

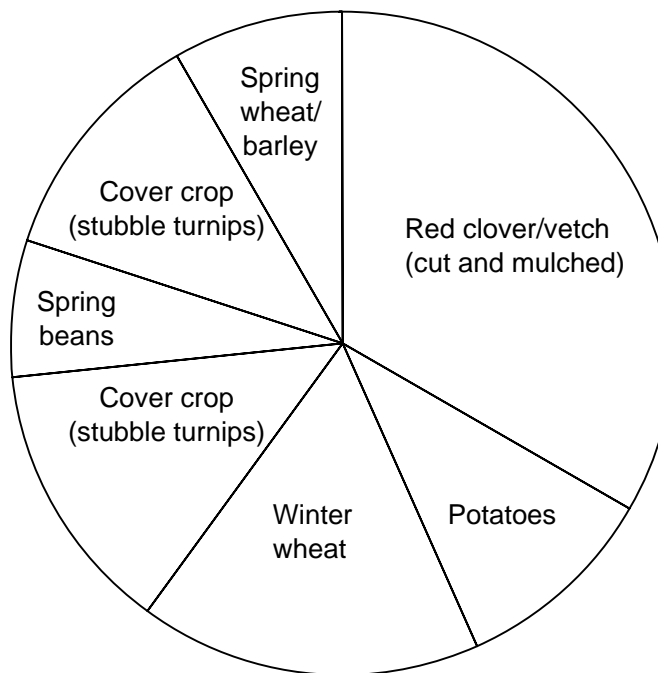
# ROTATION 1

Location: Norfolk

5 year average yields

Red clover/vetch @ 33.5 t/ha  
 Potatoes @ 7.4 t/ha  
 Winter wheat @ 7.4 t/ha  
 cover crop (stubble turnips) @ 3.5 t/ha  
 Spring beans @ 3.5 t/ha  
 cover crop (stubble turnips) @ 4.6 t/ha receives Redzlaag @ 81.5 kg P /ha  
 Spring wheat/barley

Crop offtakes of all nutrients measured



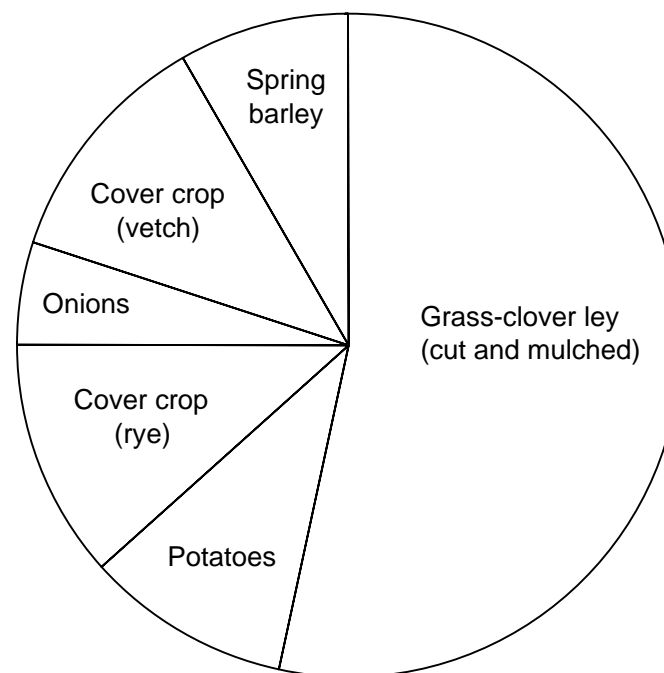
## Rotation nutrient budget kg nutrient /ha

Inputs	N	P	K	Outputs	N	P	K
Fixation	31.9			Crop sales	88.8	13.1	45.2
Deposition	30.0	-0	5	Volatilisation (from cut and mulch)	5.0		
Seed	4.3	1.2	2.6				
P fertiliser (redzlaag)		9.3					
<b>Total</b>	<b>66.2</b>	<b>10.5</b>	<b>7.6</b>		<b>83.8</b>	<b>13.1</b>	<b>45.2</b>
<b>Balance</b>					<b>-17.6</b>	<b>-2.6</b>	<b>-37.6</b>

## ROTATION 2

Location: Warwickshire

Grass-clover ley Receives 22.5 t/ha dwt green-waste compost  
 Potatoes @ 28 t/ha  
 cover crop (rye)  
 Onions @ 26 t/ha  
 cover crop (vetch)  
 Spring barley (undersown) @ 3.5 t/ha



### Rotation nutrient budget kg nutrient /ha

<b>Inputs</b>	<b>N</b>	<b>P</b>	<b>K</b>	<b>Outputs</b>	<b>N</b>	<b>P</b>	<b>K</b>
Fixation	89			Crop sales	58	10	64
Deposition	20	0.2	3	Volatilisation (from cut and mulch)	10		
Seed	5	0.7	3				
Compost	50	11.0	38				
<b>Total</b>	<b>164</b>	<b>11.9</b>	<b>44</b>		<b>68</b>	<b>10</b>	<b>64</b>
<b>Balance</b>					<b>96</b>	<b>1.9</b>	<b>-20</b>

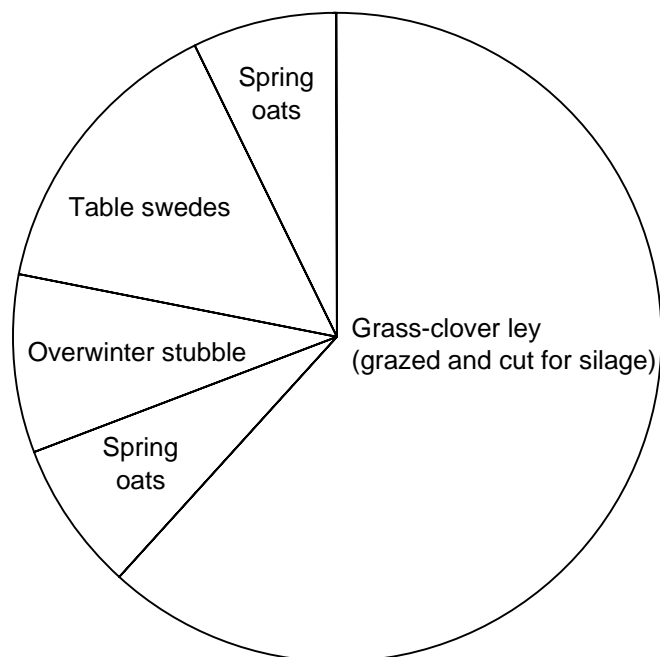
## ROTATION 3

Location: Aberdeenshire

6 year average yields

Grass-clover ley @ 4.9 t/ha  
 Spring oats @ 5.9 t/ha  
 Stubble @ 3.5 t/ha  
 Swedes @ 4.9 t/ha  
 Spring oats (undersown) @ 3.5 t/ha

Crop offtakes of N measured



### Rotation nutrient budget kg nutrient /ha

Inputs	N	P	K	Outputs	N	P	K
Fixation	45			Crop sales	37	11.3	37.3
Deposition	12	~0	2.1	Straw for bedding	7	2.2	19.0
Seed	2	0.4	0.7	Silage	52	13.1	82.0
Manure	56	11.9	50.8	Liveweight gain	6	4.0	8.7
Grazing returns	22	2.1	29.6	Volatilisation	9		
<b>Total</b>	<b>137</b>	<b>14.4</b>	<b>83.2</b>		<b>111</b>	<b>30.6</b>	<b>147.0</b>
<b>Balance</b>					<b>26</b>	<b>-16.2</b>	<b>-63.8</b>

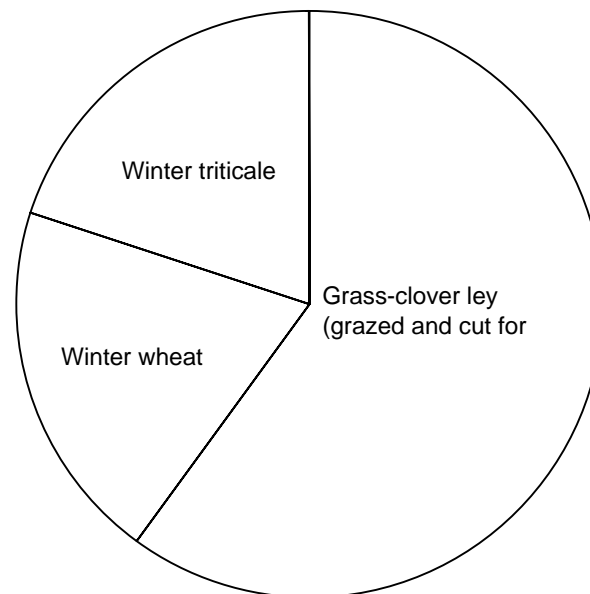
## ROTATION 4

Location: Berkshire

Grass-clover ley  
W. wheat  
Triticale

Average yields

@ 4 t/ha Some Redzlaag applied  
@ 3.8 t/ha Some Redzlaag applied



### ROTATIONAL NUTRIENT BUDGET (kg /ha)

(4 reps)

	W WHEAT		W TRITICALE		LEY		LEY		LEY		AVERAGE	
	P	K	P	K	P	K	P	K	P	K	P	K
DEPOSITION	0.3	2.5	0.3	2.5	0.3	2.5	0.3	2.5	0.3	2.5	<b>0.3</b>	<b>2.5</b>
SEED	0.9	1.2	0.9	1.2	0.1	0.2	0.0	0.0	0.0	0.0	<b>0.4</b>	<b>0.5</b>
MANURE	0.0	0.0	1.3	4.2	18.5	90.0	14.9	74.5	5.2	26.1	<b>8.0</b>	<b>39.0</b>
FERTILISER	20.9	0.2	20.9	0.2	0.0	0.0	0.0	0.0	20.9	0.2	<b>12.5</b>	<b>0.1</b>
CROP SALES	11.9	19.8	11.5	14.4	0.0	0.0	0.0	0.0	0.0	0.0	<b>4.7</b>	<b>6.8</b>
STRAW	2.5	20.2	4.0	31.6	0.0	0.0	0.0	0.0	0.0	0.0	<b>1.3</b>	<b>10.4</b>
SILAGE	0.0	0.0	2.0	10.0	10.0	70.3	11.3	74.4	13.1	81.8	<b>7.3</b>	<b>47.3</b>
ANIMAL PRODUCTS	0.0	0.0	1.0	0.3	2.6	0.6	2.4	0.6	2.4	0.6	<b>1.7</b>	<b>0.4</b>
<b>BALANCE</b>	<b>7.7</b>	<b>-36.0</b>	<b>4.9</b>	<b>-48.1</b>	<b>6.3</b>	<b>21.8</b>	<b>1.6</b>	<b>2.0</b>	<b>10.9</b>	<b>-53.5</b>	<b>6.3</b>	<b>-22.8</b>

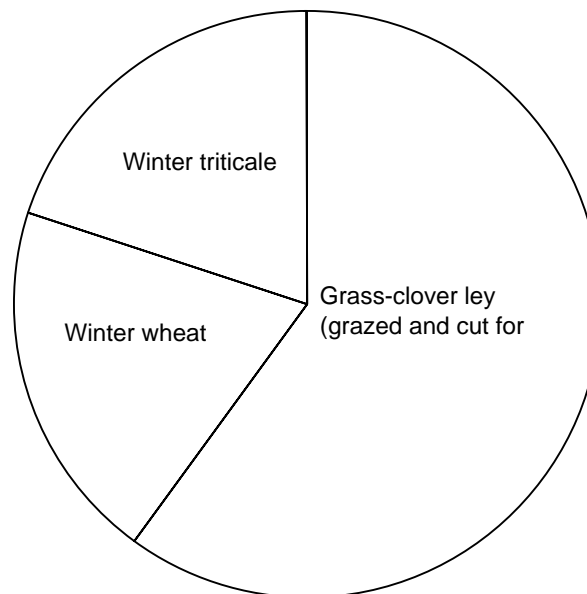
## ROTATION 5

Location: Derbyshire

Grass-clover ley  
Winter wheat  
Winter triticale

Average yields

@ 4.5 t/ha  
@ 3.5 t/ha



### ROTATIONAL NUTRIENT BUDGET (kg /ha)

(2 reps)

	W WHEAT		W TRITICALE		LEY		LEY		LEY		AVERAGE	
	P	K	P	K	P	K	P	K	P	K	P	K
DEPOSITION	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0
SEED	0.9	1.3	0.9	1.2	0.2	0.2	0.0	0.0	0.0	0.0	0.4	0.6
MANURE	0.0	0.0	0.0	0.0	2.6	12.9	1.8	12.3	5.7	32.4	2.0	11.5
FERTILISER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CROP SALES	6.8	11.3	14.0	17.5	0.0	0.0	0.0	0.0	0.0	0.0	4.2	5.8
STRAW	1.8	14.4	2.6	21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	7.1
SILAGE	2.9	18.4	0.0	0.0	9.8	64.9	1.9	13.3	14.6	93.8	5.9	38.1
ANIMAL PRODUCTS	1.8	1.5	0.0	0.0	2.9	2.4	3.8	2.0	2.5	2.1	2.2	1.6
<b>BALANCE</b>	<b>-12.4</b>	<b>-41.3</b>	<b>-15.7</b>	<b>-34.3</b>	<b>-9.9</b>	<b>-51.2</b>	<b>-4.0</b>	<b>-0.1</b>	<b>-11.4</b>	<b>-60.4</b>	<b>-10.7</b>	<b>-37.4</b>

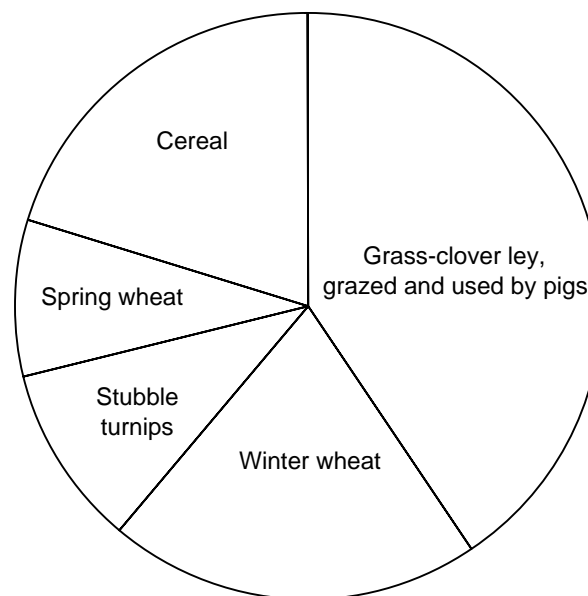
## ROTATION 6

Location: Wiltshire

Grass-clover ley  
W. wheat  
Stubble turnips  
S. wheat  
Cereal

Average yields

@ 4.7 t/ha Some Redzlaag applied  
@ 4.4 t/ha Some Redzlaag applied  
@ 4.4 t/ha Manure applied



### ROTATIONAL NUTRIENT BUDGET (kg /ha)

(2 reps)

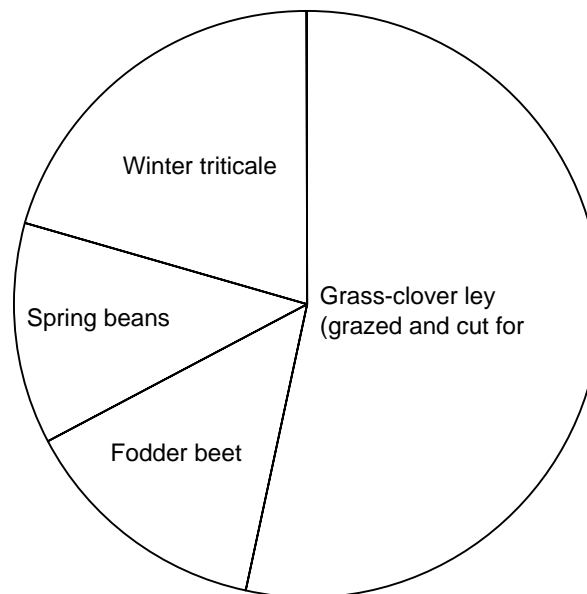
	W. WHEAT		S. WHEAT		CEREAL		LEY		LEY (PIGS)		AVERAGE	
	P	K	P	K	P	K	P	K	P	K	P	K
DEPOSITION	0.0	2.5	0.0	2.5	0.0	2.5	0.0	2.5	0.0	2.5	0.0	2.5
SEED	0.8	1.1	1.0	1.4	0.8	1.1	0.1	0.2	0.0	0.0	0.5	0.8
MANURE	0.0	0.0	13.8	68.8	8.0	8.0	0.0	0.0	50.4	69.3	14.4	29.2
FERTILISER	17.4	0.2	17.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.1
CROP SALES	14.3	23.8	15.2	23.8	13.2	22.0	0.0	0.0	0.0	0.0	8.5	13.9
STRAW	3.8	30.4	3.8	30.4	3.5	28.0	0.0	0.0	0.0	0.0	2.2	17.8
SILAGE	0.0	0.0	0.0	0.0	0.0	0.0	23.0	143.8	0.0	0.0	4.6	28.8
ANIMAL PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.3	2.1	0.5	0.7	0.2
<b>BALANCE</b>	<b>0.1</b>	<b>-50.4</b>	<b>13.1</b>	<b>18.7</b>	<b>-7.9</b>	<b>-38.4</b>	<b>-24.1</b>	<b>-141.3</b>	<b>48.4</b>	<b>71.3</b>	<b>5.9</b>	<b>-28.0</b>

## ROTATION 7

Location: Cheshire

2 year grass/red clover ley @ 43 t/ha  
 Fodder beet @ 3 t/ha  
 Spring beans @ 5 t/ha  
 W. triticale

Average yields  
 Some Redzlaag applied at establishment  
 Manure applied



### ROTATIONAL NUTRIENT BUDGET (kg /ha)

(2 reps)

	FODDER BEET		S. BEANS		W. TRITICALE		LEY		LEY		AVERAGE	
	P	K	P	K	P	K	P	K	P	K	P	K
DEPOSITION	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0	0.0	3.0
SEED	0.0	0.0	1.1	2.6	1.0	1.4	0.2	0.3	0.0	0.0	0.5	0.9
MANURE	32.3	161.7	0.0	0.0	0.0	0.0	32.8	163.8	30.6	153.1	19.1	95.7
FERTILISER	0.0	0.0	0.0	0.0	83.4	0.9	83.4	0.9	0.0	0.0	33.4	0.4
CROP SALES	43.5	261.0	0.0	0.0	20.2	25.3	0.0	0.0	0.0	0.0	12.7	57.3
STRAW	0.0	0.0	0.0	0.0	5.7	45.2	0.0	0.0	0.0	0.0	1.1	9.0
SILAGE	0.0	0.0	7.2	36.0	0.0	0.0	0.0	0.0	8.3	58.0	3.1	18.8
ANIMAL PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	7.2	6.1	3.6	3.1	2.1	1.8
<b>BALANCE</b>	<b>-11.2</b>	<b>-96.3</b>	<b>-6.1</b>	<b>-30.4</b>	<b>58.6</b>	<b>-65.2</b>	<b>109.2</b>	<b>161.9</b>	<b>18.8</b>	<b>95.1</b>	<b>33.9</b>	<b>13.0</b>

## ROTATION 8

Location: Kent

Grass-clover ley  
 Winter wheat  
 Winter oats/triticale  
 Winter beans  
 Winter wheat  
 Overwinter stubble  
 Spring cereal

Average yields

@ 4.3 t/ha  
 @ 3.8 t/ha Some Redzlaag applied  
 @ 3.5 t/ha Some Redzlaag and manure applied  
 @ 3.7 t/ha Manure applied  
 @ 3 t/ha Some Redzlaag applied



### ROTATIONAL NUTRIENT BUDGET (kg /ha)

(1-2 reps)

	W. WHEAT		W. OATS/TRITICALE		W. BEANS		W. WHEAT		S. CEREAL		LEY		LEY		LEY		AVERAGE			
	P	K	P	K	P	K	P	K	P	K	P	K	P	K	P	K	P	K		
DEPOSITION	0.3	2.5	0.3	2.5	0.3	2.5	0.3	2.5	0.3	2.5	0.3	2.5	0.3	2.5	0.3	2.5	0.3	2.5	<b>0.3</b>	<b>2.5</b>
SEED	0.9	1.2	0.7	1.2	1.3	3.0	0.8	1.2	1.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>0.6</b>	<b>1.0</b>
MANURE	0.0	0.0	0.0	0.0	7.0	49.0	6.3	44.1	0.0	0.0	16.5	82.5	16.5	82.5	16.5	82.5	16.5	82.5	<b>7.9</b>	<b>42.6</b>
FERTILISER	0.0	0.0	34.8	0.4	23.2	0.3	0.0	0.0	69.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>15.9</b>	<b>0.2</b>
CROP SALES	13.1	21.8	11.9	15.4	17.7	35.3	11.0	18.3	9.6	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>7.9</b>	<b>13.2</b>
STRAW	4.2	33.6	4.9	54.5	0.0	0.0	4.1	32.4	3.8	30.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<b>2.1</b>	<b>18.9</b>
SILAGE	0.0	0.0	0.0	0.0	0.0	0.0	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	0.0	21.2	132.3	21.2	132.3	21.2	132.3	21.2	132.3	<b>7.9</b>	<b>49.6</b>
ANIMAL PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.5	2.1	0.5	2.1	0.5	2.1	0.5	<b>0.8</b>	<b>0.2</b>
<b>BALANCE</b>	<b>-16.1</b>	<b>-51.6</b>	<b>19.0</b>	<b>-65.8</b>	<b>14.1</b>	<b>19.4</b>	<b>-7.6</b>	<b>-2.9</b>	<b>57.4</b>	<b>-40.8</b>	<b>-6.4</b>	<b>-47.8</b>	<b>-6.4</b>	<b>-47.8</b>	<b>-6.4</b>	<b>-47.8</b>	<b>-6.4</b>	<b>-47.8</b>	<b>5.9</b>	<b>-35.6</b>

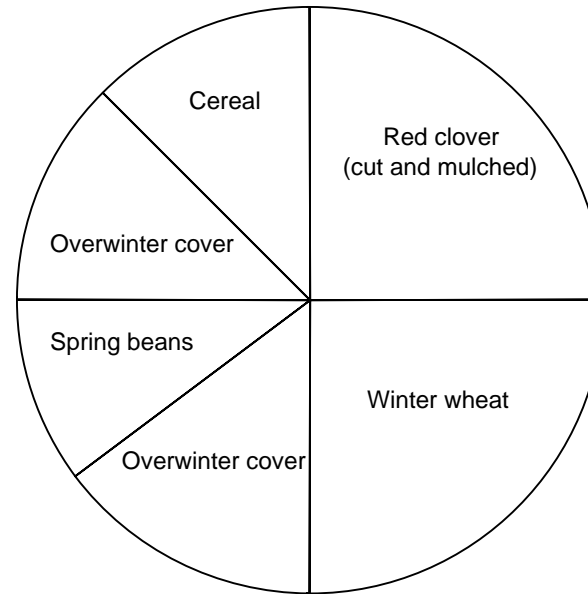


## ROTATION 9

Location: Leicestershire

Average yields

Red clover  
Winter wheat @ 5.2 t/ha  
Overwinter cover  
Spring beans @ 3.8 t/ha  
Overwinter cover  
Cereal @ 2.5 t/ha



### ROTATIONAL NUTRIENT BUDGET (kg /ha)

(1-2 reps)

	W. WHEAT		S. BEANS		S. CEREAL		R. CLOVER		AVERAGE	
	P	K	P	K	P	K	P	K	P	K
DEPOSITION	0.3	2.5	0.3	2.5	0.3	2.5	0.3	2.5	0.3	2.5
SEED	0.6	1.0	1.1	2.5	0.6	0.8	0.0	0.1	0.6	1.1
MANURE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILISER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CROP SALES	10.6	16.8	19.0	38.0	7.7	12.0	0.0	0.0	9.3	16.7
STRAW	2.1	16.8	0.0	0.0	2.0	16.0	0.0	0.0	1.0	8.2
SILAGE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ANIMAL PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>BALANCE</b>	<b>-11.8</b>	<b>-30.1</b>	<b>-17.7</b>	<b>-33.0</b>	<b>-8.8</b>	<b>-24.7</b>	<b>0.3</b>	<b>2.6</b>	<b>-9.5</b>	<b>-21.3</b>

## ROTATION 10

Location: Wiltshire

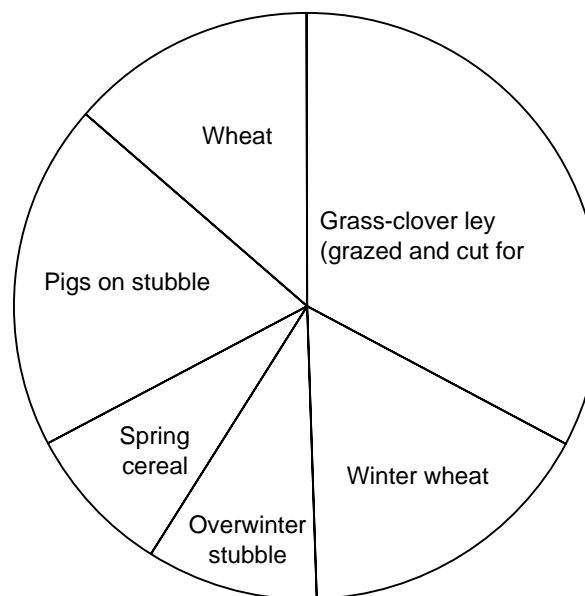
Grass-clover ley  
 Winter wheat  
 Overwinter stubble  
 Spring cereal  
 Pigs on stubble  
 Wheat

Average yields

@ 5.7 t/ha

@ 2.6 t/ha

@ 3.4 t/ha



### ROTATIONAL NUTRIENT BUDGET (kg /ha)

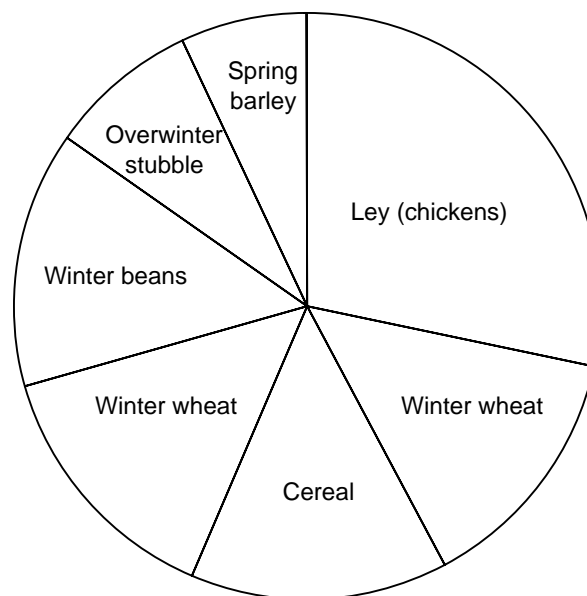
(2-5 reps)

	W. WHEAT		S. CEREAL		PIGS (on stubble)		WHEAT		LEY		LEY		AVERAGE	
	P	K	P	K	P	K	P	K	P	K	P	K	P	K
DEPOSITION	0.0	2.5	0.0	2.5	0.0	2.5	0.0	2.5	0.0	2.5	0.0	2.5	0.0	2.5
SEED	0.7	1.0	0.9	1.2	0.0	0.0	0.9	1.2	0.1	0.2	0.0	0.0	0.4	0.6
MANURE	0.0	0.0	0.0	0.0	147.6	203.0	0.0	0.0	0.0	0.0	39.4	54.1	31.2	42.8
FERTILISER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CROP SALES	12.4	20.6	7.3	11.8	0.0	0.0	11.0	18.0	0.0	0.0	0.0	0.0	5.1	8.4
STRAW	3.2	25.8	2.0	16.0	0.0	0.0	2.8	22.7	0.0	0.0	0.0	0.0	1.3	10.7
SILAGE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ANIMAL PRODUCTS	0.0	0.0	0.0	0.0	4.1	1.0	0.0	0.0	4.1	1.0	4.1	1.0	2.1	0.5
<b>BALANCE</b>	<b>-14.8</b>	<b>-42.9</b>	<b>-8.4</b>	<b>-24.0</b>	<b>143.5</b>	<b>204.5</b>	<b>-12.9</b>	<b>-37.0</b>	<b>-4.0</b>	<b>1.7</b>	<b>35.3 b</b>		<b>23.1</b>	<b>26.3</b>

# ROTATION 11

Location: Oxfordshire

Average yields  
 Grass-clover ley (chickens) @ 4.6 t/ha  
 W. Wheat @ 3.8 t/ha  
 Cereal @ 2.2 t/ha  
 W. Wheat @ 3.8 t/ha  
 W. Beans @ 2.2 t/ha  
 Overwinter stubble  
 Spring barley

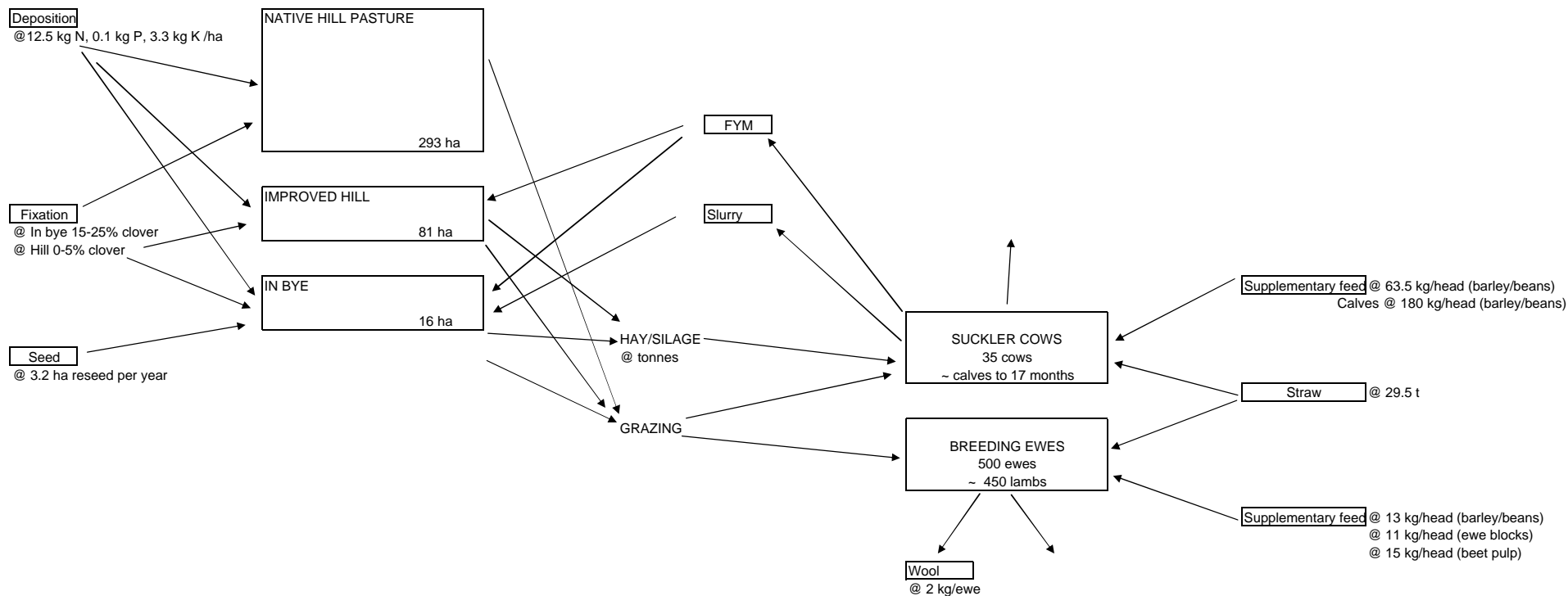


## ROTATIONAL NUTRIENT BUDGET (kg /ha)

(1-2 reps)

	W. WHEAT		CEREAL		W. BEANS		W. WHEAT		S. BARLEY		LEY (chickens)		LEY (chickens)		AVERAGE	
	P	K	P	K	P	K	P	K	P	K	P	K	P	K	P	K
DEPOSITION	0.0	2.5	0.0	2.5	0.0	2.5	0.0	2.5	0.0	2.5	0.0	2.5	0.0	2.5	0.0	2.5
SEED	1.0	1.4	1.0	1.4	1.3	3.0	1.0	1.4	1.0	1.4	0.1	0.2	0.0	0.0	0.8	1.2
MANURE	8.4	58.8	54.0	72.0	0.0	0.0	8.4	58.8	54.0	72.0	0.0	0.0	0.0	0.0	17.8	37.4
FERTILISER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CROP SALES	13.8	23.0	6.6	11.0	19.0	38.0	13.8	23.0	6.6	11.0	0.0	0.0	0.0	0.0	8.5	15.1
STRAW	3.7	29.6	1.2	9.6	0.0	0.0	3.7	29.6	1.2	9.6	0.0	0.0	0.0	0.0	1.4	11.2
SILAGE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	40.1	9.2	64.2	2.1	14.9
ANIMAL PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.5	2.1	0.5	0.6	0.1
<b>BALANCE</b>	<b>-8.1</b>	<b>10.1</b>	<b>47.2</b>	<b>55.3</b>	<b>-17.8</b>	<b>-32.5</b>	<b>-8.1</b>	<b>10.1</b>	<b>47.2</b>	<b>55.3</b>	<b>-7.7</b>	<b>-37.9</b>	<b>-11.2</b>	<b>-62.2</b>	<b>5.9</b>	<b>-0.3</b>

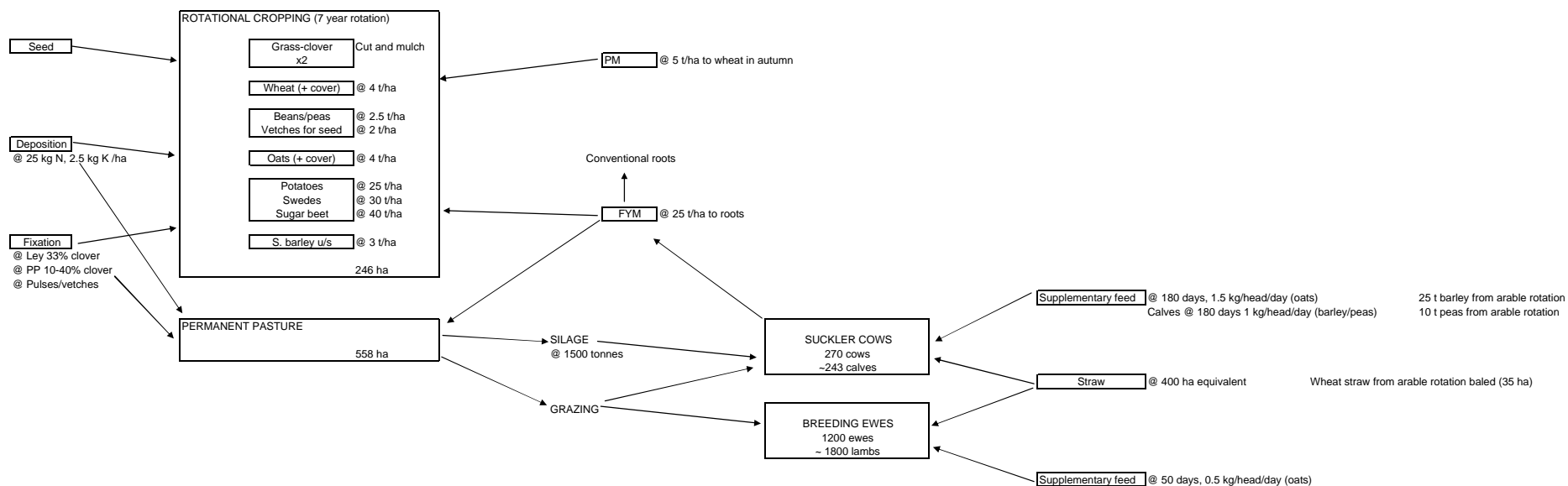
## UPLAND BEEF AND SHEEP



### Farm gate nutrient budget kg nutrient /ha

Inputs	N	P	K	Outputs	N	P	K
N fixation	6.2			Animal production	2.5	0.6	0.1
Deposition	12.5	0.1	3.3	Wool	0.4	~0	0.1
Seed	~0	~0	~0	Burning	0.1		
Straw	0.2	0.1	1.1	NH <sub>3</sub> volatilisation	1.2		
Feed	2.4	0.2	0.5				
<b>Total</b>	<b>21.3</b>	<b>0.4</b>	<b>4.9</b>		<b>4.2</b>	<b>0.6</b>	<b>0.2</b>
<b>Balance</b>					<b>17.1</b>	<b>-0.2</b>	<b>4.7</b>

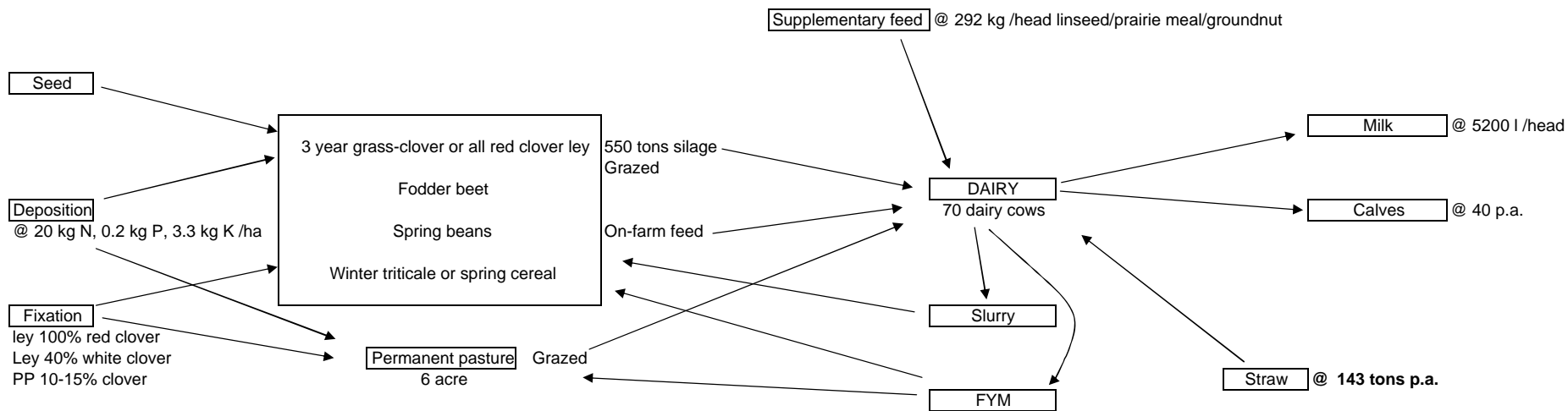
## LOWLAND ARABLE, SUCKLER BEEF, SHEEP



### WHOLE FARM

	kg/ha			kg/ha	
	P	K		P	K
<b>INPUTS</b>			<b>OUTPUTS</b>		
Seed	0.2	0.4	Crops	3.3	11.6
Deposition	0	2.5	Animal production	1.5	0.4
Supplementary feed	0.6	0.9			
Straw	4.5	27.2			
Poultry manure	1	1.3			
<b>Totals</b>	<b>6.3</b>	<b>32.3</b>		<b>4.8</b>	<b>12</b>
<b>BALANCE</b>				<b>1.5</b>	<b>20.3</b>

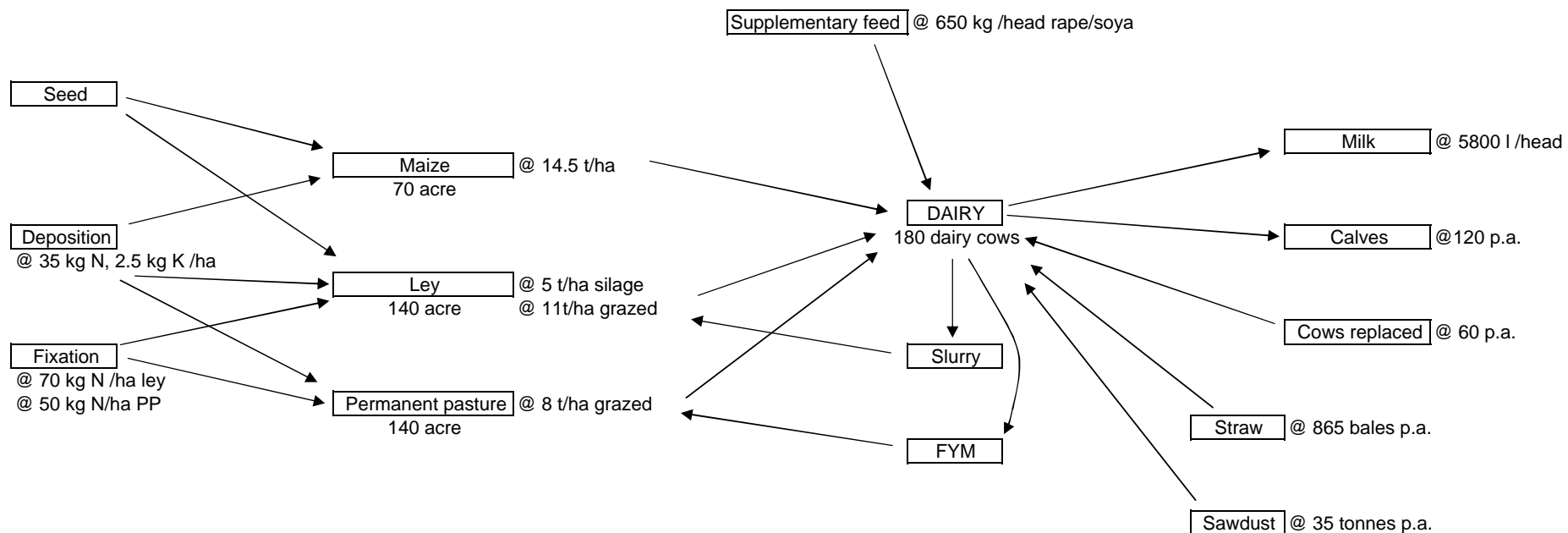
## LOWLAND DAIRY 1



### Farm gate nutrient budget kg nutrient /ha

Inputs	N	P	K	Outputs	N	P	K
N fixation	117			Animal production	4	1.0	0.3
Deposition	20	0.1	3.3	Milk	33	6.0	9.0
Seed	1	0.1	0.2	NH <sub>3</sub> volatilisation	14		
Straw	3	0.9	7.0				
Feed	18	2.0	5.0				
<b>Total</b>	<b>159</b>	<b>3.1</b>	<b>15.5</b>		<b>51</b>	<b>7.0</b>	<b>9.3</b>
<b>Balance</b>					<b>108</b>	<b>-3.9</b>	<b>6.2</b>

## LOWLAND DAIRY 2



### WHOLE FARM NUTRIENT BUDGET

	N	P	K		N	P	K
<b>INPUTS</b>				<b>OUTPUTS</b>			
Seed	1	0.1	0.4	Milk	38	7.2	11.3
Deposition	35	0.1	2.5	Calves	1	0.3	0.1
Fixation	48			Cows (sold and deaths)	6	2.1	0.4
Supplementary feed	58	5.2	20.4	Volatilisation	76		
Straw	8	2.6	11.2				
Sawdust	1	0.4	1.8				
<b>Total</b>	<b>151</b>	<b>8.4</b>	<b>36.3</b>		<b>121</b>	<b>9.6</b>	<b>11.8</b>
<b>Balance</b>					<b>30</b>	<b>-1.2</b>	<b>24.5</b>