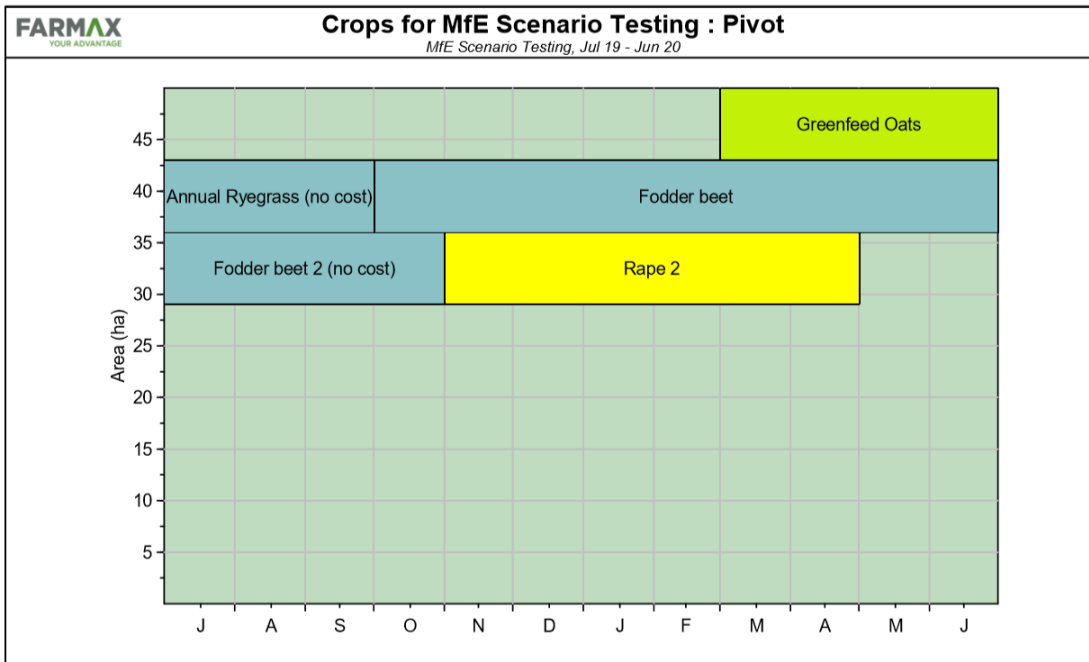


**Figure 1.1.1.2.2.** Red Meat / Hill Country: Status Quo. Fodder crops, long term steady-state basis. **a)** sprinkler block, **b)** centre pivot block.

**a)**



**b)**



**Figure 1.1.1.2.3.** Red Meat / Hill Country: Status Quo. Livestock reconciliation.

<b>FARMAX</b> YOUR ADVANTAGE		<b>Stock Reconciliation Reconciliation for MfE Scenario Testing</b>										
		Jul 19 - Jun 20										
Stock Class	Open	Aged Out	Aged In	Born	Wean	Die	Buy	Sell	Tr. In	Tr. Out	Close	
Ewe Lamb					825					525	300	
Ewe Hogget	300									300		
Ewe	1100					30		270	300		1100	
Ram	15										15	
Mixed Lamb					1038		350	1913	525			
<b>Total Sheep</b>	<b>1415</b>				<b>1863</b>	<b>30</b>	<b>350</b>	<b>2183</b>	<b>825</b>	<b>825</b>	<b>1415</b>	
1-Year Heifer					75						75	
2-Year Heifer	75							45		30		
Cow	160					4		26	30		160	
Bull Calf					75						75	
1-Year Bull	75							75				
Bull	5										5	
<b>Total Beef</b>	<b>315</b>				<b>150</b>	<b>4</b>		<b>146</b>	<b>30</b>	<b>30</b>	<b>315</b>	

### 1.1.1.3. Overseer nutrient modelling

**Table 1.1.1.3.1.** Red Meat / Hill Country: Status Quo – Whole farm nutrient budget.

Farm name: Red Meat - Status Quo (Status Quo)

### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	17	5	1	20	73	1	1
Rain/clover N fixation	40	0	3	6	3	7	38
Irrigation	1	0	0	1	3	1	3
Supplements imported	0	0	0	0	0	0	0
<b>Nutrients removed</b>							
As products	4	1	0	1	1	0	0
Exported effluent	0	0	0	0	0	0	0
As supplements	0	0	0	0	0	0	0
To atmospheric	19	0	0	0	0	0	0
To water	19	0.4	6	35	24	2	12
<b>Change in internal pools</b>							
Plant material	2	0	0	1	0	0	0
Organic pool	11	7	0	-11	0	0	0
Inorganic mineral	0	0	-24	0	8	-4	-5
Inorganic soil pool	3	-4	22	0	45	10	34



**Table 1.1.1.3.2 Red Meat / Hill Country: Status Quo – Nitrogen block report.**

Farm name: Red Meat - Status Quo (Status Quo)

## Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Hill Oma Tussoc	4976	14	N/A	30	0
Downs ClaTussoc	432	7	2.7	28	0
Downs Cla Dev	589	10	3.8	61	14
Downs Cla PP>WRape	876	146	<b>44.8</b>	60	51
Downs Cla WRape>Pasja/PP	651	109	<b>34.8</b>	53	57
KL PP	203	17	5.1	190	109
KL PP>MG Rape	411	69	<b>21.2</b>	94	88
KL MGRape>Ita/WRape	355	59	<b>16.8</b>	94	98
KL Ita/WRape>PP	83	14	4.1	111	109
pvt PP	527	18	5.1	206	109
pvt PP>Oat/Ita	460	66	<b>18.0</b>	122	84
pvt Oat/Ita>FBeet	970	139	<b>37.7</b>	146	154
pvt FBeet>SRape	713	102	<b>27.2</b>	73	78
DL flat	236	10	3.8	66	14
Lucerne	74	19	7.4	18	0
Other farm sources	31				
Whole farm	11588	19			
Less N removed in wetlands	0				
Farm output	11588	19			

**Table 1.1.1.3.3. Red Meat / Hill Country: Status Quo – Phosphorus block report.**

Farm name: Red Meat - Status Quo (Status Quo)

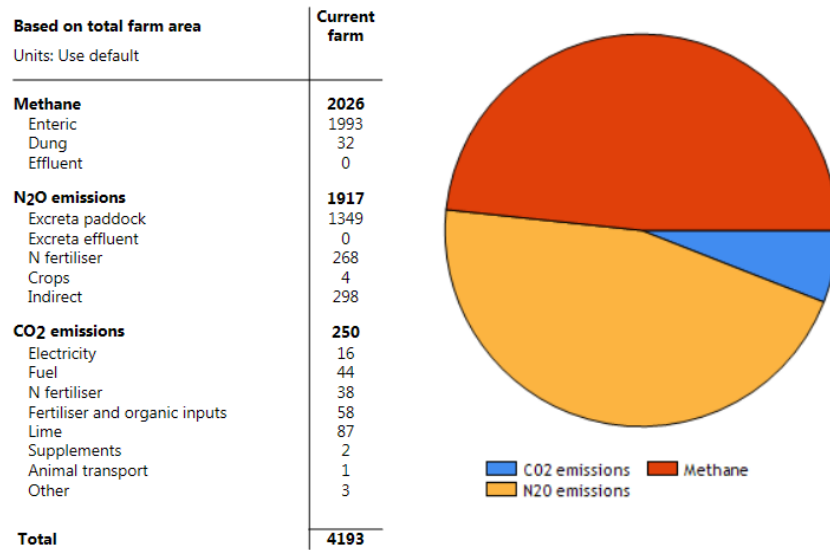
**Block Phosphorus**

Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
Hill Oma Tussoc	140	0.4	Low	n/a	n/a
Downs ClaTussoc	23	0.4	Low	n/a	n/a
Downs Cla Dev	23	0.4	Low	Low	n/a
Downs Cla PP>WRape	2	0.4	n/a	n/a	n/a
Downs Cla WRape>Pasja/PP	2	0.4	n/a	n/a	n/a
KL PP	1	0.1	Low	Low	n/a
KL PP>MG Rape	1	0.1	n/a	n/a	n/a
KL MGRape>Ita/WRape	1	0.1	n/a	n/a	n/a
KL Ita/WRape>PP	1	0.1	n/a	n/a	n/a
pvt PP	12	0.4	Low	Low	n/a
pvt PP>Oat/Ita	6	0.9	n/a	n/a	n/a
pvt Oat/Ita>FBeet	11	1.6	n/a	n/a	n/a
pvt FBeet>SRape	7	1	n/a	n/a	n/a
DL flat	0	0	Low	Low	n/a
Lucerne	0	0	Low	Low	n/a
Other farm sources	31				
Whole farm	260	0.4			

**Table 1.1.1.3.4. Red Meat / Hill Country: Status Quo – Farm greenhouse gas emissions.**

Farm name: Red Meat - Status Quo (Status Quo)

### Farm Greenhouse Gas Emissions



This report has been developed using IPCC global warming potentials

## 1.1.2. Dairy

### 1.1.2.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	MfE	File Name	Dairy - Status Quo	
Business Year	2020-21	Date Printed	5/06/2019	
Total Farm Area (ha)	318	Prepared By:	MRB	
Total Effective Area (ha)	300	Stocking Rate:	3.3	
Total kgMS produced:	434,996			
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes		Cows	1,000	
Ewe Hoggets		Heifers	240	
Male Hoggets		Heifer Calves	250	
Wethers		Male Calves		
Rams		Steers/Bulls		
		Bulls		
TOTAL SHEEP		TOTAL CATTLE	1,490	
Sheep stock units		Cattle stock units	8,200	
Lambing percentage		Calving percentage		
Wool/sheep S.U.		Cows in Milk		
Av. Wool Price/kg		kgMS /cow		
SHEEP INCOME/SU		kgMS /ha	1,450	
		CATTLE INCOME/SU	338	
<b>DEER</b>		<b>PRODUCE</b>		
M.A. Hinds		Crop	Area	Yield/Ha
R 2yr Hinds		M.Wheat		
R 1yr Hinds		F.Wheat		
R1yr Stags		Oats		
R 2yr Stags		Barley		
M.A. Stags		Peas		
		Other Grain		
TOTAL DEER		Grass Seed 1.		
Deer stock units		Grass Seed 2.		
Fawning percentage		Clover		
Velvet/stag		Other Small Seed		
Av. Velvet Price/kg				
		TOTAL AREA		
DEER INCOME/SU		PRODUCE INCOME/HA		
<b>FINANCIAL INDICES</b>				
	Total \$	\$/ha	\$/kgMS	
Total Cash Farm Income	2,911,308	9,704	6.69	
Change in Value of Stock on Hand				
Change in Value of Produce on Hand				
Gross Farm Income	2,911,308	9,704	6.69	
Farm Working Expenses	1,833,772	6,113	4.22	
Earnings Before Interest, Drawings and Tax	1,077,535	3,592	2.48	
Total Debt Servicing	686,584	2,289	1.58	
Farm Working Expenses as a % of Gross Farm Income		63		
Debt Servicing as % of Gross Farm Income		24		
Debt Servicing as % of EBIT		64		

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY			
		434,996 Su or Ha			
	TOTAL \$	\$/kgMS		TOTAL \$	\$/kgMS
WAGES	338,476	0.78	SHEEP		
ANIMAL HEALTH	123,000	0.28	WOOL		
STOCKFEED PURCHASED	635,260	1.46	CATTLE	208,300	
OTHER STOCK EXPENSES	77,530	0.18	MILK	2,609,973	
FEED CONSERVATION	3,240	0.01	DEER		
CONTRACTING	3,990	0.01	VELVET		
CARTAGE	2,740	0.01	GRAIN AND PULSE PRODUCE		
FERTILISER & LIME	195,218	0.45	Previous Yr Sales		
SEEDS & TREATMENT	39,000	0.09	Current Yr Sales		
SACKS & SEED DRESSING			Unsold At Year End		
WEED & PEST CONTROL	2,455	0.01	SMALL SEED PRODUCE		
REPAIRS & MAINTENANCE	100,075	0.23	Previous Yr Sales		
VEHICLE EXPENSES	52,500	0.12	Current Yr Sales		
ELECTRICITY	80,650	0.19	Unsold At Year End		
OTHER WORKING EXPS	15,330	0.04	MISCELLANEOUS INCOME	137,033	
ADMINISTRATION	35,000	0.08			
STANDING CHARGES	129,308	0.30	STOCK PURCHASES		
			Sheep		
			Cattle	-44,000	
			Deer		
			Other		
<b>CASH FARM WORKING EXPENSES</b>	<b>1,833,772</b>	<b>4.22</b>	<b>CASH FARM INCOME</b>	<b>2,911,306</b>	<b>6.69</b>
<b>CASH FARM WORKING PROFIT</b>	<b>1,077,535</b>	<b>2.48</b>			
<b>DEBT SERVICING</b>					
Mortgage	681,750	1.57			
Term Interest					
Current Account	4,834	0.01			
Rent					
Other					
<b>CASH OPERATING EXPENSES</b>	<b>2,520,356</b>	<b>5.79</b>	<b>CASH OPERATING INCOME</b>	<b>2,911,306</b>	<b>6.69</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>390,951</b>	<b>0.90</b>			
<b>PERSONAL DRAWINGS</b>			<b>NON OPERATING INCOME</b>		
OTHER PERSONAL					
TAXATION	87,773	0.20			
CAPITAL PURCHASES & PAYMENTS	98,375	0.23	INVESTMENT INCOME		
INVESTMENTS					
UNPAID ACCOUNTS					
<b>TOTAL CASH EXPENDITURE</b>	<b>2,706,504</b>	<b>6.22</b>	<b>TOTAL CASH INCOME</b>	<b>2,911,306</b>	<b>6.69</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>204,803</b>	<b>0.47</b>			
Change in value of stock on hand					
Change in value of produce on hand					
Depreciation					
<b>TRUE SURPLUS/DEFICIT</b>	<b>204,803</b>	<b>0.47</b>			

### 1.1.2.2. Farmax biophysical modelling

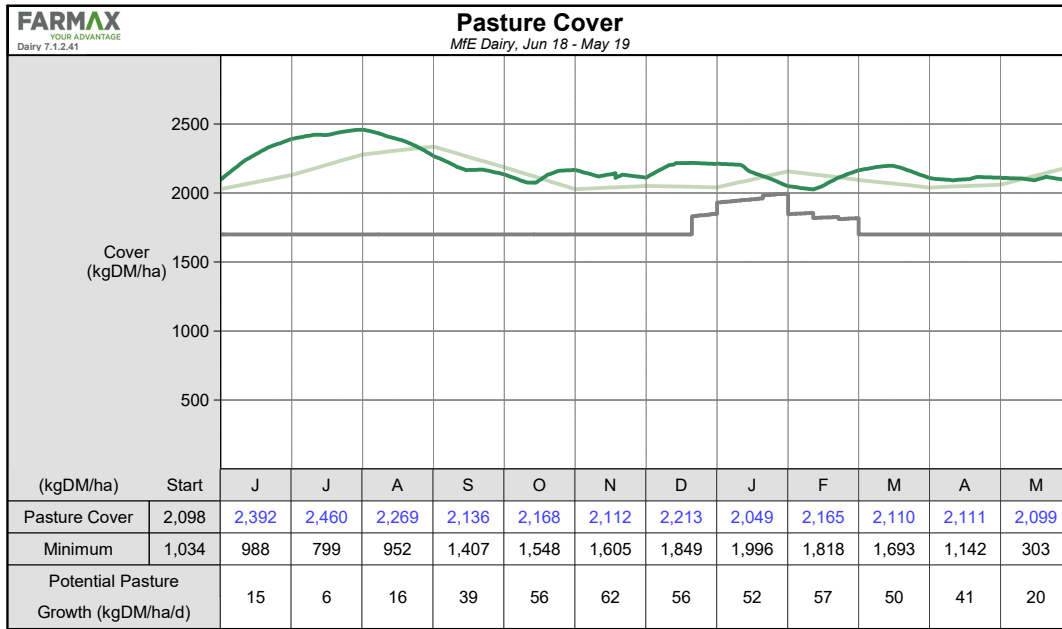
**Figure 1.1.2.2.1.** Dairy: Status Quo. Farmax biophysical summary of the dairy farm program, long term steady-state basis.

<b>FARMAX</b> YOUR ADVANTAGE Dairy 7.1.2.41		<b>Physical Summary for MfE Dairy</b> Jun 18 - May 19	
<b>Category</b>	<b>Description</b>	<b>Value</b>	<b>Units</b>
<b>Farm</b>	Effective Area	300	ha
	Stocking Rate	3.3	cows/ha
	Potential Pasture Growth	14.2	t DM/ha
	Nitrogen Use	215	kg N/ha
	Feed Conversion Efficiency (eaten)	10.6	kg DM eaten/kg MS
<b>Herd</b>	Cow Numbers (1st July)	1,030	cows
	Peak Cows Milked	1,000	cows
	Days in Milk	0	days
	Avg. BCS at calving	4.9	BCS
	Liveweight	1,421	kg/ha
<b>Production (to Factory)</b>	Milk Solids total	434,996	kg
	Milk Solids per ha	1,450	kg/ha
	Milk Solids per cow	435	kg/cow
	Peak Milk Solids production	2.01	kg/cow/day
	Milk Solids as % of live weight	102.0	%
<b>Feeding</b>	Pasture Eaten per cow *	3.6	t DM/cow
	Supplements Eaten per cow *	0.4	t DM/cow
	Off-farm Grazing Eaten per cow *	0.6	t DM/cow
	Total Feed Eaten per cow *	4.6	t DM/cow
	Pasture Eaten per ha	12.0	t DM/ha
	Supplements Eaten per ha	1.5	t DM/ha
	Off-farm Grazing Eaten per ha	3.8	t DM/ha
	Total Feed Eaten per ha	17.2	t DM/ha
	Supplements and Grazing / Feed Eaten *	23.0	%
	Bought Feed / Feed Eaten *	4.2	%

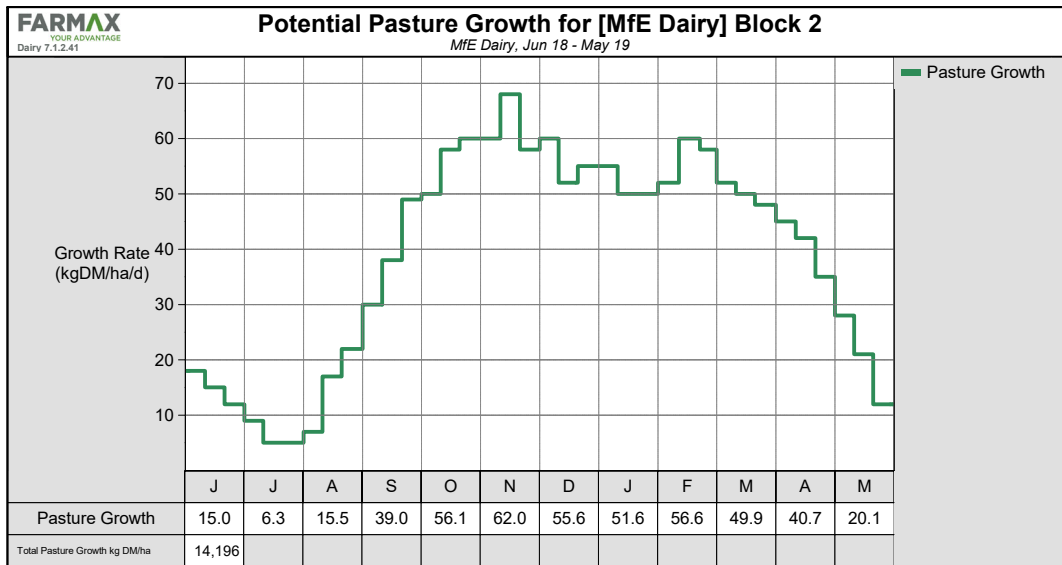
(\*) feed eaten by females > 20 months old / peak cows milked

**Figure 1.1.2.2. Dairy: Status Quo. a) Average pasture covers, b) Potential base pasture growth of dairy platform excluding nitrogen.**

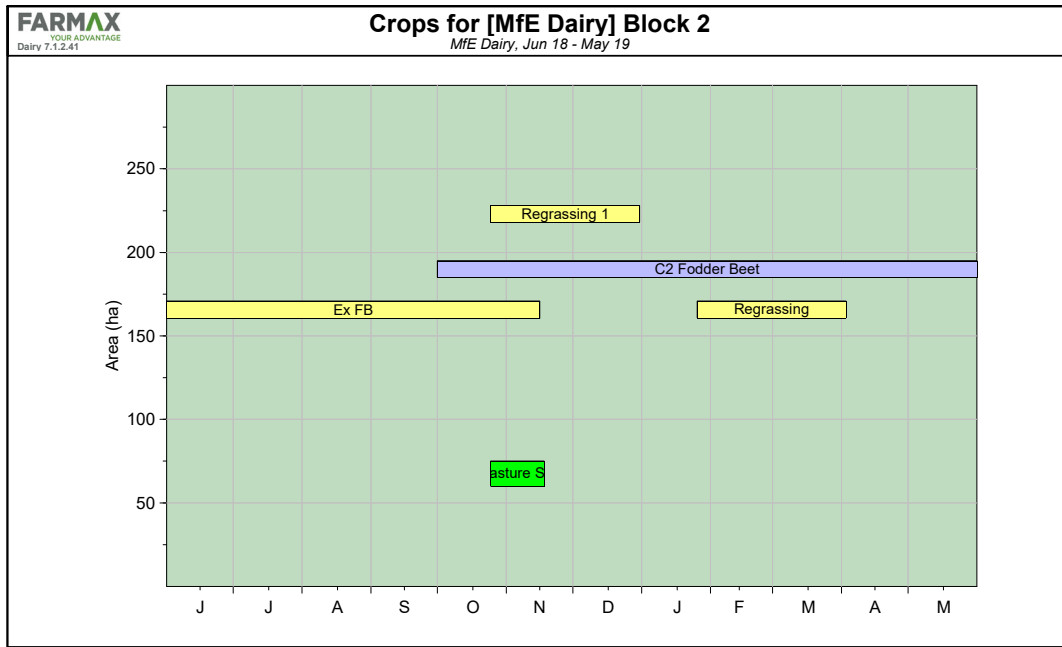
a)



b)



**Figure 1.1.2.2.3.** Dairy: Status Quo. Crops and silage, whole farm, long term steady-state basis.



**Figure 1.1.2.2.4.** Dairy: Status Quo. Supplements used.

FARMAX YOUR ADVANTAGE Dairy 7.1:2.41		Supplement Usage Summary for MfE Dairy													kg	
		Jun 18 - May 19														
Feed	tonnes DM offered													Total	/milker	
	Jun 18	Jul 18	Aug 18	Sep 18	Oct 18	Nov 18	Dec 18	Jan 19	Feb 19	Mar 19	Apr 19	May 19				
F4 Hay/Straw bought		0	20	8										28	28	
C2 Fodder Beet											68	131	199	199		
F1 Meal and Grains bought		1	13	20	15	30	20		14	15	5		133	133		
F2 Pasture Silage		3	60	39									37	139	139	
<b>Total</b>													<b>498</b>	<b>498</b>		



Figure 1.1.2.2.5. Dairy: Status Quo. Feed offered to milking cows, long term steady-state basis.

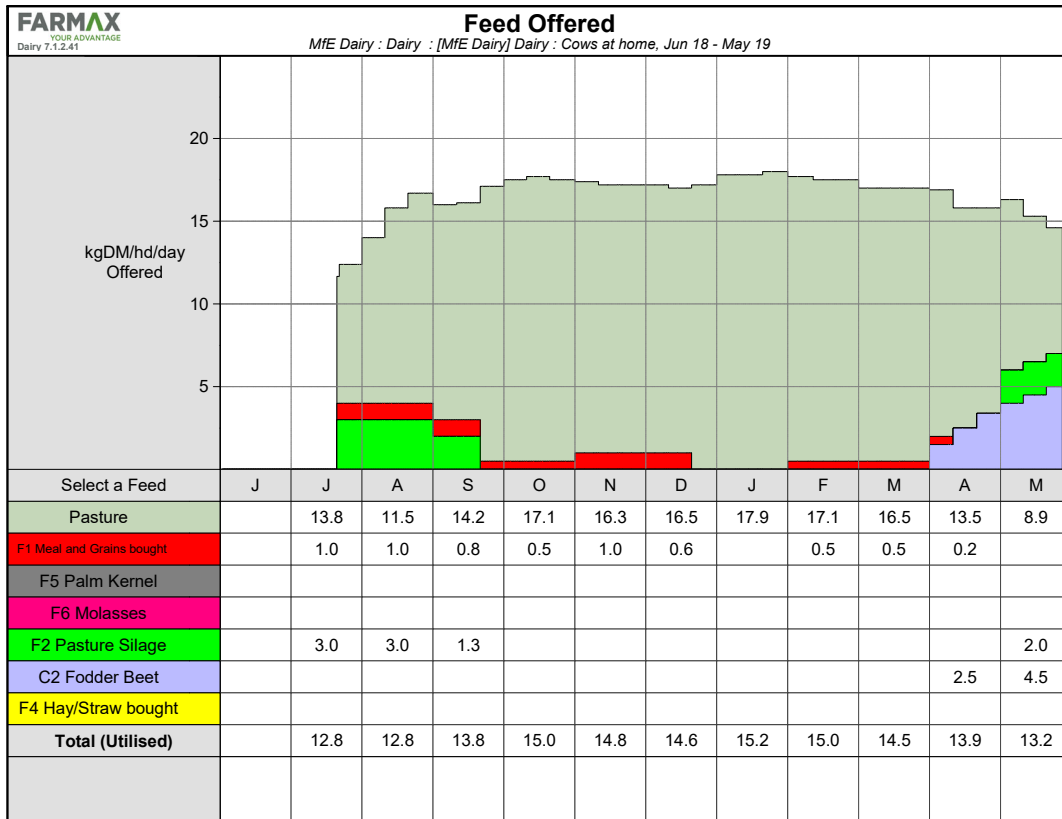
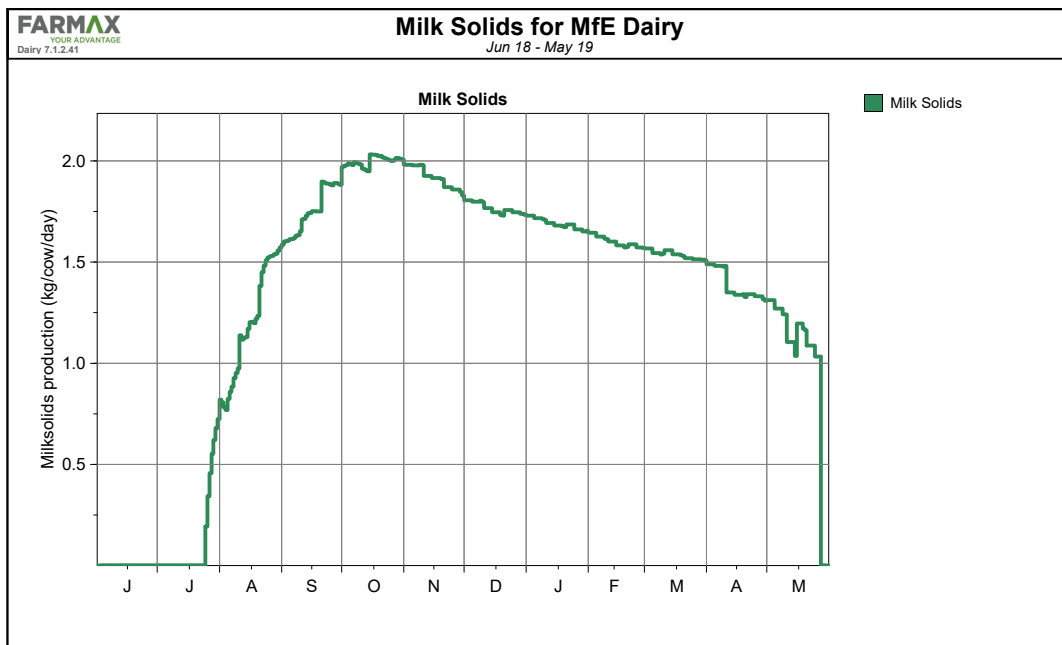


Figure 1.1.2.2.6. Dairy: Status Quo. Lactation curve. Long-term steady state basis.



### 1.1.2.3. Overseer nutrient modelling

**Table 1.1.2.3.1** Dairy: Status Quo – Whole farm nutrient budget.

Farm name: MFE Dairy model base Overseer file (2019/20)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	215	23	2	43	58	7	1
Rain/clover N fixation	116	0	2	4	2	4	19
Irrigation	11	0	7	11	39	9	40
Supplements imported	19	3	12	2	3	1	1
<b>Nutrients removed</b>							
As products	93	16	22	5	20	2	6
Exported effluent	0	0	0	0	0	0	0
As supplements	2	0	2	0	0	0	0
To atmospheric	96	0	0	0	0	0	0
To water	66	1.5	10	57	73	4	13
<b>Change in internal pools</b>							
Plant material	-1	0	-5	1	0	0	0
Organic pool	102	15	0	-4	0	0	0
Inorganic mineral	0	0	-40	0	-1	-1	-2
Inorganic soil pool	4	-6	34	0	11	20	44

**Table 1.1.2.3.2 Dairy: Status Quo – Nitrogen block report.**

Farm name: MFE Dairy model base Overseer file (2019/20)

**Block Nitrogen**

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
(F) Eff S.Pivot Darn_4a.2	1438	48	<b>24.0</b>	301	359
(F) Eff K Line Darn_4a.2	489	122	<b>29.1</b>	368	359
(F) Eff S.Pivot Darn_4a.2	401	50	<b>25.1</b>	314	359
(F) Eff Kline Darn_4a.2	489	122	<b>29.1</b>	368	359
(F) Non Eff Pivot Darn_4a.2	828	36	<b>18.1</b>	227	245
(F)Non Eff K Line Darn_4a.2	2329	93	<b>22.3</b>	260	245
(F) Non Eff K Line Darn_4a.2	497	99	<b>23.8</b>	280	245
(F) Non Eff K Line Raka_2a.1	1455	112	<b>26.3</b>	278	245
(F) Eff K Line Raka_2a.1	1707	131	<b>30.6</b>	348	325
(R) Non Eff K Line Timu_1a.1	6223	76	<b>19.2</b>	255	245
(F) Eff Pivot Darn_4a.2 ##	1106	41	<b>22.6</b>	288	325
Trees and Scrub	22	2	N/A		
NB Pasture K Line Darn_4a.2	772	96	<b>23.1</b>	271	245
NB Pasture K Line Darn_4a.2	221	110	<b>26.4</b>	316	245
NB Pasture Pivot Darn_4a.2 ##	997	32	<b>21.0</b>	222	245
NB Pasture Pivot Darn_4a.2 ##	186	33	<b>22.1</b>	240	245
Fodder Beet	1812	181	<b>86.3</b>	-12	116
Other farm sources	47				
Whole farm	21017	66			
Less N removed in wetlands	0				
Farm output	21017	66			

**Table 1.1.2.3.3 Dairy: Status Quo – Phosphorus block report.**

Farm name: MFE Dairy model base Overseer file (2019/20)

## Block Phosphorus

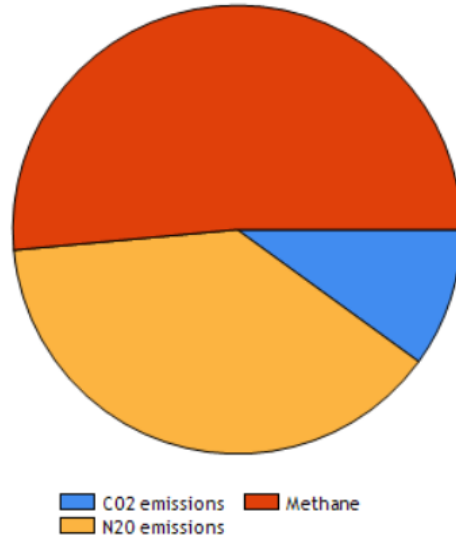
Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
(F) Eff S.Pivot Darn_4a.2	8	0.3	Low	Low	Low
(F) Eff K Line Darn_4a.2	2	0.6	Low	Low	Low
(F) Eff S.Pivot Darn_4a.2	2	0.3	Low	Low	Low
(F) Eff Kline Darn_4a.2	2	0.6	Low	Low	Low
(F) Non Eff Pivot Darn_4a.2	6	0.3	Low	Low	n/a
(F)Non Eff K Line Darn_4a.2	14	0.6	Low	Low	n/a
(F) Non Eff K Line Darn_4a.2	3	0.6	Low	Low	n/a
(F) Non Eff K Line Raka_2a.1	24	1.8	High	Medium *	n/a
(F) Eff K Line Raka_2a.1	25	1.9	High	Medium	Medium
(R) Non Eff K Line Timu_1a.1	195	2.4	High	High *	n/a
(F) Eff Pivot Darn_4a.2 ##	7	0.3	Low	Low	Low
Trees and Scrub	1	0.1	n/a	n/a	n/a
NB Pasture K Line Darn_4a.2	5	0.6	Low	Low	n/a
NB Pasture K Line Darn_4a.2	1	0.6	Low	Low	n/a
NB Pasture Pivot Darn_4a.2 ##	4	0.1	Low	Low	n/a
NB Pasture Pivot Darn_4a.2 ##	1	0.1	Low	Low	n/a
Fodder Beet	3	0.3	n/a	n/a	n/a
Other farm sources	160				
<b>Whole farm</b>	<b>463</b>	<b>1.5</b>			

**Table 1.1.2.3.4. Dairy: Status Quo – Farm greenhouse gas emissions.**

Farm name: MFE Dairy model base Overseer file (2019/20)

## Farm Greenhouse Gas Emissions

Based on total farm area	Current farm
Units: CO2 equivalents (kg/ha/yr)	
<b>Methane</b>	<b>8919</b>
Enteric	8775
Dung	103
Effluent	41
<b>N<sub>2</sub>O emissions</b>	<b>6680</b>
Excreta paddock	3868
Excreta effluent	19
N fertiliser	1691
Crops	3
Indirect	1099
<b>CO<sub>2</sub> emissions</b>	<b>1735</b>
Electricity	333
Fuel	72
N fertiliser	835
Fertiliser and organic inputs	86
Lime	0
Supplements	279
Animal transport	5
Other	125
<b>Total</b>	<b>17334</b>



### 1.1.3. Dairy support

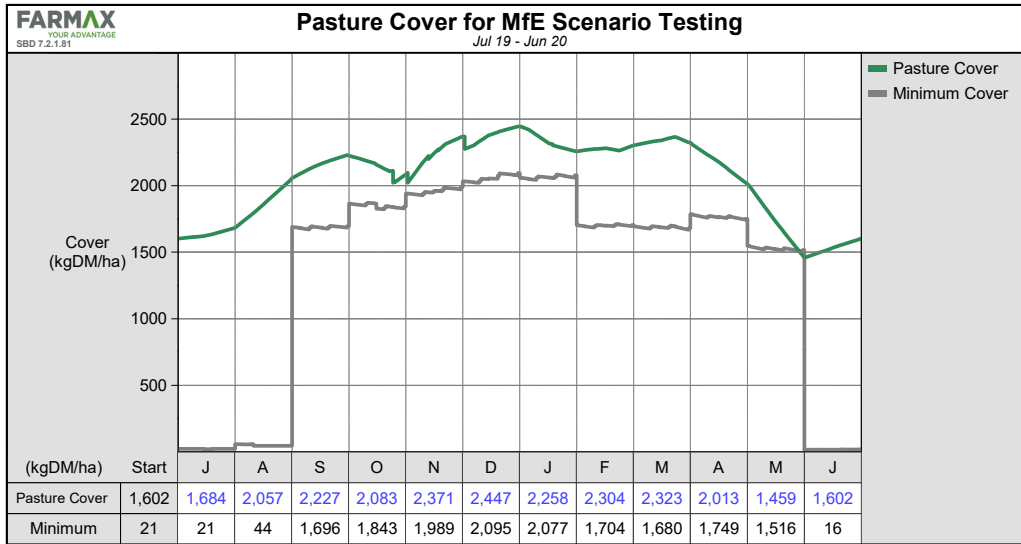
#### 1.1.3.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	MFE	File Name	Dairy Support - Status Quo	
Business Year	2019/20	Date Printed	5/06/2019	
Total Farm Area (ha)	475	Prepared By:	Jamie Gordon	
Total Effective Area (ha)	460	Stocking Rate:	5.1	
Total Stock Units Wintered:	2,361			
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes		Cows		
Ewe Hoggets		Heifers		
Male Hoggets		Heifer Calves	472	
Wethers		Male Calves	105	
Rams		Steers/Bulls		
		Bulls		
TOTAL SHEEP		TOTAL CATTLE	577	
Sheep stock units		Cattle stock units	2,361	
Lambing percentage		Calving percentage		
Wool/sheep S.U.		Cows in Milk		
Av. Wool Price/kg		kgMS /cow		
		kgMS /ha		
SHEEP INCOME/SU		CATTLE INCOME/SU	565	
<b>DEER</b>		<b>PRODUCE</b>		
M.A. Hinds		Crop	Area	Yield/Ha
R 2yr Hinds		M.Wheat		
R 1yr Hinds		F.Wheat	32.5	
R1yr Stags		Oats	6.0	
R 2yr Stags		Barley		
M.A. Stags		Peas		
		Other Grain		
TOTAL DEER		Grass Seed 1.		
Deer stock units		Grass Seed 2.		
Fawning percentage		Clover		
Velvet/stag		Other Small Seed		
Av. Velvet Price/kg				
		TOTAL AREA	38.5	
DEER INCOME/SU		PRODUCE INCOME/HA	2,871	
<b>FINANCIAL INDICES</b>				
	Total \$	\$/ha	\$/su	
Total Cash Farm Income	1,448,792	3,145	613	
Change in Value of Stock on Hand				
Change in Value of Produce on Hand				
Gross Farm Income	1,448,792	3,145	613	
Farm Working Expenses	958,792	2,084	406	
Earnings Before Interest, Drawings and Tax	488,001	1,061	207	
Total Debt Servicing	350,824	763	149	
Farm Working Expenses as a % of Gross Farm Income		66		
Debt Servicing as % of Gross Farm Income		24		
Debt Servicing as % of EBIT		72		

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY		
		460 Su or Ha		
	TOTAL \$		TOTAL \$	
WAGES	138,400	301 SHEEP		
ANIMAL HEALTH	9,442	21 WOOL		
STOCKFEED PURCHASED	33,250	72 CATTLE	1,612,295	
OTHER STOCK EXPENSES	1,000	2 MILK		
FEED CONSERVATION	75,840	165 DEER		
CONTRACTING	75,142	163 VELVET		
CARTAGE	13,015	28 GRAIN AND PULSE PRODUCE		
FERTILISER & LIME	192,402	418 Previous Yr Sales		
SEEDS & TREATMENT	61,335	133 Current Yr Sales	110,538	
SACKS & SEED DRESSING		Unsold At Year End		
WEED & PEST CONTROL	129,338	281 SMALL SEED PRODUCE		
REPAIRS & MAINTENANCE	30,500	66 Previous Yr Sales		
VEHICLE EXPENSES	33,500	73 Current Yr Sales		
ELECTRICITY	2,400	5 Unsold At Year End		
OTHER WORKING EXPS		MISCELLANEOUS INCOME	2,500	
ADMINISTRATION	19,000	41		
STANDING CHARGES	144,228	314 STOCK PURCHASES		
		Sheep		
		Cattle	-278,540	
		Deer		
		Other		
<b>CASH FARM WORKING EXPENSES</b>	<b>958,792</b>	<b>2.084 CASH FARM INCOME</b>	<b>1,446,792</b>	<b>3,145</b>
<b>CASH FARM WORKING PROFIT</b>	<b>488,001</b>	<b>1.061</b>		
<b>DEBT SERVICING</b>				
Mortgage	336,150	731		
Term Interest				
Current Account	14,674	32		
Rent				
Other				
<b>CASH OPERATING EXPENSES</b>	<b>1,309,616</b>	<b>2.847 CASH OPERATING INCOME</b>	<b>1,446,792</b>	<b>3,145</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>137,176</b>	<b>298</b>		
<b>PERSONAL DRAWINGS</b>		<b>NON OPERATING INCOME</b>		
OTHER PERSONAL				
TAXATION	16,613	36		
CAPITAL PURCHASES & PAYMENTS	81,800	178 INVESTMENT INCOME		
INVESTMENTS				
UNPAID ACCOUNTS				
<b>TOTAL CASH EXPENDITURE</b>	<b>1,408,029</b>	<b>3.061 TOTAL CASH INCOME</b>	<b>1,446,792</b>	<b>3,145</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>38,763</b>	<b>84</b>		
Change in value of stock on hand				
Change in value of produce on hand				
Depreciation				
<b>TRUE SURPLUS/DEFICIT</b>	<b>38,763</b>	<b>84</b>		

### 1.1.3.2. Farmax biophysical modelling

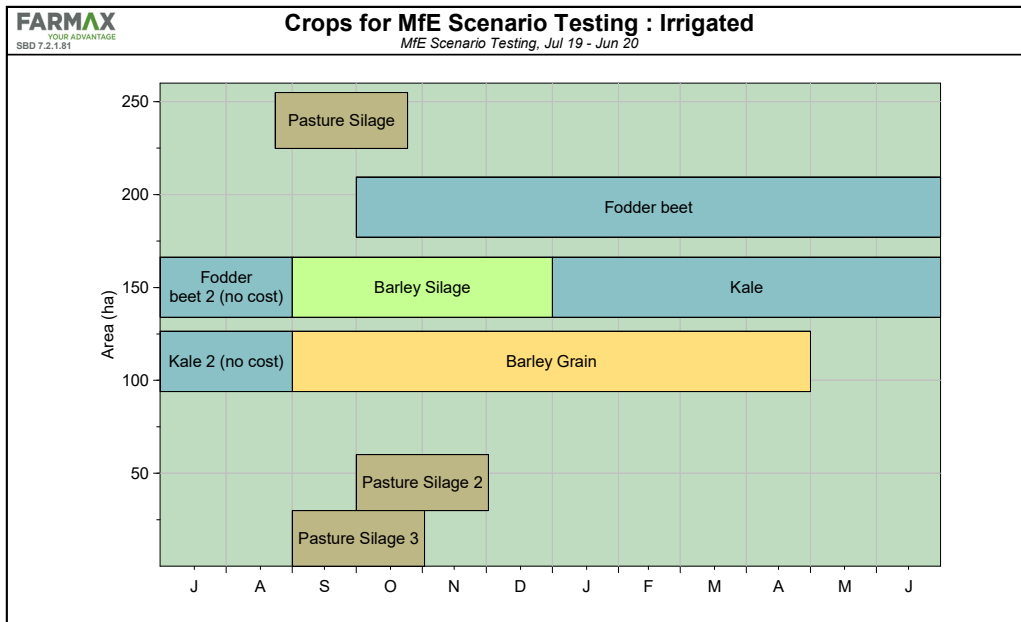
**Figure 1.1.3.2.1.** Dairy support: Status Quo. Average pasture covers, whole farm, long term steady-state basis.



**Figure 1.1.3.2.2.** Dairy support: Status Quo. Crops and silage, whole farm, long term steady-state basis.

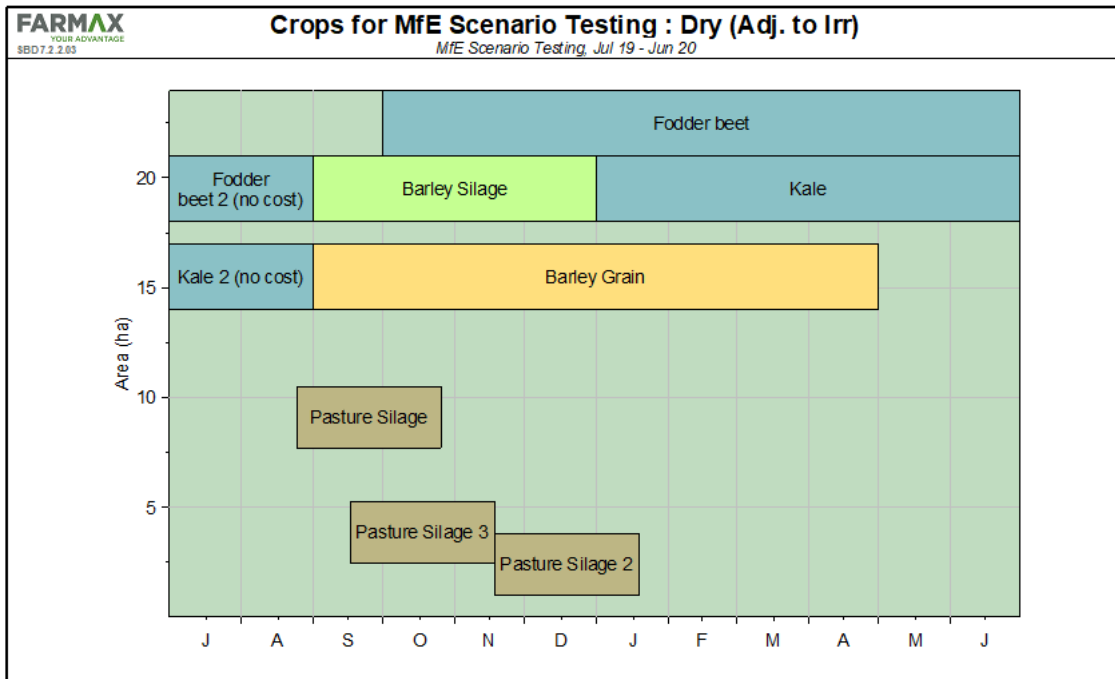
a) Irrigated block, b) Dryland block 1, c) Dryland block 2.

a)

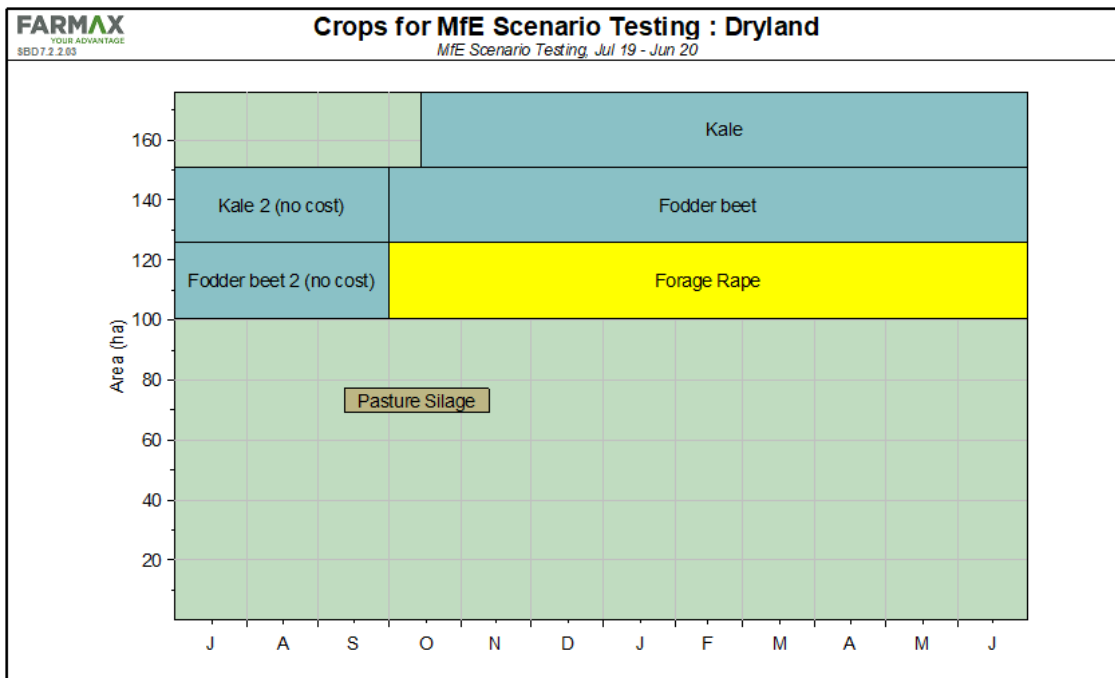




b)

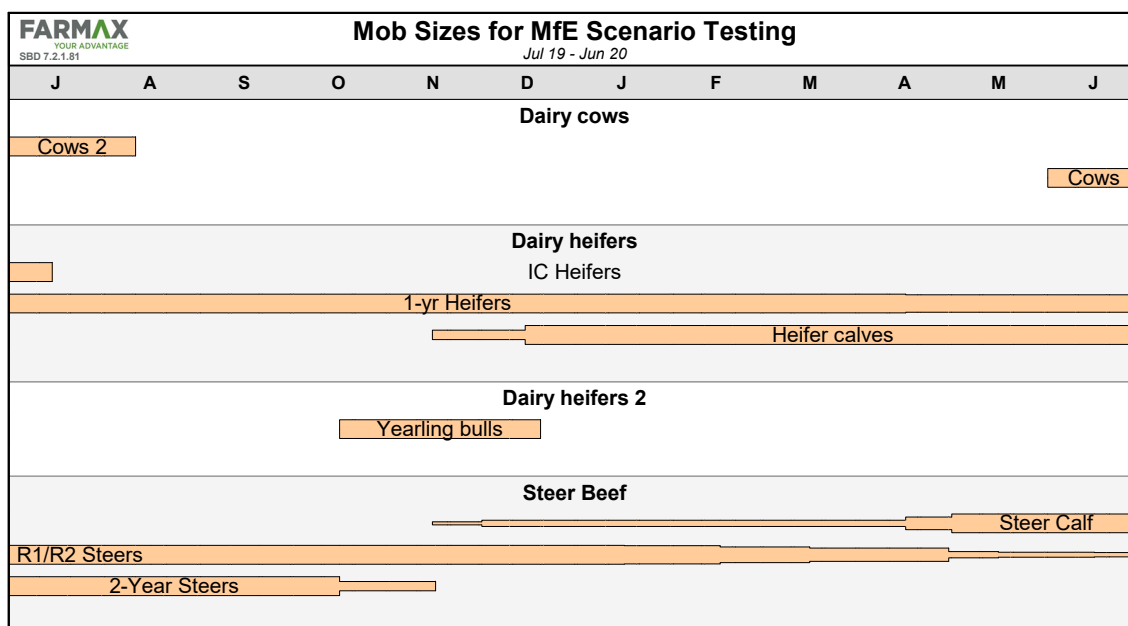


c)



**Figure 1.1.3.2.3.** Dairy support: Status Quo. Whole farm, long term steady-state basis: **a)** relative mob sizes throughout the year; **b)** livestock reconciliation by month.

a)



b)

**FARMAX**  
YOUR ADVANTAGE  
SBD 7.2:1.81

**Stock Reconciliation Numbers by Month for MfE Scenario Testing**  
Jul 19 - Jun 20

(end of month)	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20	Apr 20	May 20	Jun 20
Heifer Calf					230	460	460	460	460	460	460	460
1-Year Heifer	460	460	460	460	460	460	460	460	460	437	437	437
2-Year Heifer												
Cow	1700											1700
1-Year Bull				13	13							
Steer Calf					75	155	155	154	154	314	473	472
1-Year Steer	472	471	471	471	470	470	451	399	323	161	121	105
2-Year Steer	105	105	105	53								
<b>Total Beef</b>	<b>2737</b>	<b>1036</b>	<b>1036</b>	<b>997</b>	<b>1248</b>	<b>1545</b>	<b>1526</b>	<b>1473</b>	<b>1397</b>	<b>1372</b>	<b>1491</b>	<b>3174</b>

### 1.1.3.3. Overseer nutrient modelling

**Table 1.1.3.3.1.** Dairy support: Status Quo – Whole farm nutrient budget.

Farm name: Dairy Support Farm - Base - INC Cows + Incr Supplements  
(2019)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	146	31	12	19	85	1	8
Rain/clover N fixation	27	0	2	4	2	4	15
Irrigation	2	0	1	2	9	2	9
Supplements imported	4	0	11	1	2	1	1
<b>Nutrients removed</b>							
As products	11	3	3	1	2	1	0
Exported effluent	0	0	0	0	0	0	0
As supplements, crop exports	26	4	25	3	6	2	1
To atmospheric	46	0	0	0	0	0	0
To water	68	0.2	11	42	98	9	25
<b>Change in internal pools</b>							
Plant material	-108	-14	-94	-12	-48	-9	-21
Organic pool	105	1	1	-8	0	0	0
Inorganic mineral	0	3	-17	0	-2	-4	-4
Inorganic soil pool	33	35	97	0	41	9	31

**Table 1.1.3.3.2. Dairy support: Status Quo – Nitrogen block report.**

Farm name: Dairy Support Farm - Base - INC Cows + Incr Supplements  
(2019)

## Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Irrigated	4148	32	7.3	209	189
DLC- Silage	49	17	5.0	45	189
OG - FB	4017	124	<b>27.7</b>	184	118
FB- Ba Si - Ka	5455	168	<b>36.1</b>	151	187
Ba Sil - Ka - Ba -NG	4440	137	<b>27.3</b>	108	160
DLC - OG - FB	474	158	<b>41.8</b>	559	118
DLC - FB- Ba Si - Ka	507	169	<b>43.2</b>	615	187
DLC - Ba Sil - Ka - Ba - NG	488	163	<b>34.5</b>	462	148
DL Corners	373	25	7.1	182	159
DL - OG - Ka	1676	67	<b>18.6</b>	213	141
DL Ka - FB	2094	83	<b>21.8</b>	206	105
DL - FB - Fo Ra - NG	4727	188	<b>48.0</b>	114	68
Rolling DL Pasture	2089	23	6.4	141	99
Rolling DL Silage Pasture	213	27	7.6	113	99
Irr Silage x 3 cuts	531	18	5.0	46	189
Other farm sources	83				
Whole farm	31364	68			
Less N removed in wetlands	0				
Farm output	31364	68			

**Table 1.1.3.3.3 Dairy support: Status Quo – Phosphorus block report.**

Farm name: Dairy Support Farm - Base - INC Cows + Incr Supplements  
(2019)

### Block Phosphorus

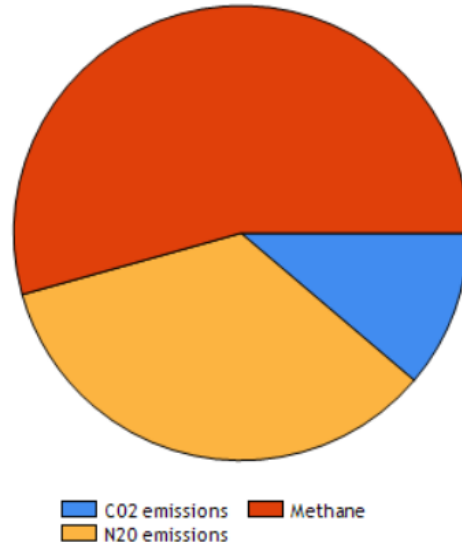
Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
Irrigated	13	0.1	Low	Low	n/a
DLC- Silage	0	0	Low	Low	n/a
OG - FB	8	0.2	n/a	n/a	n/a
FB- Ba Si - Ka	7	0.2	n/a	n/a	n/a
Ba Sil - Ka - Ba -NG	5	0.2	n/a	n/a	n/a
DLC - OG - FB	0	0.1	n/a	n/a	n/a
DLC - FB- Ba Si - Ka	0	0.1	n/a	n/a	n/a
DLC - Ba Sil - Ka - Ba - NG	0	0.1	n/a	n/a	n/a
DL Corners	1	0	Low	Low	n/a
DL - OG - Ka	3	0.1	n/a	n/a	n/a
DL Ka - FB	4	0.1	n/a	n/a	n/a
DL - FB - Fo Ra - NG	3	0.1	n/a	n/a	n/a
Rolling DL Pasture	14	0.2	Low	Low	n/a
Rolling DL Silage Pasture	1	0.2	Low	Low	n/a
Irr Silage x 3 cuts	1	0	Low	Low	n/a
Other farm sources	39				
<b>Whole farm</b>	<b>102</b>	<b>0.2</b>			

**Table 1.1.3.3.4** Dairy support: Status Quo – Farm greenhouse gas emissions.

Farm name: Dairy Support Farm - Base - INC Cows + Incr Supplements (2019)

## Farm Greenhouse Gas Emissions

Based on total farm area	Current farm
Units: Use default	
<b>Methane</b>	<b>5301</b>
Enteric	5174
Dung	126
Effluent	1
<b>N<sub>2</sub>O emissions</b>	<b>3357</b>
Excreta paddock	1572
Excreta effluent	0
N fertiliser	802
Crops	30
Indirect	953
<b>CO<sub>2</sub> emissions</b>	<b>1094</b>
Electricity	54
Fuel	157
N fertiliser	483
Fertiliser and organic inputs	210
Lime	83
Supplements	47
Animal transport	22
Other	40
<b>Total</b>	<b>9752</b>



## 1.1.4. Arable mixed cropping

### 1.1.4.1. Financial budget summary detail

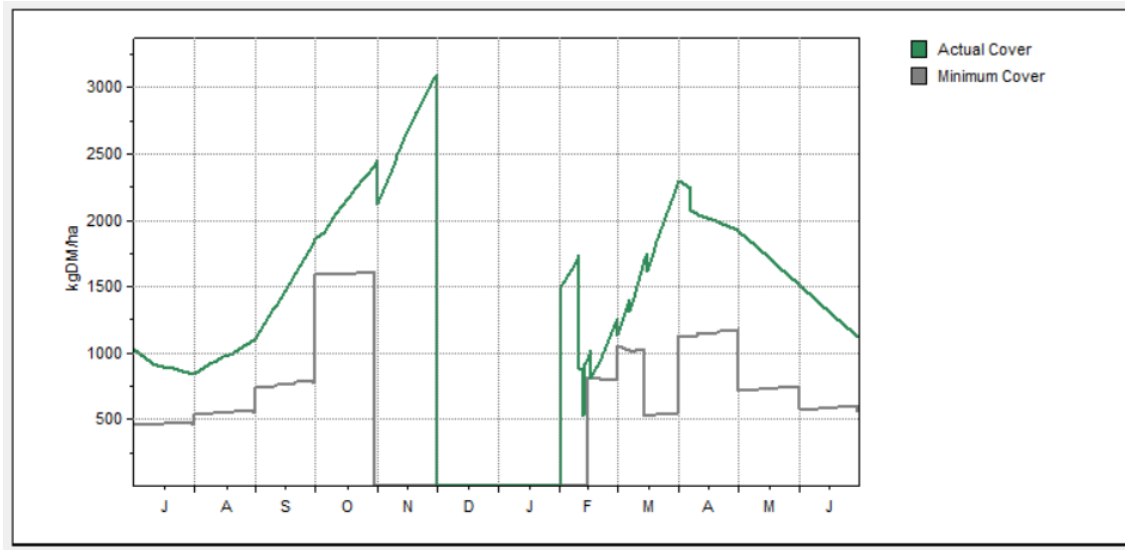
MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	MRB Arable Mixed Crop Farm	File Name	M/E Arable - STATUS QUO	
Business Year	2017/18	Date Printed	4/06/2019	
Total Farm Area (ha)	348	Prepared By:	Anton Nicholls	
Total Effective Area (ha)	325	Stocking Rate:		
Total Stock Units Wintered:				
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes		Cows		
Ewe Hoggets		Heifers		
Male Hoggets		Heifer Calves		
Wethers		Male Calves		
Rams		Steers/Bulls		
		Bulls		
TOTAL SHEEP		TOTAL CATTLE		
Sheep stock units		Cattle stock units		
Lambing percentage		Calving percentage		
Wool/sheep S.U.		Cows in Milk		
Av. Wool Price/kg	450	kgMS /cow		
		kgMS /ha		
SHEEP INCOME/SU		CATTLE INCOME/SU		
<b>DEER</b>		<b>PRODUCE</b>		
M.A. Hinds		Crop	Area	Yield t/ha
R 2yr Hinds		M.Wheat	45.0	10.0
R 1yr Hinds		F.Wheat	45.0	13.0
R1yr Stags		Barley	45.0	9.0
R 2yr Stags		Triticale		
M.A. Stags		Peas - Vining	45.0	3.6
		Ryegrass seed	45.0	2.5
TOTAL DEER		Clover - White	45.0	0.6
Deer stock units		Linseed	15.0	3.0
Fawning percentage		Sunflowers	15.0	3.2
Velvet/stag		Hemp	15.0	1.0
Av. Velvet Price/kg		Other		
		Other		
		Other		
		TOTAL AREA	315	
DEER INCOME/SU		PRODUCE INCOME/HA		3,971
<b>FINANCIAL INDICES</b>				
		Total \$	\$/ha	\$/su
Total Cash Farm Income		1,534,634	4,722	
Change in Value of Stock on Hand				
Change in Value of Produce on Hand				
Gross Farm Income		1,534,634	4,722	
Farm Working Expenses		969,222	2,982	
Earnings Before Interest, Drawings and Tax		565,412	1,740	
Total Debt Servicing		318,273	979	
Farm Working Expenses as a % of Gross Farm Income			63	
Debt Servicing as % of Gross Farm Income			21	
Debt Servicing as % of EBIT			56	

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY			
		325 Su or Ha			
	TOTAL \$			TOTAL \$	
WAGES	175,453	540 SHEEP		601,402	
ANIMAL HEALTH	7,350	23 WOOL		19,845	
STOCKFEED PURCHASED	600	2 CATTLE			
OTHER STOCK EXPENSES	2,000	6 MILK			
FEED CONSERVATION	24,331	75 DEER			
CONTRACTING	19,992	62 VELVET			
CARTAGE	55,486	171 GRAIN AND PULSE PRODUCE			
FERTILISER & LIME	124,094	382 Previous Yr Sales		291,600	
SEEDS & TREATMENT	66,465	205 Current Yr Sales		461,700	
SACKS & SEED DRESSING	58,638	180 Unsold At Year End	291,600		
WEED & PEST CONTROL	160,365	493 SMALL SEED PRODUCE			
REPAIRS & MAINTENANCE	50,375	155 Previous Yr Sales		229,125	
VEHICLE EXPENSES	83,925	258 Current Yr Sales		268,485	
ELECTRICITY	36,150	111 Unsold At Year End	229,125		
OTHER WORKING EXPS	29,333	90 MISCELLANEOUS INCOME		64,557	
ADMINISTRATION	27,486	85			
STANDING CHARGES	47,180	145 STOCK PURCHASES			
			Sheep	-402,080	
			Cattle		
			Deer		
			Other		
<b>CASH FARM WORKING EXPENSES</b>	<b>969,222</b>	<b>2,982</b>	<b>CASH FARM INCOME</b>	<b>1,534,634</b>	<b>4,722</b>
<b>EBIT / CASH FARM WORKING PROF.</b>	<b>565,412</b>	<b>1,740</b>			
<b>DEBT SERVICING</b>					
Mortgage	296,156	911			
Term Interest					
Current Account	22,117	68			
Rent					
Other					
<b>CASH OPERATING EXPENSES</b>	<b>1,287,496</b>	<b>3,962</b>	<b>CASH OPERATING INCOME</b>	<b>1,534,634</b>	<b>4,722</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>247,139</b>	<b>760</b>			
<b>PERSONAL DRAWINGS</b>			<b>NON OPERATING INCOME</b>		
<b>OTHER PERSONAL</b>					
TAXATION PROVISION FOR	8,767	27			
CAPITAL PURCHASES & PAYMENTS	218,200	671	INVESTMENT INCOME		
INVESTMENTS					
UNPAID ACCOUNTS					
<b>TOTAL CASH EXPENDITURE</b>	<b>1,514,463</b>	<b>4,660</b>	<b>TOTAL CASH INCOME</b>	<b>1,534,634</b>	<b>4,722</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>20,172</b>	<b>62</b>			
Change in value of stock on hand					
Change in value of produce on hand					
Depreciation					
<b>TRUE SURPLUS/DEFICIT</b>	<b>20,172</b>	<b>62</b>			

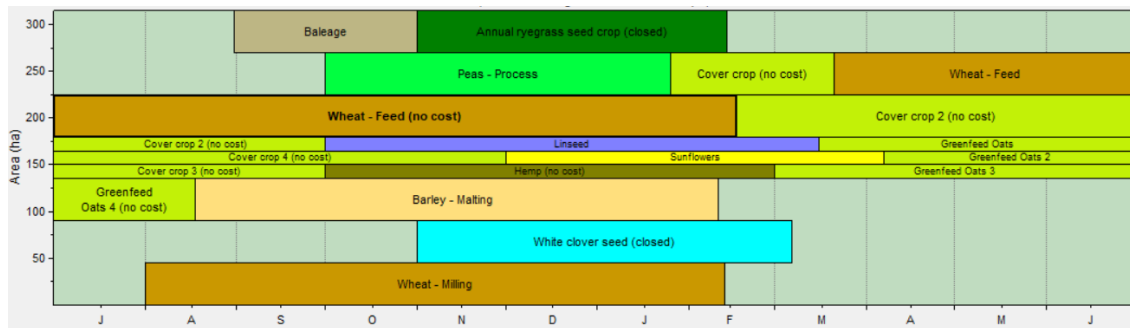


### 1.1.4.2. Farmax biophysical modelling

**Figure 1.1.4.2.1** Arable mixed cropping: Status Quo. Average pasture covers, whole farm, long term steady-state basis.

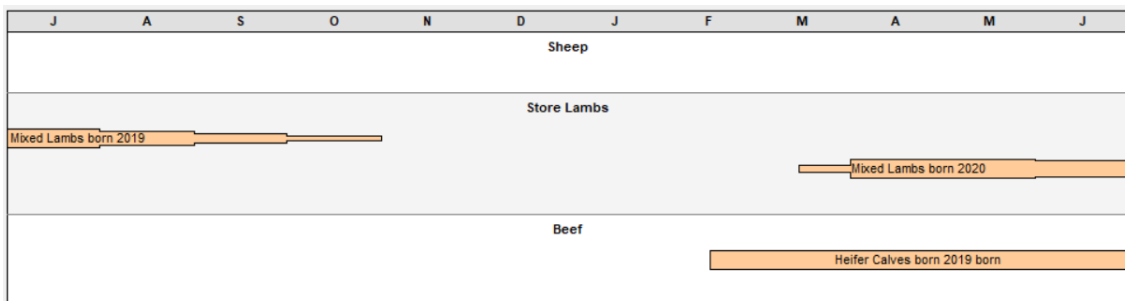


**Figure 1.1.4.2.2.** Arable mixed cropping: Status Quo. Crops and silage, whole farm, long term steady-state basis.



**Figure 1.1.4.2.3.** Arable mixed cropping: Status Quo. Whole farm, long term steady-state basis: **a)** relative mob sizes throughout the year; **b)** livestock reconciliation by month.

**a)**



**b)**

(end of month)	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20	Apr 20	May 20	Jun 20
Mixed Lamb									2100	4900	4175	3450
Mixed Hogget	2425	1702	1002									
<b>Total Sheep</b>	<b>2425</b>	<b>1702</b>	<b>1002</b>						<b>2100</b>	<b>4900</b>	<b>4175</b>	<b>3450</b>
Heifer Calf								210	210	210	210	
<b>Total Beef</b>								<b>210</b>	<b>210</b>	<b>210</b>	<b>210</b>	

### 1.1.4.3. Overseer nutrient modelling

**Table 1.1.4.3.1.** Arable mixed cropping: Status Quo – Whole farm nutrient budget.

Farm name: MfE - Arable - Status Quo - 335ha - MAIN (2018)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	84	22	27	37	39	22	0
Rain/clover N fixation	144	0	3	5	2	5	31
Irrigation	8	0	5	8	28	7	29
Supplements imported	9	1	7	1	2	1	0
<b>Nutrients removed</b>							
As products	94	27	29	8	8	7	2
Exported effluent	0	0	0	0	0	0	0
As supplements	34	4	27	2	7	1	1
To atmospheric	34	0	0	0	0	0	0
To water	24	0.5	7	56	53	5	10
<b>Change in internal pools</b>							
Plant material	103	8	21	7	7	-3	-1
Organic pool	-118	-5	0	-22	0	0	0
Inorganic mineral	0	0	-18	0	-11	-2	-2
Inorganic soil pool	73	-12	-25	0	9	28	50

**Table 1.1.4.3.2.** Arable mixed cropping: Status Quo – Nitrogen block report.

Farm name: MFE - Arable - Status Quo - 335ha - MAIN (2018)

### Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
P_Pre_WC>Wht>Rgs	107	5	4.4	-119	139
P_Pre_Rgs>Peas	129	6	5.7	44	55
P_Pre_Rgs>Peas>Wht	607	30	<b>21.3</b>	56	186
P_Pre_Wht>CC>Lin	34	5	3.9	-53	107
P_Pre_Wht>CC>Sun	34	5	4.4	-145	15
P_Pre_Wht>CC>Hem	34	5	4.4	-76	64
P_Pre_CC>Oil>GFO>Bly	322	16	<b>12.5</b>	-7	96
P_Pre_GFO>Bly>WC	132	7	4.8	853	0
P_Pre_WC>Wht	592	30	<b>25.4</b>	214	110
D_Pre_Lucerne	16	2	4.8	36	0
P_Wak_WC>Wht>Rgs	57	6	3.9	-83	139
P_Wak_Rgs>Peas	77	8	5.8	-29	55
P_Wak_Rgs>Peas>Wht	590	59	<b>31.7</b>	57	186
P_Wak_Wht>CC>Lin	17	5	3.4	-53	107
P_Wak_Wht>CC>Sun	17	5	3.2	-145	15
P_Wak_Wht>CC>Hem	17	5	3.2	-76	64
P_Wak_CC>Oil>GFO>Bly	273	27	<b>17.8</b>	-9	96
P_Wak_GFO>Bly>WC	95	10	6.3	854	0
P_Wak_WC>Wht	589	59	<b>41.5</b>	131	110
Tr_Pre_WC>Wht>Rgs	137	14	5.6	-81	139
Tr_Pre_Rgs>Peas	178	18	6.4	-24	55
Tr_Pre_Rgs>Peas>Wht	662	66	<b>18.1</b>	65	186
Tr_Pre_Wht>CC>Lin	30	9	2.8	-46	107
Tr_Pre_Wht>CC>Sun	36	11	3.4	-138	15
Tr_Pre_Wht>CC>Hem	62	19	5.7	-69	64

Tr_Pre_CC>Oil>GFO>Bly	283	28	8.6	0	96
Tr_Pre_GFO>Bly>WC	101	10	4.1	879	0
Tr_Pre_WC>Whit	969	97	<b>32.3</b>	142	110
Tr_Wak_WC>Whit>Rgs	103	21	8.0	-273	139
Tr_Wak_Rgs>Peas	207	41	<b>12.5</b>	-23	55
Tr_Wak_Rgs>Peas>Whit	524	105	<b>24.7</b>	65	186
Tr_Wak_Whit>CC>Lin	31	18	5.0	-46	107
Tr_Wak_Whit>CC>Sun	37	23	6.1	-138	15
Tr_Wak_Whit>CC>Hem	70	44	<b>11.4</b>	-69	64
Tr_Wak_CC>Oil>GFO>Bly	205	41	10.3	0	96
Tr_Wak_GFO>Bly>WC	71	14	5.5	864	0
Tr_Wak_WC>Whit	930	186	<b>50.7</b>	146	110
Other farm sources	5				
<hr/>					
Whole farm	8381	24			
Less N removed in wetlands	0				
Farm output	8381	24			

**Table 1.1.4.3.3.** Arable mixed cropping: Status Quo – Phosphorus block report.

Farm name: MfE - Arable - Status Quo - 335ha - MAIN (2018)

### Block Phosphorus

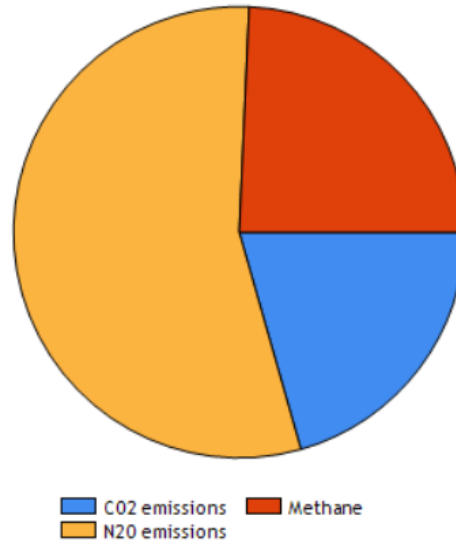
Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
P_Pre_WC>Wht>Rgs	14	0.7	n/a	n/a	n/a
P_Pre_Rgs>Peas	4	0.2	n/a	n/a	n/a
P_Pre_Rgs>Peas>Wht	2	0.1	n/a	n/a	n/a
P_Pre_Wht>CC>Lin	2	0.2	n/a	n/a	n/a
P_Pre_Wht>CC>Sun	1	0.1	n/a	n/a	n/a
P_Pre_Wht>CC>Hem	1	0.2	n/a	n/a	n/a
P_Pre_CC>Oil>GFO>Bly	2	0.1	n/a	n/a	n/a
P_Pre_GFO>Bly>WC	14	0.7	n/a	n/a	n/a
P_Pre_WC>Wht	2	0.1	n/a	n/a	n/a
D_Pre_Lucerne	0	0	Low	Low	n/a
P_Wak_WC>Wht>Rgs	9	0.9	n/a	n/a	n/a
P_Wak_Rgs>Peas	2	0.2	n/a	n/a	n/a
P_Wak_Rgs>Peas>Wht	1	0.1	n/a	n/a	n/a
P_Wak_Wht>CC>Lin	0	0.1	n/a	n/a	n/a
P_Wak_Wht>CC>Sun	0	0.1	n/a	n/a	n/a
P_Wak_Wht>CC>Hem	0	0.1	n/a	n/a	n/a
P_Wak_CC>Oil>GFO>Bly	1	0.1	n/a	n/a	n/a
P_Wak_GFO>Bly>WC	6	0.6	n/a	n/a	n/a
P_Wak_WC>Wht	1	0.1	n/a	n/a	n/a
Tr_Pre_WC>Wht>Rgs	11	1.1	n/a	n/a	n/a
Tr_Pre_Rgs>Peas	9	0.9	n/a	n/a	n/a
Tr_Pre_Rgs>Peas>Wht	10	1	n/a	n/a	n/a
Tr_Pre_Wht>CC>Lin	3	1	n/a	n/a	n/a
Tr_Pre_Wht>CC>Sun	3	1	n/a	n/a	n/a
Tr_Pre_Wht>CC>Hem	4	1.1	n/a	n/a	n/a
Tr_Pre_CC>Oil>GFO>Bly	9	0.9	n/a	n/a	n/a
Tr_Pre_GFO>Bly>WC	10	1	n/a	n/a	n/a
Tr_Pre_WC>Wht	8	0.8	n/a	n/a	n/a
Tr_Wak_WC>Wht>Rgs	7	1.4	n/a	n/a	n/a
Tr_Wak_Rgs>Peas	4	0.8	n/a	n/a	n/a
Tr_Wak_Rgs>Peas>Wht	4	0.8	n/a	n/a	n/a
Tr_Wak_Wht>CC>Lin	2	0.9	n/a	n/a	n/a
Tr_Wak_Wht>CC>Sun	1	0.9	n/a	n/a	n/a
Tr_Wak_Wht>CC>Hem	2	1	n/a	n/a	n/a
Tr_Wak_CC>Oil>GFO>Bly	4	0.8	n/a	n/a	n/a
Tr_Wak_GFO>Bly>WC	5	0.9	n/a	n/a	n/a
Tr_Wak_WC>Wht	4	0.7	n/a	n/a	n/a
Other farm sources	14				
Whole farm	178	0.5			

**Table 1.1.4.3.4.** Arable mixed cropping: Status Quo – Farm greenhouse gas emissions.

Farm name: MfE - Arable - Status Quo - 335ha - MAIN (2018)

### Farm Greenhouse Gas Emissions

Based on total farm area	Current farm
Units: CO2 equivalents (kg/ha/yr)	
<b>Methane</b>	<b>1479</b>
Enteric	1456
Dung	23
Effluent	0
<b>N2O emissions</b>	<b>3352</b>
Excreta paddock	1284
Excreta effluent	0
N fertiliser	1055
Crops	862
Indirect	152
<b>CO2 emissions</b>	<b>1253</b>
Electricity	257
Fuel	154
N fertiliser	253
Fertiliser and organic inputs	301
Lime	49
Supplements	88
Animal transport	4
Other	149
<b>Total</b>	<b>6084</b>



## 1.2. Scenario 1 – Nitrogen Loss Cap

### 1.2.1. Dairy

#### 1.2.1.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY	
Farm / Client	MfE	File Name	Dairy - Scenario 1 N Loss Cap
Business Year	2020-21	Date Printed	5/06/2019
Total Farm Area (ha)	318	Prepared By:	MRB
Total Effective Area (ha)	300	Stocking Rate:	3.3
Total kgMS produced:	420,630		
<b>SHEEP</b>		<b>CATTLE</b>	
Ewes		Cows	1,000
Ewe Hoggets		Heifers	240
Male Hoggets		Heifer Calves	250
Wethers		Male Calves	
Rams		Steers/Bulls	
		Bulls	
TOTAL SHEEP		TOTAL CATTLE	1,490
Sheep stock units		Cattle stock units	8,200
Lambing percentage		Calving percentage	
Wool/sheep S.U.		Cows in Milk	
Av. Wool Price/kg		kgMS /cow	
		kgMS /ha	1,402
SHEEP INCOME/SU		CATTLE INCOME/SU	328
<b>DEER</b>		<b>PRODUCE</b>	
M.A. Hinds		Crop	Area Yield/Ha
R 2yr Hinds		M.Wheat	
R 1yr Hinds		F.Wheat	
R1yr Stags		Oats	
R 2yr Stags		Barley	
M.A. Stags		Peas	
		Other Grain	
TOTAL DEER		Grass Seed 1.	
Deer stock units		Grass Seed 2.	
Fawning percentage		Clover	
Velvet/stag		Other Small Seed	
Av. Velvet Price/kg			
		TOTAL AREA	
DEER INCOME/SU		PRODUCE INCOME/HA	
<b>FINANCIAL INDICES</b>			
	Total \$	\$/ha	\$/kgMS
Total Cash Farm Income	2,820,769	9,403	6.71
Change in Value of Stock on Hand			
Change in Value of Produce on Hand			
Gross Farm Income	2,820,769	9,403	6.71
Farm Working Expenses	1,814,149	6,047	4.31
Earnings Before Interest, Drawings and Tax	1,006,620	3,355	2.39
Total Debt Servicing	687,276	2,291	1.63
Farm Working Expenses as a % of Gross Farm Income		64	
Debt Servicing as % of Gross Farm Income		24	
Debt Servicing as % of EBIT		68	

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY	
		420,630 Su or Ha	
	TOTAL \$	\$/kgMS	
WAGES	338,478	0.80	SHEEP
ANIMAL HEALTH	123,000	0.29	WOOL
STOCKFEED PURCHASED	635,280	1.51	CATTLE
OTHER STOCK EXPENSES	77,530	0.18	MILK
FEED CONSERVATION	3,240	0.01	DEER
CONTRACTING	3,990	0.01	VELVET
CARTAGE	2,740	0.01	GRAIN AND PULSE PRODUCE
FERTILISER & LIME	175,595	0.42	Previous Yr Sales
SEEDS & TREATMENT	39,000	0.09	Current Yr Sales
SACKS & SEED DRESSING			Unsold At Year End
WEED & PEST CONTROL	2,455	0.01	SMALL SEED PRODUCE
REPAIRS & MAINTENANCE	100,075	0.24	Previous Yr Sales
VEHICLE EXPENSES	52,500	0.12	Current Yr Sales
ELECTRICITY	80,650	0.19	Unsold At Year End
OTHER WORKING EXPS	15,330	0.04	MISCELLANEOUS INCOME
ADMINISTRATION	35,000	0.08	
STANDING CHARGES	129,308	0.31	STOCK PURCHASES
			Sheep
			Cattle
			Deer
			Other
<b>CASH FARM WORKING EXPENSES</b>	<b>1,814,149</b>	<b>4.31</b>	<b>CASH FARM INCOME</b>
			<b>2,820,769</b>
			<b>6.71</b>
<b>CASH FARM WORKING PROFIT</b>	<b>1,006,620</b>	<b>2.39</b>	
<b>DEBT SERVICING</b>			
Mortgage	681,750	1.62	
Term Interest			
Current Account	5,528	0.01	
Rent			
Other			
<b>CASH OPERATING EXPENSES</b>	<b>2,501,424</b>	<b>5.95</b>	<b>CASH OPERATING INCOME</b>
			<b>2,820,769</b>
			<b>6.71</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>319,345</b>	<b>0.76</b>	
<b>PERSONAL DRAWINGS</b>			<b>NON OPERATING INCOME</b>
OTHER PERSONAL			
TAXATION	68,291	0.16	
CAPITAL PURCHASES & PAYMENTS	98,375	0.23	INVESTMENT INCOME
INVESTMENTS			
UNPAID ACCOUNTS			
<b>TOTAL CASH EXPENDITURE</b>	<b>2,666,090</b>	<b>6.34</b>	<b>TOTAL CASH INCOME</b>
			<b>2,820,769</b>
			<b>6.71</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>154,679</b>	<b>0.37</b>	
Change in value of stock on hand			
Change in value of produce on hand			
Depreciation			
<b>TRUE SURPLUS/DEFICIT</b>	<b>154,679</b>	<b>0.37</b>	



### 1.2.1.2. Farmax biophysical modelling

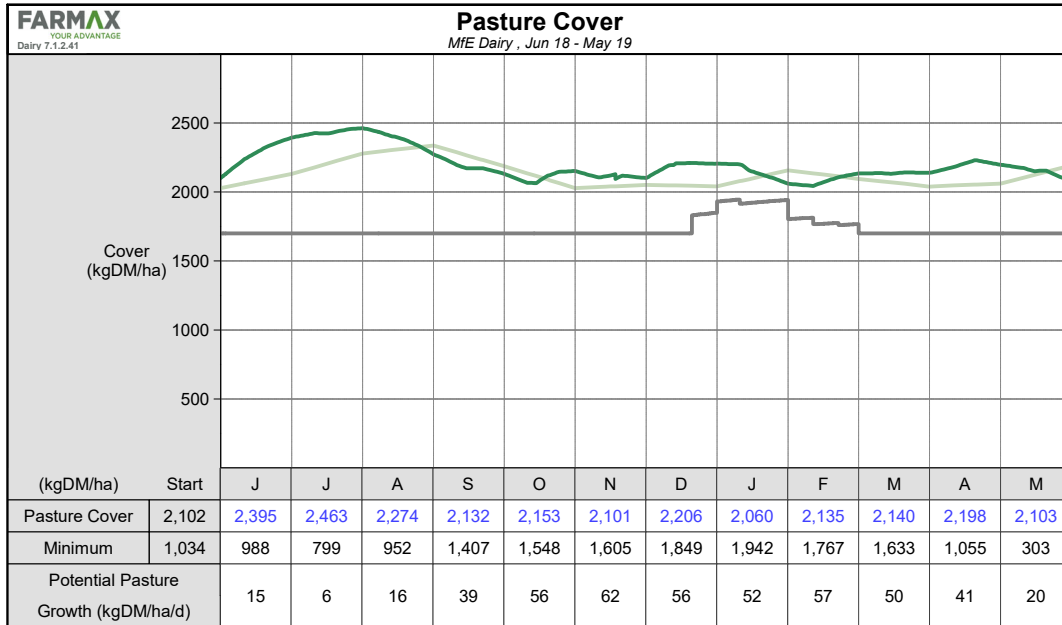
**Figure 1.2.1.2.1.** Dairy: Scenario 1 Nitrogen Loss Cap. Farmax biophysical summary of the dairy farm program, whole farm, long term steady-state basis.

<b>FARMAX</b> YOUR ADVANTAGE Dairy 7.1.2.41		<b>Physical Summary for MfE Dairy</b> Jun 18 - May 19	
Category	Description	Value	Units
<b>Farm</b>	Effective Area	300	ha
	Stocking Rate	3.3	cows/ha
	Potential Pasture Growth	14.2	t DM/ha
	Nitrogen Use	177	kg N/ha
	Feed Conversion Efficiency (eaten)	10.7	kg DM eaten/kg MS
<b>Herd</b>	Cow Numbers (1st July)	1,030	cows
	Peak Cows Milked	1,000	cows
	Days in Milk	0	days
	Avg. BCS at calving	4.9	BCS
	Liveweight	1,421	kg/ha
<b>Production (to Factory)</b>	Milk Solids total	420,630	kg
	Milk Solids per ha	1,402	kg/ha
	Milk Solids per cow	421	kg/cow
	Peak Milk Solids production	2.01	kg/cow/day
	Milk Solids as % of live weight	98.7	%
<b>Feeding</b>	Pasture Eaten per cow *	3.5	t DM/cow
	Supplements Eaten per cow *	0.4	t DM/cow
	Off-farm Grazing Eaten per cow *	0.6	t DM/cow
	Total Feed Eaten per cow *	4.5	t DM/cow
	Pasture Eaten per ha	11.6	t DM/ha
	Supplements Eaten per ha	1.5	t DM/ha
	Off-farm Grazing Eaten per ha	3.8	t DM/ha
	Total Feed Eaten per ha	16.9	t DM/ha
	Supplements and Grazing / Feed Eaten *	23.4	%
	Bought Feed / Feed Eaten *	4.3	%

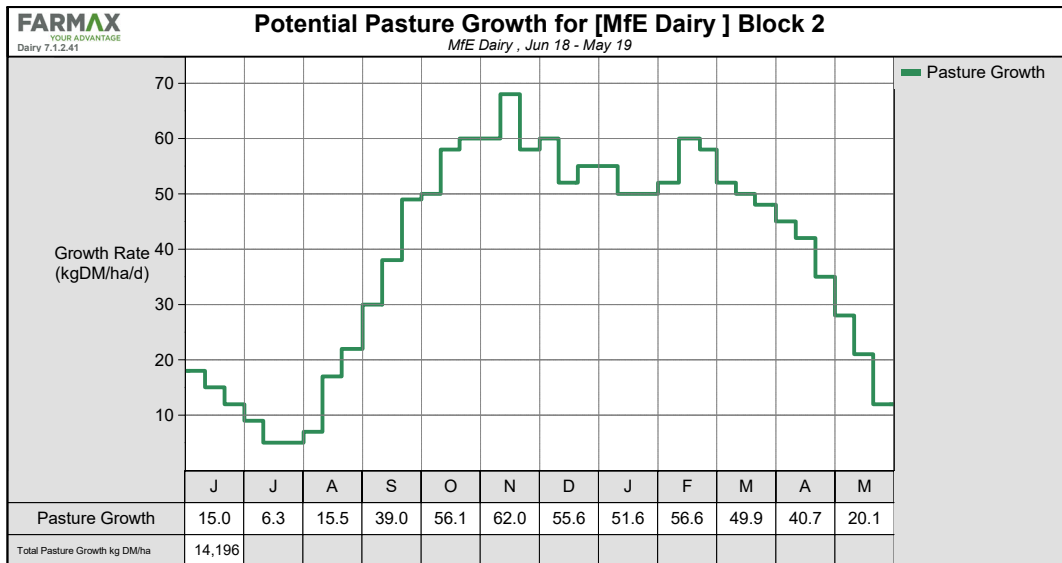
(\*) feed eaten by females > 20 months old / peak cows milked

**Figure 1.2.1.2.2. Dairy: Scenario 1 Nitrogen Loss Cap. a) Average pasture covers, b) pasture growth curve, whole farm, long term steady-state basis.**

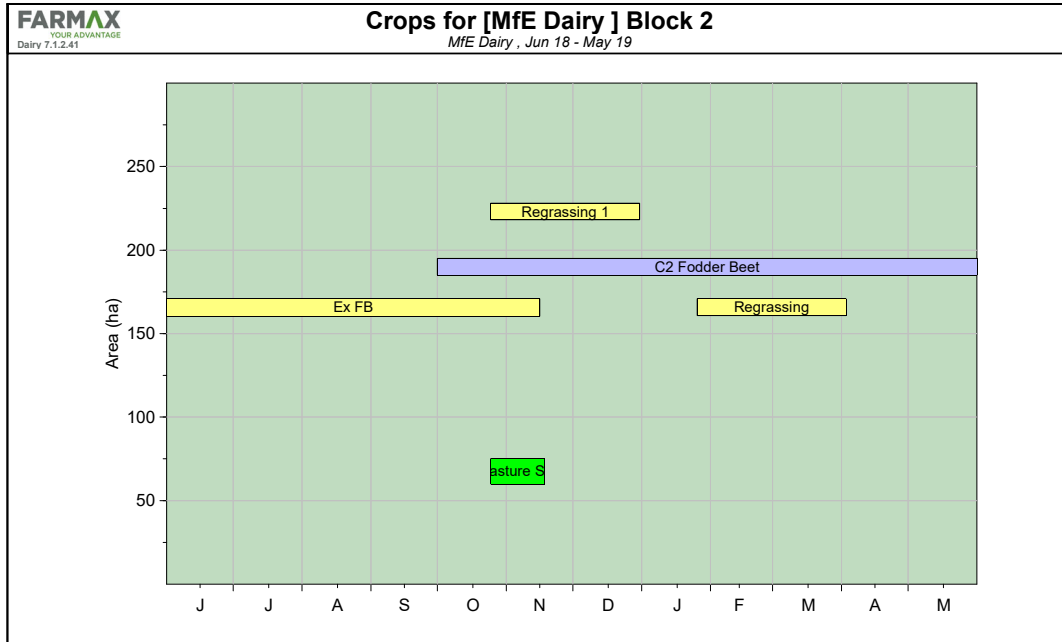
a)



b)



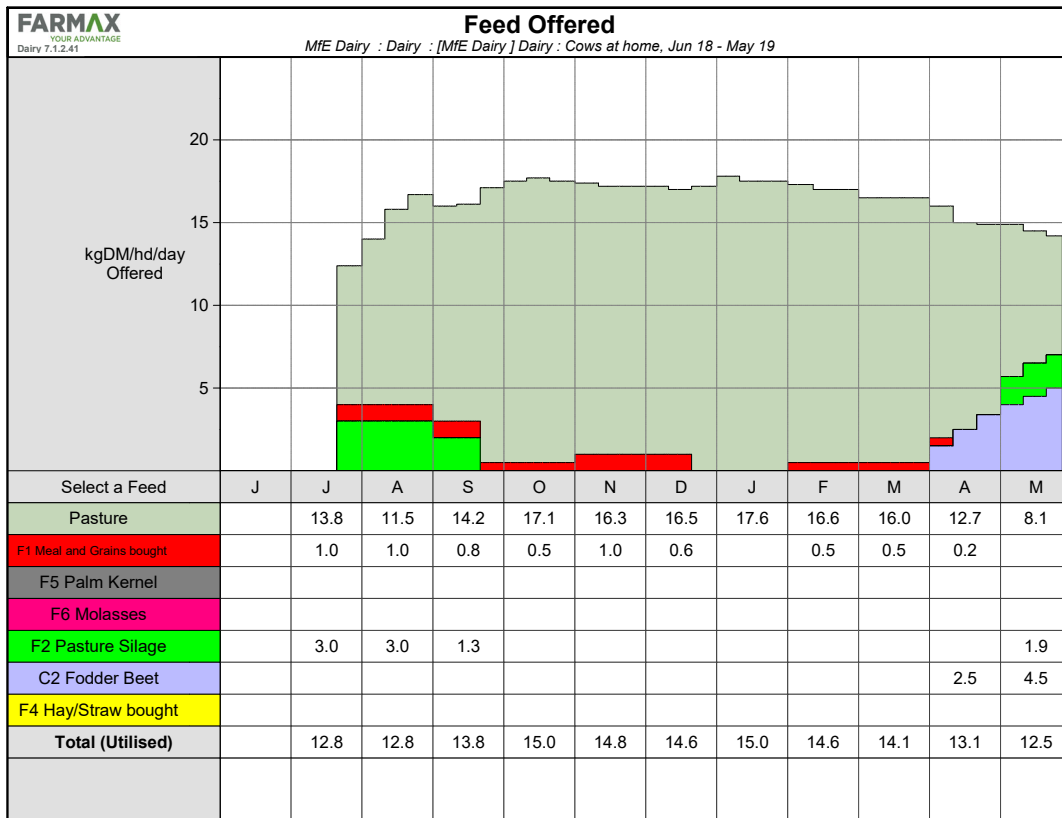
**Figure 1.2.1.2.3.** Dairy: Scenario 1 Nitrogen Loss Cap. Crops and silage, whole farm, long term steady-state basis.



**Figure 1.2.1.2.4.** Dairy: Scenario 1 Nitrogen Loss Cap. Supplement use, whole farm, long term steady-state basis.

FARMAX YOUR ADVANTAGE Dairy 7.1.2.41		Supplement Usage Summary for MfE Dairy Jun 18 - May 19												kg	
		tonnes DM offered												/milker	
Feed	Jun 18	Jul 18	Aug 18	Sep 18	Oct 18	Nov 18	Dec 18	Jan 19	Feb 19	Mar 19	Apr 19	May 19	Total		
F4 Hay/Straw bought		0	20	8									28	28	
C2 Fodder Beet											65	131	196	196	
F1 Meal and Grains bought		1	13	20	15	30	20		14	14	4		131	131	
F2 Pasture Silage		3	60	39								35	136	136	
<b>Total</b>													<b>491</b>	<b>491</b>	

**Figure 1.2.1.2.5.** Dairy: Scenario 1 Nitrogen Loss Cap. Feed offered. Whole farm, long term steady-state basis.



### 1.2.1.3. Overseer nutrient modelling

**Table 1.2.1.3.1.** Dairy: Scenario 1 Nitrogen Loss Cap – Whole farm nutrient budget.

Farm name: MFE Dairy model N-Caps Overseer file (2019/20)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	177	21	2	40	53	6	1
Rain/clover N fixation	128	0	2	4	2	4	19
Irrigation	11	0	7	11	39	9	40
Supplements imported	19	3	12	2	3	1	1
<b>Nutrients removed</b>							
As products	90	15	22	5	19	2	6
Exported effluent	0	0	0	0	0	0	0
As supplements	2	0	2	0	0	0	0
To atmospheric	90	0	0	0	0	0	0
To water	59	1.4	10	54	67	4	13
<b>Change in internal pools</b>							
Plant material	-1	0	-5	1	0	0	0
Organic pool	93	15	0	-4	0	0	0
Inorganic mineral	0	0	-40	0	-1	-1	-2
Inorganic soil pool	4	-7	35	0	12	19	44

**Table 1.2.1.3.2. Dairy: Scenario 1 Nitrogen Loss Cap – Nitrogen block report.**

Farm name: MFE Dairy model N-Caps Overseer file (2019/20)

## Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
1 Eff S.Pivot Darn_4a.2	1183	39	<b>19.7</b>	276	317
2 Eff K Line Darn_4a.2	440	110	<b>26.2</b>	341	317
3 Eff S.Pivot Darn_4a.2	329	41	<b>20.6</b>	289	317
4 Eff Kline Darn_4a.2	440	110	<b>26.2</b>	341	317
5 Non Eff Pivot Darn_4a.2	694	30	<b>15.2</b>	204	200
6 Non Eff K Line Darn_4a.2	2100	84	<b>20.1</b>	235	200
7 Non Eff K Line Darn_4a.2	449	90	<b>21.5</b>	254	200
8 Non Eff K Line Darn_4a.2	1320	102	<b>23.9</b>	251	200
9 Eff K Line Raka_2a.1	1553	119	<b>27.8</b>	323	285
10 Non Eff K Line Timu_1a.1	5568	68	<b>17.2</b>	231	200
11 Eff Pivot Darn_4a.2 ##	901	34	<b>18.4</b>	266	285
12 Trees and Scrub	22	2	N/A		
13 NB Pasture K Line Darn_4a.2	697	87	<b>20.8</b>	245	200
14 NB Pasture K Line Darn_4a.2	200	100	<b>23.9</b>	290	200
15 NB Pasture Pivot Darn_4a.2 ##	826	26	<b>17.4</b>	199	200
16 NB Pasture Pivot Darn_4a.2 ##	154	27	<b>18.3</b>	217	200
Fodder Beet	1685	168	<b>80.3</b>	-6	116
Other farm sources	45				
Whole farm	18605	59			
Less N removed in wetlands	0				
Farm output	18605	59			

**Table 1.2.1.3.3. Dairy: Scenario 1 Nitrogen Loss Cap – Phosphorus block report.**

Farm name: MFE Dairy model N-Caps Overseer file (2019/20)

## Block Phosphorus

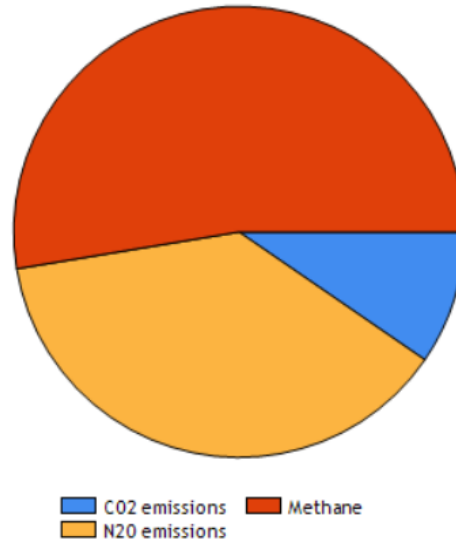
Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
1 Eff S.Pivot Darn_4a.2	8	0.3	Low	Low	Low
2 Eff K Line Darn_4a.2	2	0.6	Low	Low	Low
3 Eff S.Pivot Darn_4a.2	2	0.3	Low	Low	Low
4 Eff Kline Darn_4a.2	2	0.6	Low	Low	Low
5 Non Eff Pivot Darn_4a.2	6	0.3	Low	Low	n/a
6 Non Eff K Line Darn_4a.2	14	0.6	Low	Low	n/a
7 Non Eff K Line Darn_4a.2	3	0.6	Low	Low	n/a
8 Non Eff K Line Darn_4a.2	24	1.8	High	Medium	n/a
9 Eff K Line Raka_2a.1	24	1.9	High	Medium	Medium
10 Non Eff K Line Timu_1a.1	193	2.4	High	Medium *	n/a
11 Eff Pivot Darn_4a.2 ##	7	0.3	Low	Low	Low
12 Trees and Scrub	1	0.1	n/a	n/a	n/a
13 NB Pasture K Line Darn_4a.2	4	0.6	Low	Low	n/a
14 NB Pasture K Line Darn_4a.2	1	0.6	Low	Low	n/a
15 NB Pasture Pivot Darn_4a.2 ##	4	0.1	Low	Low	n/a
16 NB Pasture Pivot Darn_4a.2 ##	1	0.1	Low	Low	n/a
Fodder Beet	3	0.3	n/a	n/a	n/a
Other farm sources	155				
<b>Whole farm</b>	<b>455</b>	<b>1.4</b>			

**Table 1.2.1.3.4. Dairy: Scenario 1 Nitrogen Loss Cap – Farm greenhouse gas emissions.**

Farm name: MFE Dairy model N-Caps Overseer file (2019/20)

## Farm Greenhouse Gas Emissions

Based on total farm area	Current farm
Units: CO2 equivalents (kg/ha/yr)	
<b>Methane</b>	<b>8663</b>
Enteric	8523
Dung	100
Effluent	40
<b>N<sub>2</sub>O emissions</b>	<b>6224</b>
Excreta paddock	3718
Excreta effluent	19
N fertiliser	1493
Crops	3
Indirect	992
<b>CO<sub>2</sub> emissions</b>	<b>1579</b>
Electricity	333
Fuel	72
N fertiliser	688
Fertiliser and organic inputs	79
Lime	0
Supplements	279
Animal transport	6
Other	124
<b>Total</b>	<b>16466</b>





## 1.2.2. Dairy support

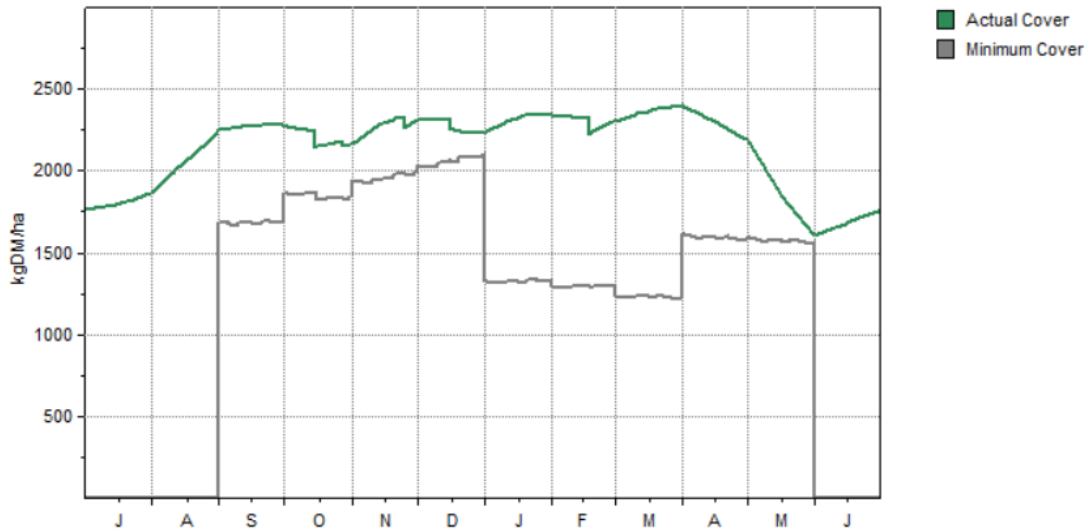
### 1.2.2.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	M/E	File Name	Dairy Support Scenario 1 - 60kg/ha	
Business Year	2019/20	Date Printed	5/08/2019	
Total Farm Area (ha)	475	Prepared By:	Jamie Gordon	
Total Effective Area (ha)	460	Stocking Rate:	4.8	
Total Stock Units Wintered:	2,209			
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes		Cows		
Ewe Hoggets		Heifers		
Male Hoggets		Heifer Calves	442	
Wethers		Male Calves	98	
Rams		Steers/Bulls		
		Bulls		
TOTAL SHEEP		TOTAL CATTLE	540	
Sheep stock units		Cattle stock units	2,209	
Lambing percentage		Calving percentage		
Wool/sheep S.U.		Cows in Milk		
Av. Wool Price/kg		kgMS /cow		
		kgMS /ha		
SHEEP INCOME/SU		CATTLE INCOME/SU	512.8	
<b>DEER</b>		<b>PRODUCE</b>		
M.A. Hinds		Crop	Area	Yield/Ha
R 2yr Hinds		M.Wheat		
R 1yr Hinds		F.Wheat	37.1	
R1yr Stags		Oats	6.8	
R 2yr Stags		Barley		
M.A. Stags		Peas		
		Other Grain		
TOTAL DEER		Grass Seed 1.		
Deer stock units		Grass Seed 2.		
Fawning percentage		Clover		
Velvet/stag		Other Small Seed		
Av. Velvet Price/kg				
		TOTAL AREA	43.9	
DEER INCOME/SU		PRODUCE INCOME/HA	2,873	
<b>FINANCIAL INDICES</b>				
	Total \$	\$/ha	\$/su	
Total Cash Farm Income	1,365,517	2,969	618	
Change in Value of Stock on Hand				
Change in Value of Produce on Hand				
Gross Farm Income	1,365,517	2,969	618	
Farm Working Expenses	914,931	1,989	414	
Earnings Before Interest, Drawings and Tax	450,586	980	204	
Total Debt Servicing	359,754	782	163	
Farm Working Expenses as a % of Gross Farm Income		67		
Debt Servicing as % of Gross Farm Income		26		
Debt Servicing as % of EBIT		80		

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY	
		460 Su or Ha	
	TOTAL \$		TOTAL \$
WAGES	135,025	294 SHEEP	
ANIMAL HEALTH	8,836	19 WOOL	
STOCKFEED PURCHASED	13,125	29 CATTLE	1,393,703
OTHER STOCK EXPENSES	1,000	2 MILK	
FEED CONSERVATION	67,350	146 DEER	
CONTRACTING	84,555	184 VELVET	
CARTAGE	13,477	29 GRAIN AND PULSE PRODUCE	
FERTILISER & LIME	169,921	369 Previous Yr Sales	
SEEDS & TREATMENT	65,852	143 Current Yr Sales	126,115
SACKS & SEED DRESSING		Unsold At Year End	
WEED & PEST CONTROL	128,814	280 SMALL SEED PRODUCE	
REPAIRS & MAINTENANCE	29,500	64 Previous Yr Sales	
VEHICLE EXPENSES	32,000	70 Current Yr Sales	
ELECTRICITY	2,400	5 Unsold At Year End	
OTHER WORKING EXPS		MISCELLANEOUS INCOME	106,700
ADMINISTRATION	19,000	41	
STANDING CHARGES	144,076	313 STOCK PURCHASES	
		Sheep	
		Cattle	-261,000
		Deer	
		Other	
<b>CASH FARM WORKING EXPENSES</b>	<b>914,931</b>	<b>1,989 CASH FARM INCOME</b>	<b>1,365,517</b>
			<b>2,969</b>
<b>CASH FARM WORKING PROFIT</b>	<b>450,586</b>	<b>980</b>	
DEBT SERVICING			
Mortgage	336,150	731	
Term Interest			
Current Account	23,604	51	
Rent			
Other			
<b>CASH OPERATING EXPENSES</b>	<b>1,274,685</b>	<b>2,771 CASH OPERATING INCOME</b>	<b>1,365,517</b>
			<b>2,969</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>90,832</b>	<b>197</b>	
PERSONAL DRAWINGS		NON OPERATING INCOME	
OTHER PERSONAL			
TAXATION	2,710	6	
CAPITAL PURCHASES & PAYMENTS	81,800	178 INVESTMENT INCOME	
INVESTMENTS			
UNPAID ACCOUNTS			
<b>TOTAL CASH EXPENDITURE</b>	<b>1,359,195</b>	<b>2,955 TOTAL CASH INCOME</b>	<b>1,365,517</b>
			<b>2,969</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>6,322</b>	<b>14</b>	
Change in value of stock on hand			
Change in value of produce on hand			
Depreciation			
<b>TRUE SURPLUS/DEFICIT</b>	<b>6,322</b>	<b>14</b>	

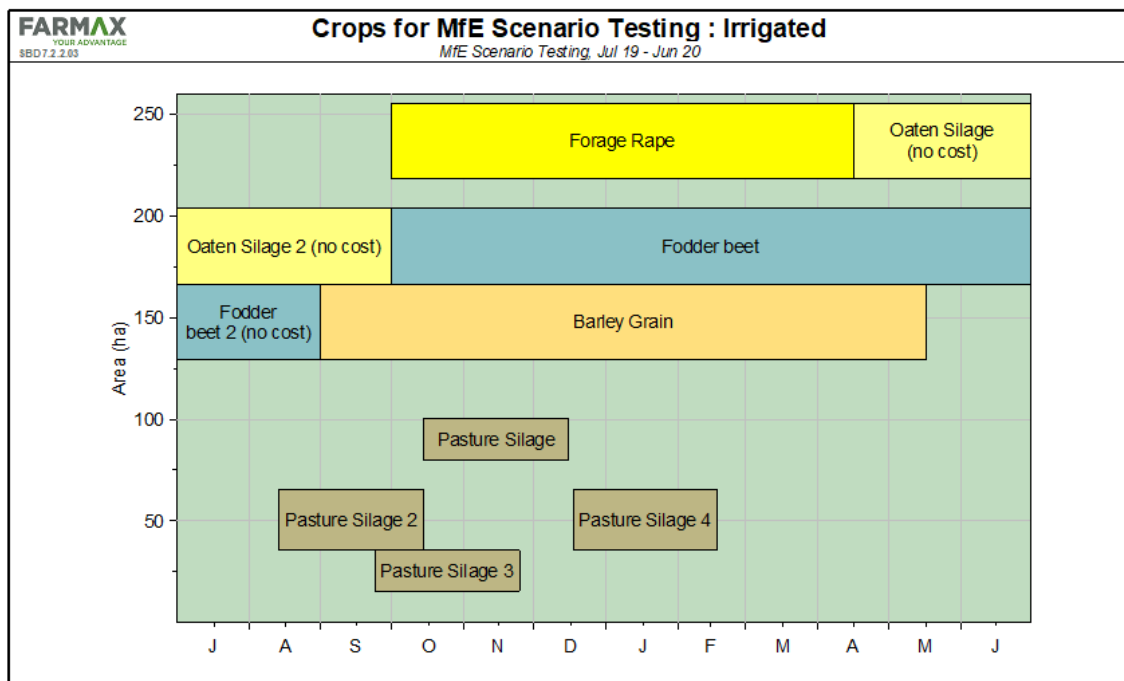
### 1.2.2.2. Farmax biophysical modelling

**Figure 1.2.2.2.1.** Dairy support: Scenario 1 Nitrogen Loss Cap. Average pasture covers, whole farm, long term steady-state basis.

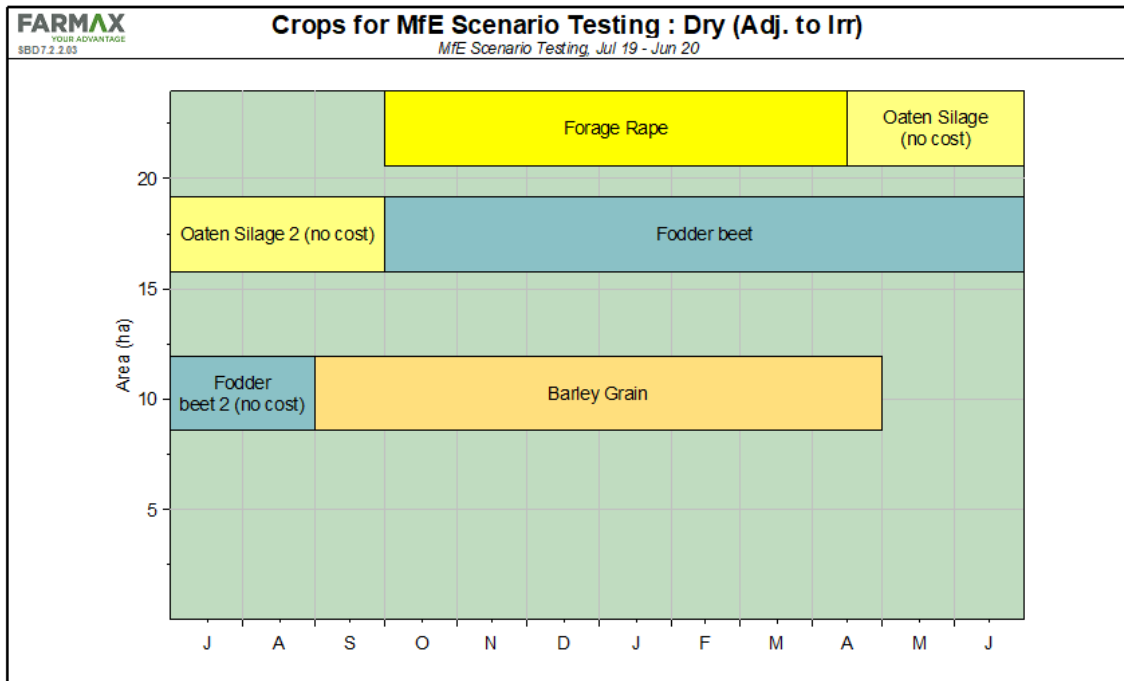


**Figure 1.2.2.2.2.** Dairy support: Scenario 1 Nitrogen Loss Cap. Crops and silage, whole farm, long term steady-state basis. **a)** Irrigated block, **b)** Dryland block 1, **c)** Dryland block 2.

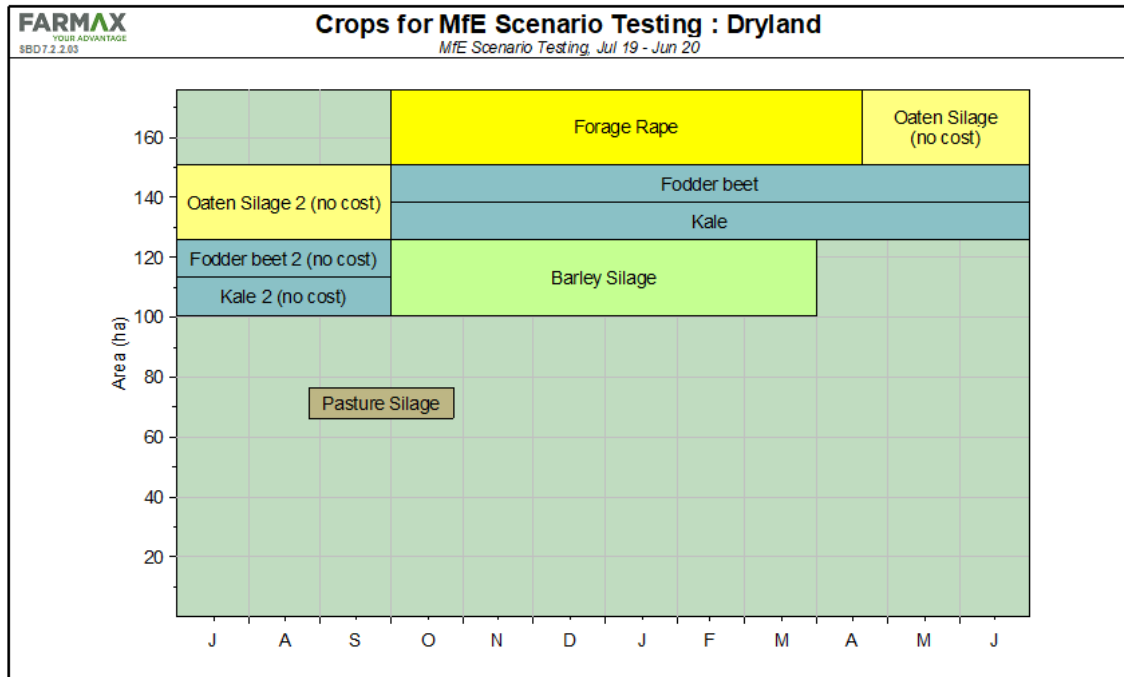
**a)**



b)

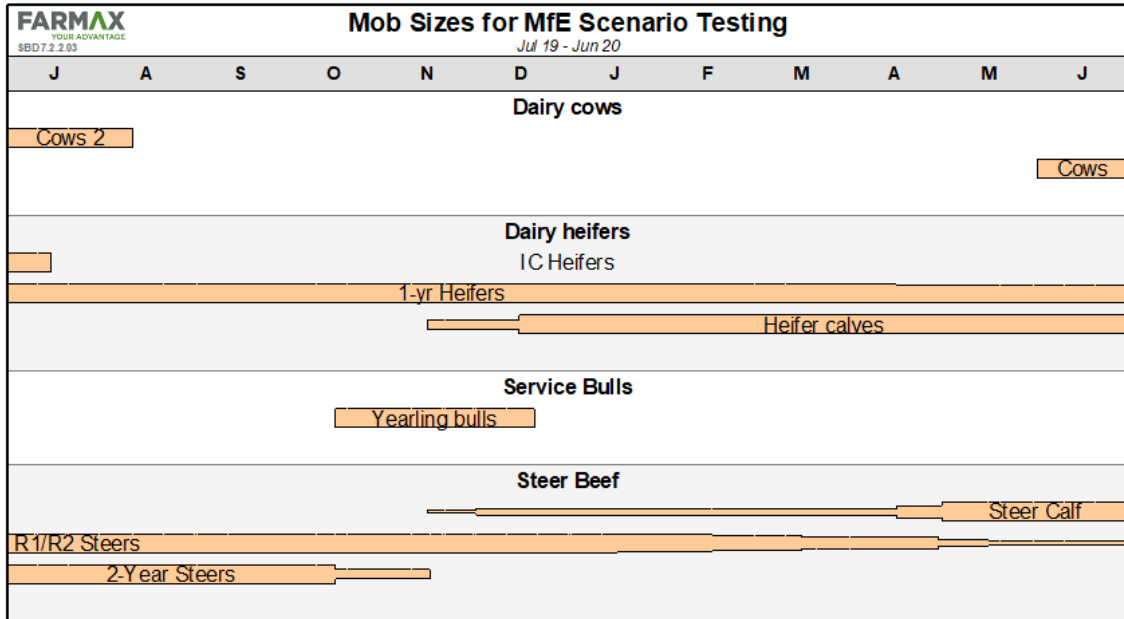


c)



**Figure 1.2.2.2.3.** Dairy support: Scenario 1 Nitrogen Loss Cap. Whole farm, long term steady-state basis: a) relative mob sizes throughout the year; b) livestock reconciliation by month.

a)



b)

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YOUR ADVANTAGE  
SBD7.2.2.03

**Stock Reconciliation Numbers by Month for MfE Scenario Testing**  
Jul 19 - Jun 20

(end of month)	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20	Apr 20	May 20	Jun 20
Heifer Calf					230	460	460	460	460	460	460	460
1-Year Heifer	460	460	460	460	460	460	460	460	460	437	437	437
2-Year Heifer												
Cow	1040											1040
1-Year Bull				13	13							
Steer Calf					70	145	145	144	144	294	443	442
1-Year Steer	442	441	441	441	440	440	410	374	303	151	114	98
2-Year Steer	98	98	98	49								
<b>Total Beef</b>	<b>2040</b>	<b>999</b>	<b>999</b>	<b>963</b>	<b>1213</b>	<b>1505</b>	<b>1475</b>	<b>1438</b>	<b>1367</b>	<b>1342</b>	<b>1454</b>	<b>2477</b>

### 1.2.2.3. Overseer nutrient modelling

**Table 1.2.2.3.1.** Dairy support: Scenario 1 Nitrogen Loss Cap – Whole farm nutrient budget.

Farm name: Dairy Support 60KG N Limit. Final (2019)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	112	35	38	24	88	1	8
Rain/clover N fixation	30	0	2	4	2	4	15
Irrigation	1	0	1	1	5	1	5
Supplements imported	31	3	31	3	6	3	2
<b>Nutrients removed</b>							
As products	16	5	5	2	3	1	1
Exported effluent	0	0	0	0	0	0	0
As supplements, crop exports	36	6	36	4	8	3	1
To atmospheric	37	0	0	0	0	0	0
To water	59	0.2	13	41	90	9	25
<b>Change in internal pools</b>							
Plant material	-59	-8	-51	-7	-25	-5	-15
Organic pool	56	1	1	-9	0	0	0
Inorganic mineral	0	3	-13	0	-2	-4	-4
Inorganic soil pool	28	31	81	0	29	5	23

**Table 1.2.2.3.2. Dairy support: Scenario 1 Nitrogen Loss Cap – Nitrogen block report.**

Farm name: Dairy Support 60KG N Limit. Final (2019)

## Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Irrigated	1475	30	6.9	178	114
OG - Ra - Oa Si	5269	142	<b>30.6</b>	134	82
Oa Si - FB	2834	76	<b>17.1</b>	71	118
FB - Ba Gr - NG	5712	154	<b>31.3</b>	92	154
DL Corners	166	12	3.4	147	81
DL - OG - Ra - Oa Si	2552	102	<b>25.6</b>	125	82
DL Oa Si - FB	727	58	<b>15.3</b>	82	118
DL - FB - Ba Gr - NG	1541	123	<b>26.7</b>	75	154
Rolling DL Pasture	1103	12	3.5	162	100
Rolling DL Silage Pasture	167	17	4.8	116	98
Irr Silage	607	30	8.6	116	114
Irr Silage Sold	2340	29	8.3	110	114
DL - OG - Ra - Oa Si	356	105	<b>26.4</b>	125	82
DL Oa Si - FB	198	58	<b>15.3</b>	82	118
DL - FB - Ba Si - NG	198	58	<b>15.3</b>	82	118
DL Oa Si - Ka	473	38	10.5	107	141
DL - Ka - Ba Si - NG	1155	92	<b>20.0</b>	78	154
Other farm sources	70				
Whole farm	26942	59			
Less N removed in wetlands	0				
Farm output	26942	59			

**Table 1.2.2.3.3.** Dairy support: Scenario 1 Nitrogen Loss Cap – Phosphorus block report.

Farm name: Dairy Support 60KG N Limit. Final (2019)

**Block Phosphorus**

Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
Irrigated	5	0.1	Low	Low	n/a
OG - Ra - Oa Si	7	0.2	n/a	n/a	n/a
Oa Si - FB	9	0.2	n/a	n/a	n/a
FB - Ba Gr - NG	6	0.2	n/a	n/a	n/a
DL Corners	1	0	Low	Low	n/a
DL - OG - Ra - Oa Si	3	0.1	n/a	n/a	n/a
DL Oa Si - FB	2	0.1	n/a	n/a	n/a
DL - FB - Ba Gr - NG	2	0.1	n/a	n/a	n/a
Rolling DL Pasture	14	0.2	Low	Low	n/a
Rolling DL Silage Pasture	2	0.2	Low	Low	n/a
Irr Silage	1	0.1	Low	Low	n/a
Irr Silage Sold	4	0	Low	Low	n/a
DL - OG - Ra - Oa Si	0	0.1	n/a	n/a	n/a
DL Oa Si - FB	0	0.1	n/a	n/a	n/a
DL - FB - Ba Si - NG	0	0.1	n/a	n/a	n/a
DL Oa Si - Ka	1	0.1	n/a	n/a	n/a
DL - Ka - Ba Si - NG	2	0.1	n/a	n/a	n/a
Other farm sources	34				
<b>Whole farm</b>	<b>93</b>	<b>0.2</b>			

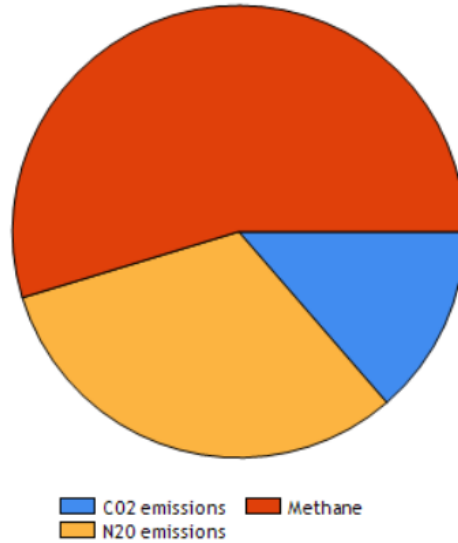


**Table 1.2.2.3.4.** Dairy support: Scenario 1 Nitrogen Loss Cap – Farm greenhouse gas emissions.

Farm name: Dairy Support 60KG N Limit. Final (2019)

## Farm Greenhouse Gas Emissions

Based on total farm area	Current farm
Units: Use default	
<b>Methane</b>	<b>4483</b>
Enteric	4381
Dung	101
Effluent	1
<b>N2O emissions</b>	<b>2593</b>
Excreta paddock	1190
Excreta effluent	0
N fertiliser	563
Crops	23
Indirect	816
<b>CO2 emissions</b>	<b>1118</b>
Electricity	36
Fuel	151
N fertiliser	341
Fertiliser and organic inputs	251
Lime	78
Supplements	201
Animal transport	15
Other	45
<b>Total</b>	<b>8194</b>



### 1.3. Scenario 2 - Stock Exclusion

#### 1.3.1. Red meat / hill country

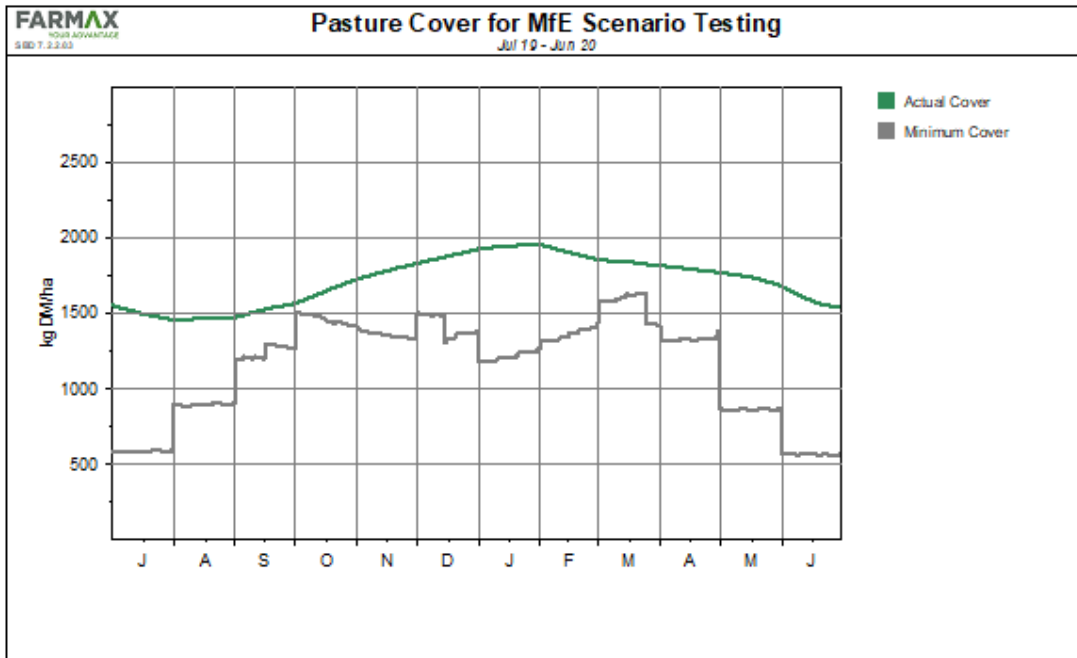
##### 1.3.1.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY	
Farm / Client	MfE - Red Meat	File Name	Red Meat
Business Year	Stock Exclusion	Date Printed	24/05/2019
Total Farm Area (ha)	598	Prepared By:	Mark Everest
Total Effective Area (ha)	545	Stocking Rate:	5.7
Total Stock Units Wintered:	3,114		
<b>SHEEP</b>		<b>CATTLE</b>	
Ewes	1,023	Cows	130
Ewe Hoggets	279	Heifers	30
Male Hoggets		Heifer Calves	75
Wethers		Male Calves	75
Rams	14	Steers/Bulls	
		Bulls	5
TOTAL SHEEP	1,316	TOTAL CATTLE	315
Sheep stock units	1,516	Cattle stock units	1,598
Lambing percentage	132.9	Calving percentage	
Wool/sheep S.U.	5.2	Cows in Milk	
Av. Wool Price/kg	364.0	kgMS /cow	
		kgMS /ha	
SHEEP INCOME/SU	136.1	CATTLE INCOME/SU	96.8
<b>DEER</b>		<b>PRODUCE</b>	
M.A. Hinds		Crop	Area Yield/Ha
R 2yr Hinds		M.Wheat	
R 1yr Hinds		F.Wheat	
R1yr Stags		Oats	
R 2yr Stags		Barley	
M.A. Stags		Peas	
		Other Grain	
TOTAL DEER		Grass Seed 1.	
Deer stock units		Grass Seed 2.	
Fawning percentage		Clover	
Velvet/stag		Other Small Seed	
Av. Velvet Price/kg			
		TOTAL AREA	
DEER INCOME/SU		PRODUCE INCOME/HA	
<b>FINANCIAL INDICES</b>			
	Total \$	\$/ha	\$/su
Total Cash Farm Income	364,957	670	117.2
Change in Value of Stock on Hand			
Change in Value of Produce on Hand			
Gross Farm Income	364,957	670	117.2
Farm Working Expenses	294,209	540	94.5
Earnings Before Interest, Drawings and Tax	70,748	130	23
Total Debt Servicing	144,498	265	46
Farm Working Expenses as a % of Gross Farm Income		80.6	
Debt Servicing as % of Gross Farm Income		39.6	
Debt Servicing as % of EBIT		204.2	

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY			
		3,114 Su or Ha			
	TOTAL \$	\$ per Su		TOTAL \$	\$ per Su
WAGES	89,484	28.7	SHEEP	208,314	
ANIMAL HEALTH	12,972	4.2	WOOL	25,093	
STOCKFEED PURCHASED			CATTLE	170,581	
OTHER STOCK EXPENSES	4,778	1.5	MILK		
FEED CONSERVATION	3,680	1.2	DEER		
CONTRACTING	15,860	5.1	VELVET		
CARTAGE	1,077	0.3	GRAIN AND PULSE PRODUCE		
FERTILISER & LIME	48,472	14.9	Previous Yr Sales		
SEEDS & TREATMENT	11,225	3.6	Current Yr Sales		
SACKS & SEED DRESSING			Unsold At Year End		
WEED & PEST CONTROL	21,031	6.8	SMALL SEED PRODUCE		
REPAIRS & MAINTENANCE	33,862	10.8	Previous Yr Sales		
VEHICLE EXPENSES	16,983	5.5	Current Yr Sales		
ELECTRICITY	7,360	2.4	Unsold At Year End		
OTHER WORKING EXPS			MISCELLANEOUS INCOME	4,041	
ADMINISTRATION	12,500	4.0			
STANDING CHARGES	17,125	5.5	STOCK PURCHASES		
			Sheep	-27,072	
			Cattle	-16,000	
			Deer		
			Other		
<b>CASH FARM WORKING EXPENSES</b>	<b>294,209</b>	<b>94.5</b>	<b>CASH FARM INCOME</b>	<b>364,957</b>	<b>117.2</b>
<b>CASH FARM WORKING PROFIT</b>	<b>70,748</b>	<b>22.7</b>			
<b>DEBT SERVICING</b>					
Mortgage	135,024	43.4			
Term Interest					
Current Account	9,474	3.0			
Rent					
Other					
<b>CASH OPERATING EXPENSES</b>	<b>438,707</b>	<b>140.9</b>	<b>CASH OPERATING INCOME</b>	<b>364,957</b>	<b>117.2</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>-73,750</b>	<b>-23.7</b>			
<b>PERSONAL DRAWINGS</b>			<b>NON OPERATING INCOME</b>		
<b>OTHER PERSONAL TAXATION</b>					
<b>CAPITAL PURCHASES &amp; PAYMENTS</b>	<b>57,459</b>	<b>18.5</b>	<b>INVESTMENT INCOME</b>		
<b>INVESTMENTS</b>					
<b>UNPAID ACCOUNTS</b>					
<b>TOTAL CASH EXPENDITURE</b>	<b>496,166</b>	<b>159.3</b>	<b>TOTAL CASH INCOME</b>	<b>364,957</b>	<b>117.2</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>-131,209</b>	<b>-42.1</b>			
Change in value of stock on hand					
Change in value of produce on hand					
Depreciation					
<b>TRUE SURPLUS/DEFICIT</b>	<b>-131,209</b>	<b>-42.1</b>			

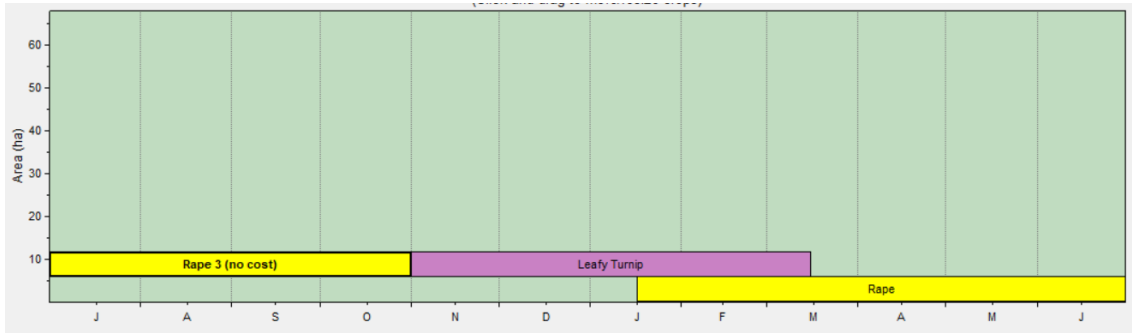
### 1.3.1.2. Farmax biophysical modelling

**Figure 1.3.1.2.1.** Red meat / hill country: Scenario 2 Stock Exclusion. Average pasture covers, whole farm, long term steady-state basis.

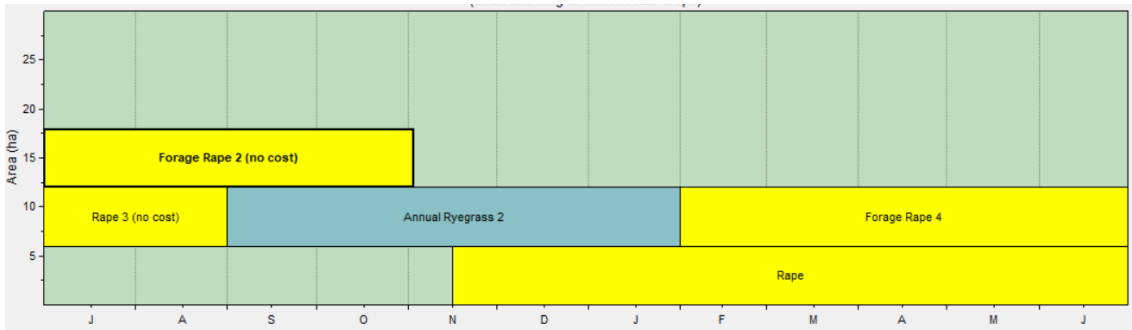


**Figure 1.3.1.2.2.** Red meat / hill country: Scenario 2 Stock Exclusion. Crops and silage, whole farm, long term steady-state basis. **a)** Developed downs, **b)** sprinkler block, **c)** centre pivot block.

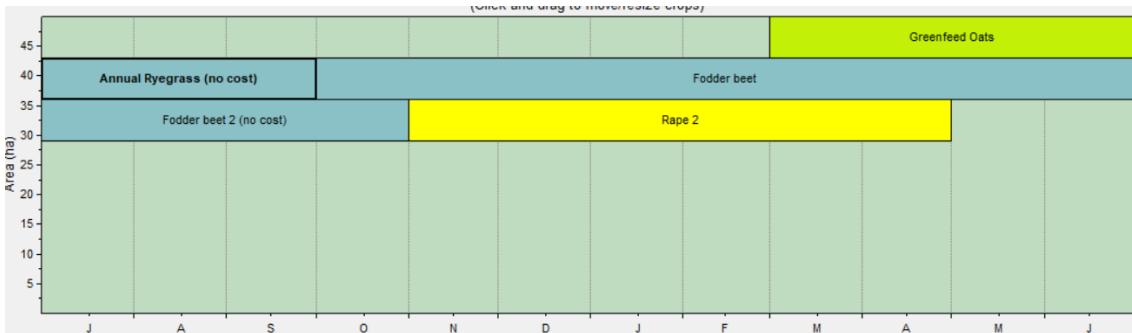
**a)**



**b)**

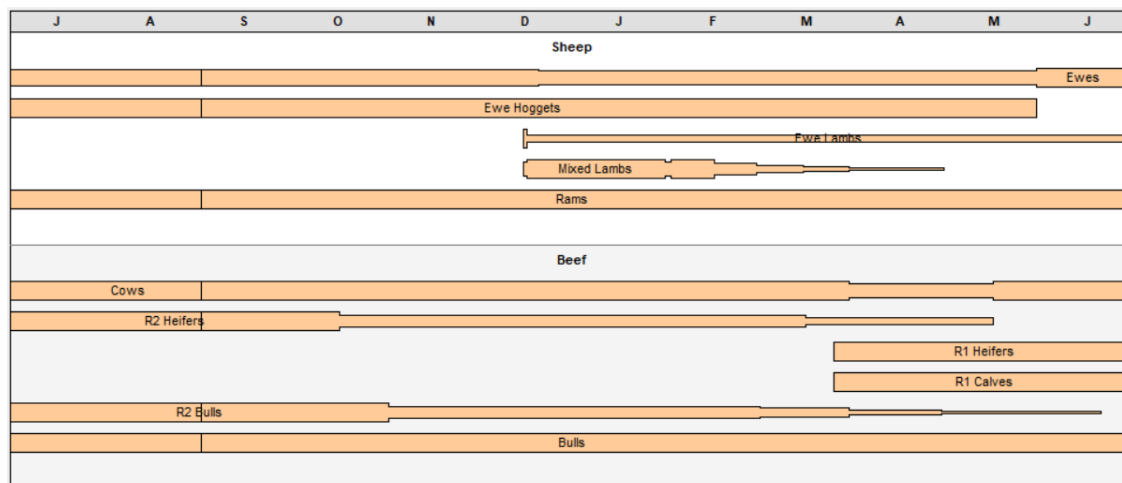


**c)**



**Figure 1.3.1.2.3.** Red meat / hill country: Scenario 2 Stock Exclusion. Whole farm, long term steady-state basis: **a)** relative mob sizes throughout the year; **b)** livestock reconciliation by month.

**a)**



**b)**

(end of month)	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20	Apr 20	May 20	Jun 20
Ewe Lamb						279	279	279	279	279	279	279
Ewe Hogget	279	279	279	279	279	279	279	279	279	279	279	279
Ewe	1018	1013	1008	1003	998	894	894	894	894	894	1173	1023
Ram	14	14	14	14	14	14	14	14	14	14	14	14
Mixed Lamb						1228	945	550	232			
<b>Total Sheep</b>	<b>1311</b>	<b>1306</b>	<b>1301</b>	<b>1296</b>	<b>1291</b>	<b>2694</b>	<b>2411</b>	<b>2016</b>	<b>1698</b>	<b>1466</b>	<b>1466</b>	<b>1316</b>
1-Year Heifer									75	75	75	75
2-Year Heifer	75	75	75	45	45	45	45	45	30	30		
Cow	160	160	158	156	156	156	156	156	130	130	160	160
Bull Calf									75	75	75	75
1-Year Bull	75	75	75	75	45	45	45	45	22	7	7	
Bull	5	5	5	5	5	5	5	5	5	5	5	5
<b>Total Beef</b>	<b>315</b>	<b>315</b>	<b>313</b>	<b>281</b>	<b>251</b>	<b>251</b>	<b>251</b>	<b>251</b>	<b>337</b>	<b>322</b>	<b>322</b>	<b>315</b>

### 1.3.1.3. Overseer nutrient modelling

**Table 1.3.1.3.1.** Red Meat / Hill Country: Scenario 2 Stock Exclusion – Whole farm nutrient budget.

Farm name: Red Meat - Stock Exclusion (Stock Exclusion)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	17	5	1	18	69	1	1
Rain/clover N fixation	40	0	3	6	3	7	38
Irrigation	1	0	0	1	3	1	3
Supplements imported	0	0	0	0	0	0	0
<b>Nutrients removed</b>							
As products	4	1	0	1	1	0	0
Exported effluent	0	0	0	0	0	0	0
As supplements	0	0	0	0	0	0	0
To atmospheric	19	0	0	0	0	0	0
To water	19	0.2	6	33	23	2	14
<b>Change in internal pools</b>							
Plant material	2	0	0	1	0	0	0
Organic pool	11	7	0	-10	0	0	0
Inorganic mineral	0	0	-22	0	8	-4	-4
Inorganic soil pool	3	-3	20	0	42	9	31

**Table 1.3.1.3.2. Red Meat / Hill Country: Scenario 2 Stock Exclusion – Nitrogen block report.**

Farm name: Red Meat - Stock Exclusion (Stock Exclusion)

**Block Nitrogen**

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Hill Oma Tussoc	4633	14	N/A	32	0
Downs ClaTussoc	398	8	2.8	30	0
Downs Cla Dev	595	11	4.0	65	14
Downs Cla PP>WRape	838	145	<b>44.4</b>	62	51
Downs Cla WRape>Pasja/PP	627	108	<b>34.7</b>	53	57
KL PP	214	18	5.4	201	109
KL PP>MG Rape	412	69	<b>21.3</b>	94	88
KL MGRape>Ita/WRape	355	59	<b>16.8</b>	93	98
KL Ita/WRape>PP	85	14	4.2	111	109
pvt PP	561	19	5.5	219	109
pvt PP>Oat/Ita	462	66	<b>18.1</b>	121	84
pvt Oat/Ita>FBeet	970	139	<b>37.7</b>	146	154
pvt FBeet>SRape	710	101	<b>27.1</b>	73	78
DL flat	204	10	4.0	70	14
Lucerne	79	20	7.9	28	0
Riparian Hill	130	3	N/A		
Riparian Downs	6	3	N/A		
Riparian Flats	7	3	N/A		
Wetland Hill	11	3	N/A		
Wetland Flats	5	3	N/A		
Other farm sources	31				
Whole farm	11333	19			
Less N removed in wetlands	442				
Farm output	10891	18			



**Table 1.3.1.3.3. Red Meat / Hill Country: Scenario 2 Stock Exclusion – Phosphorus block report.**

Farm name: Red Meat - Stock Exclusion (Stock Exclusion)

## Block Phosphorus

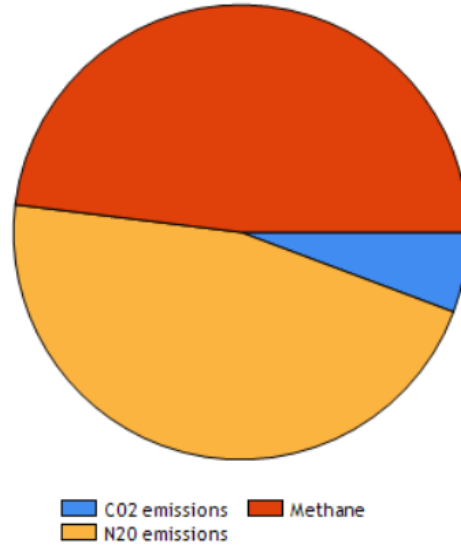
Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
Hill Oma Tussoc	42	0.1	Low	n/a	n/a
Downs ClaTussoc	6	0.1	Low	n/a	n/a
Downs Cla Dev	23	0.4	Low	Low	n/a
Downs Cla PP>WRape	2	0.4	n/a	n/a	n/a
Downs Cla WRape>Pasja/PP	2	0.4	n/a	n/a	n/a
KL PP	1	0.1	Low	Low	n/a
KL PP>MG Rape	1	0.1	n/a	n/a	n/a
KL MGRape>Ita/WRape	1	0.1	n/a	n/a	n/a
KL Ita/WRape>PP	1	0.1	n/a	n/a	n/a
pvt PP	12	0.4	Low	Low	n/a
pvt PP>Oat/Ita	6	0.9	n/a	n/a	n/a
pvt Oat/Ita>FBeet	11	1.6	n/a	n/a	n/a
pvt FBeet>SRape	7	1	n/a	n/a	n/a
DL flat	0	0	Low	Low	n/a
Lucerne	0	0	Low	Low	n/a
Riparian Hill	4	0.1	n/a	n/a	n/a
Riparian Downs	0	0.1	n/a	n/a	n/a
Riparian Flats	0	0.1	n/a	n/a	n/a
Wetland Hill	0	0.1	n/a	n/a	n/a
Wetland Flats	0	0.1	n/a	n/a	n/a
Other farm sources	30				
<b>Whole farm</b>	<b>140</b>	<b>0.2</b>			

**Table 1.3.1.3.4. Red Meat / Hill Country: Scenario 2 Stock Exclusion – Farm greenhouse gas emissions.**

Farm name: Red Meat - Stock Exclusion (Stock Exclusion)

## Farm Greenhouse Gas Emissions

Based on total farm area	Current farm
Units: Use default	
<b>Methane</b>	<b>2022</b>
Enteric	1990
Dung	32
Effluent	0
<b>N<sub>2</sub>O emissions</b>	<b>1945</b>
Excreta paddock	1385
Excreta effluent	0
N fertiliser	267
Crops	4
Indirect	289
<b>CO<sub>2</sub> emissions</b>	<b>240</b>
Electricity	16
Fuel	43
N fertiliser	38
Fertiliser and organic inputs	55
Lime	82
Supplements	2
Animal transport	1
Other	3
<b>Total</b>	<b>4207</b>



### 1.3.2. Dairy

#### 1.3.2.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	MfE	File Name	Dairy - Scenario 2 Stock Exclusion	
Business Year	2020-21	Date Printed	20/06/2019	
Total Farm Area (ha)	318	Prepared By:	MRB	
Total Effective Area (ha)	300	Stocking Rate:	3.3	
Total kgMS produced:	428,370			
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes		Cows	984	
Ewe Hoggets		Heifers	236	
Male Hoggets		Heifer Calves	246	
Wethers		Male Calves		
Rams		Steers/Bulls		
		Bulls		
TOTAL SHEEP		TOTAL CATTLE	1,466	
Sheep stock units		Cattle stock units	8,068	
Lambing percentage		Calving percentage		
Wool/sheep S.U.		Cows in Milk		
Av. Wool Price/kg		kgMS /cow		
		kgMS /ha	1,428	
SHEEP INCOME/SU		CATTLE INCOME/SU	339	
<b>DEER</b>		<b>PRODUCE</b>		
M.A. Hinds		Crop	Area	Yield/Ha
R 2yr Hinds		M.Wheat		
R 1yr Hinds		F.Wheat		
R1yr Stags		Oats		
R 2yr Stags		Barley		
M.A. Stags		Peas		
		Other Grain		
TOTAL DEER		Grass Seed 1.		
Deer stock units		Grass Seed 2.		
Fawning percentage		Clover		
Velvet/stag		Other Small Seed		
Av. Velvet Price/kg				
		TOTAL AREA		
DEER INCOME/SU		PRODUCE INCOME/HA		
<b>FINANCIAL INDICES</b>				
	Total \$	\$/ha	\$/kgMS	
Total Cash Farm Income	2,867,927	9,560	6.69	
Change in Value of Stock on Hand				
Change in Value of Produce on Hand				
Gross Farm Income	2,867,927	9,560	6.69	
Farm Working Expenses	1,817,436	6,058	4.24	
Earnings Before Interest, Drawings and Tax	1,050,491	3,502	2.45	
Total Debt Servicing	691,606	2,305	1.61	
Farm Working Expenses as a % of Gross Farm Income		63		
Debt Servicing as % of Gross Farm Income		24		
Debt Servicing as % of EBIT		66		

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY			
		428,370 Su or Ha			
	TOTAL \$	\$/kgMS		TOTAL \$	\$/kgMS
WAGES	338,338	0.79	SHEEP		
ANIMAL HEALTH	121,028	0.28	WOOL		
STOCKFEED PURCHASED	625,399	1.46	CATTLE	206,697	
OTHER STOCK EXPENSES	78,290	0.18	MILK	2,570,219	
FEED CONSERVATION	3,240	0.01	DEER		
CONTRACTING	3,990	0.01	VELVET		
CARTAGE	2,740	0.01	GRAIN AND PULSE PRODUCE		
FERTILISER & LIME	192,095	0.45	Previous Yr Sales		
SEEDS & TREATMENT	39,000	0.09	Current Yr Sales		
SACKS & SEED DRESSING			Unsold At Year End		
WEED & PEST CONTROL	2,455	0.01	SMALL SEED PRODUCE		
REPAIRS & MAINTENANCE	100,075	0.23	Previous Yr Sales		
VEHICLE EXPENSES	52,500	0.12	Current Yr Sales		
ELECTRICITY	80,650	0.19	Unsold At Year End		
OTHER WORKING EXPS	15,330	0.04	MISCELLANEOUS INCOME	135,011	
ADMINISTRATION	35,000	0.08			
STANDING CHARGES	129,308	0.30	STOCK PURCHASES		
			Sheep		
			Cattle	-44,000	
			Deer		
			Other		
<b>CASH FARM WORKING EXPENSES</b>	<b>1,817,436</b>	<b>4.24</b>	<b>CASH FARM INCOME</b>	<b>2,867,927</b>	<b>6.69</b>
<b>CASH FARM WORKING PROFIT</b>	<b>1,050,491</b>	<b>2.45</b>			
<b>DEBT SERVICING</b>					
Mortgage	681,750	1.59			
Term Interest	3,980	0.01			
Current Account	5,878	0.01			
Rent					
Other					
<b>CASH OPERATING EXPENSES</b>	<b>2,509,041</b>	<b>5.86</b>	<b>CASH OPERATING INCOME</b>	<b>2,867,927</b>	<b>6.69</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>358,886</b>	<b>0.84</b>			
<b>PERSONAL DRAWINGS</b>			<b>NON OPERATING INCOME</b>		
OTHER PERSONAL					
TAXATION	78,153	0.18			
CAPITAL PURCHASES & PAYMENTS	98,375	0.23	INVESTMENT INCOME		
INVESTMENTS					
UNPAID ACCOUNTS					
<b>TOTAL CASH EXPENDITURE</b>	<b>2,685,569</b>	<b>6.27</b>	<b>TOTAL CASH INCOME</b>	<b>2,867,927</b>	<b>6.69</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>182,358</b>	<b>0.43</b>			
Change in value of stock on hand					
Change in value of produce on hand					
Depreciation					
<b>TRUE SURPLUS/DEFICIT</b>	<b>182,358</b>	<b>0.43</b>			

### 1.3.2.2. Farmax biophysical modelling

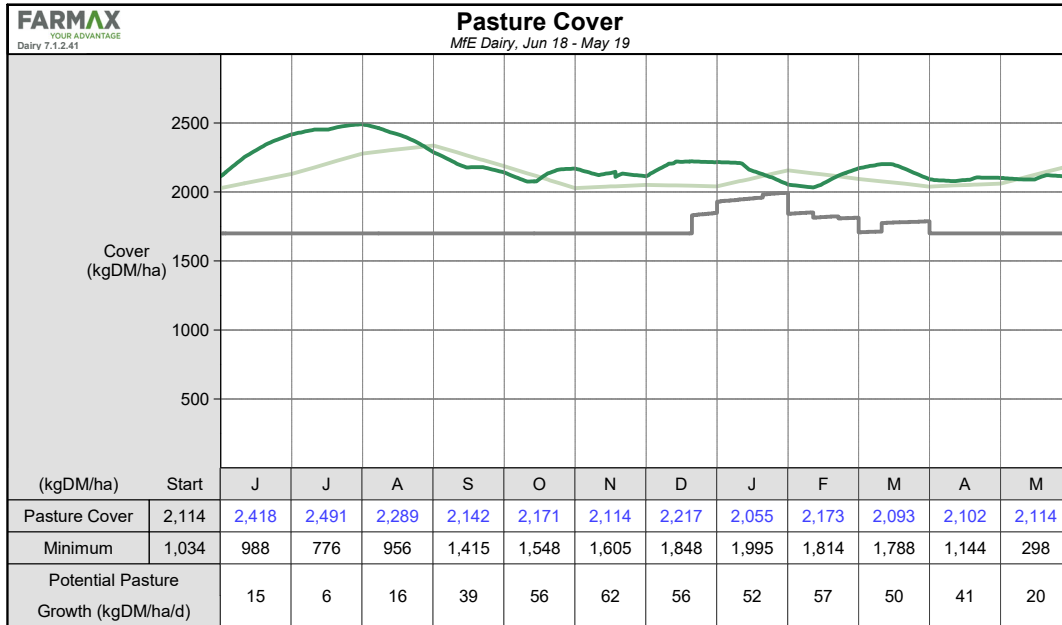
**Figure 1.3.2.2.1. Dairy: Scenario 2 Stock Exclusion.** Farmax biophysical summary of the dairy farm program, whole farm, long term steady-state basis.

<b>FARMAX</b> YOUR ADVANTAGE Dairy 7.1.2.41		<b>Physical Summary for MfE Dairy</b> Jun 18 - May 19	
<b>Category</b>	<b>Description</b>	<b>Value</b>	<b>Units</b>
<b>Farm</b>	Effective Area	300	ha
	Stocking Rate	3.3	cows/ha
	Potential Pasture Growth	14.2	t DM/ha
	Nitrogen Use	215	kg N/ha
	Feed Conversion Efficiency (eaten)	10.6	kg DM eaten/kg MS
<b>Herd</b>	Cow Numbers (1st July)	1,014	cows
	Peak Cows Milked	984	cows
	Days in Milk	0	days
	Avg. BCS at calving	4.9	BCS
	Liveweight	1,399	kg/ha
<b>Production (to Factory)</b>	Milk Solids total	428,370	kg
	Milk Solids per ha	1,428	kg/ha
	Milk Solids per cow	435	kg/cow
	Peak Milk Solids production	2.01	kg/cow/day
	Milk Solids as % of live weight	102.1	%
<b>Feeding</b>	Pasture Eaten per cow *	3.6	t DM/cow
	Supplements Eaten per cow *	0.4	t DM/cow
	Off-farm Grazing Eaten per cow *	0.6	t DM/cow
	Total Feed Eaten per cow *	4.6	t DM/cow
	Pasture Eaten per ha	11.8	t DM/ha
	Supplements Eaten per ha	1.5	t DM/ha
	Off-farm Grazing Eaten per ha	3.8	t DM/ha
	Total Feed Eaten per ha	17.0	t DM/ha
	Supplements and Grazing / Feed Eaten *	23.0	%
	Bought Feed / Feed Eaten *	4.2	%

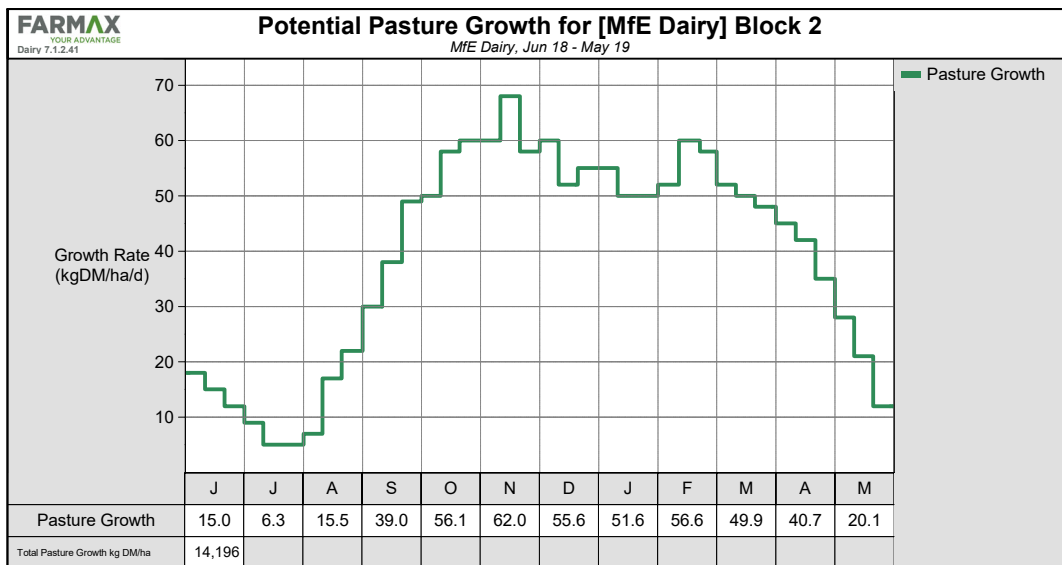
(\*) feed eaten by females > 20 months old / peak cows milked

**Figure 1.3.2.2.2. Dairy: Scenario 2 Stock Exclusion. a) Average pasture covers, b) pasture growth curve, whole farm, long term steady-state basis.**

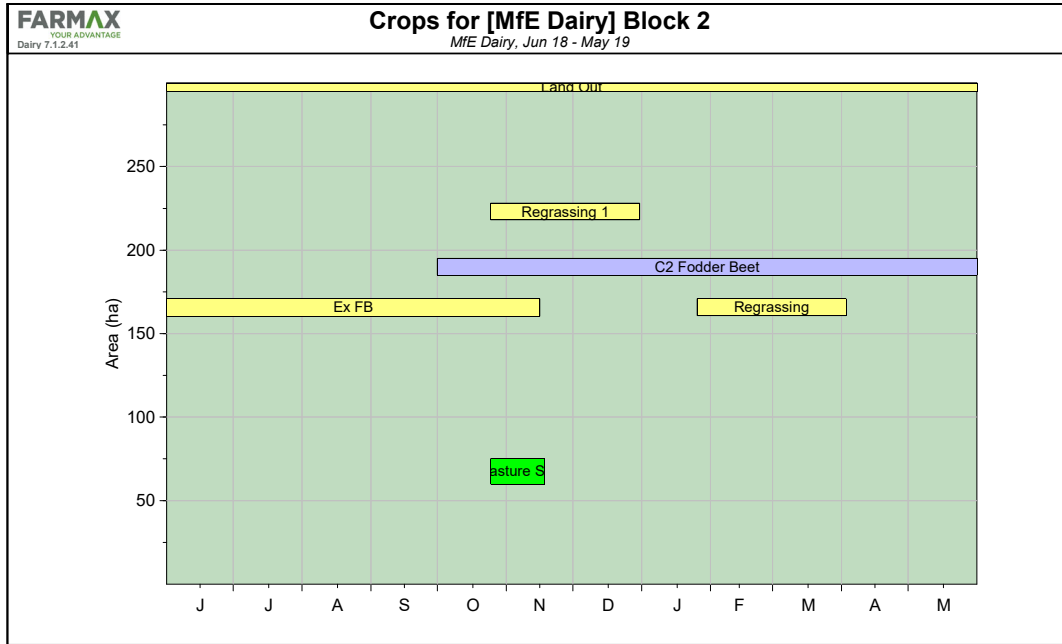
a)



b)



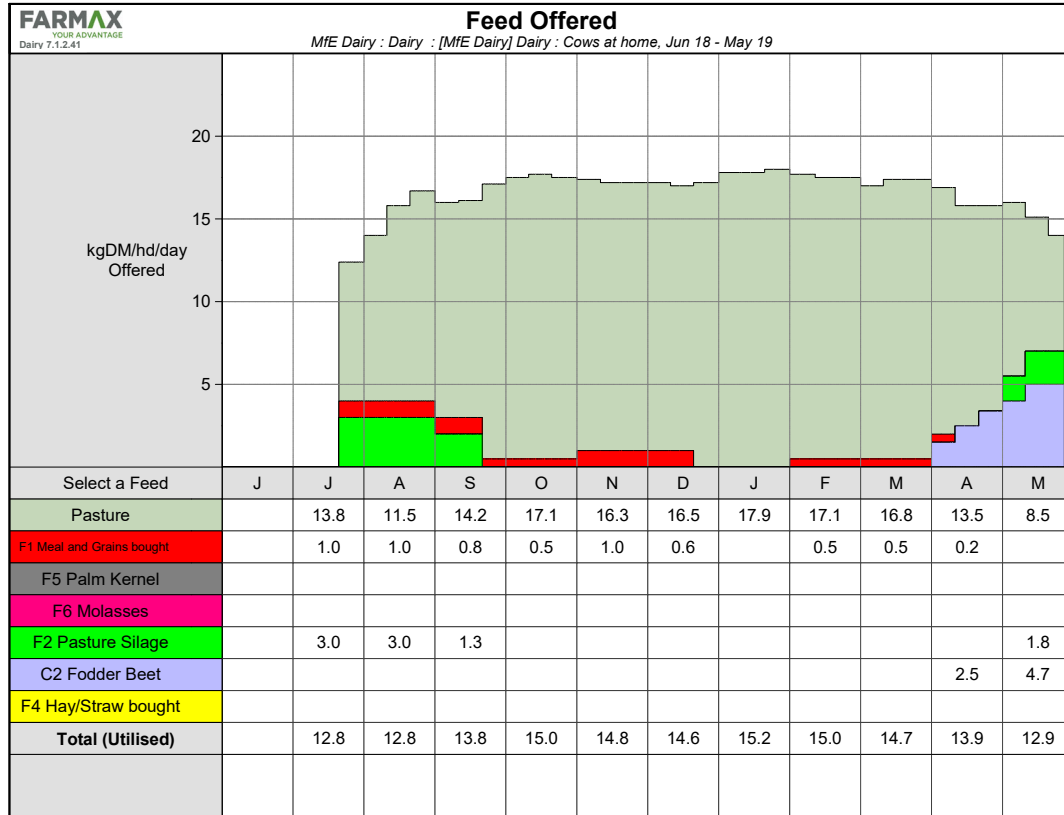
**Figure 1.3.2.2.3.** Dairy: Scenario 2 Stock Exclusion. Crops and silage, whole farm, long term steady-state basis.



**Figure 1.3.2.2.4.** Dairy: Scenario 2 Stock Exclusion. Supplement use, whole farm, long term steady-state basis.

FARMAX YOUR ADVANTAGE Dairy 7.1.2.41		Supplement Usage Summary for MfE Dairy													kg /milker	
		Jun 18 - May 19														
Feed	tonnes DM offered													Total	kg /milker	
	Jun 18	Jul 18	Aug 18	Sep 18	Oct 18	Nov 18	Dec 18	Jan 19	Feb 19	Mar 19	Apr 19	May 19				
F4 Hay/Straw bought		0	20	7										27	28	
C2 Fodder Beet												67	132	199	202	
F1 Meal and Grains bought		1	13	20	15	30	20		13	15	5			131	133	
F2 Pasture Silage		3	59	39									32	133	135	
<b>Total</b>														<b>490</b>	<b>498</b>	

**Figure 1.3.2.2.5. Dairy: Scenario 2 Stock Exclusion. Feed offered to milking cows. Whole farm, long term steady-state basis.**





### 1.3.2.3. Overseer nutrient modelling

**Table 1.3.2.3.1.** Dairy: Scenario 2 Stock Exclusion – Whole farm nutrient budget.

Farm name: MFE Dairy model Stock Exclusion Overseer file (2019/20)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	211	23	2	42	57	7	1
Rain/clover N fixation	113	0	2	4	2	4	19
Irrigation	10	0	7	10	39	9	40
Supplements imported	19	3	12	2	3	1	1
<b>Nutrients removed</b>							
As products	91	15	22	5	20	2	6
Exported effluent	0	0	0	0	0	0	0
As supplements	2	0	2	0	0	0	0
To atmospheric	94	0	0	0	0	0	0
To water	64	1.4	10	56	71	4	13
<b>Change in internal pools</b>							
Plant material	-1	0	-5	1	0	0	0
Organic pool	100	15	0	-4	0	0	0
Inorganic mineral	0	0	-40	0	-1	-1	-2
Inorganic soil pool	4	-5	34	0	11	19	43

**Table 1.3.2.3.2. Dairy: Scenario 2 Stock Exclusion – Nitrogen block report.**

Farm name: MFE Dairy model Stock Exclusion Overseer file (2019/20)

## Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
(F) Eff S.Pivot Darn_4a.2	1408	47	<b>23.5</b>	299	358
(F) Eff K Line Darn_4a.2	486	121	<b>29.0</b>	366	358
(F) Eff S.Pivot Darn_4a.2	392	49	<b>24.6</b>	312	358
(F) Eff Kline Darn_4a.2	486	121	<b>29.0</b>	366	358
(F) Non Eff Pivot Darn_4a.2	775	35	<b>17.6</b>	226	245
(F)Non Eff K Line Darn_4a.2	2313	93	<b>22.1</b>	259	245
(F) Non Eff K Line Darn_4a.2	494	99	<b>23.6</b>	279	245
(F) Non Eff K Line Raka_2a.1	1306	112	<b>26.3</b>	278	245
(F) Eff K Line Raka_2a.1	1696	130	<b>30.4</b>	346	324
(R) Non Eff K Line Timu_1a.1	6058	75	<b>19.1</b>	255	245
(F) Eff Pivot Darn_4a.2 ##	1044	40	<b>22.1</b>	286	324
Trees and Scrub	22	2	N/A		
NB Pasture K Line Darn_4a.2	767	96	<b>22.9</b>	270	245
NB Pasture K Line Darn_4a.2	220	110	<b>26.3</b>	315	245
NB Pasture Pivot Darn_4a.2 ##	964	31	<b>20.4</b>	221	245
NB Pasture Pivot Darn_4a.2 ##	180	32	<b>21.5</b>	239	245
Fodder Beet	1792	179	<b>85.0</b>	-12	116
Other farm sources	46				
Whole farm	20450	64			
Less N removed in wetlands	0				
Farm output	20450	64			

**Table 1.3.2.3.3. Dairy: Scenario 2 Stock Exclusion – Phosphorus block report.**

Farm name: MFE Dairy model Stock Exclusion Overseer file (2019/20)

## Block Phosphorus

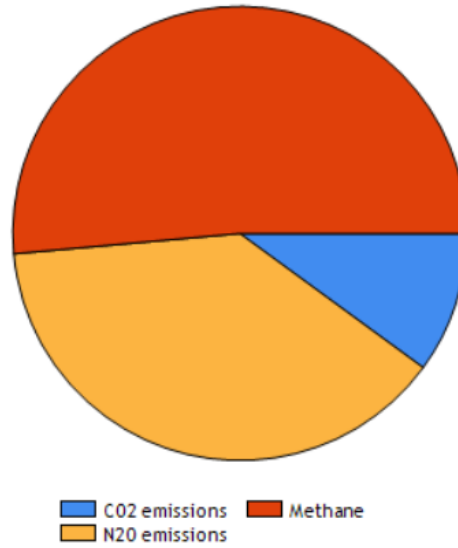
Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
(F) Eff S.Pivot Darn_4a.2	8	0.3	Low	Low	Low
(F) Eff K Line Darn_4a.2	2	0.6	Low	Low	Low
(F) Eff S.Pivot Darn_4a.2	2	0.3	Low	Low	Low
(F) Eff Kline Darn_4a.2	2	0.6	Low	Low	Low
(F) Non Eff Pivot Darn_4a.2	6	0.3	Low	Low	n/a
(F)Non Eff K Line Darn_4a.2	14	0.6	Low	Low	n/a
(F) Non Eff K Line Darn_4a.2	3	0.6	Low	Low	n/a
(F) Non Eff K Line Raka_2a.1	21	1.8	High	Medium *	n/a
(F) Eff K Line Raka_2a.1	25	1.9	High	Medium	Medium
(R) Non Eff K Line Timu_1a.1	192	2.4	High	High *	n/a
(F) Eff Pivot Darn_4a.2 ##	7	0.3	Low	Low	Low
Trees and Scrub	1	0.1	n/a	n/a	n/a
NB Pasture K Line Darn_4a.2	5	0.6	Low	Low	n/a
NB Pasture K Line Darn_4a.2	1	0.6	Low	Low	n/a
NB Pasture Pivot Darn_4a.2 ##	4	0.1	Low	Low	n/a
NB Pasture Pivot Darn_4a.2 ##	1	0.1	Low	Low	n/a
Fodder Beet	3	0.3	n/a	n/a	n/a
Other farm sources	157				
<b>Whole farm</b>	<b>453</b>	<b>1.4</b>			

**Table 1.3.2.3.4. Dairy: Scenario 2 Stock Exclusion – Farm greenhouse gas emissions.**

Farm name: MFE Dairy model Stock Exclusion Overseer file (2019/20)

## Farm Greenhouse Gas Emissions

Based on total farm area	Current farm
Units: CO2 equivalents (kg/ha/yr)	
<b>Methane</b>	<b>8746</b>
Enteric	8605
Dung	101
Effluent	41
<b>N2O emissions</b>	<b>6550</b>
Excreta paddock	3795
Excreta effluent	19
N fertiliser	1662
Crops	3
Indirect	1071
<b>CO2 emissions</b>	<b>1711</b>
Electricity	327
Fuel	71
N fertiliser	821
Fertiliser and organic inputs	85
Lime	0
Supplements	279
Animal transport	6
Other	123
<b>Total</b>	<b>17008</b>



### 1.3.3. Dairy support

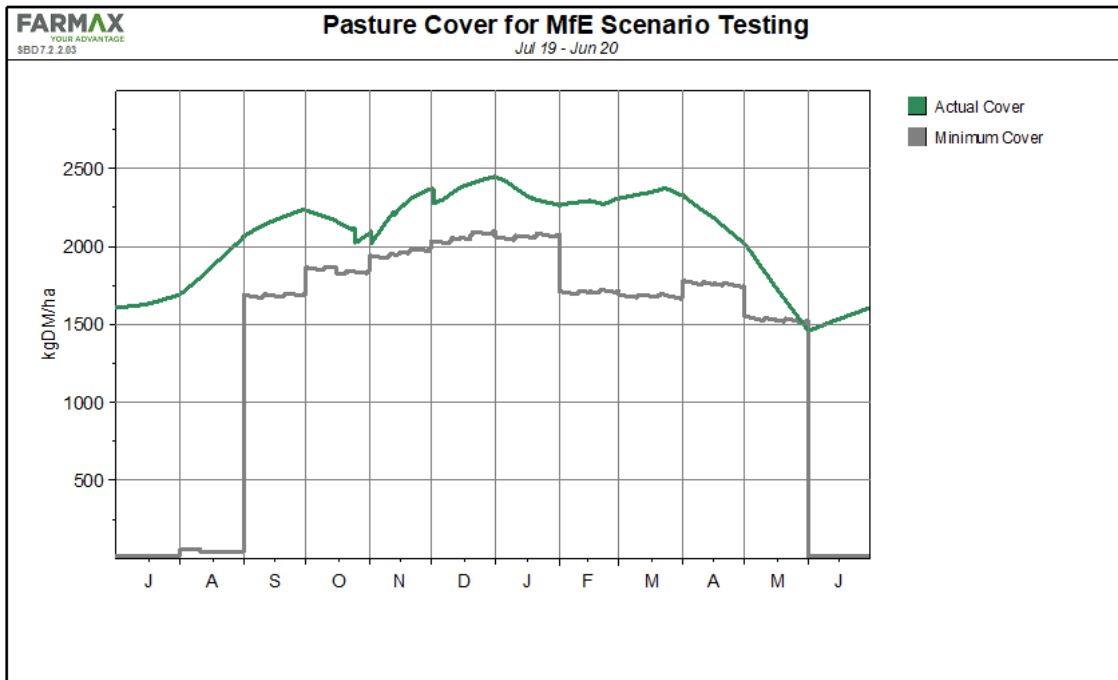
#### 1.3.3.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	MFE	File Name	Dairy Support - Scenario 2 Stock E	
Business Year	2019/20	Date Printed	20/06/2019	
Total Farm Area (ha)	475	Prepared By:	Jamie Gordon	
Total Effective Area (ha)	455	Stocking Rate:	5.1	
Total Stock Units Wintered:	2,332			
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes		Cows		
Ewe Hoggets		Heifers		
Male Hoggets		Heifer Calves		466
Wethers		Male Calves		104
Rams		Steers/Bulls		
		Bulls		
TOTAL SHEEP		TOTAL CATTLE		570
Sheep stock units		Cattle stock units		2,332
Lambing percentage		Calving percentage		
Wool/sheep S.U.		Cows in Milk		
Av. Wool Price/kg		kgMS /cow		
		kgMS /ha		
SHEEP INCOME/SU		CATTLE INCOME/SU		565
<b>DEER</b>		<b>PRODUCE</b>		
M.A. Hinds		Crop	Area	Yield/Ha
R 2yr Hinds		M.Wheat		
R 1yr Hinds		F.Wheat		32.2
R1yr Stags		Oats		6.0
R 2yr Stags		Barley		
M.A. Stags		Peas		
		Other Grain		
TOTAL DEER		Grass Seed 1.		
Deer stock units		Grass Seed 2.		
Fawning percentage		Clover		
Velvet/stag		Other Small Seed		
Av. Velvet Price/kg				
		TOTAL AREA		38.2
DEER INCOME/SU		PRODUCE INCOME/HA		2,869
<b>FINANCIAL INDICES</b>				
	Total \$	\$/ha	\$/su	
Total Cash Farm Income	1,430,222	3,143	613	
Change in Value of Stock on Hand				
Change in Value of Produce on Hand				
Gross Farm Income	1,430,222	3,143	613	
Farm Working Expenses	948,822	2,085	407	
Earnings Before Interest, Drawings and Tax	481,400	1,058	206	
Total Debt Servicing	357,502	786	153	
Farm Working Expenses as a % of Gross Farm Income		66.3		
Debt Servicing as % of Gross Farm Income		25.0		
Debt Servicing as % of EBIT		74.3		

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY		
		455 Su or Ha		
	TOTAL \$		TOTAL \$	
WAGES	138,400	304 SHEEP		
ANIMAL HEALTH	9,328	21 WOOL		
STOCKFEED PURCHASED	32,900	72 CATTLE	1,593,160	
OTHER STOCK EXPENSES	1,000	2 MILK		
FEED CONSERVATION	74,880	165 DEER		
CONTRACTING	72,095	158 VELVET		
CARTAGE	12,888	28 GRAIN AND PULSE PRODUCE		
FERTILISER & LIME	189,243	416 Previous Yr Sales		
SEEDS & TREATMENT	60,650	133 Current Yr Sales	109,594	
SACKS & SEED DRESSING		Unsold At Year End		
WEED & PEST CONTROL	127,810	281 SMALL SEED PRODUCE		
REPAIRS & MAINTENANCE	30,500	87 Previous Yr Sales		
VEHICLE EXPENSES	33,500	74 Current Yr Sales		
ELECTRICITY	2,400	5 Unsold At Year End		
OTHER WORKING EXPS		MISCELLANEOUS INCOME	2,500	
ADMINISTRATION	19,000	42		
STANDING CHARGES	144,228	317 STOCK PURCHASES		
		Sheep		
		Cattle	-275,032	
		Deer		
		Other		
<b>CASH FARM WORKING EXPENSES</b>	<b>948,822</b>	<b>2,085 CASH FARM INCOME</b>	<b>1,430,222</b>	<b>3,143</b>
<b>CASH FARM WORKING PROFIT</b>	<b>481,400</b>	<b>1,058</b>		
DEBT SERVICING				
Mortgage	342,319	752		
Term Interest				
Current Account	15,183	33		
Rent				
Other				
<b>CASH OPERATING EXPENSES</b>	<b>1,306,324</b>	<b>2,871 CASH OPERATING INCOME</b>	<b>1,430,222</b>	<b>3,143</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>123,898</b>	<b>272</b>		
PERSONAL DRAWINGS		NON OPERATING INCOME		
OTHER PERSONAL				
TAXATION	12,630	28		
CAPITAL PURCHASES & PAYMENTS	81,800	180 INVESTMENT INCOME		
INVESTMENTS				
UNPAID ACCOUNTS				
<b>TOTAL CASH EXPENDITURE</b>	<b>1,400,754</b>	<b>3,079 TOTAL CASH INCOME</b>	<b>1,430,222</b>	<b>3,143</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>29,468</b>	<b>65</b>		
Change in value of stock on hand				
Change in value of produce on hand				
Depreciation				
<b>TRUE SURPLUS/DEFICIT</b>	<b>29,468</b>	<b>65</b>		

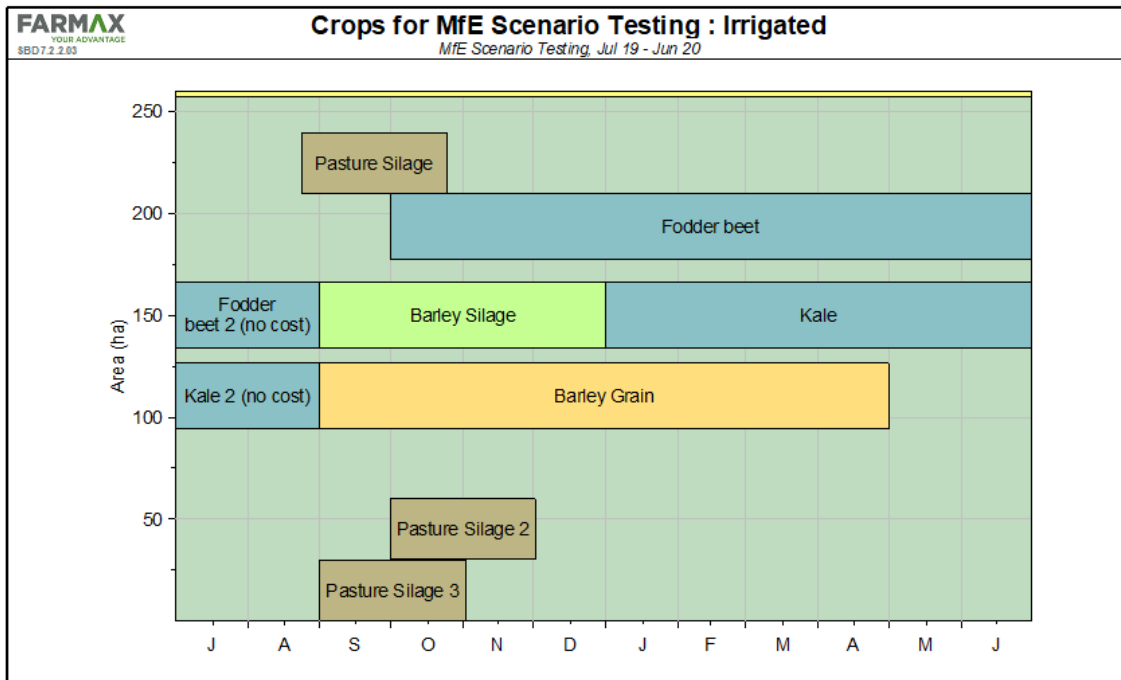
### 1.3.3.2. Farmax biophysical modelling

**Figure 1.3.3.2.1.** Dairy support: Scenario 2 Stock Exclusion. Average pasture covers, whole farm, long term steady-state basis.

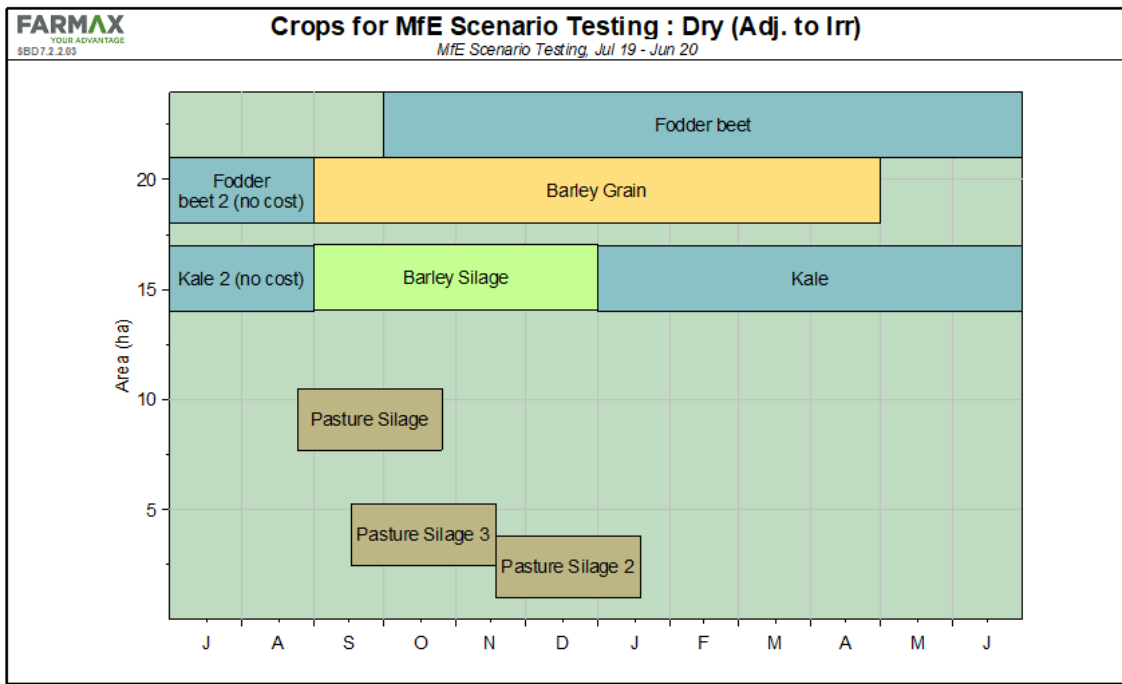


**Figure 1.3.3.2.2.** Dairy support: Scenario 2 Stock Exclusion. Crops and silage, whole farm, long term steady-state basis. a) Irrigated, b) Dryland block 1, c) Dryland block 2.

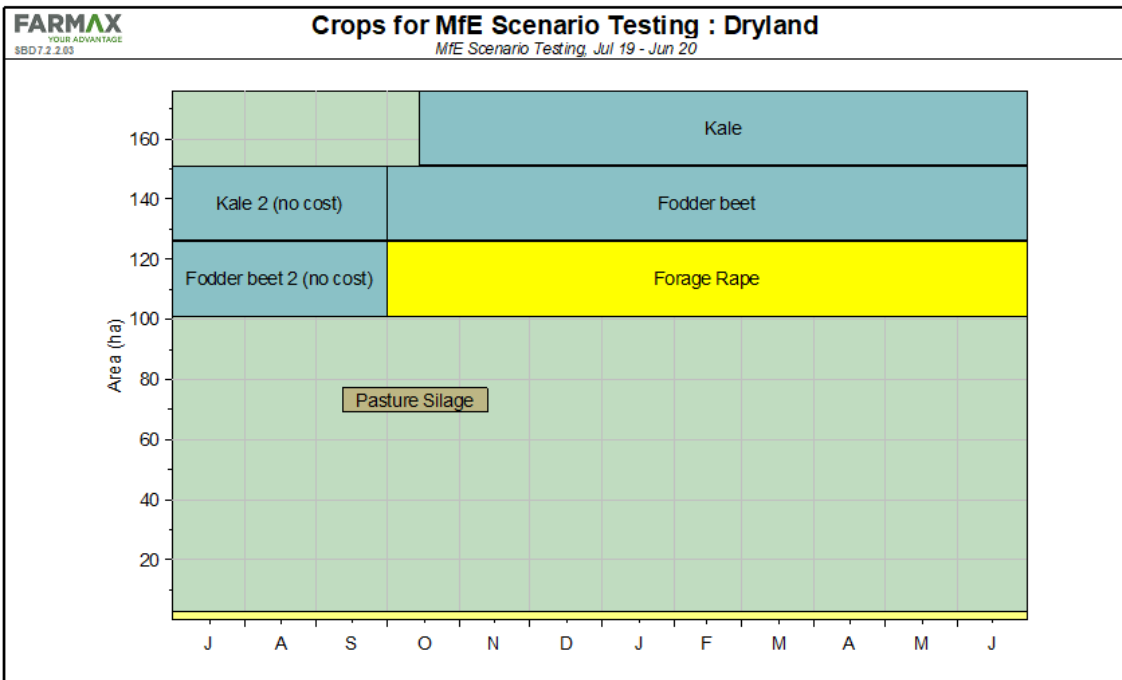
a)



b)



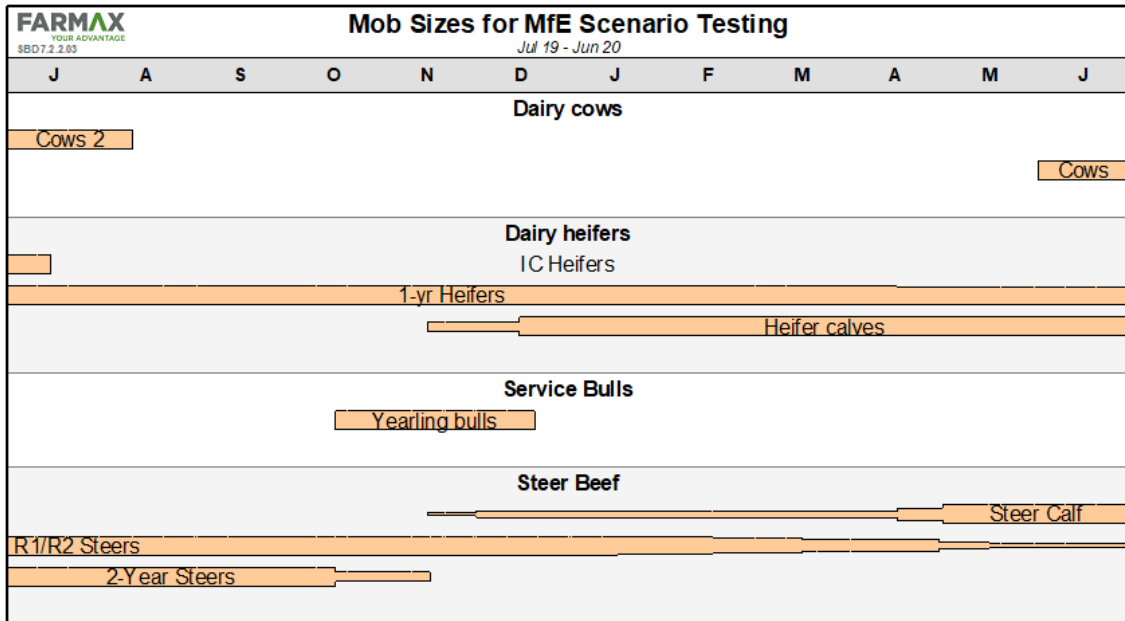
c)





**Figure 1.3.3.2.3.** Dairy support: Scenario 2 Stock Exclusion. Whole farm, long term steady-state basis: **a)** relative mob sizes throughout the year; **b)** livestock reconciliation by month.

a)



b)

**FARMAX**  
YOUR ADVANTAGE  
SBD 7.2.2.63

**Stock Reconciliation Numbers by Month for MfE Scenario Testing**  
Jul 19 - Jun 20

(end of month)	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20	Apr 20	May 20	Jun 20
Heifer Calf					227	455	455	455	455	455	455	455
1-Year Heifer	455	455	455	455	455	455	455	455	455	432	432	432
2-Year Heifer												
Cow	1680											1680
1-Year Bull				13	13							
Steer Calf					74	153	153	152	152	310	467	466
1-Year Steer	466	465	465	464	464	464	432	395	319	159	120	104
2-Year Steer	104	104	104	52								
<b>Total Beef</b>	<b>2705</b>	<b>1024</b>	<b>1024</b>	<b>984</b>	<b>1233</b>	<b>1527</b>	<b>1495</b>	<b>1457</b>	<b>1381</b>	<b>1356</b>	<b>1474</b>	<b>3137</b>

### 1.3.3.3. Overseer nutrient modelling

**Table 1.3.3.3.1.** Dairy support: Scenario 2 Stock Exclusion – Whole farm nutrient budget.

Farm name: Dairy Support Farm - Livestock Exclusion (2019)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	145	31	12	19	85	1	8
Rain/clover N fixation	27	0	2	4	2	4	15
Irrigation	2	0	1	2	8	2	9
Supplements imported	4	0	11	1	2	1	1
<b>Nutrients removed</b>							
As products	11	3	3	1	2	1	0
Exported effluent	0	0	0	0	0	0	0
As supplements, crop exports	26	4	25	3	6	2	1
To atmospheric	46	0	0	0	0	0	0
To water	67	0.2	11	42	98	9	25
<b>Change in internal pools</b>							
Plant material	-108	-14	-94	-12	-47	-9	-21
Organic pool	104	1	1	-8	0	0	0
Inorganic mineral	0	3	-17	0	-2	-4	-4
Inorganic soil pool	32	34	96	0	41	9	31

**Table 1.3.3.3.2.** Dairy support: Scenario 2 Stock Exclusion – Nitrogen block report.

Farm name: Dairy Support Farm - Livestock Exclusion (2019)

## Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Irrigated	4101	32	7.3	209	189
DLC- Silage	52	19	5.3	50	189
OG - FB	3970	123	<b>27.6</b>	184	118
FB- Ba Si - Ka	5408	168	<b>36.1</b>	152	187
Ba Sil - Ka - Ba -NG	4400	137	<b>27.3</b>	108	160
DLC - OG - FB	474	158	<b>41.7</b>	557	118
DLC - FB- Ba Si - Ka	507	169	<b>43.2</b>	612	187
DLC - Ba Sil - Ka - Ba - NG	487	162	<b>34.5</b>	460	148
DL Corners	373	25	7.1	181	159
DL - OG - Ka	1651	67	<b>18.6</b>	213	141
DL Ka - FB	2062	83	<b>21.8</b>	207	105
DL - FB - Fo Ra - NG	4654	188	<b>48.0</b>	115	68
Rolling DL Pasture	2054	23	6.4	141	99
Rolling DL Silage Pasture	210	27	7.6	113	99
Irr Silage x 3 cuts	526	18	5.1	46	189
Other farm sources	89				
Whole farm	31016	67			
Less N removed in wetlands	0				
Farm output	31016	67			

**Table 1.3.3.3.3.** Dairy support: Scenario 2 Stock Exclusion – Phosphorus block report.

Farm name: Dairy Support Farm - Livestock Exclusion (2019)

## Block Phosphorus

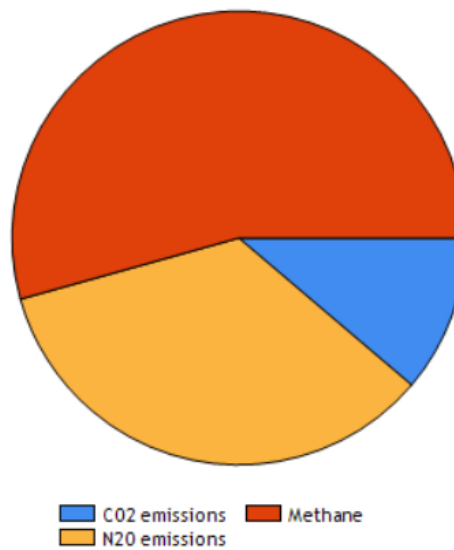
Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
Irrigated	13	0.1	Low	Low	n/a
DLC- Silage	0	0	Low	Low	n/a
OG - FB	8	0.2	n/a	n/a	n/a
FB- Ba Si - Ka	7	0.2	n/a	n/a	n/a
Ba Sil - Ka - Ba -NG	5	0.2	n/a	n/a	n/a
DLC - OG - FB	0	0.1	n/a	n/a	n/a
DLC - FB- Ba Si - Ka	0	0.1	n/a	n/a	n/a
DLC - Ba Sil - Ka - Ba - NG	0	0.1	n/a	n/a	n/a
DL Corners	1	0	Low	Low	n/a
DL - OG - Ka	3	0.1	n/a	n/a	n/a
DL Ka - FB	4	0.1	n/a	n/a	n/a
DL - FB - Fo Ra - NG	3	0.1	n/a	n/a	n/a
Rolling DL Pasture	14	0.2	Low	Low	n/a
Rolling DL Silage Pasture	1	0.2	Low	Low	n/a
Irr Silage x 3 cuts	1	0	Low	Low	n/a
Other farm sources	39				
Whole farm	101	0.2			

**Table 1.3.3.3.4.** Dairy support: Scenario 2 Stock Exclusion – Farm greenhouse gas emissions.

Farm name: Dairy Support Farm - Livestock Exclusion (2019)

## Farm Greenhouse Gas Emissions

Based on total farm area	Current farm
Units: Use default	
<b>Methane</b>	<b>5270</b>
Enteric	5143
Dung	125
Effluent	1
<b>N2O emissions</b>	<b>3339</b>
Excreta paddock	1563
Excreta effluent	0
N fertiliser	798
Crops	29
Indirect	948
<b>CO2 emissions</b>	<b>1088</b>
Electricity	54
Fuel	156
N fertiliser	481
Fertiliser and organic inputs	208
Lime	83
Supplements	46
Animal transport	22
Other	39
<b>Total</b>	<b>9697</b>



### 1.3.4. Arable mixed cropping

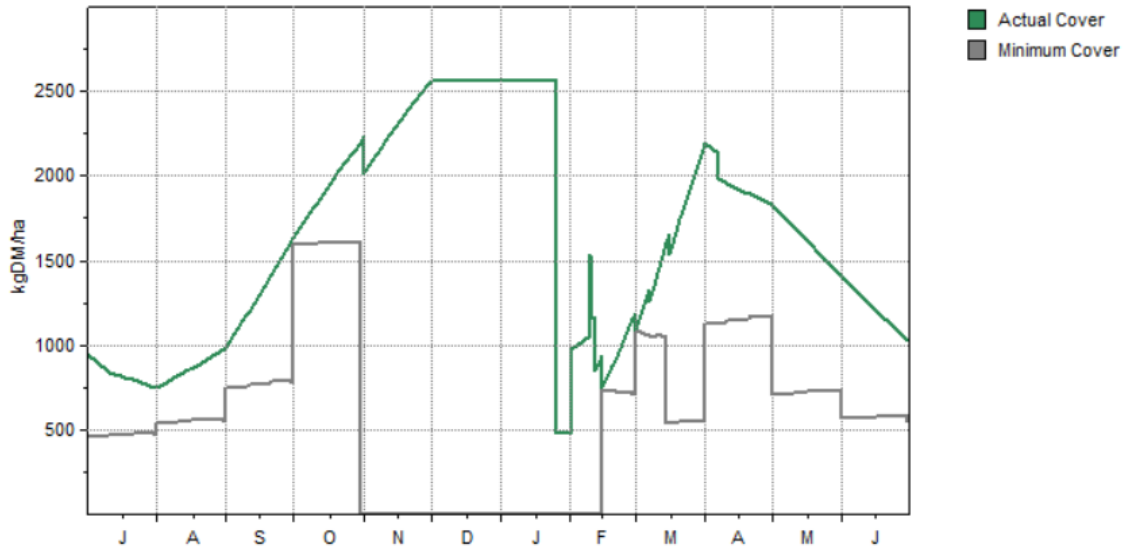
#### 1.3.4.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	MFE Arable Mixed Crop Farm	File Name	Scenario 2 - Stock Exclusion	
Business Year	2017/18	Date Printed	4/06/2019	
Total Farm Area (ha)	348.0	Prepared By:	Anton Nicholls	
Total Effective Area (ha)	317.8	Stocking Rate:		
Total Stock Units Wintered:				
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes		Cows		
Ewe Hoggets		Heifers		
Male Hoggets		Heifer Calves		
Wethers		Male Calves		
Rams		Steers/Bulls		
		Bulls		
TOTAL SHEEP		TOTAL CATTLE		
Sheep stock units		Cattle stock units		
Lambing percentage		Calving percentage		
Wool/sheep S.U.		Cows in Milk		
Av. Wool Price/kg	450	kgMS /cow		
		kgMS /ha		
SHEEP INCOME/SU		CATTLE INCOME/SU		
<b>DEER</b>		<b>PRODUCE</b>		
M.A. Hinds		Crop	Area	Yield t/ha
R 2yr Hinds		M.Wheat	44.0	10.0
R 1yr Hinds		F.Wheat	44.0	13.0
R1yr Stags		Barley	44.0	9.0
R 2yr Stags		Triticale		
M.A. Stags		Peas - Vining	44.0	3.6
		Ryegrass seed	44.0	2.5
TOTAL DEER		Clover - White	44.0	0.6
Deer stock units		Linseed	14.7	3.0
Fawning percentage		Sunflowers	14.7	3.2
Velvet/stag		Hemp	14.7	1.0
Av. Velvet Price/kg		Other		
		Other		
		Other		
		TOTAL AREA	308	
DEER INCOME/SU		PRODUCE INCOME/HA		3,971
<b>FINANCIAL INDICES</b>				
		Total \$	\$/ha	\$/su
Total Cash Farm Income		1,502,834	4,729	
Change in Value of Stock on Hand				
Change in Value of Produce on Hand				
Gross Farm Income		1,502,834	4,729	
Farm Working Expenses		956,535	3,010	
Earnings Before Interest, Drawings and Tax		546,299	1,719	
Total Debt Servicing		327,196	1,030	
Farm Working Expenses as a % of Gross Farm Income			64	
Debt Servicing as % of Gross Farm Income			22	
Debt Servicing as % of EBIT			60	

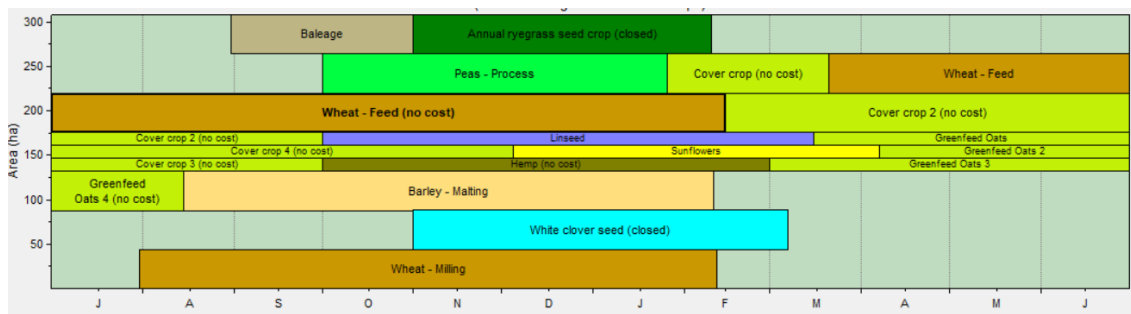
MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY			
		318 Su or Ha			
	TOTAL \$			TOTAL \$	
WAGES	175,453	552 SHEEP		601,402	
ANIMAL HEALTH	7,350	23 WOOL		19,845	
STOCKFEED PURCHASED	600	2 CATTLE			
OTHER STOCK EXPENSES	2,000	6 MILK			
FEED CONSERVATION	23,902	75 DEER			
CONTRACTING	19,667	62 VELVET			
CARTAGE	54,629	172 GRAIN AND PULSE PRODUCE			
FERTILISER & LIME	121,347	382 Previous Yr Sales		285,120	
SEEDS & TREATMENT	64,983	204 Current Yr Sales		451,440	
SACKS & SEED DRESSING	57,588	181 Unsold At Year End	285,120		
WEED & PEST CONTROL	156,797	493 SMALL SEED PRODUCE			
REPAIRS & MAINTENANCE	50,200	158 Previous Yr Sales		224,011	
VEHICLE EXPENSES	83,169	262 Current Yr Sales		262,478	
ELECTRICITY	35,380	111 Unsold At Year End	224,011		
OTHER WORKING EXPS	28,805	91 MISCELLANEOUS INCOME		60,618	
ADMINISTRATION	27,486	86			
STANDING CHARGES	47,180	148 STOCK PURCHASES			
			Sheep	-402,080	
			Cattle		
			Deer		
			Other		
<b>CASH FARM WORKING EXPENSES</b>	<b>956,535</b>	<b>3,010 CASH FARM INCOME</b>		<b>1,502,834</b>	<b>4,729</b>
<b>EBIT / CASH FARM WORKING PROF.</b>	<b>546,299</b>	<b>1,719</b>			
<b>DEBT SERVICING</b>					
Mortgage	296,156	932			
Term Interest	8,419	26			
Current Account	22,621	71			
Rent					
Other					
<b>CASH OPERATING EXPENSES</b>	<b>1,283,731</b>	<b>4,039 CASH OPERATING INCOME</b>		<b>1,502,834</b>	<b>4,729</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>219,103</b>	<b>689</b>			
<b>PERSONAL DRAWINGS</b>			<b>NON OPERATING INCOME</b>		
OTHER PERSONAL					
TAXATION PROVISION FOR	271	1			
CAPITAL PURCHASES & PAYMENTS	218,200	687 INVESTMENT INCOME			
INVESTMENTS					
UNPAID ACCOUNTS					
<b>TOTAL CASH EXPENDITURE</b>	<b>1,502,202</b>	<b>4,727 TOTAL CASH INCOME</b>		<b>1,502,834</b>	<b>4,729</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>632</b>	<b>2</b>			
Change in value of stock on hand					
Change in value of produce on hand					
Depreciation					
<b>TRUE SURPLUS/DEFICIT</b>	<b>632</b>	<b>2</b>			

### 1.3.4.2. Farmax biophysical modelling

**Figure 1.3.4.2.1.** Arable mixed cropping: Scenario 2 Stock Exclusion. Average pasture covers, whole farm, long term steady-state basis.

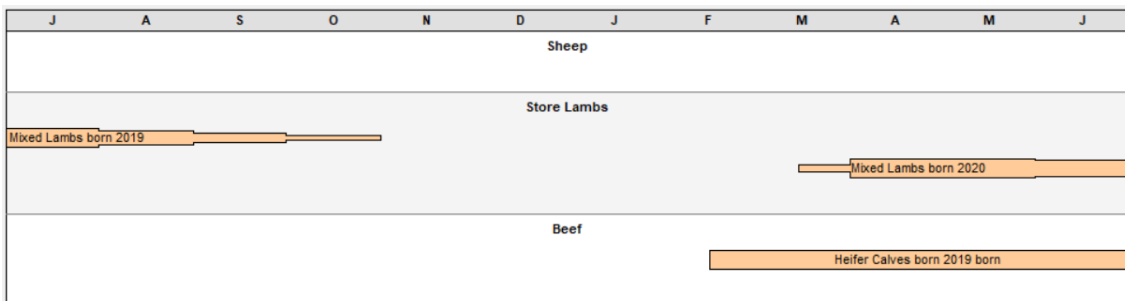


**Figure 1.3.4.2.2.** Arable mixed cropping: Scenario 2 Stock Exclusion. Crops and silage, whole farm, long term steady-state basis.



**Figure 1.3.4.2.3.** Arable mixed cropping: Scenario 2 Stock Exclusion. Whole farm, long term steady-state basis: a) relative mob sizes throughout the year; b) livestock reconciliation by month.

a)



b)

(end of month)	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20	Apr 20	May 20	Jun 20
Mixed Lamb									2100	4900	4175	3450
Mixed Hogget	2425	1702	1002									
<b>Total Sheep</b>	<b>2425</b>	<b>1702</b>	<b>1002</b>						<b>2100</b>	<b>4900</b>	<b>4175</b>	<b>3450</b>
Heifer Calf								190	190	190	190	
<b>Total Beef</b>								<b>190</b>	<b>190</b>	<b>190</b>	<b>190</b>	



### 1.3.4.3. Overseer nutrient modelling

**Table 1.3.4.3.1.** Arable mixed cropping: Scenario 2 Stock Exclusion – Whole farm nutrient budget.

Farm name: MfE - Arable - Scenario 2 - Stock Exclusion (2018)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	82	21	26	36	38	22	0
Rain/clover N fixation	141	0	3	5	2	5	31
Irrigation	7	0	5	7	28	7	28
Supplements imported	9	1	7	1	2	1	0
<b>Nutrients removed</b>							
As products	92	26	28	8	8	7	2
Exported effluent	0	0	0	0	0	0	0
As supplements	34	4	27	2	7	1	1
To atmospheric	33	0	0	0	0	0	0
To water	24	0.5	7	54	52	5	11
<b>Change in internal pools</b>							
Plant material	102	7	21	6	7	-3	-1
Organic pool	-117	-5	0	-22	0	0	0
Inorganic mineral	0	0	-18	0	-11	-2	-2
Inorganic soil pool	72	-11	-25	0	9	27	49

**Table 1.3.4.3.2.** Arable mixed cropping: Scenario 2 Stock Exclusion – Nitrogen block report.

Farm name: MfE - Arable - Scenario 2 - Stock Exclusion (2018)

## Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
P_Pre_WC>Wht>Rgs	105	5	4.4	-119	139
P_Pre_Rgs>Peas	126	6	5.7	47	55
P_Pre_Rgs>Peas>Wht	594	30	<b>21.3</b>	56	186
P_Pre_Wht>CC>Lin	33	5	3.9	-53	107
P_Pre_Wht>CC>Sun	33	5	4.4	-145	15
P_Pre_Wht>CC>Hem	33	5	4.4	-76	64
P_Pre_CC>Oil>GFO>Bly	317	16	<b>12.5</b>	-7	96
P_Pre_GFO>Bly>WC	130	7	4.8	853	0
P_Pre_WC>Wht	582	30	<b>25.5</b>	219	110
D_Pre_Lucerne	15	2	4.7	35	0
P_Wak_WC>Wht>Rgs	56	6	3.9	-87	139
P_Wak_Rgs>Peas	76	8	5.8	-29	55
P_Wak_Rgs>Peas>Wht	578	59	<b>31.7</b>	57	186
P_Wak_Wht>CC>Lin	17	5	3.4	-53	107
P_Wak_Wht>CC>Sun	17	5	3.2	-145	15
P_Wak_Wht>CC>Hem	17	5	3.2	-76	64
P_Wak_CC>Oil>GFO>Bly	268	27	<b>17.8</b>	-9	96
P_Wak_GFO>Bly>WC	94	10	6.3	854	0
P_Wak_WC>Wht	578	59	<b>41.5</b>	131	110
Tr_Pre_WC>Wht>Rgs	135	14	5.6	-84	139
Tr_Pre_Rgs>Peas	176	18	6.4	-24	55
Tr_Pre_Rgs>Peas>Wht	649	66	<b>18.1</b>	65	186
Tr_Pre_Wht>CC>Lin	29	9	2.8	-46	107
Tr_Pre_Wht>CC>Sun	36	11	3.4	-138	15
Tr_Pre_Wht>CC>Hem	62	19	5.7	-69	64

Tr_Pre_CC>Oil>GFO>Bly	278	28	8.6	0	96
Tr_Pre_GFO>Bly>WC	99	10	4.1	878	0
Tr_Pre_WC>Wht	953	97	<b>32.4</b>	143	110
Tr_Wak_WC>Wht>Rgs	101	21	8.2	-289	139
Tr_Wak_Rgs>Peas	200	42	<b>12.6</b>	-24	55
Tr_Wak_Rgs>Peas>Wht	503	105	<b>24.7</b>	65	186
Tr_Wak_Wht>CC>Lin	29	18	5.0	-46	107
Tr_Wak_Wht>CC>Sun	37	23	6.1	-138	15
Tr_Wak_Wht>CC>Hem	65	44	<b>11.4</b>	-69	64
Tr_Wak_CC>Oil>GFO>Bly	198	41	10.3	0	96
Tr_Wak_GFO>Bly>WC	68	14	5.5	864	0
Tr_Wak_WC>Wht	896	187	<b>50.9</b>	147	110
Other farm sources	6				
<hr/>					
Whole farm	8188	24			
Less N removed in wetlands	0				
Farm output	8188	24			

**Table 1.3.4.3.3.** Arable mixed cropping: Scenario 2 Stock Exclusion – Phosphorus block report.

Farm name: MfE - Arable - Scenario 2 - Stock Exclusion (2018)

## Block Phosphorus

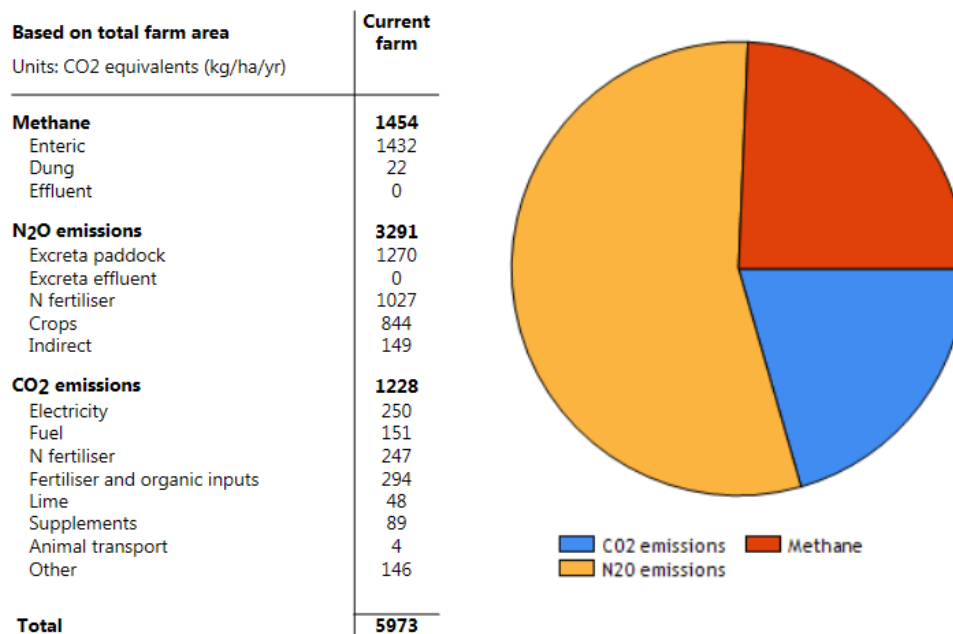
Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
P_Pre_WC>Wht>Rgs	14	0.7	n/a	n/a	n/a
P_Pre_Rgs>Peas	4	0.2	n/a	n/a	n/a
P_Pre_Rgs>Peas>Wht	2	0.1	n/a	n/a	n/a
P_Pre_Wht>CC>Lin	1	0.2	n/a	n/a	n/a
P_Pre_Wht>CC>Sun	1	0.1	n/a	n/a	n/a
P_Pre_Wht>CC>Hem	1	0.2	n/a	n/a	n/a
P_Pre_CC>Oil>GFO>Bly	2	0.1	n/a	n/a	n/a
P_Pre_GFO>Bly>WC	14	0.7	n/a	n/a	n/a
P_Pre_WC>Wht	2	0.1	n/a	n/a	n/a
D_Pre_Lucerne	0	0	Low	Low	n/a
P_Wak_WC>Wht>Rgs	9	0.9	n/a	n/a	n/a
P_Wak_Rgs>Peas	2	0.2	n/a	n/a	n/a
P_Wak_Rgs>Peas>Wht	1	0.1	n/a	n/a	n/a
P_Wak_Wht>CC>Lin	0	0.1	n/a	n/a	n/a
P_Wak_Wht>CC>Sun	0	0.1	n/a	n/a	n/a
P_Wak_Wht>CC>Hem	0	0.1	n/a	n/a	n/a
P_Wak_CC>Oil>GFO>Bly	1	0.1	n/a	n/a	n/a
P_Wak_GFO>Bly>WC	6	0.6	n/a	n/a	n/a
P_Wak_WC>Wht	1	0.1	n/a	n/a	n/a
Tr_Pre_WC>Wht>Rgs	11	1.1	n/a	n/a	n/a
Tr_Pre_Rgs>Peas	9	0.9	n/a	n/a	n/a
Tr_Pre_Rgs>Peas>Wht	9	1	n/a	n/a	n/a
Tr_Pre_Wht>CC>Lin	3	1	n/a	n/a	n/a
Tr_Pre_Wht>CC>Sun	3	1	n/a	n/a	n/a
Tr_Pre_Wht>CC>Hem	4	1.1	n/a	n/a	n/a
Tr_Pre_CC>Oil>GFO>Bly	9	0.9	n/a	n/a	n/a

Tr_Pre_GFO>Bly>WC	10	1	n/a	n/a	n/a
Tr_Pre_WC>Wht	8	0.8	n/a	n/a	n/a
Tr_Wak_WC>Wht>Rgs	7	1.4	n/a	n/a	n/a
Tr_Wak_Rgs>Peas	4	0.8	n/a	n/a	n/a
Tr_Wak_Rgs>Peas>Wht	4	0.8	n/a	n/a	n/a
Tr_Wak_Wht>CC>Lin	1	0.9	n/a	n/a	n/a
Tr_Wak_Wht>CC>Sun	1	0.9	n/a	n/a	n/a
Tr_Wak_Wht>CC>Hem	1	1	n/a	n/a	n/a
Tr_Wak_CC>Oil>GFO>Bly	4	0.8	n/a	n/a	n/a
Tr_Wak_GFO>Bly>WC	4	0.9	n/a	n/a	n/a
Tr_Wak_WC>Wht	3	0.7	n/a	n/a	n/a
Other farm sources	14				
<hr/>					
Whole farm	174	0.5			

**Table 1.3.4.3.4.** Arable mixed cropping: Scenario 2 Stock Exclusion – Farm greenhouse gas emissions.

Farm name: MfE - Arable - Scenario 2 - Stock Exclusion (2018)

## Farm Greenhouse Gas Emissions



## 1.4. Scenario 3 – Land Intensification

### 1.4.1. Red meat / hill country

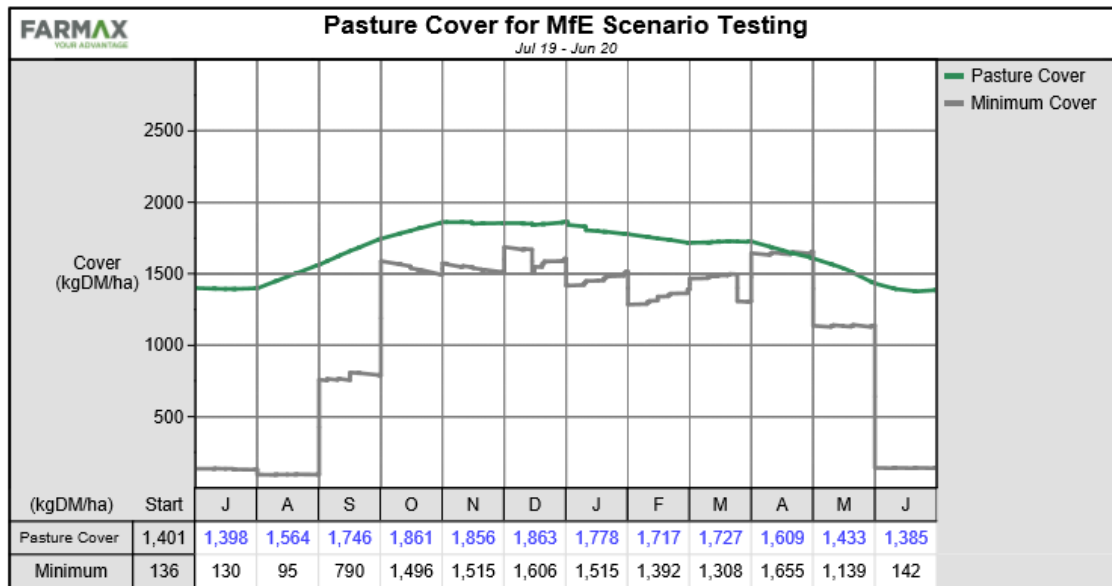
#### 1.4.1.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	M/E - Red Meat	File Name	Red Meat	
Business Year	Intensification	Date Printed	6/08/2019	
Total Farm Area (ha)	598	Prepared By:	Mark Everest	
Total Effective Area (ha)	598	Stocking Rate:	6.5	
Total Stock Units Wintered:	3,911			
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes	825	Cows	130	
Ewe Hoggets	225	Heifers	30	
Male Hoggets		Heifer Calves	75	
Wethers		Male Calves	75	
Rams	12	Steers/Bulls	40	
		Bulls	5	
TOTAL SHEEP	1,062	TOTAL CATTLE	355	
Sheep stock units	1,223	Cattle stock units	1,838	
Lambing percentage	145.0	Calving percentage		
Wool/sheep S.U.	5.0	Cows in Milk		
Av. Wool Price/kg	361.1	kgMS /cow		
		kgMS /ha		
SHEEP INCOME/SU	142.8	CATTLE INCOME/SU	93.6	
<b>GRAZING</b>		<b>PRODUCE</b>		
R1 Heifers	85	Crop	Area	Yield/Ha
R2 Heifers	85	M.Wheat		
R2 IC Heifers	85	F.Wheat		
		Oats		
		Barley		
		Peas		
		Other Grain		
TOTAL GRAZING	255	Grass Seed 1.		
Grazing stock units	850	Grass Seed 2.		
		Clover		
		Other Small Seed		
		TOTAL AREA		
DEER INCOME/SU	104.4	PRODUCE INCOME/HA		
<b>FINANCIAL INDICES</b>				
		Total \$	\$/ha	\$/su
Total Cash Farm Income		439,525	735	112.4
Change in Value of Stock on Hand				
Change in Value of Produce on Hand				
Gross Farm Income		439,525	735	112.4
Farm Working Expenses		340,972	570	87.2
Earnings Before Interest, Drawings and Tax		98,553	165	25
Total Debt Servicing		41,144	69	11
Farm Working Expenses as a % of Gross Farm Income			77.6	
Debt Servicing as % of Gross Farm Income			9.4	
Debt Servicing as % of EBIT			41.7	

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY			
		3,911 Su or Ha			
	TOTAL \$	\$ per Su		TOTAL \$	\$ per Su
WAGES	85,990	22.0	SHEEP	157,994	
ANIMAL HEALTH	11,587	3.0	WOOL	19,070	
STOCKFEED PURCHASED	12,800	3.3	CATTLE	235,101	
OTHER STOCK EXPENSES	4,615	1.2	MILK		
FEED CONSERVATION	29,660	7.6	DEER		
CONTRACTING	22,120	5.7	GRAZING	88,740	
CARTAGE	554	0.1	GRAIN AND PULSE PRODUCE		
FERTILISER & LIME	49,337	12.6	Previous Yr Sales		
SEEDS & TREATMENT	18,799	4.8	Current Yr Sales		
SACKS & SEED DRESSING			Unsold At Year End		
WEED & PEST CONTROL	30,317	7.8	SMALL SEED PRODUCE		
REPAIRS & MAINTENANCE	11,600	3.0	Previous Yr Sales		
VEHICLE EXPENSES	26,608	6.8	Current Yr Sales		
ELECTRICITY	7,360	1.9	Unsold At Year End		
OTHER WORKING EXPS			MISCELLANEOUS INCOME	4,060	
ADMINISTRATION	12,500	3.2			
STANDING CHARGES	17,125	4.4	STOCK PURCHASES		
			Sheep	-2,400	
			Cattle	-63,040	
			Deer		
			Other		
<b>CASH FARM WORKING EXPENSES</b>	<b>340,972</b>	<b>87.2</b>	<b>CASH FARM INCOME</b>	<b>439,525</b>	<b>112.4</b>
<b>CASH FARM WORKING PROFIT</b>	<b>98,553</b>	<b>25.2</b>			
<b>DEBT SERVICING</b>					
Mortgage	39,700	10.2			
Term Interest					
Current Account	1,444	0.4			
Rent					
Other					
<b>CASH OPERATING EXPENSES</b>	<b>382,116</b>	<b>97.7</b>	<b>CASH OPERATING INCOME</b>	<b>439,525</b>	<b>112.4</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>57,409</b>	<b>14.7</b>			
<b>PERSONAL DRAWINGS</b>			<b>NON OPERATING INCOME</b>		
OTHER PERSONAL					
TAXATION	5,898	1.5			
CAPITAL PURCHASES & PAYMENTS	37,750	9.7	INVESTMENT INCOME		
INVESTMENTS					
UNPAID ACCOUNTS					
<b>TOTAL CASH EXPENDITURE</b>	<b>425,764</b>	<b>108.9</b>	<b>TOTAL CASH INCOME</b>	<b>439,525</b>	<b>112.4</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>13,761</b>	<b>3.5</b>			
Change in value of stock on hand					
Change in value of produce on hand					
Depreciation					
<b>TRUE SURPLUS/DEFICIT</b>	<b>13,761</b>	<b>3.5</b>			

### 1.4.1.2. Farmax biophysical modelling

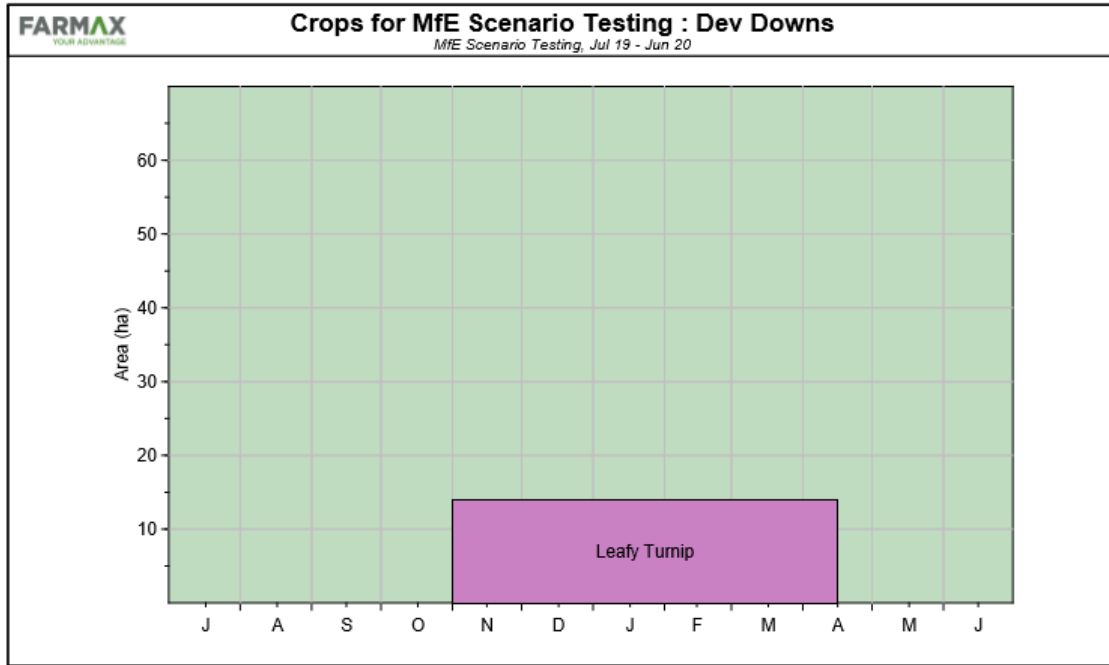
**Figure 1.4.1.2.1.** Red meat / hill country: Scenario 3 Land Intensification. Average pasture covers, whole farm, long term steady-state basis.



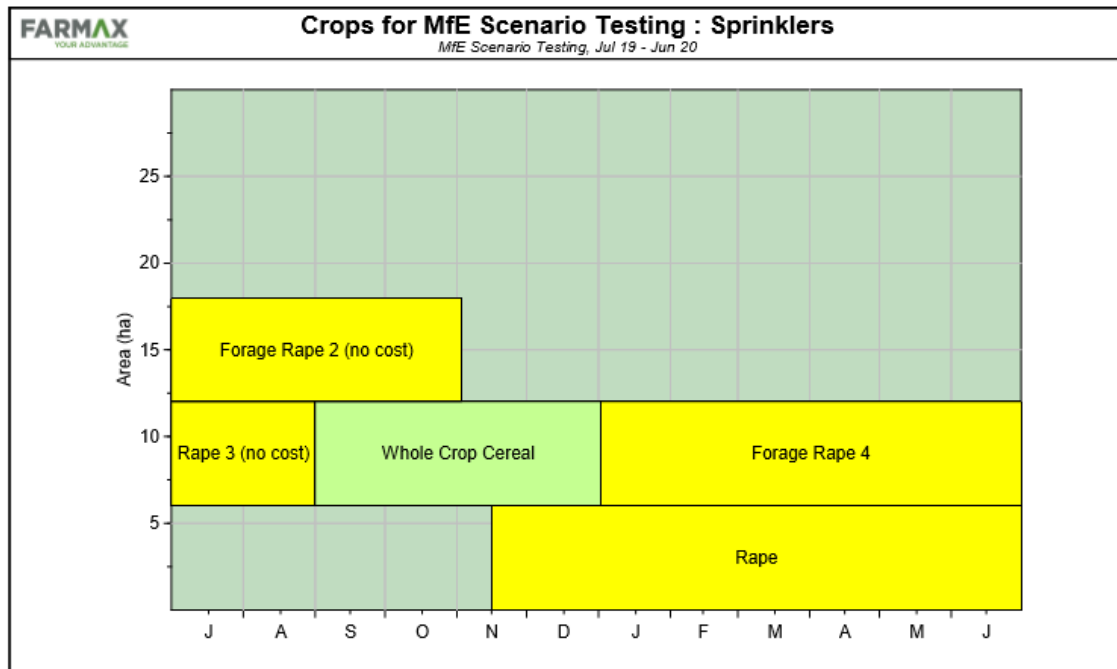


**Figure 1.4.1.2.2.** Red meat / hill country: Scenario 3 Land Intensification. Crops and silage, whole farm, long term steady-state basis. a) Developed downs block, b) sprinkler block, c) centre pivot block.

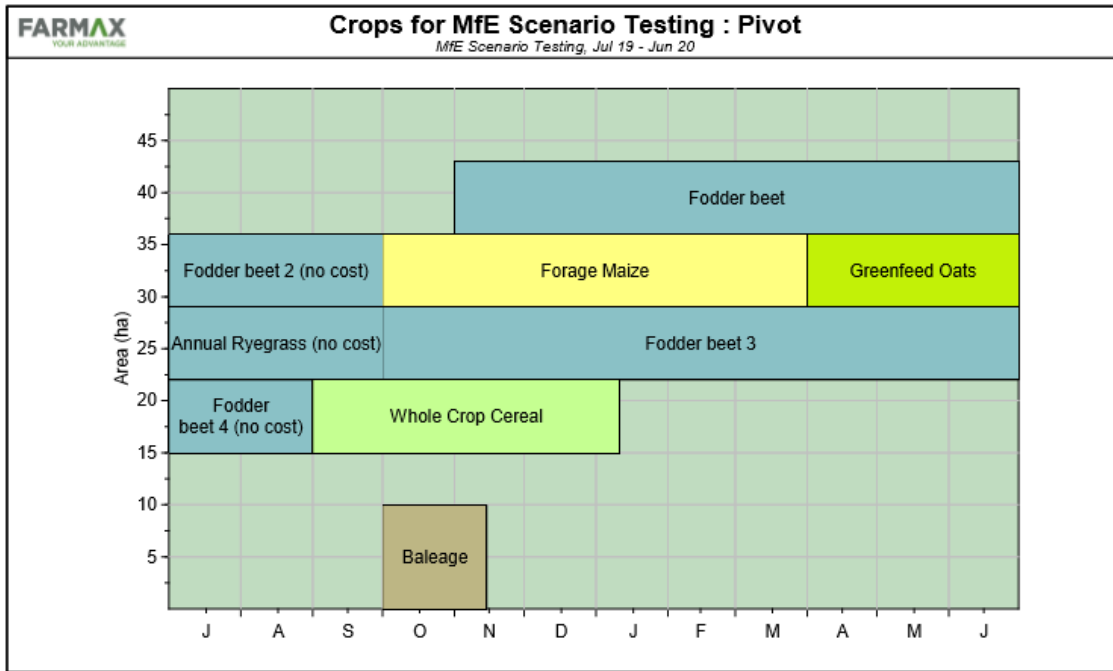
a)



b)



c)

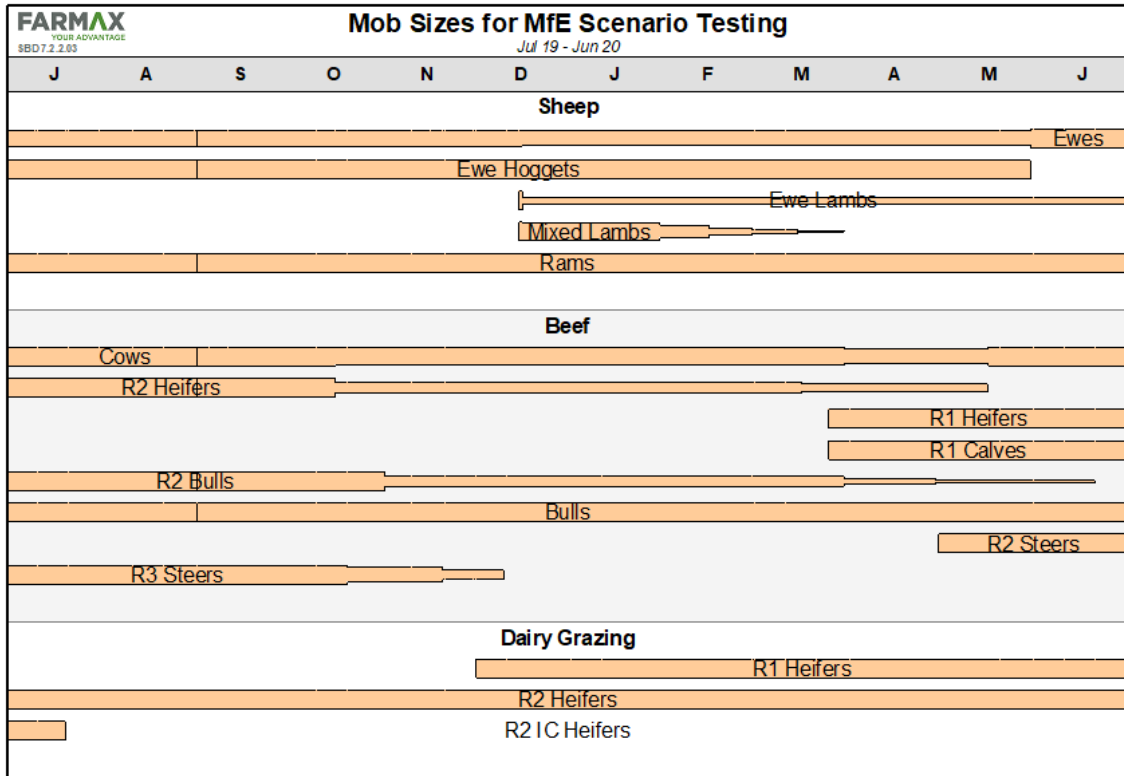


**Figure 1.4.1.2.3.** Red meat / hill country: Scenario 3 Land Intensification. Whole farm, long term steady-state basis: Supplementary feed allocation.

FARMAX YOUR ADVANTAGE											
Supplement Percent of Demand for MfE Scenario Testing Jul 19 - Jun 20											
Month	Percent of total demand in each month										
	Rape	Baleage	Annual Ryegrass	Greenfeed Oats	Leafy Turnip	Forage Rape	Fodder beet	Whole Crop Cereal	Forage Maize	Barley Grain	Total
Jul 19	8.2	7.2	5.7	4.9		8.2	51.8	11.7			91.9
Aug 19	8.3	7.3	5.7			8.3	52.5	11.9			94.0
Sep 19		4.0	5.6				27.4	7.9			44.9
Oct 19											
Nov 19											
Dec 19											
Jan 20	1.6				8.5				5.7		15.8
Feb 20	1.8				9.5				12.7	4.9	28.9
Mar 20	1.8				9.7				10.9	5.0	27.5
Apr 20					5.4					5.0	10.4
May 20		3.4					24.7	5.6			33.7
Jun 20	8.1	7.2		4.9		8.1	51.6	11.7			91.6

**Figure 1.4.1.2.4.** Red meat / hill country: Scenario 3 Land Intensification. Livestock reconciliation, long term steady-state business. **a)** Mob size per month, **b)** livestock reconciliation by month.

a)



b)

**FARMAX**  
YOUR ADVANTAGE  
SBD7.2.2.93

**Stock Reconciliation Numbers by Month for MfE Scenario Testing**  
Jul 19 - Jun 20

(end of month)	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20	Apr 20	May 20	Jun 20
Ewe Lamb						225	225	225	225	225	225	225
Ewe Hogget	225	225	225	225	225	225	225	225	225	225		
Ewe	821	818	814	810	806	723	723	723	723	723	948	825
Ram	15	15	15	15	15	15	15	15	15	15	15	15
Mixed Lamb						838	614	143				
<b>Total Sheep</b>	<b>1061</b>	<b>1058</b>	<b>1054</b>	<b>1050</b>	<b>1046</b>	<b>2026</b>	<b>1802</b>	<b>1331</b>	<b>1188</b>	<b>1188</b>	<b>1188</b>	<b>1065</b>
Heifer Calf						85	85	85	85	85	85	85
1-Year Heifer	85	85	85	85	85	85	85	85	160	160	160	160
2-Year Heifer	75	75	75	45	45	45	45	45	30	30		
Cow	160	160	158	156	156	156	156	156	130	130	160	160
Bull Calf									75	75	75	75
1-Year Bull	75	75	75	75	45	45	45	45	22	7	7	
Bull	5	5	5	5	5	5	5	5	5	5	5	5
1-Year Steer										40	40	40
2-Year Steer	40	40	40	31	22							
<b>Total Beef</b>	<b>440</b>	<b>440</b>	<b>438</b>	<b>397</b>	<b>358</b>	<b>421</b>	<b>421</b>	<b>421</b>	<b>507</b>	<b>532</b>	<b>532</b>	<b>525</b>

### 1.4.1.3. Overseer nutrient modelling

**Table 1.4.1.3.1.** Red Meat / Hill Country: Scenario 3 Land Intensification – Whole farm nutrient budget.

Farm name: Red Meat - Intensification (Intensification)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	19	5	2	19	71	1	1
Rain/clover N fixation	42	0	3	6	3	7	38
Irrigation	1	0	0	1	2	1	3
Supplements imported	4	1	4	0	1	0	0
<b>Nutrients removed</b>							
As products	5	1	0	1	2	0	0
Exported effluent	0	0	0	0	0	0	0
As exported defoliation	3	1	1	0	0	0	0
To atmospheric	19	0	0	0	0	0	0
To water	19	0.4	6	35	24	2	12
<b>Change in internal pools</b>							
Plant material	2	0	0	1	0	0	0
Organic pool	15	8	1	-11	0	0	0
Inorganic mineral	0	0	-24	0	7	-4	-5
Inorganic soil pool	1	-5	25	0	42	10	35

**Table 1.4.1.3.2. Red Meat / Hill Country: Scenario 3 Land Intensification – Nitrogen block report.**

Farm name: Red Meat - Intensification (Intensification)

## Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Hill Oma Tussoc	4885	14	N/A	31	0
Downs ClaTussoc	443	7	2.8	29	0
Downs Cla Dev	584	10	3.9	65	14
Downs Cla PP>Pasja/PP	411	29	10.3	58	52
KL PP	215	18	5.4	194	109
KL PP>MG Rape	377	63	<b>19.8</b>	123	65
KL MGRape>WCS/WRape	372	62	<b>17.9</b>	92	190
KL WCS/WRape>PP	89	15	4.4	111	109
pvt PP	409	19	5.3	203	109
pvt FB>Mz/Oat/Ita	1498	214	<b>53.4</b>	99	114
pvt Oat/Ita>FBeet	717	102	<b>27.9</b>	243	118
pvt FBeet>WCS/PP	463	66	<b>18.2</b>	43	169
DL flat	233	10	3.8	57	14
Lucerne	70	18	7.0	6	0
pvt PP>FB	611	87	<b>24.7</b>	293	118
Other farm sources	31				
Whole farm	11408	19			
Less N removed in wetlands	0				
Farm output	11408	19			

**Table 1.4.1.3.3.** Red Meat / Hill Country: Scenario 3 Land Intensification – Phosphorus block report.

Farm name: Red Meat - Intensification (Intensification)

## Block Phosphorus

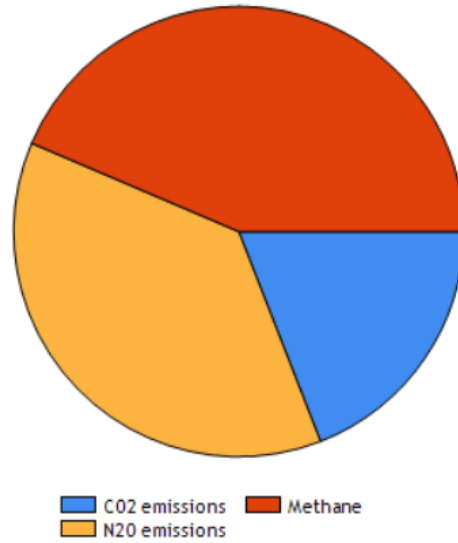
Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
Hill Oma Tussoc	140	0.4	Low	n/a	n/a
Downs ClaTussoc	23	0.4	Low	n/a	n/a
Downs Cla Dev	22	0.4	Low	Low	n/a
Downs Cla PP>Pasja/PP	5	0.4	n/a	n/a	n/a
KL PP	1	0.1	Low	Low	n/a
KL PP>MG Rape	1	0.1	n/a	n/a	n/a
KL MGRape>WCS/WRape	1	0.1	n/a	n/a	n/a
KL WCS/WRape>PP	1	0.1	n/a	n/a	n/a
pvt PP	9	0.4	Low	Low	n/a
pvt FB>Mz/Oat/Ita	6	0.8	n/a	n/a	n/a
pvt Oat/Ita>FBeet	10	1.5	n/a	n/a	n/a
pvt FBeet>WCS/PP	5	0.8	n/a	n/a	n/a
DL flat	0	0	Low	Low	n/a
Lucerne	0	0	Low	Low	n/a
pvt PP>FB	10	1.4	n/a	n/a	n/a
Other farm sources	35				
Whole farm	269	0.4			

**Table 1.4.1.3.4.** Red Meat / Hill Country: Scenario 3 Land Intensification – Farm greenhouse gas emissions.

Farm name: Red Meat - Intensification (Intensification)

## Farm Greenhouse Gas Emissions

Based on total farm area	Current farm
Units: Use default	
<b>Methane</b>	<b>2263</b>
Enteric	2223
Dung	40
Effluent	0
<b>N<sub>2</sub>O emissions</b>	<b>1938</b>
Excreta paddock	1354
Excreta effluent	0
N fertiliser	286
Crops	6
Indirect	292
<b>CO<sub>2</sub> emissions</b>	<b>991</b>
Electricity	16
Fuel	51
N fertiliser	47
Fertiliser and organic inputs	59
Lime	83
Supplements	727
Animal transport	1
Other	6
<b>Total</b>	<b>5192</b>



## 1.4.2. Dairy – Scenario 3.1

### 1.4.2.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	MFE	File Name	Dairy - Scenario 3.1 Intensifica	
Business Year	2020-21	Date Printed	5/06/2019	
Total Farm Area (ha)	318	Prepared By:	MRB	
Total Effective Area (ha)	300	Stocking Rate:	3.3	
Total kgMS produced:	522,090			
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes		Cows	1,000	
Ewe Hoggets		Heifers	240	
Male Hoggets		Heifer Calves	250	
Wethers		Male Calves		
Rams		Steers/Bulls		
		Bulls		
TOTAL SHEEP		TOTAL CATTLE	1,490	
Sheep stock units		Cattle stock units	8,200	
Lambing percentage		Calving percentage		
Wool/sheep S.U.		Cows in Milk		
Av. Wool Price/kg		kgMS /cow		
SHEEP INCOME/SU		kgMS /ha	1,740	
		CATTLE INCOME/SU	402	
<b>DEER</b>		<b>PRODUCE</b>		
M.A. Hinds		Crop	Area	Yield/Ha
R 2yr Hinds		M.Wheat		
R 1yr Hinds		F.Wheat		
R1yr Stags		Oats		
R 2yr Stags		Barley		
M.A. Stags		Peas		
		Other Grain		
TOTAL DEER		Grass Seed 1.		
Deer stock units		Grass Seed 2.		
Fawning percentage		Clover		
Velvet/stag		Other Small Seed		
Av. Velvet Price/kg				
		TOTAL AREA		
DEER INCOME/SU		PRODUCE INCOME/HA		
<b>FINANCIAL INDICES</b>				
	Total \$	\$/ha	\$/kgMS	
Total Cash Farm Income	3,459,967	11,533	6.63	
Change in Value of Stock on Hand				
Change in Value of Produce on Hand				
Gross Farm Income	3,459,967	11,533	6.63	
Farm Working Expenses	2,262,196	7,541	4.33	
Earnings Before Interest, Drawings and Tax	1,197,770	3,993	2.29	
Total Debt Servicing	685,782	2,286	1.31	
Farm Working Expenses as a % of Gross Farm Income		65		
Debt Servicing as % of Gross Farm Income		20		
Debt Servicing as % of EBIT		57		



MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY			
		522,090 Su or Ha			
	TOTAL \$	\$/kgMS		TOTAL \$	\$/kgMS
WAGES	358,476	0.69	SHEEP		
ANIMAL HEALTH	134,325	0.26	WOOL		
STOCKFEED PURCHASED	1,004,040	1.92	CATTLE	208,300	
OTHER STOCK EXPENSES	87,505	0.17	MILK	3,132,540	
FEED CONSERVATION	3,240	0.01	DEER		
CONTRACTING	3,990	0.01	VELVET		
CARTAGE	2,740	0.01	GRAIN AND PULSE PRODUCE		
FERTILISER & LIME	195,218	0.37	Previous Yr Sales		
SEEDS & TREATMENT	21,000	0.04	Current Yr Sales		
SACKS & SEED DRESSING			Unsold At Year End		
WEED & PEST CONTROL	2,455	0.00	SMALL SEED PRODUCE		
REPAIRS & MAINTENANCE	107,575	0.21	Previous Yr Sales		
VEHICLE EXPENSES	80,520	0.15	Current Yr Sales		
ELECTRICITY	80,650	0.15	Unsold At Year End		
OTHER WORKING EXPS	15,330	0.03	MISCELLANEOUS INCOME	163,127	
ADMINISTRATION	35,000	0.07			
STANDING CHARGES	130,133	0.25	STOCK PURCHASES		
			Sheep		
			Cattle	-44,000	
			Deer		
			Other		
<b>CASH FARM WORKING EXPENSES</b>	<b>2,262,196</b>	<b>4.33</b>	<b>CASH FARM INCOME</b>	<b>3,459,967</b>	<b>6.63</b>
<b>CASH FARM WORKING PROFIT</b>	<b>1,197,770</b>	<b>2.29</b>			
DEBT SERVICING					
Mortgage	681,750	1.31			
Term Interest					
Current Account	4,032	0.01			
Rent					
Other					
<b>CASH OPERATING EXPENSES</b>	<b>2,947,979</b>	<b>5.65</b>	<b>CASH OPERATING INCOME</b>	<b>3,459,967</b>	<b>6.63</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>511,988</b>	<b>0.98</b>			
PERSONAL DRAWINGS			NON OPERATING INCOME		
OTHER PERSONAL					
TAXATION	124,084	0.24			
CAPITAL PURCHASES & PAYMENTS	98,375	0.19	INVESTMENT INCOME		
INVESTMENTS					
UNPAID ACCOUNTS					
<b>TOTAL CASH EXPENDITURE</b>	<b>3,170,438</b>	<b>6.07</b>	<b>TOTAL CASH INCOME</b>	<b>3,459,967</b>	<b>6.63</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>289,529</b>	<b>0.55</b>			
Change in value of stock on hand					
Change in value of produce on hand					
Depreciation					
<b>TRUE SURPLUS/DEFICIT</b>	<b>289,529</b>	<b>0.55</b>			

### 1.4.2.2. Farmax biophysical modelling

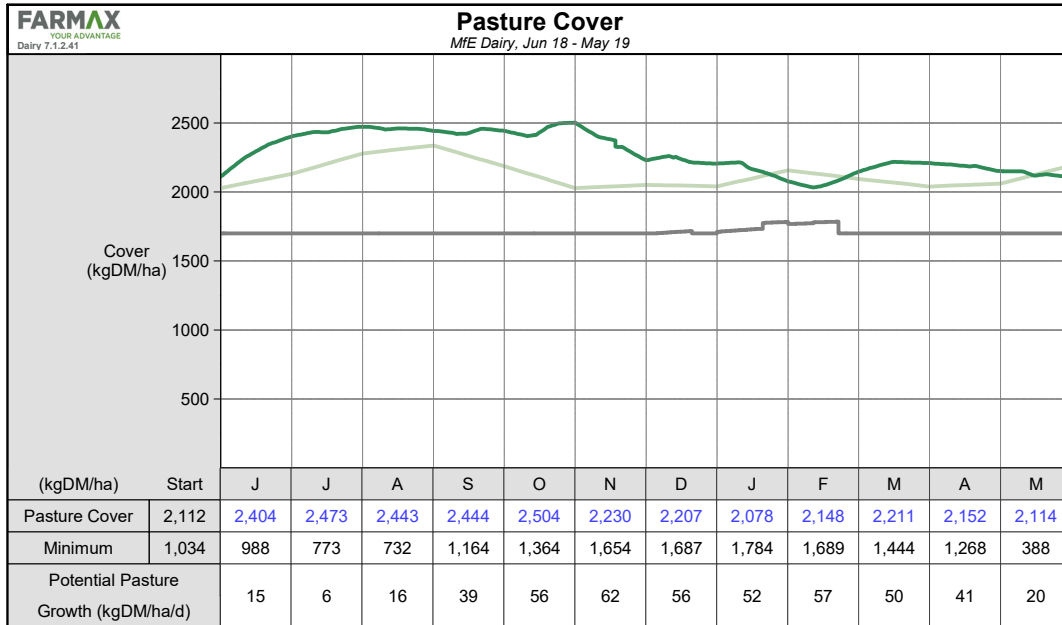
**Figure 1.4.2.2.1.** Dairy: Scenario 3.1 Land Intensification. Farmax biophysical summary of the dairy farm program, whole farm, long term steady-state basis.

<b>FARMAX</b> YOUR ADVANTAGE Dairy 7.1.2.41		<b>Physical Summary for MfE Dairy</b> Jun 18 - May 19	
Category	Description	Value	Units
<b>Farm</b>	Effective Area	300	ha
	Stocking Rate	3.3	cows/ha
	Potential Pasture Growth	14.2	t DM/ha
	Nitrogen Use	215	kg N/ha
	Feed Conversion Efficiency (eaten)	10.1	kg DM eaten/kg MS
<b>Herd</b>	Cow Numbers (1st July)	1,030	cows
	Peak Cows Milked	1,000	cows
	Days in Milk	0	days
	Avg. BCS at calving	5.2	BCS
	Liveweight	1,474	kg/ha
<b>Production (to Factory)</b>	Milk Solids total	522,090	kg
	Milk Solids per ha	1,740	kg/ha
	Milk Solids per cow	522	kg/cow
	Peak Milk Solids production	2.29	kg/cow/day
	Milk Solids as % of live weight	118.0	%
<b>Feeding</b>	Pasture Eaten per cow *	3.6	t DM/cow
	Supplements Eaten per cow *	1.0	t DM/cow
	Off-farm Grazing Eaten per cow *	0.7	t DM/cow
	Total Feed Eaten per cow *	5.3	t DM/cow
	Pasture Eaten per ha	12.0	t DM/ha
	Supplements Eaten per ha	3.5	t DM/ha
	Off-farm Grazing Eaten per ha	4.0	t DM/ha
	Total Feed Eaten per ha	19.5	t DM/ha
	Supplements and Grazing / Feed Eaten *	32.7	%
	Bought Feed / Feed Eaten *	20.6	%

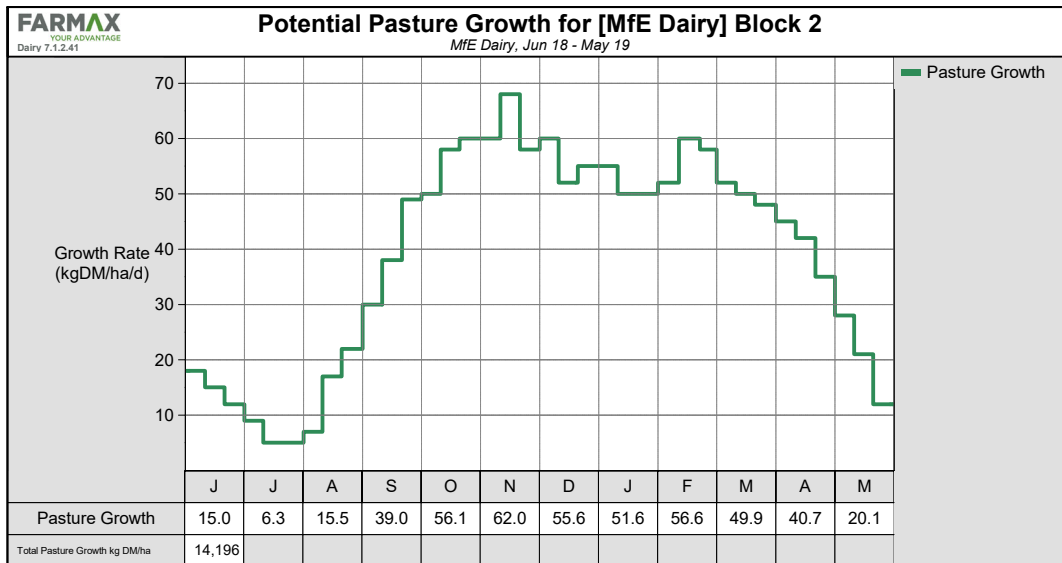
(\*) feed eaten by females > 20 months old / peak cows milked

**Figure 1.4.2.2.2. Dairy: Scenario 3.1 Land Intensification. a) Average pasture covers, b) pasture growth curve, whole farm, long term steady-state basis.**

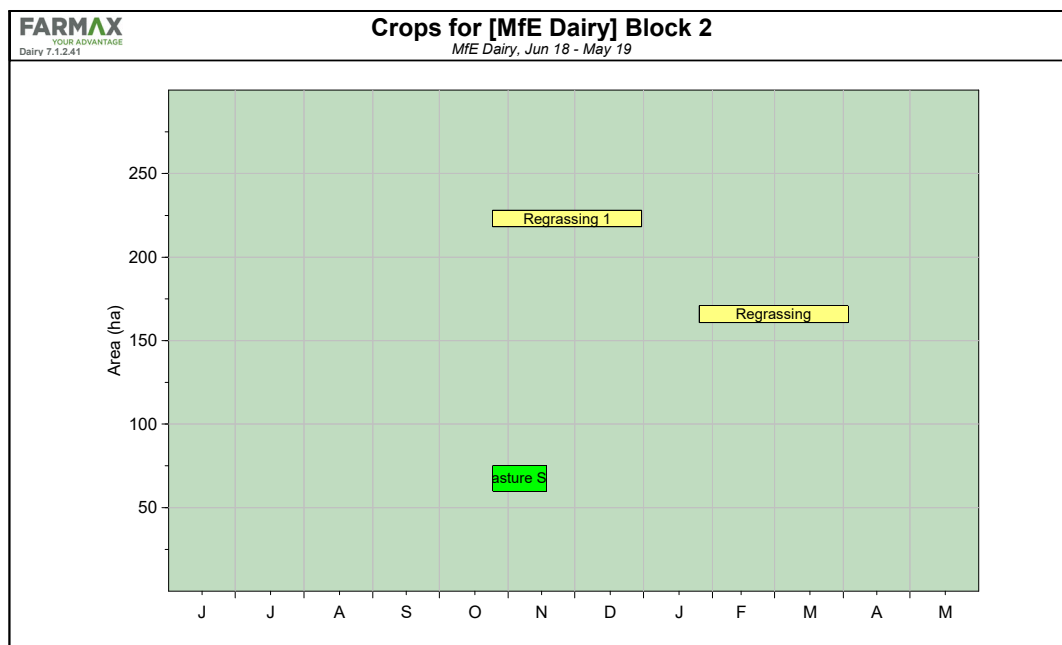
a)



b)



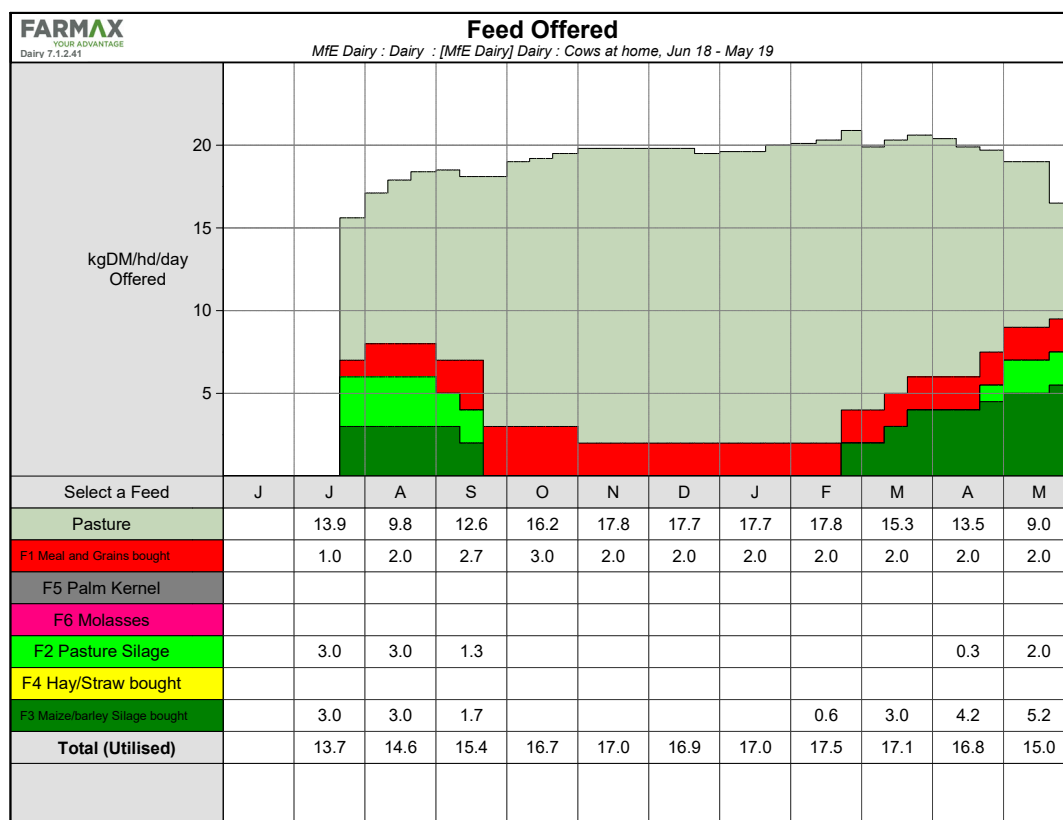
**Figure 1.4.2.2.3.** Dairy: Scenario 3.1 Land Intensification. Crops and silage, whole farm, long term steady-state basis.



**Figure 1.4.2.2.4.** Dairy: Scenario 3.1 Land Intensification. Supplement use, whole farm, long term steady-state basis.

Feed	tonnes DM offered												kg	
	Jun 18	Jul 18	Aug 18	Sep 18	Oct 18	Nov 18	Dec 18	Jan 19	Feb 19	Mar 19	Apr 19	May 19	Total	/milker
F3 Maize/barley Silage bought		5	66	54					16	93	123	99	456	456
F4 Hay/Straw bought		0	20	8									28	28
F1 Meal and Grains bought		1	26	67	91	60	62	62	55	61	59	39	584	584
F2 Pasture Silage		3	60	39							10	39	150	150
<b>Total</b>													<b>1,218</b>	<b>1,218</b>

**Figure 1.4.2.2.5. Dairy: Scenario 3.1 Land Intensification. Feed offered. Whole farm, long term steady-state basis.**



### 1.4.2.3. Overseer nutrient modelling

**Table 1.4.2.3.1. Dairy: Scenario 3.1 Land Intensification – Whole farm nutrient budget.**

Farm name: MFE Dairy model Intensification1 Overseer file (2019/20)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	215	23	0	42	60	7	0
Rain/clover N fixation	104	0	2	4	2	4	19
Irrigation	11	0	7	11	40	9	40
Supplements imported	62	11	30	5	6	5	4
<b>Nutrients removed</b>							
As products	111	19	27	6	24	2	8
Exported effluent	0	0	0	0	0	0	0
As supplements	2	0	2	0	0	0	0
To atmospheric	95	0	0	0	0	0	0
To water	63	1.5	10	61	70	4	13
<b>Change in internal pools</b>							
Plant material	0	0	0	0	0	0	0
Organic pool	121	15	1	-4	0	0	0
Inorganic mineral	0	0	-36	0	-1	-1	-2
Inorganic soil pool	0	-1	35	0	14	22	43

**Table 1.4.2.3.2. Dairy: Scenario 3.1 Land Intensification – Nitrogen block report.**

Farm name: MFE Dairy model Intensification1 Overseer file (2019/20)

**Block Nitrogen**

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
(F) Eff S.Pivot Darn_4a.2	1512	50	<b>25.3</b>	306	359
(F) Eff K Line Darn_4a.2	552	138	<b>32.9</b>	381	359
(F) Eff S.Pivot Darn_4a.2	441	55	<b>27.6</b>	320	359
(F) Eff Kline Darn_4a.2	552	138	<b>32.9</b>	381	359
(F) Non Eff Pivot Darn_4a.2	875	38	<b>19.1</b>	226	239
(F)Non Eff K Line Darn_4a.2	2299	92	<b>22.0</b>	258	239
(F) Non Eff K Line Darn_4a.2	543	109	<b>26.0</b>	284	239
(F) Non Eff K Line Raka_2a.1	1471	113	<b>26.6</b>	278	239
(F) Eff K Line Raka_2a.1	1744	134	<b>31.3</b>	352	326
(R) Non Eff K Line Timu_1a.1	6029	74	<b>18.6</b>	252	239
(F) Eff Pivot Darn_4a.2	1353	44	<b>23.9</b>	292	326
Trees and Scrub	22	2	N/A		
NB Pasture K Line Darn_4a.2	812	101	<b>24.3</b>	275	245
NB Pasture K Line Darn_4a.2	284	142	<b>34.0</b>	320	245
NB Pasture Pivot Darn_4a.2	1230	34	<b>22.5</b>	224	245
NB Pasture Pivot Darn_4a.2	239	37	<b>24.5</b>	241	245
Other farm sources	48				
Whole farm	20007	63			
Less N removed in wetlands	0				
Farm output	20007	63			

**Table 1.4.2.3.3. Dairy: Scenario 3.1 Land Intensification – Phosphorus block report.**

Farm name: MFE Dairy model Intensification1 Overseer file (2019/20)

## Block Phosphorus

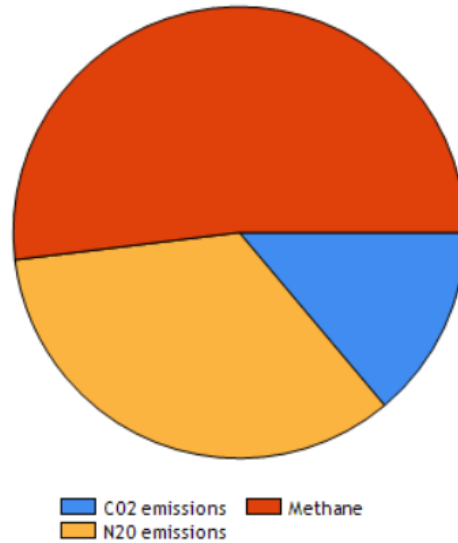
Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
(F) Eff S.Pivot Darn_4a.2	8	0.3	Low	Low	Low
(F) Eff K Line Darn_4a.2	2	0.6	Low	Low	Low
(F) Eff S.Pivot Darn_4a.2	2	0.3	Low	Low	Low
(F) Eff Kline Darn_4a.2	2	0.6	Low	Low	Low
(F) Non Eff Pivot Darn_4a.2	6	0.3	Low	Low	n/a
(F)Non Eff K Line Darn_4a.2	14	0.6	Low	Low	n/a
(F) Non Eff K Line Darn_4a.2	3	0.6	Low	Low	n/a
(F) Non Eff K Line Raka_2a.1	24	1.8	High	Medium *	n/a
(F) Eff K Line Raka_2a.1	25	1.9	High	Medium	Medium
(R) Non Eff K Line Timu_1a.1	195	2.4	High	High *	n/a
(F) Eff Pivot Darn_4a.2	8	0.3	Low	Low	Low
Trees and Scrub	1	0.1	n/a	n/a	n/a
NB Pasture K Line Darn_4a.2	5	0.6	Low	Low	n/a
NB Pasture K Line Darn_4a.2	1	0.6	Low	Low	n/a
NB Pasture Pivot Darn_4a.2	5	0.1	Low	Low	n/a
NB Pasture Pivot Darn_4a.2	1	0.1	Low	Low	n/a
Other farm sources	170				
Whole farm	472	1.5			

**Table 1.4.2.3.4. Dairy: Scenario 3.1 Land Intensification – Farm greenhouse gas emissions.**

Farm name: MFE Dairy model Intensification1 Overseer file (2019/20)

## Farm Greenhouse Gas Emissions

Based on total farm area	Current farm
Units: CO2 equivalents (kg/ha/yr)	
<b>Methane</b>	<b>9956</b>
Enteric	9812
Dung	101
Effluent	43
<b>N<sub>2</sub>O emissions</b>	<b>6552</b>
Excreta paddock	3787
Excreta effluent	20
N fertiliser	1673
Crops	0
Indirect	1073
<b>CO<sub>2</sub> emissions</b>	<b>2662</b>
Electricity	333
Fuel	60
N fertiliser	840
Fertiliser and organic inputs	80
Lime	0
Supplements	1214
Animal transport	5
Other	129
<b>Total</b>	<b>19170</b>





### 1.4.3. Dairy – Scenario 3.2

#### 1.4.3.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	MfE	File Name	Dairy - Scenario 3.2 Intensifica	
Business Year	2020-21	Date Printed	5/08/2019	
Total Farm Area (ha)	318	Prepared By:	MRB	
Total Effective Area (ha)	300	Stocking Rate:	3.3	
Total kgMS produced:	522,090			
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes		Cows	1,000	
Ewe Hoggets		Heifers	240	
Male Hoggets		Heifer Calves	250	
Wethers		Male Calves		
Rams		Steers/Bulls		
		Bulls		
TOTAL SHEEP		TOTAL CATTLE	1,490	
Sheep stock units		Cattle stock units	8,200	
Lambing percentage		Calving percentage		
Wool/sheep S.U.		Cows in Milk		
Av. Wool Price/kg		kgMS /cow		
SHEEP INCOME/SU		kgMS /ha	1,740	
		CATTLE INCOME/SU	401	
<b>DEER</b>		<b>PRODUCE</b>		
M.A. Hinds		Crop	Area	Yield/Ha
R 2yr Hinds		M.Wheat		
R 1yr Hinds		F.Wheat		
R1yr Stags		Oats		
R 2yr Stags		Barley		
M.A. Stags		Peas		
		Other Grain		
TOTAL DEER		Grass Seed 1.		
Deer stock units		Grass Seed 2.		
Fawning percentage		Clover		
Velvet/stag		Other Small Seed		
Av. Velvet Price/kg				
		TOTAL AREA		
DEER INCOME/SU		PRODUCE INCOME/HA		
<b>FINANCIAL INDICES</b>				
	Total \$	\$/ha	\$/kgMS	
Total Cash Farm Income	3,451,988	11,507	6.61	
Change in Value of Stock on Hand				
Change in Value of Produce on Hand				
Gross Farm Income	3,451,988	11,507	6.61	
Farm Working Expenses	2,291,386	7,638	4.39	
Earnings Before Interest, Drawings and Tax	1,160,582	3,869	2.22	
Total Debt Servicing	686,604	2,289	1.32	
Farm Working Expenses as a % of Gross Farm Income		66		
Debt Servicing as % of Gross Farm Income		20		
Debt Servicing as % of EBIT		59		

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY			
		522,090 Su or Ha			
	TOTAL \$	\$/kgMS		TOTAL \$	\$/kgMS
WAGES	358,478	0.69	SHEEP		
ANIMAL HEALTH	134,325	0.26	WOOL		
STOCKFEED PURCHASED	1,045,380	2.00	CATTLE	200,300	
OTHER STOCK EXPENSES	89,291	0.17	MILK	3,132,541	
FEED CONSERVATION			DEER		
CONTRACTING	3,990	0.01	VELVET		
CARTAGE	2,740	0.01	GRAIN AND PULSE PRODUCE		
FERTILISER & LIME	185,482	0.36	Previous Yr Sales		
SEEDS & TREATMENT	21,000	0.04	Current Yr Sales		
SACKS & SEED DRESSING			Unsold At Year End		
WEED & PEST CONTROL	2,455	0.00	SMALL SEED PRODUCE		
REPAIRS & MAINTENANCE	107,575	0.21	Previous Yr Sales		
VEHICLE EXPENSES	79,580	0.15	Current Yr Sales		
ELECTRICITY	80,650	0.15	Unsold At Year End		
OTHER WORKING EXPS	15,330	0.03	MISCELLANEOUS INCOME	163,127	
ADMINISTRATION	35,000	0.07			
STANDING CHARGES	130,133	0.25	STOCK PURCHASES		
			Sheep		
			Cattle	-44,000	
			Deer		
			Other		
<b>CASH FARM WORKING EXPENSES</b>	<b>2,291,386</b>	<b>4.39</b>	<b>CASH FARM INCOME</b>	<b>3,451,968</b>	<b>6.61</b>
<b>CASH FARM WORKING PROFIT</b>	<b>1,160,582</b>	<b>2.22</b>			
<b>DEBT SERVICING</b>					
Mortgage	681,750	1.31			
Term Interest					
Current Account	4,854	0.01			
Rent					
Other					
<b>CASH OPERATING EXPENSES</b>	<b>2,977,991</b>	<b>5.70</b>	<b>CASH OPERATING INCOME</b>	<b>3,451,968</b>	<b>6.61</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>473,977</b>	<b>0.91</b>			
<b>PERSONAL DRAWINGS</b>			<b>NON OPERATING INCOME</b>		
OTHER PERSONAL					
TAXATION	112,681	0.22			
CAPITAL PURCHASES & PAYMENTS	98,375	0.19	INVESTMENT INCOME		
INVESTMENTS					
UNPAID ACCOUNTS					
<b>TOTAL CASH EXPENDITURE</b>	<b>3,189,047</b>	<b>6.11</b>	<b>TOTAL CASH INCOME</b>	<b>3,451,968</b>	<b>6.61</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>262,921</b>	<b>0.50</b>			
Change in value of stock on hand					
Change in value of produce on hand					
Depreciation					
<b>TRUE SURPLUS/DEFICIT</b>	<b>262,921</b>	<b>0.50</b>			

### 1.4.3.2. Farmax biophysical modelling

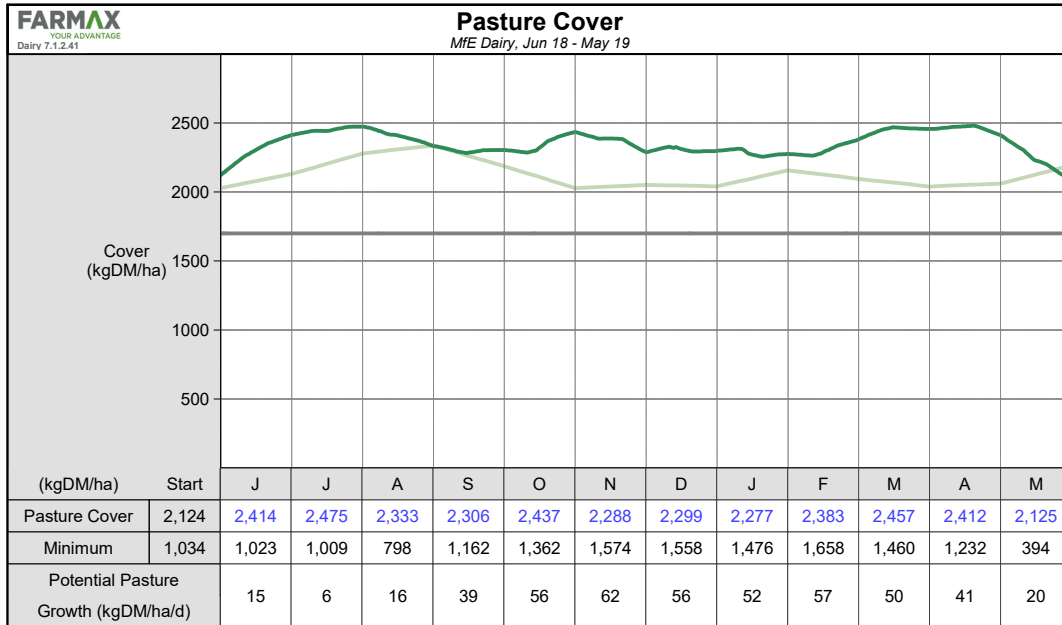
**Figure 1.4.3.2.1.** Dairy: Scenario 3.2 Land Intensification. Farmax biophysical summary of the dairy farm program, whole farm, long term steady-state basis.

<b>FARMAX</b> YOUR ADVANTAGE Dairy 7.1.2.41		<b>Physical Summary for MfE Dairy</b> Jun 18 - May 19	
Category	Description	Value	Units
<b>Farm</b>	Effective Area	300	ha
	Stocking Rate	3.3	cows/ha
	Potential Pasture Growth	14.2	t DM/ha
	Nitrogen Use	197	kg N/ha
	Feed Conversion Efficiency (eaten)	10.1	kg DM eaten/kg MS
<b>Herd</b>	Cow Numbers (1st July)	1,030	cows
	Peak Cows Milked	1,000	cows
	Days in Milk	0	days
	Avg. BCS at calving	5.2	BCS
	Liveweight	1,482	kg/ha
<b>Production (to Factory)</b>	Milk Solids total	522,089	kg
	Milk Solids per ha	1,740	kg/ha
	Milk Solids per cow	522	kg/cow
	Peak Milk Solids production	2.33	kg/cow/day
	Milk Solids as % of live weight	117.4	%
<b>Feeding</b>	Pasture Eaten per cow *	3.5	t DM/cow
	Supplements Eaten per cow *	1.1	t DM/cow
	Off-farm Grazing Eaten per cow *	0.7	t DM/cow
	Total Feed Eaten per cow *	5.3	t DM/cow
	Pasture Eaten per ha	11.7	t DM/ha
	Supplements Eaten per ha	3.7	t DM/ha
	Off-farm Grazing Eaten per ha	4.1	t DM/ha
	Total Feed Eaten per ha	19.4	t DM/ha
	Supplements and Grazing / Feed Eaten *	34.2	%
	Bought Feed / Feed Eaten *	24.6	%

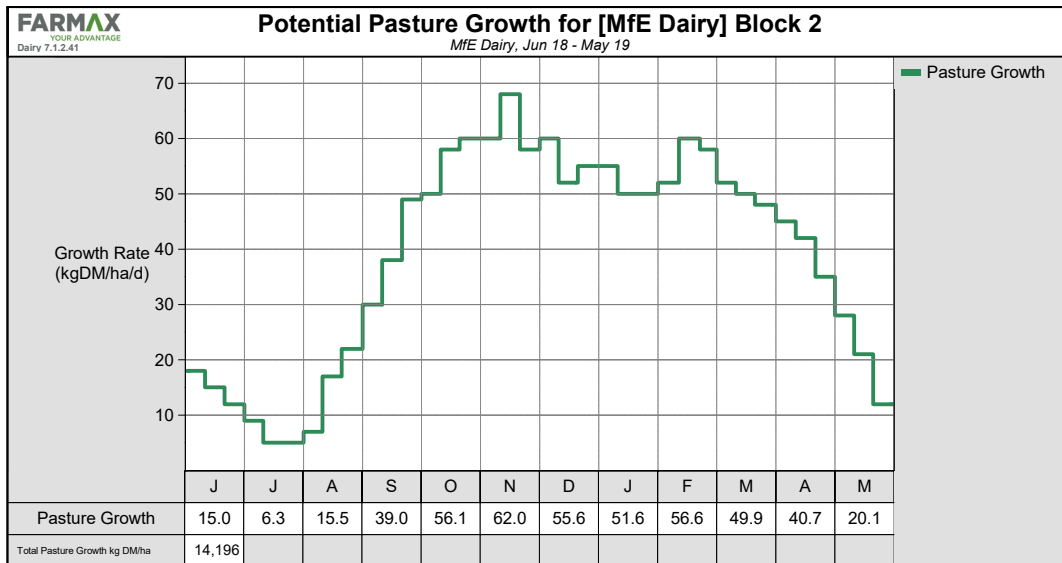
(\*) feed eaten by females > 20 months old / peak cows milked

**Figure 1.4.3.2.2. Dairy: Scenario 3.2 Land Intensification. a) Average pasture covers, b) pasture growth curve, whole farm, long term steady-state basis.**

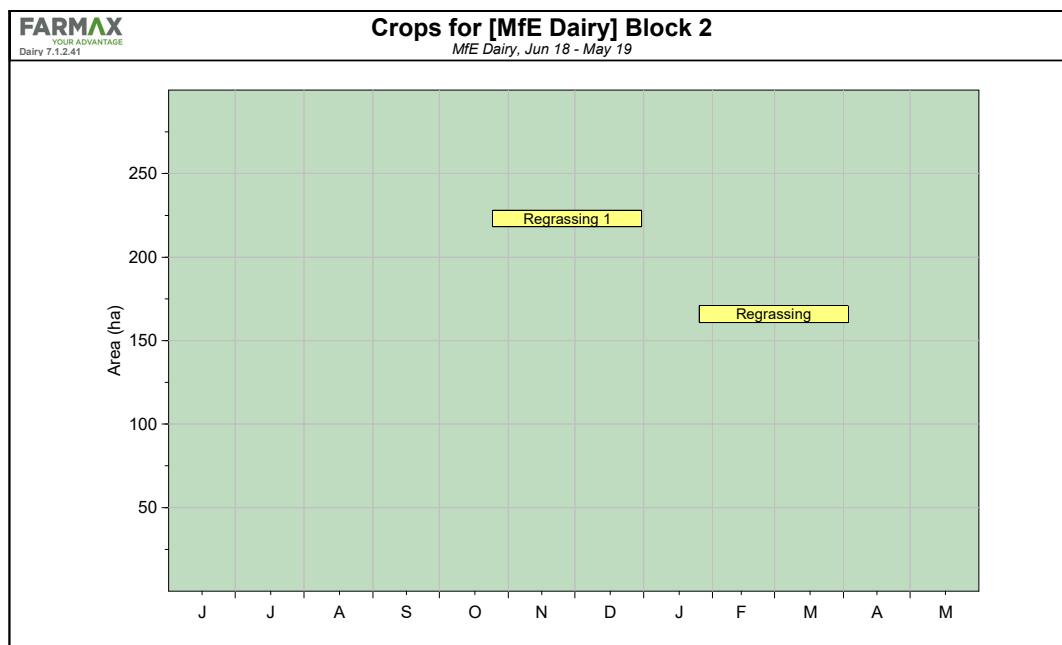
a)



b)



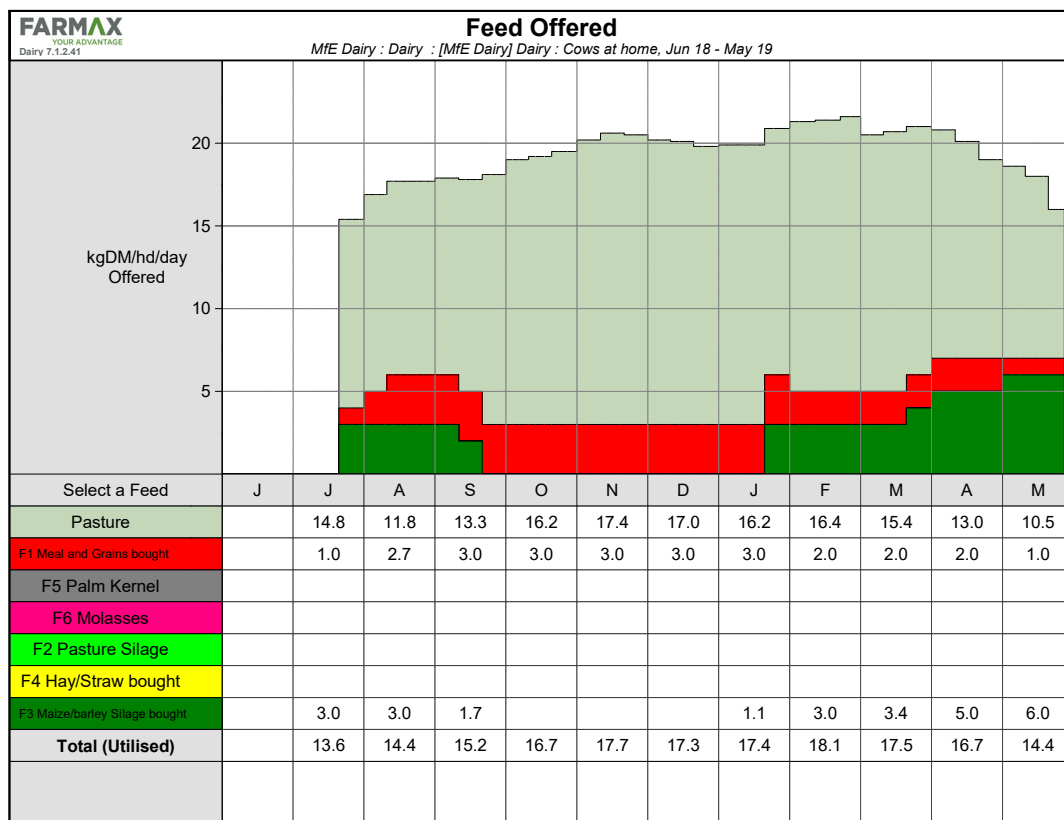
**Figure 1.4.3.2.3.** Dairy: Scenario 3.2 Land Intensification. Crops and silage, whole farm, long term steady-state basis.



**Figure 1.4.3.2.4.** Dairy: Scenario 3.2 Land Intensification. Supplement use, whole farm, long term steady-state basis.

Feed	tonnes DM offered												kg	
	Jun 18	Jul 18	Aug 18	Sep 18	Oct 18	Nov 18	Dec 18	Jan 19	Feb 19	Mar 19	Apr 19	May 19	Total	/milker
F3 Maize/barley Silage bought	1	5	66	54				33	83	95	136	117	590	590
F4 Hay/Straw bought		0	20	8									28	28
F1 Meal and Grains bought		1	37	74	91	90	93	93	55	56	55	20	665	665
F2 Pasture Silage														
<b>Total</b>													<b>1,283</b>	<b>1,283</b>

**Figure 1.4.3.2.5. Dairy: Scenario 3.2 Land Intensification. Feed offered. Whole farm, long term steady-state basis.**



### 1.4.3.3. Overseer nutrient modelling

**Table 1.4.3.3.1.** Dairy: Scenario 3.2 Land Intensification – Whole farm nutrient budget.

Farm name: MFE Dairy model Intensification2 Overseer file (2019/20)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	197	23	0	42	60	7	0
Rain/clover N fixation	110	0	2	4	2	4	19
Irrigation	11	0	7	11	40	9	40
Supplements imported	59	11	26	5	5	5	4
<b>Nutrients removed</b>							
As products	111	19	27	6	24	2	8
Exported effluent	0	0	0	0	0	0	0
As supplements	2	0	2	0	0	0	0
To atmospheric	91	0	0	0	0	0	0
To water	57	1.5	10	60	66	4	13
<b>Change in internal pools</b>							
Plant material	0	0	0	0	0	0	0
Organic pool	116	15	2	-4	1	0	0
Inorganic mineral	0	0	-38	0	-1	-1	-2
Inorganic soil pool	0	-1	32	0	17	22	43

**Table 1.4.3.3.2. Dairy: Scenario 3.2 Land Intensification – Nitrogen block report.**

Farm name: MFE Dairy model Intensification2 Overseer file (2019/20)

## Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
(F) Eff S.Pivot Darn_4a.2	1257	42	<b>21.0</b>	285	334
(F) Eff K Line Darn_4a.2	536	134	<b>31.9</b>	370	334
(F) Eff S.Pivot Darn_4a.2	373	47	<b>23.3</b>	303	334
(F) Eff Kline Darn_4a.2	536	134	<b>31.9</b>	370	334
(F) Non Eff Pivot Darn_4a.2	734	32	<b>16.0</b>	208	216
(F)Non Eff K Line Darn_4a.2	2137	85	<b>20.5</b>	240	216
(F) Non Eff K Line Darn_4a.2	528	106	<b>25.3</b>	273	216
(F) Non Eff K Line Raka_2a.1	1384	106	<b>25.0</b>	260	216
(F) Eff K Line Raka_2a.1	1626	125	<b>29.2</b>	333	302
(R) Non Eff K Line Timu_1a.1	5557	68	<b>17.1</b>	235	221
(F) Eff Pivot Darn_4a.2	1124	36	<b>19.9</b>	275	309
Trees and Scrub	22	2	N/A		
NB Pasture K Line Darn_4a.2	781	98	<b>23.4</b>	263	227
NB Pasture K Line Darn_4a.2	293	147	<b>35.1</b>	311	227
NB Pasture Pivot Darn_4a.2	1027	28	<b>18.8</b>	208	227
NB Pasture Pivot Darn_4a.2	204	31	<b>20.9</b>	229	227
Other farm sources	46				
Whole farm	18164	57			
Less N removed in wetlands	0				
Farm output	18164	57			



**Table 1.4.3.3.3. Dairy: Scenario 3.2 Land Intensification – Phosphorus block report.**

Farm name: MFE Dairy model Intensification2 Overseer file (2019/20)

## Block Phosphorus

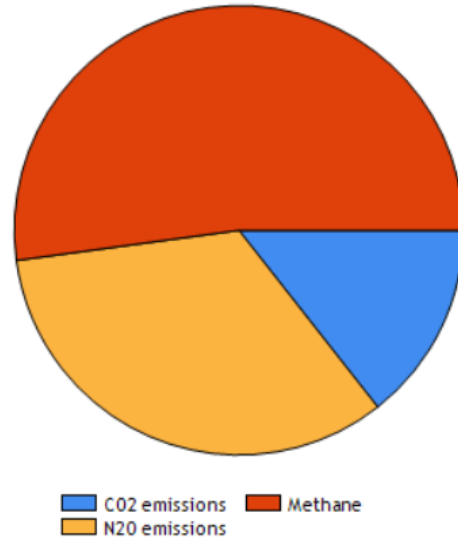
Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
(F) Eff S.Pivot Darn_4a.2	8	0.3	Low	Low	Low
(F) Eff K Line Darn_4a.2	2	0.6	Low	Low	Low
(F) Eff S.Pivot Darn_4a.2	2	0.3	Low	Low	Low
(F) Eff Kline Darn_4a.2	2	0.6	Low	Low	Low
(F) Non Eff Pivot Darn_4a.2	6	0.3	Low	Low	n/a
(F)Non Eff K Line Darn_4a.2	14	0.6	Low	Low	n/a
(F) Non Eff K Line Darn_4a.2	3	0.6	Low	Low	n/a
(F) Non Eff K Line Raka_2a.1	24	1.8	High	Medium *	n/a
(F) Eff K Line Raka_2a.1	25	1.9	High	Medium	Medium
(R) Non Eff K Line Timu_1a.1	195	2.4	High	High *	n/a
(F) Eff Pivot Darn_4a.2	8	0.3	Low	Low	Low
Trees and Scrub	1	0.1	n/a	n/a	n/a
NB Pasture K Line Darn_4a.2	5	0.6	Low	Low	n/a
NB Pasture K Line Darn_4a.2	1	0.6	Low	Low	n/a
NB Pasture Pivot Darn_4a.2	5	0.1	Low	Low	n/a
NB Pasture Pivot Darn_4a.2	1	0.1	Low	Low	n/a
Other farm sources	165				
Whole farm	468	1.5			

**Table 1.4.3.3.4. Dairy: Scenario 3.2 Land Intensification – Farm greenhouse gas emissions.**

Farm name: MFE Dairy model Intensification2 Overseer file (2019/20)

## Farm Greenhouse Gas Emissions

Based on total farm area	Current farm
Units: CO2 equivalents (kg/ha/yr)	
<b>Methane</b>	<b>9854</b>
Enteric	9712
Dung	100
Effluent	42
<b>N<sub>2</sub>O emissions</b>	<b>6323</b>
Excreta paddock	3655
Excreta effluent	19
N fertiliser	1656
Crops	0
Indirect	993
<b>CO<sub>2</sub> emissions</b>	<b>2722</b>
Electricity	333
Fuel	60
N fertiliser	771
Fertiliser and organic inputs	80
Lime	0
Supplements	1344
Animal transport	5
Other	129
<b>Total</b>	<b>18899</b>



## 1.4.4. Dairy support – Scenario 3.1

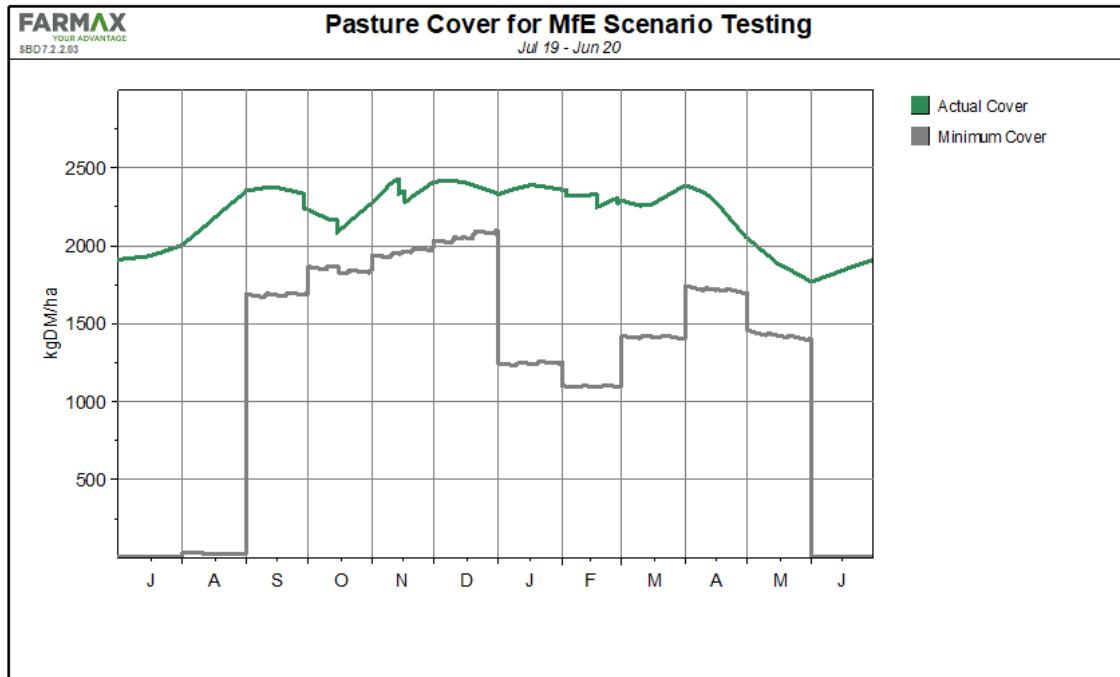
### 1.4.4.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	M/E	File Name	Dairy Support - Scenario 3.1 Intensi	
Business Year	2019/20	Date Printed	5/06/2019	
Total Farm Area (ha)	475	Prepared By:	Jamie Gordon	
Total Effective Area (ha)	460	Stocking Rate:	5.1	
Total Stock Units Wintered:	2,361			
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes		Cows		
Ewe Hoggets		Heifers		
Male Hoggets		Heifer Calves	472	
Wethers		Male Calves	105	
Rams		Steers/Bulls		
		Bulls		
TOTAL SHEEP		TOTAL CATTLE	577	
Sheep stock units		Cattle stock units	2,361	
Lambing percentage		Calving percentage		
Wool/sheep S.U.		Cows in Milk		
Av. Wool Price/kg		kgMS /cow		
		kgMS /ha		
SHEEP INCOME/SU		CATTLE INCOME/SU	567	
<b>DEER</b>		<b>PRODUCE</b>		
M.A. Hinds		Crop	Area	Yield/Ha
R 2yr Hinds		M.Wheat		
R 1yr Hinds		Barley	37.1	
R 1yr Stags		Oats	6.8	
R 2yr Stags		Barley		
M.A. Stags		Peas		
		Other Grain		
TOTAL DEER		Grass Seed 1.		
Deer stock units		Grass Seed 2.		
Fawning percentage		Clover		
Velvet/stag		Other Small Seed		
Av. Velvet Price/kg				
		TOTAL AREA	43.9	
DEER INCOME/SU		PRODUCE INCOME/HA	2,873	
<b>FINANCIAL INDICES</b>				
Total Cash Farm Income	Total \$	\$/ha	\$/su	
Change in Value of Stock on Hand	1,467,941	3,191	622	
Change in Value of Produce on Hand				
Gross Farm Income	1,467,941	3,191	622	
Farm Working Expenses	1,051,532	2,286	445	
Earnings Before Interest, Drawings and Tax	416,410	905	176	
Total Debt Servicing	419,822	913	178	
Farm Working Expenses as a % of Gross Farm Income		72		
Debt Servicing as % of Gross Farm Income		29		
Debt Servicing as % of EBIT		101		

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY		
		460 Su or Ha		
	TOTAL \$		TOTAL \$	
WAGES	141,900	308 SHEEP		
ANIMAL HEALTH	9,442	21 WOOL		
STOCKFEED PURCHASED	16,625	36 CATTLE	1,617,867	
OTHER STOCK EXPENSES	25,500	55 MILK		
FEED CONSERVATION	154,950	337 DEER		
CONTRACTING	91,555	199 VELVET		
CARTAGE	13,857	30 GRAIN AND PULSE PRODUCE		
FERTILISER & LIME	164,751	358 Previous Yr Sales		
SEEDS & TREATMENT	65,852	143 Current Yr Sales	128,115	
SACKS & SEED DRESSING		Unsold At Year End		
WEED & PEST CONTROL	128,814	280 SMALL SEED PRODUCE		
REPAIRS & MAINTENANCE	34,000	74 Previous Yr Sales		
VEHICLE EXPENSES	38,500	84 Current Yr Sales		
ELECTRICITY	2,400	5 Unsold At Year End		
OTHER WORKING EXPS		MISCELLANEOUS INCOME	2,500	
ADMINISTRATION	19,000	41		
STANDING CHARGES	144,386	314 STOCK PURCHASES		
		Sheep		
		Cattle	-278,540	
		Deer		
		Other		
<b>CASH FARM WORKING EXPENSES</b>	<b>1,051,532</b>	<b>2,286 CASH FARM INCOME</b>	<b>1,467,941</b>	<b>3,191</b>
<b>CASH FARM WORKING PROFIT</b>	<b>416,410</b>	<b>905</b>		
DEBT SERVICING				
Mortgage	338,150	731		
Term Interest	62,168	135		
Current Account	21,505	47		
Rent				
Other				
<b>CASH OPERATING EXPENSES</b>	<b>1,471,354</b>	<b>3,199 CASH OPERATING INCOME</b>	<b>1,467,941</b>	<b>3,191</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>-3,412</b>	<b>-7</b>		
PERSONAL DRAWINGS		NON OPERATING INCOME		
OTHER PERSONAL				
TAXATION				
CAPITAL PURCHASES & PAYMENTS	121,640	264 INVESTMENT INCOME		
INVESTMENTS				
UNPAID ACCOUNTS				
<b>TOTAL CASH EXPENDITURE</b>	<b>1,592,994</b>	<b>3,463 TOTAL CASH INCOME</b>	<b>1,467,941</b>	<b>3,191</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>-125,052</b>	<b>-272</b>		
Change in value of stock on hand				
Change in value of produce on hand				
Depreciation				
<b>TRUE SURPLUS/DEFICIT</b>	<b>-125,052</b>	<b>-272</b>		

### 1.4.4.2. Farmax biophysical modelling

**Figure 1.4.4.2.1.** Dairy Support: Scenario 3.1 Land Intensification – Average pasture covers, long term steady-state basis.

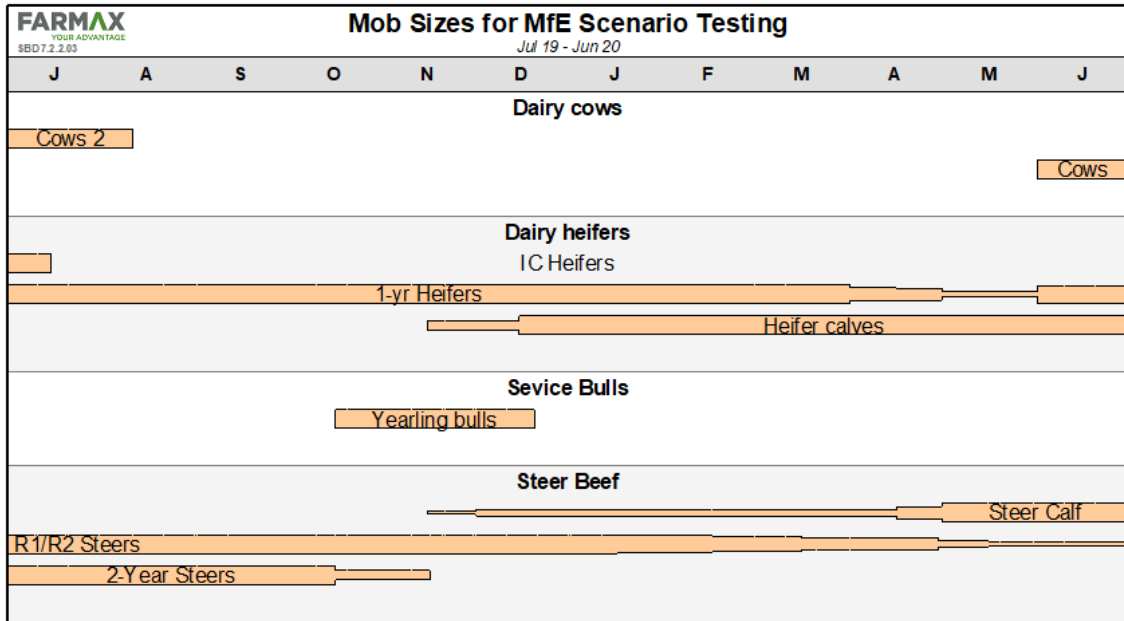


**Figure 1.4.4.2.2.** Dairy Support: Scenario 3.1 Land Intensification – Farmax supplements used.

Month	Percent of total demand in each month							Total
	Fodder beet	Forage Rape	Pasture Silage	Straw Big	Oaten Silage	Barley Silage	Kale	
Jul 19	68.1		1.2	1.1	22.7		6.5	99.7
Aug 19	62.8			0.8	26.1		8.8	98.5
Sep 19								
Oct 19								
Nov 19								
Dec 19								
Jan 20		39.6						39.6
Feb 20		45.7						45.7
Mar 20		31.5						31.5
Apr 20		13.9						13.9
May 20	25.3							25.3
Jun 20	71.4		1.1	0.9	20.2		5.9	99.6

**Figure 1.4.4.2.3. Dairy Support: Scenario 3.1 Land Intensification – a) Mob size per month, b) Livestock reconciliation per month.**

a)



b)

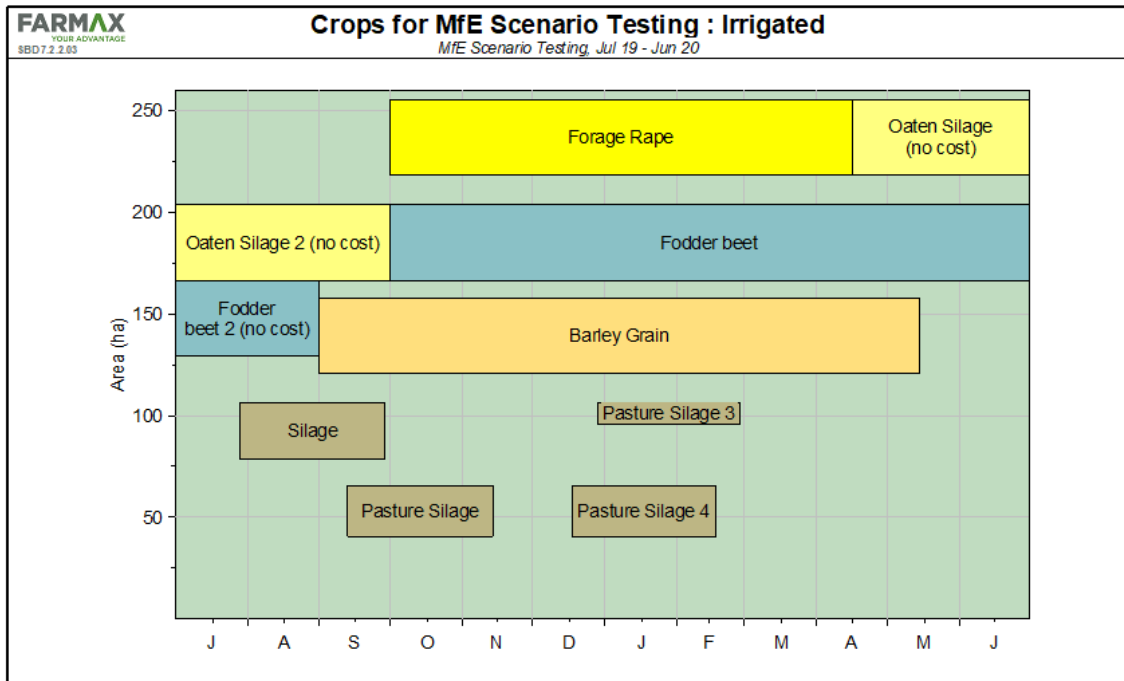
**FARMAX**  
YOUR ADVANTAGE  
SBD7.2.2.03

**Stock Reconciliation Numbers by Month for MfE Scenario Testing**  
Jul 19 - Jun 20

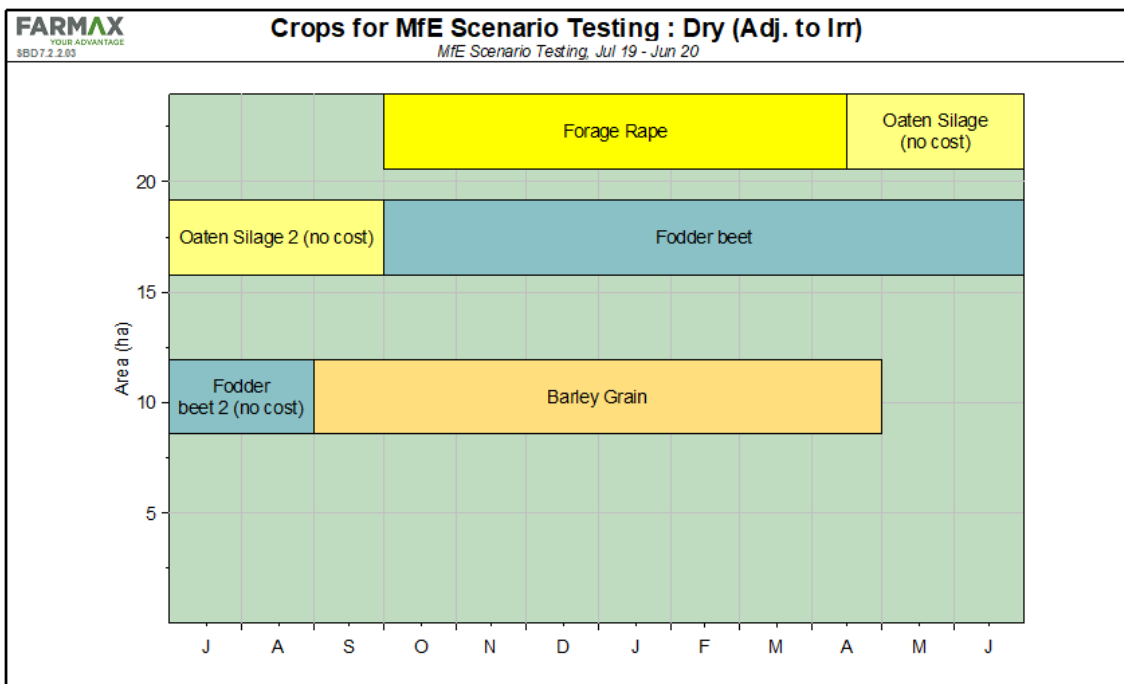
(end of month)	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20	Apr 20	May 20	Jun 20
Heifer Calf					230	460	460	460	460	460	460	460
1-Year Heifer	460	460	460	460	460	460	460	460	460	287	107	437
2-Year Heifer												
Cow	1030											1030
1-Year Bull				13	13							
Steer Calf					75	155	155	154	154	314	473	472
1-Year Steer	472	471	471	471	470	470	451	399	323	161	121	105
2-Year Steer	105	105	105	53								
<b>Total Beef</b>	<b>2067</b>	<b>1036</b>	<b>1036</b>	<b>997</b>	<b>1248</b>	<b>1545</b>	<b>1526</b>	<b>1473</b>	<b>1397</b>	<b>1222</b>	<b>1161</b>	<b>2504</b>

**Figure 1.4.4.2.4.** Dairy support: Scenario 3.1 Land Intensification – Crops and silage, whole farm, long term steady-state basis. **a)** Irrigated, **b)** Dryland block 1, **c)** Dryland block 2.

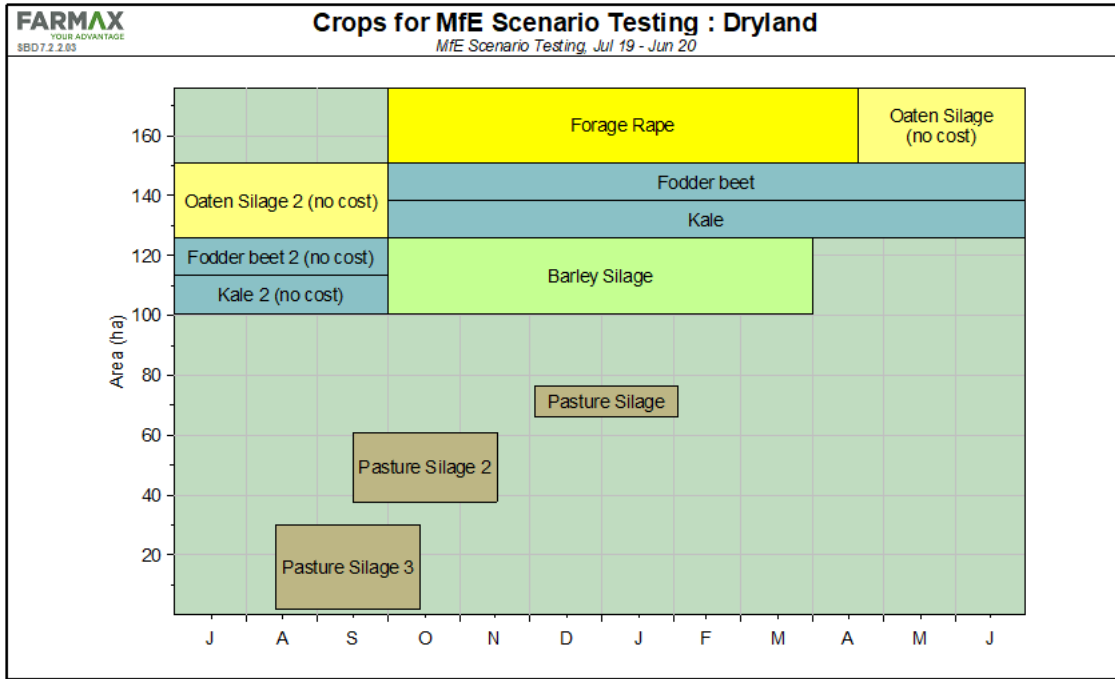
**a)**



**b)**



c)





### 1.4.4.3. Overseer nutrient modelling

**Table 1.4.4.3.1.** Dairy support: Scenario 3.1 Land Intensification – Whole farm nutrient budget.

Farm name: Dairy Support Farm - 10% less N & P - FINAL (2019)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	110	33	14	22	84	1	9
Rain/clover N fixation	68	0	2	4	2	4	15
Irrigation	3	0	2	3	10	2	10
Supplements imported	54	5	55	5	10	5	3
<b>Nutrients removed</b>							
As products	21	6	4	3	7	1	1
Exported effluent	0	0	0	0	0	0	0
As supplements, crop exports	46	9	37	4	8	3	2
To atmospheric	63	0	0	0	0	0	0
To water	60	0.2	13	41	90	9	26
<b>Change in internal pools</b>							
Plant material	-66	-9	-54	-9	-29	-6	-21
Organic pool	84	1	7	-6	1	1	0
Inorganic mineral	0	3	-16	0	-2	-4	-4
Inorganic soil pool	27	30	83	0	31	7	34

**Table 1.4.4.3.2 Dairy support: Scenario 3.1 Land Intensification – Nitrogen block report.**

Farm name: Dairy Support Farm - 10% less N &amp; P - FINAL (2019)

## Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Irrigated	1496	25	5.7	229	151
OG - Ra - Oa Si	4845	131	<b>28.1</b>	100	82
Oa Si - FB	1968	53	<b>11.9</b>	78	118
FB - Ba Gr - NG	6745	182	<b>37.0</b>	151	154
DLC - OG - Ra - Oa Si	314	92	<b>23.3</b>	92	82
DLC -Oa Si - FB	164	48	<b>12.7</b>	81	118
DLC -FB - Ba Gr - NG	535	157	<b>34.0</b>	158	151
DL Corners	212	15	4.4	182	81
DL - OG - Ra - Oa Si	2297	92	<b>23.1</b>	92	82
DL Oa Si - FB	1169	47	<b>12.3</b>	82	118
DL - FB - Ba Gr - NG	2593	103	<b>24.4</b>	124	151
Rolling DL Pasture	624	16	4.5	191	100
Rolling DL Silage Pasture	1633	27	7.6	147	100
Irr Silage	2889	32	7.4	177	151
Other farm sources	95				
Whole farm	27579	60			
Less N removed in wetlands	0				
Farm output	27579	60			

**Table 1.4.4.3.3.** Dairy support: Scenario 3.1 Land Intensification – Phosphorus block report.

Farm name: Dairy Support Farm - 10% less N &amp; P - FINAL (2019)

## Block Phosphorus

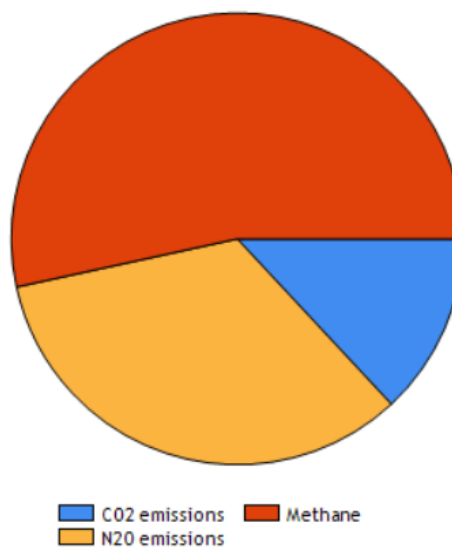
Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
Irrigated	6	0.1	Low	Low	n/a
OG - Ra - Oa Si	7	0.2	n/a	n/a	n/a
Oa Si - FB	9	0.2	n/a	n/a	n/a
FB - Ba Gr - NG	6	0.2	n/a	n/a	n/a
DLC - OG - Ra - Oa Si	0	0.1	n/a	n/a	n/a
DLC -Oa Si - FB	0	0.1	n/a	n/a	n/a
DLC -FB - Ba Gr - NG	0	0.1	n/a	n/a	n/a
DL Corners	1	0	Low	Low	n/a
DL - OG - Ra - Oa Si	3	0.1	n/a	n/a	n/a
DL Oa Si - FB	3	0.1	n/a	n/a	n/a
DL - FB - Ba Gr - NG	3	0.1	n/a	n/a	n/a
Rolling DL Pasture	6	0.2	Low	Low	Low
Rolling DL Silage Pasture	10	0.2	Low	Low	Low
Irr Silage	9	0.1	Low	Low	n/a
Other farm sources	46				
Whole farm	110	0.2			

**Table 1.4.4.3.4.** Dairy support: Scenario 3.1 Land Intensification – Farm greenhouse gas emissions.

Farm name: Dairy Support Farm - 10% less N & P - FINAL (2019)

## Farm Greenhouse Gas Emissions

Based on total farm area	Current farm
Units: Use default	
<b>Methane</b>	<b>6514</b>
Enteric	6344
Dung	122
Effluent	48
<b>N<sub>2</sub>O emissions</b>	<b>4086</b>
Excreta paddock	1342
Excreta effluent	1120
N fertiliser	667
Crops	28
Indirect	927
<b>CO<sub>2</sub> emissions</b>	<b>1593</b>
Electricity	63
Fuel	166
N fertiliser	334
Fertiliser and organic inputs	216
Lime	78
Supplements	655
Animal transport	38
Other	43
<b>Total</b>	<b>12192</b>



## 1.4.5. Dairy support – Scenario 3.2

### 1.4.5.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	MFE	File Name	Dairy Support - Scenario 3.2 D	
Business Year	2020-21	Date Printed	5/06/2019	
Total Farm Area (ha)	0	Prepared By:	MRB	
Total Effective Area (ha)	325	Stocking Rate:	2.4	
Total kgMS produced:	390,909			
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes	0	Cows	782	
Ewe Hoggets	0	Heifers	190	
Male Hoggets	0	Heifer Calves	190	
Wethers	0	Male Calves	0	
Rams	0	Steers/Bulls	0	
		Bulls	0	
TOTAL SHEEP	0	TOTAL CATTLE	1,050	
Sheep stock units	0	Cattle stock units	5,710	
Lambing percentage	0.0	Calving percentage	0	
Wool/sheep S.U.	0.0	Cows in Milk	0	
Av. Wool Price/kg	0.0	kgMS /cow	0	
		kgMS /ha	1,203	
SHEEP INCOME/SU	0.0	CATTLE INCOME/SU	432	
<b>DEER</b>		<b>PRODUCE</b>		
M.A. Hinds	0	Crop	Area	Yield/Ha
R 2yr Hinds	0	M.Wheat	0	0
R 1yr Hinds	0	F.Wheat	0	0
R1yr Stags	0	Oats	0	0
R 2yr Stags	0	Barley	0	0
M.A. Stags	0	Peas	0	0
		Other Grain	0	0
TOTAL DEER	0	Grass Seed 1.	0	0
Deer stock units	0	Grass Seed 2.	0	0
Fawning percentage	0.0	Clover	0	0
Velvet/stag	0.0	Other Small Seed	0	0
Av. Velvet Price/kg	0			
		TOTAL AREA	0	
DEER INCOME/SU	0.0	PRODUCE INCOME/HA	0	
<b>FINANCIAL INDICES</b>				
	Total \$	\$/ha	\$/kgMS	
Total Cash Farm Income	2,591,327	7,973	6.63	
Change in Value of Stock on Hand	0	0	0.00	
Change in Value of Produce on Hand	0	0	0.00	
Gross Farm Income	2,591,327	7,973	6.63	
Farm Working Expenses	1,400,387	4,309	3.58	
Earnings Before Interest, Drawings and Tax	1,190,940	3,664	3.05	
Total Debt Servicing	839,017	2,582	2.15	
Farm Working Expenses as a % of Gross Farm Income		54		
Debt Servicing as % of Gross Farm Income		32		
Debt Servicing as % of EBIT		70		

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY			
		390,909 \$u or Ha			
	TOTAL \$	\$/kgMS		TOTAL \$	\$/kgMS
WAGES	298,400	0.76	SHEEP	0	
ANIMAL HEALTH	99,215	0.25	WOOL	0	
STOCKFEED PURCHASED	84,238	0.22	CATTLE	166,100	
OTHER STOCK EXPENSES	69,200	0.18	MILK	2,345,454	
FEED CONSERVATION	66,600	0.17	DEER	0	
CONTRACTING	43,810	0.11	VELVET	0	
CARTAGE	2,740	0.01	GRAIN AND PULSE PRODUCE		
FERTILISER & LIME	206,428	0.53	Previous Yr Sales	0	
SEEDS & TREATMENT	32,160	0.08	Current Yr Sales	0	
SACKS & SEED DRESSING	0	0.00	Unsold At Year End	0	
WEED & PEST CONTROL	54,648	0.14	SMALL SEED PRODUCE		
REPAIRS & MAINTENANCE	98,000	0.25	Previous Yr Sales	0	
VEHICLE EXPENSES	69,000	0.18	Current Yr Sales	0	
ELECTRICITY	38,790	0.10	Unsold At Year End	0	
OTHER WORKING EXPS	15,330	0.04	MISCELLANEOUS INCOME	123,773	
ADMINISTRATION	50,000	0.13			
STANDING CHARGES	172,028	0.44	STOCK PURCHASES		
			Sheep	0	
			Cattle	-44,000	
			Deer	0	
			Other	0	
<b>CASH FARM WORKING EXPENSES</b>	<b>1,400,387</b>	<b>3.58</b>	<b>CASH FARM INCOME</b>	<b>2,591,327</b>	<b>6.63</b>
<b>CASH FARM WORKING PROFIT</b>	<b>1,190,940</b>	<b>3.05</b>			
<b>DEBT SERVICING</b>					
Mortgage	831,533	2.13			
Term Interest	0	0.00			
Current Account	7,484	0.02			
Rent	0	0.00			
Other	0	0.00			
<b>CASH OPERATING EXPENSES</b>	<b>2,239,404</b>	<b>5.73</b>	<b>CASH OPERATING INCOME</b>	<b>2,591,327</b>	<b>6.63</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>351,923</b>	<b>0.90</b>			
<b>PERSONAL DRAWINGS</b>	<b>0</b>	<b>0.00</b>	<b>NON OPERATING INCOME</b>	<b>0</b>	<b>0.00</b>
OTHER PERSONAL	0	0.00			
TAXATION	61,777	0.16			
CAPITAL PURCHASES & PAYMENTS	146,000	0.37	INVESTMENT INCOME	0	0.00
INVESTMENTS	0	0.00			
UNPAID ACCOUNTS	0	0.00			
<b>TOTAL CASH EXPENDITURE</b>	<b>2,447,181</b>	<b>6.26</b>	<b>TOTAL CASH INCOME</b>	<b>2,591,327</b>	<b>6.63</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>144,146</b>	<b>0.37</b>			<b>0.0</b>
Change in value of stock on hand	0	0.00			
Change in value of produce on hand	0	0.00			
Depreciation					
<b>TRUE SURPLUS/DEFICIT</b>	<b>144,146</b>	<b>0.37</b>			

### 1.4.5.2. Farmax biophysical modelling

**Figure 1.4.5.2.1.** Dairy Support: Scenario 3.2 Land Intensification – Farmax Dairy biophysical summary of the dairy farm and support farm program, long term steady-state basis.

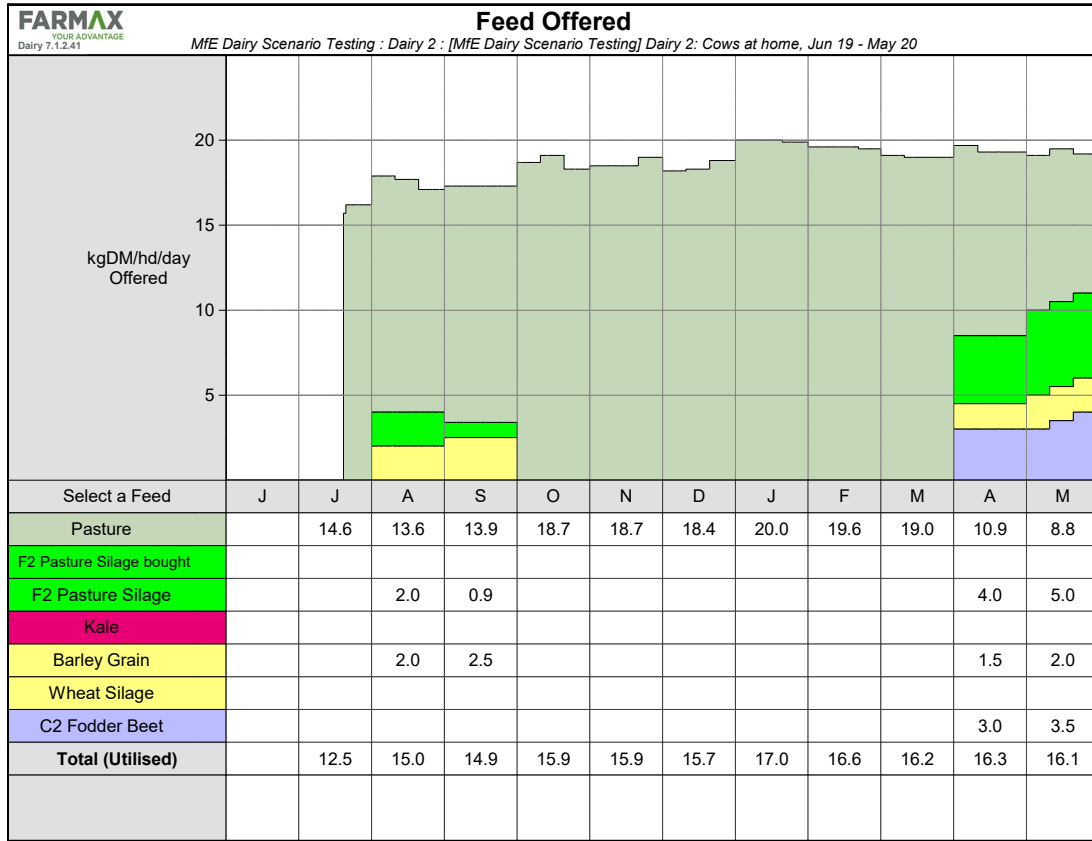
FARMAX YOUR ADVANTAGE Dairy 7.1.2.41		Physical Summary for MfE Dairy Scenario Testing Jun 19 - May 20	
Category	Description	Value	Units
<b>Farm</b>	Effective Area	460	ha
	Stocking Rate	1.8	cows/ha
	Potential Pasture Growth	11.5	t DM/ha
	Nitrogen Use	147	kg N/ha
	Feed Conversion Efficiency (eaten)	11.2	kg DM eaten/kg MS
<b>Herd</b>	Cow Numbers (1st July)	850	cows
	Peak Cows Milked	820	cows
	Days in Milk	275	days
	Avg. BCS at calving	5.6	BCS
	Liveweight	893	kg/ha
<b>Production (to Factory)</b>	Milk Solids total	390,909	kg
	Milk Solids per ha	850	kg/ha
	Milk Solids per cow	477	kg/cow
	Peak Milk Solids production	2.09	kg/cow/day
	Milk Solids as % of live weight	95.2	%
<b>Feeding</b>	Pasture Eaten per cow *	4.0	t DM/cow
	Supplements Eaten per cow *	1.3	t DM/cow
	Off-farm Grazing Eaten per cow *	0.0	t DM/cow
	Total Feed Eaten per cow *	5.3	t DM/cow
	Pasture Eaten per ha	8.0	t DM/ha
	Supplements Eaten per ha	2.8	t DM/ha
	Off-farm Grazing Eaten per ha	0.0	t DM/ha
	Total Feed Eaten per ha	10.8	t DM/ha
	Supplements and Grazing / Feed Eaten *	24.9	%
	Bought Feed / Feed Eaten *	3.3	%

(\*) feed eaten by females > 20 months old / peak cows milked

**Figure 1.4.5.2.2.** Dairy Support: Scenario 3.2 Land Intensification – Farmax Dairy supplements used.

FARMAX YOUR ADVANTAGE Dairy 7.1.2.41		Supplement Usage Summary for MfE Dairy Scenario Testing Jun 19 - May 20												
Feed	tonnes DM offered													kg /milker
	Jun 19	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20	Apr 20	May 20	Total	
F2 Pasture Silage	10	12	76	28							97	124	349	425
Kale	110	110	29										249	304
Barley Grain			27	54							31	41	153	186
Wheat Silage	77	77	11										164	200
C2 Fodder Beet	178	180	84								62	72	575	702
<b>Total</b>													<b>1,489</b>	<b>1,816</b>

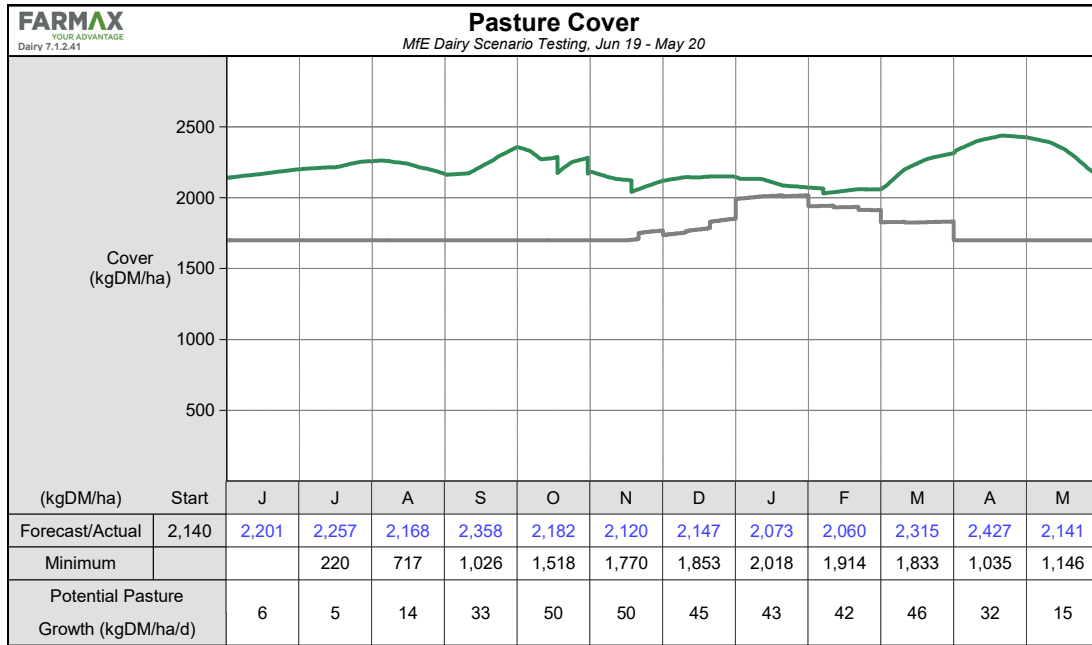
**Figure 1.4.5.2.3.** Dairy Support: Scenario 3.2 Land Intensification – Feed offered to milking cows, long term steady-state basis.





**Figure 1.4.5.2.4. Dairy Support: Scenario 3.2 Land Intensification – a) Pasture cover, b) Potential base pasture growth of dairy platform excluding nitrogen.**

a)



b)

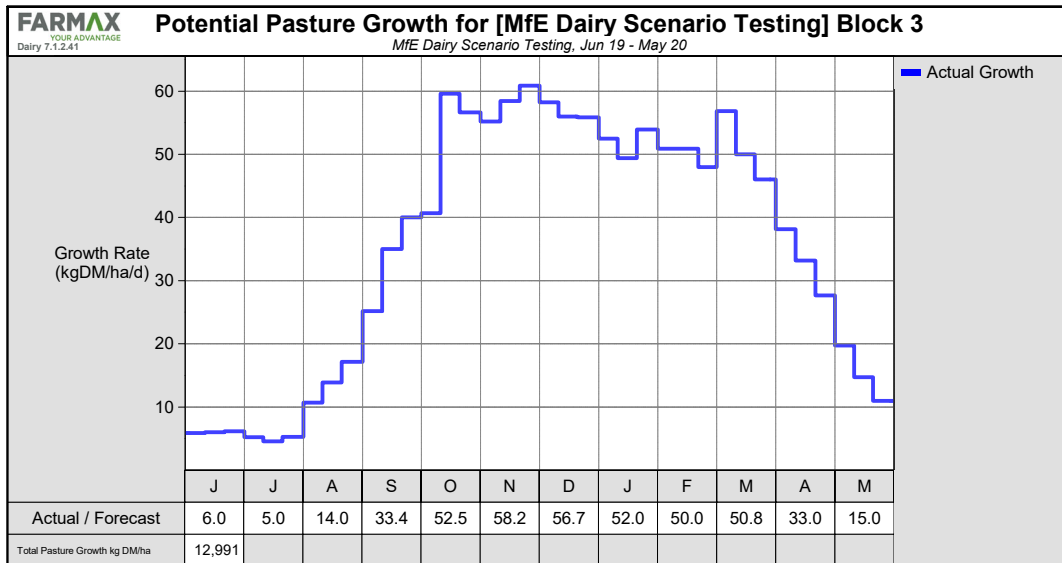
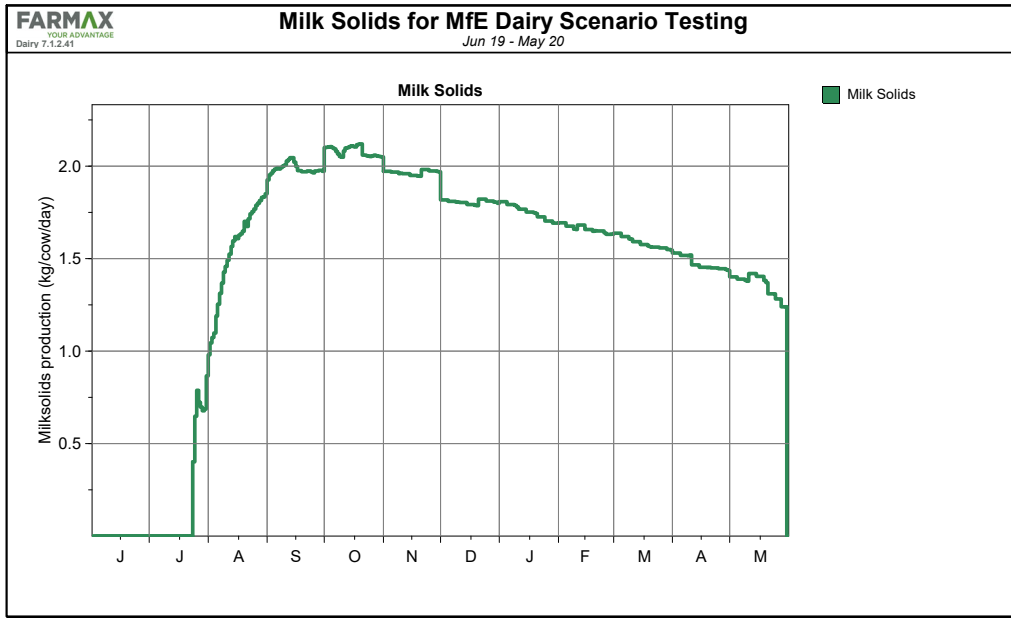
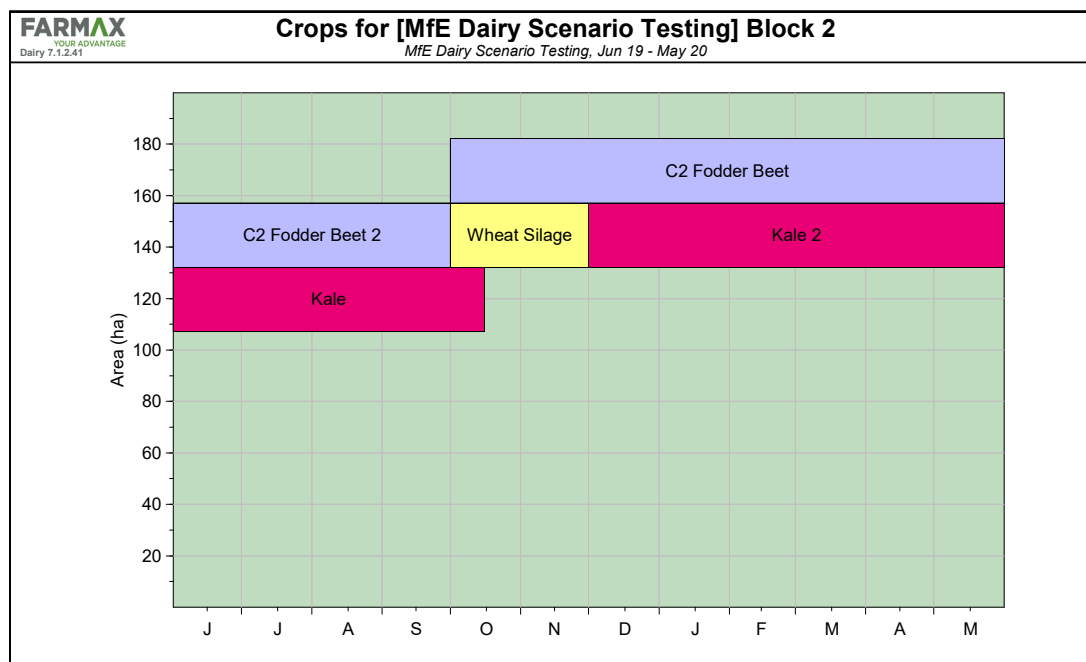


Figure 1.4.5.2.5. Dairy Support: Scenario 3.2 Land Intensification – Lactation Curve.



**Figure 1.4.5.2.6.** Dairy support: Scenario 3.2 Land Intensification – Crops and silage, whole farm, long term steady-state basis.



### 1.4.5.3. Overseer nutrient modelling

**Table 1.4.5.3.1.** Dairy support: Scenario 3.2 Land Intensification – Whole farm nutrient budget.

Farm name: Dairy Support Farm - Dairy Conversion - V1\_2 (2019)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	144	29	3	48	177	1	4
Rain/clover N fixation	95	0	2	4	2	4	15
Irrigation	3	0	2	3	12	3	12
Supplements imported	11	2	8	1	1	1	1
<b>Nutrients removed</b>							
As products	67	12	15	4	16	1	4
Exported effluent	0	0	0	0	0	0	0
As exported defoliation	5	1	2	1	0	0	0
To atmospheric	71	0	0	0	0	0	0
To water	64	0.4	21	66	75	13	47
<b>Change in internal pools</b>							
Plant material	-23	-4	-27	-5	-23	-3	-9
Organic pool	58	3	0	-10	0	0	0
Inorganic mineral	0	2	-21	0	-2	-4	-4
Inorganic soil pool	11	17	24	0	124	1	-6

**Table 1.4.5.3.2 Dairy support: Scenario 3.2 Land Intensification – Nitrogen block report.**

Farm name: Dairy Support Farm - Dairy Conversion - V1\_2 (2019)

### Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
MP- PP	4309	61	<b>13.6</b>	232	201
DL - PP + DLC	3605	29	8.1	108	100
PP - FB	2552	102	<b>26.7</b>	127	143
FB - Ba Sil - Ka	3674	147	<b>38.6</b>	165	228
Ka- NG	2013	81	<b>21.7</b>	4	139
MP - PP - FB - Ba Si	3065	438	<b>96.1</b>	488	137
MP - FB - Ba Si - NG	1041	149	<b>31.6</b>	-18	148
MP - Silage	8934	51	<b>11.4</b>	186	201
Other farm sources	766				
Whole farm	29960	64			
Less N removed in wetlands	0				
Farm output	29960	64			

**Table 1.4.5.3.3. Dairy support: Scenario 3.2 Land Intensification – Phosphorus block report.**

Farm name: Dairy Support Farm - Dairy Conversion - V1\_2 (2019)

### Block Phosphorus

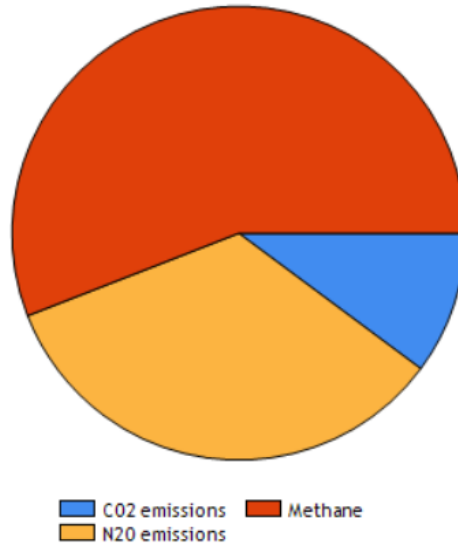
Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
MP- PP	7	0.1	Low	Low	n/a
DL - PP + DLC	17	0.1	Low	Low	n/a
PP - FB	3	0.1	n/a	n/a	n/a
FB - Ba Sil - Ka	4	0.1	n/a	n/a	n/a
Ka- NG	2	0.1	n/a	n/a	n/a
MP - PP - FB - Ba Si	2	0.2	n/a	n/a	n/a
MP - FB - Ba Si - NG	1	0.2	n/a	n/a	n/a
MP - Silage	17	0.1	Low	Low	n/a
Other farm sources	137				
Whole farm	190	0.4			

**Table 1.4.5.3.4.** Dairy support: Scenario 3.2 Land Intensification – Farm greenhouse gas emissions.

Farm name: Dairy Support Farm - Dairy Conversion - V1\_2 (2019)

## Farm Greenhouse Gas Emissions

Based on total farm area	Current farm
Units: Use default	
<b>Methane</b>	<b>7496</b>
Enteric	7262
Dung	105
Effluent	130
<b>N2O emissions</b>	<b>4542</b>
Excreta paddock	2604
Excreta effluent	58
N fertiliser	828
Crops	13
Indirect	1040
<b>CO2 emissions</b>	<b>1364</b>
Electricity	148
Fuel	89
N fertiliser	550
Fertiliser and organic inputs	121
Lime	141
Supplements	229
Animal transport	4
Other	83
<b>Total</b>	<b>13402</b>



## 1.4.6. Arable mixed cropping

### 1.4.6.1. Financial budget summary detail

MACFARLANE RURAL BUSINESS LTD		PHYSICAL PRODUCTION SUMMARY		
Farm / Client	MFE	File Name	Arable - Scenario 3 Dairy Conv	
Business Year	2020-21	Date Printed	6/06/2019	
Total Farm Area (ha)		Prepared By:	MRB	
Total Effective Area (ha)	325	Stocking Rate:	2.4	
Total kgMS produced:	378,532			
<b>SHEEP</b>		<b>CATTLE</b>		
Ewes		Cows	782	
Ewe Hoggets		Heifers	190	
Male Hoggets		Heifer Calves	190	
Wethers		Male Calves		
Rams		Steers/Bulls		
		Bulls		
TOTAL SHEEP		TOTAL CATTLE	1,000	
Sheep stock units		Cattle stock units	5,440	
Lambing percentage		Calving percentage		
Wool/sheep S.U.		Cows in Milk		
Av. Wool Price/kg		kgMS /cow		
SHEEP INCOME/SU		kgMS /ha	1,165	
		CATTLE INCOME/SU	440	
<b>DEER</b>		<b>PRODUCE</b>		
M.A. Hinds		Crop	Area	Yield/Ha
R 2yr Hinds		M.Wheat		
R 1yr Hinds		F.Wheat		
R1yr Stags		Oats		
R 2yr Stags		Barley		
M.A. Stags		Peas		
		Other Grain		
TOTAL DEER		Grass Seed 1.		
Deer stock units		Grass Seed 2.		
Fawning percentage		Clover		
Velvet/stag		Other Small Seed		
Av. Velvet Price/kg				
		TOTAL AREA		
DEER INCOME/SU		PRODUCE INCOME/HA		
<b>FINANCIAL INDICES</b>				
	Total \$	\$/ha	\$/kgMS	
Total Cash Farm Income	2,529,415	7,783	6.68	
Change in Value of Stock on Hand				
Change in Value of Produce on Hand				
Gross Farm Income	2,529,415	7,783	6.68	
Farm Working Expenses	1,299,971	4,000	3.43	
Earnings Before Interest, Drawings and Tax	1,229,444	3,783	3.25	
Total Debt Servicing	785,535	2,417	2.08	
Farm Working Expenses as a % of Gross Farm Income		51		
Debt Servicing as % of Gross Farm Income		31		
Debt Servicing as % of EBIT		64		

MACFARLANE RURAL BUSINESS LTD		BUDGET SUMMARY			
		378,532 Su or Ha			
	TOTAL \$	\$/kgMS		TOTAL \$	\$/kgMS
WAGES	288,400	0.76	SHEEP		
ANIMAL HEALTH	94,538	0.25	WOOL		
STOCKFEED PURCHASED	185,753	0.49	CATTLE	165,190	
OTHER STOCK EXPENSES	66,800	0.18	MILK	2,271,192	
FEED CONSERVATION	59,250	0.16	DEER		
CONTRACTING	30,390	0.08	VELVET		
CARTAGE	2,740	0.01	GRAIN AND PULSE PRODUCE		
FERTILISER & LIME	138,837	0.36	Previous Yr Sales		
SEEDS & TREATMENT	34,800	0.09	Current Yr Sales		
SACKS & SEED DRESSING			Unsold At Year End		
WEED & PEST CONTROL	30,100	0.08	SMALL SEED PRODUCE		
REPAIRS & MAINTENANCE	98,000	0.26	Previous Yr Sales		
VEHICLE EXPENSES	53,250	0.14	Current Yr Sales		
ELECTRICITY	72,610	0.19	Unsold At Year End		
OTHER WORKING EXPS	15,330	0.04	MISCELLANEOUS INCOME	137,033	
ADMINISTRATION	50,000	0.13			
STANDING CHARGES	81,174	0.21	STOCK PURCHASES		
			Sheep		
			Cattle	-44,000	
			Deer		
			Other		
<b>CASH FARM WORKING EXPENSES</b>	<b>1,299,971</b>	<b>3.43</b>	<b>CASH FARM INCOME</b>	<b>2,529,415</b>	<b>6.68</b>
<b>CASH FARM WORKING PROFIT</b>	<b>1,229,444</b>	<b>3.25</b>			
<b>DEBT SERVICING</b>					
Mortgage	782,824	2.07			
Term Interest					
Current Account	2,711	0.01			
Rent					
Other					
<b>CASH OPERATING EXPENSES</b>	<b>2,085,506</b>	<b>5.51</b>	<b>CASH OPERATING INCOME</b>	<b>2,529,415</b>	<b>6.68</b>
<b>CASH OPERATING SURPLUS/DEFICIT</b>	<b>443,909</b>	<b>1.17</b>			
<b>PERSONAL DRAWINGS</b>			<b>NON OPERATING INCOME</b>		
OTHER PERSONAL					
TAXATION	89,373	0.24			
CAPITAL PURCHASES & PAYMENTS	146,000	0.39	INVESTMENT INCOME		
INVESTMENTS					
UNPAID ACCOUNTS					
<b>TOTAL CASH EXPENDITURE</b>	<b>2,320,879</b>	<b>6.13</b>	<b>TOTAL CASH INCOME</b>	<b>2,529,415</b>	<b>6.68</b>
<b>TOTAL CASH SURPLUS/DEFICIT</b>	<b>208,536</b>	<b>0.55</b>			
Change in value of stock on hand					
Change in value of produce on hand					
Depreciation					
<b>TRUE SURPLUS/DEFICIT</b>	<b>208,536</b>	<b>0.55</b>			

### 1.4.6.2. Farmax biophysical modelling

**Figure 1.4.6.2.1.** Arable mixed cropping: Scenario 3 Land Intensification - Farmax Dairy biophysical summary of the dairy farm and support farm program, long term steady-state basis.

FARMAX YOUR ADVANTAGE Dairy 7.1.2.41		Physical Summary for MfE Arable conversion Jun 19 - May 20	
Category	Description	Value	Units
<b>Farm</b>	Effective Area	325	ha
	Stocking Rate	2.4	cows/ha
	Potential Pasture Growth	16.3	t DM/ha
	Nitrogen Use	129	kg N/ha
	Feed Conversion Efficiency (eaten)	11.1	kg DM eaten/kg MS
<b>Herd</b>	Cow Numbers (1st July)	810	cows
	Peak Cows Milked	782	cows
	Days in Milk	274	days
	Avg. BCS at calving	5.3	BCS
	Liveweight	1,192	kg/ha
<b>Production (to Factory)</b>	Milk Solids total	378,531	kg
	Milk Solids per ha	1,165	kg/ha
	Milk Solids per cow	484	kg/cow
	Peak Milk Solids production	2.07	kg/cow/day
	Milk Solids as % of live weight	97.7	%
<b>Feeding</b>	Pasture Eaten per cow *	4.2	t DM/cow
	Supplements Eaten per cow *	1.2	t DM/cow
	Off-farm Grazing Eaten per cow *	0.0	t DM/cow
	Total Feed Eaten per cow *	5.4	t DM/cow
	Pasture Eaten per ha	11.4	t DM/ha
	Supplements Eaten per ha	3.3	t DM/ha
	Off-farm Grazing Eaten per ha	0.0	t DM/ha
	Total Feed Eaten per ha	14.7	t DM/ha
	Supplements and Grazing / Feed Eaten *	21.7	%
	Bought Feed / Feed Eaten *	5.5	%

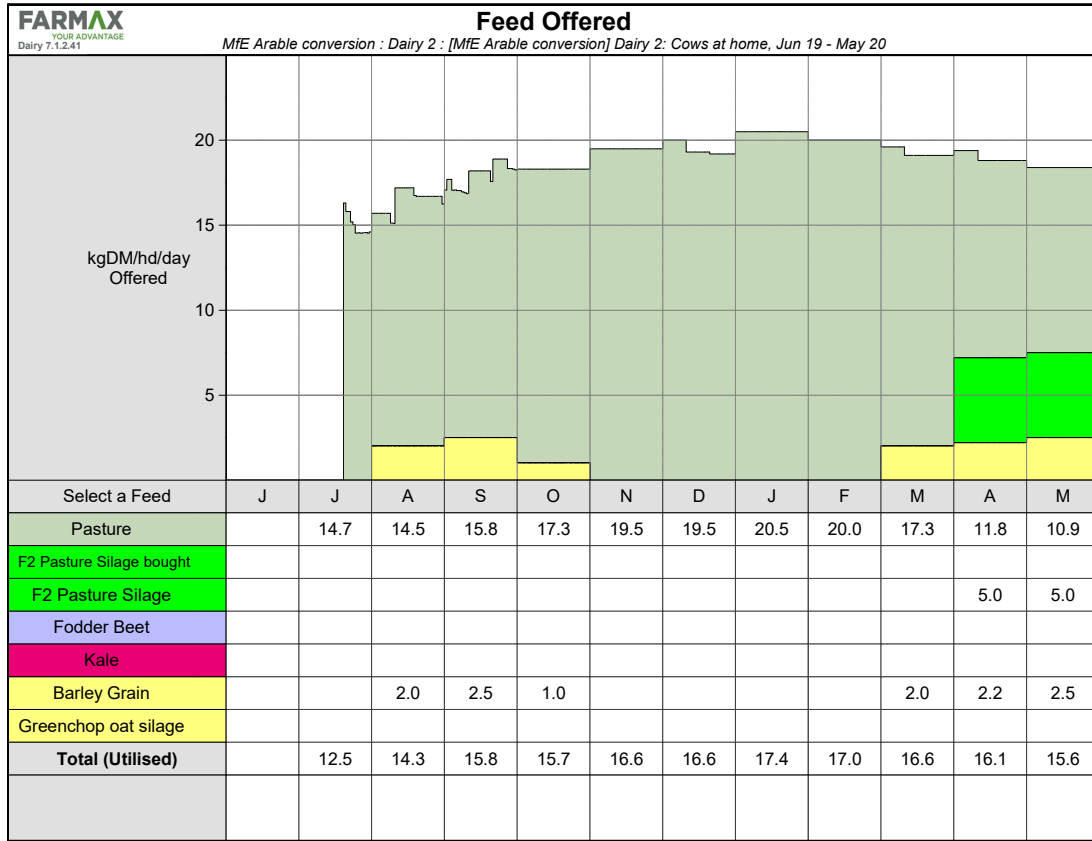
(\*) feed eaten by females > 20 months old / peak cows milked

**Figure 1.4.6.2.2.** Arable mixed cropping: Scenario 3 Land Intensification – Farmax Dairy supplements used.

FARMAX YOUR ADVANTAGE Dairy 7.1.2.41		Supplement Usage Summary for MfE Arable conversion Jun 19 - May 20													
Feed	tonnes DM offered													kg /milker	
	Jun 19	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20	Apr 20	May 20	Total		
F2 Pasture Silage	9	9									110	123	251	321	
Fodder Beet	164	165												329	420
Kale	95	85												180	230
Greenchop oat silage	73	73	28	5										179	229
Barley Grain			27	54	24					48	43	48	243	311	
<b>Total</b>														<b>1,182</b>	<b>1,512</b>

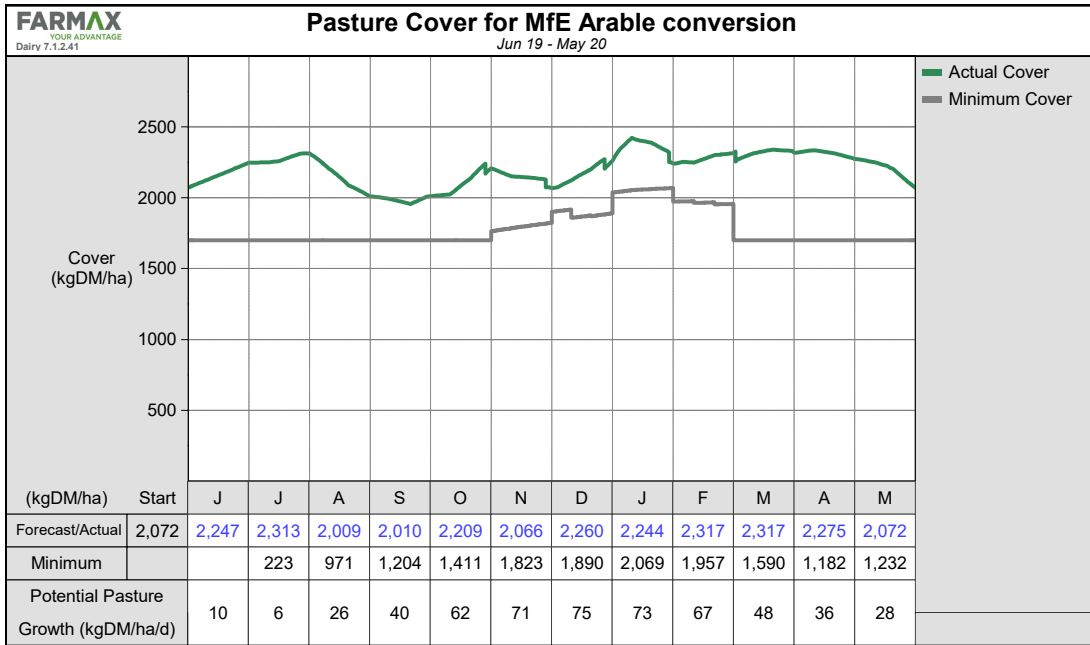


**Figure 1.4.6.2.3.** Arable mixed cropping: Scenario 3 Land Intensification – Feed offered to milking cows, long term steady-state basis.

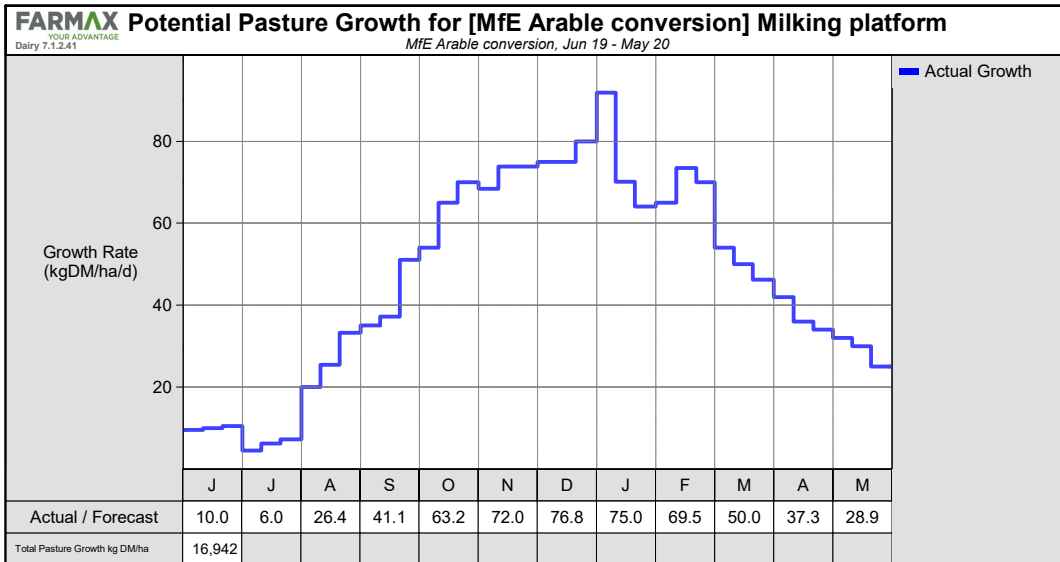


**Figure 1.4.6.2.4. Arable mixed cropping: Scenario 3 Land Intensification – Dairy conversion a) Pasture cover, b) Potential base pasture growth of farm excluding nitrogen.**

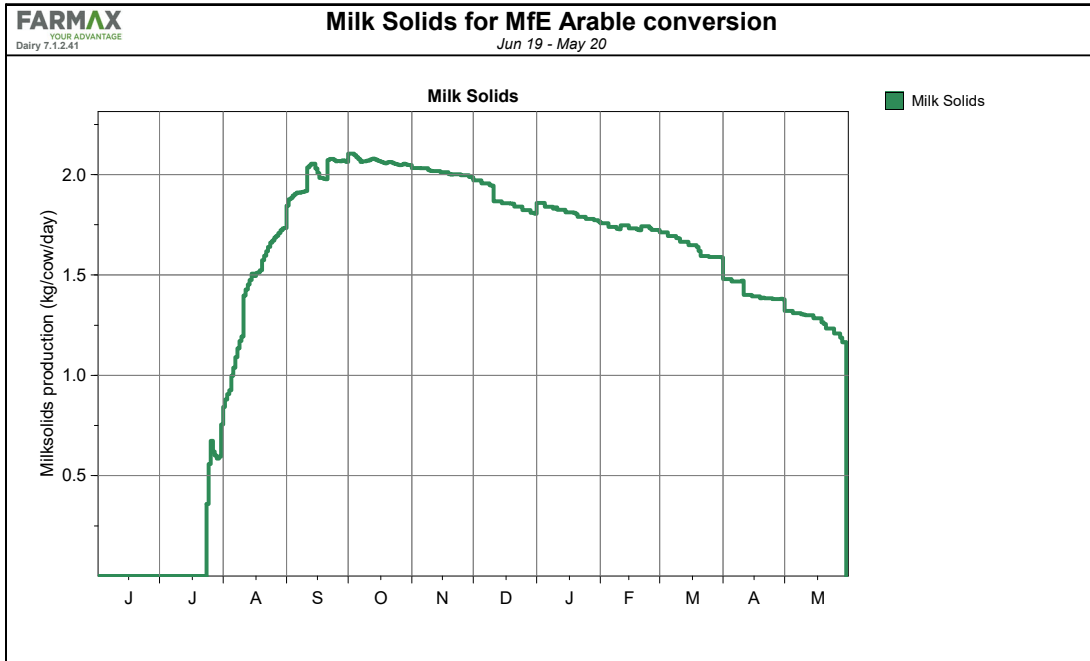
a)



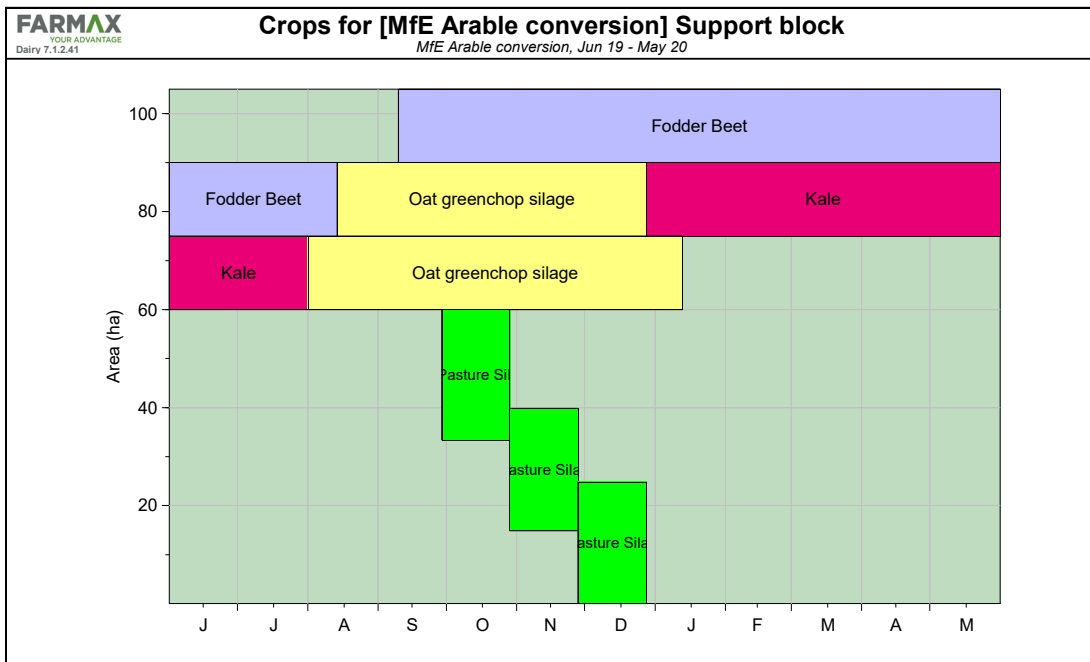
b)



**Figure 1.4.6.2.5.** Arable mixed cropping: Scenario 3 Land Intensification – Dairy conversion, lactation Curve.



**Figure 1.4.6.2.6.** Arable mixed cropping: Scenario 3 Land Intensification – Crops and silage, whole farm, long term steady-state basis.



### 1.4.6.3. Overseer nutrient modelling

**Table 1.4.6.3.1.** Arable mixed cropping: Scenario 3 Land Intensification – Whole farm nutrient budget.

Farm name: MfE - Arable - Scenario 3 - Intensification to Dairy - revised rotation (2018)

#### Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
<b>Nutrients added</b>							
Fertiliser, lime & other	152	26	17	39	56	0	0
Rain/clover N fixation	136	0	3	5	2	5	31
Irrigation	10	0	6	10	37	9	38
Supplements imported	35	6	25	3	5	3	2
<b>Nutrients removed</b>							
As products	89	16	20	5	22	2	6
Exported effluent	0	0	0	0	0	0	0
As supplements and defoliation	27	4	16	2	4	1	1
To atmospheric	92	0	0	0	0	0	0
To water	20	0.7	9	54	41	9	9
<b>Change in internal pools</b>							
Plant material	-9	-2	-16	-3	-14	-2	-10
Organic pool	94	10	2	0	1	0	0
Inorganic mineral	0	0	-32	0	-1	-2	-2
Inorganic soil pool	18	4	51	0	49	8	67

**Table 1.4.6.3.2.** Arable mixed cropping: Scenario 3 Land Intensification – Nitrogen block report.

Farm name: MfE - Arable - Scenario 3 - Intensification to Dairy - revised rotation (2018)

#### Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Pla_Preb_Pvt_Pasture	3203	15	<b>13.4</b>	211	173
Sup_Waka_Trav_P>FB>GCO>K	1357	90	<b>65.5</b>	231	249
Sup_Waka_Trav_FB>GCO>K>GCO>P	379	25	<b>18.2</b>	93	121
Pla_Preb_Trav_Pasture	157	16	8.6	155	174
Sup_Waka_Trav_Pasture	1591	21	10.9	173	230
Other farm sources	407				
<hr/>					
Whole farm	7094	20			
Less N removed in wetlands	0				
Farm output	7094	20			

**Table 1.4.6.3.3.** Arable mixed cropping: Scenario 3 Land Intensification – Phosphorus block report.

Farm name: MfE - Arable - Scenario 3 - Intensification to Dairy - revised rotation (2018)

### Block Phosphorus

Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
Pla_Preb_Pvt_Pasture	50	0.2	Low	Low	n/a
Sup_Waka_Trav_P>FB>GCO>K	2	0.2	n/a	n/a	n/a
Sup_Waka_Trav_FB>GCO>K>GCO>P	1	0.1	n/a	n/a	n/a
Pla_Preb_Trav_Pasture	3	0.3	Low	Low	n/a
Sup_Waka_Trav_Pasture	29	0.4	Low	Low	n/a
Other farm sources	145				
<b>Whole farm</b>	<b>230</b>	<b>0.7</b>			

**Table 1.4.6.3.4.** Arable mixed cropping: Scenario 3 Land Intensification– Farm greenhouse gas emissions.

Farm name: MfE - Arable - Scenario 3 - Intensification to Dairy - revised rotation (2018)

### Farm Greenhouse Gas Emissions

