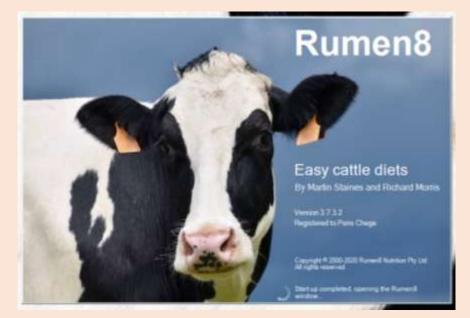
#### Theme 3: Animal Nutrition and Feeding

# USE OF RUMEN8 SOFTWARE FOR RATION CALCULATION (Level 3 – Part II)

Торіс	Training & information Content
3.1	Estimating feeding value of fodder & feed on dairy farms
3.2	Sampling feeds & forages/analysis interpretation
3.3	Estimating Dry Matter intake for various breeds/age categories of dairy cattle in the tropics
3.4	Reviewing feed intake, rumen fill, Body Condition Scoring (BCS)
3.5	Life weight estimation of cows
3.6	Rumen fermentation
3.7	Mineral & vitamin requirement, guidelines
3.8	Manure scoring and evaluation
3.9	Guidelines for ration calculations for various breeds, heifers, lactation stage (Rumen8)
3.10	Use of Rumen8 software for ration calculation
3.11	Optimization of ration with Rumen8
3.12	Feeding management guidelines
3.13	Feeding management of dry cows/close up
3.14	Feeding systems
3.15	Metabolic disorders
3.16	Scoring locomotion and hoof condition
3.17	Mycotoxin in dairy cattle nutrition
3.18	Heat stress in dairy cattle nutrition
3.19	Monitoring feeding management, using KPIs (based on Rumen8)



- 1. You will learn about (learning objectives):
- Introduction to ration formulation using Rumen8 Software.
- Step by step guide to making a ration for dairy cows.
- Examples of the rations for various categories of cattle.



This module has two parts; this is part II – ensure you download Part I.



# 2. Case study 1: Reduce milk yield

- According to the result of the original feed ration, the cow's requirement to produce 15L is not met.
- We can adjust the milk to get to the estimated level of production if the cows are fed with this ration.
- On the bottom right of the landing (green box) reduce the milk production and target to settle on a level where the bars turn green, especially the metabolizable energy (red box).
- The picture on the right shows that for the ration provided in this case cows can only produce 7.1L/d (green box).

			DM	As Fed	
1. {	Maize silage DM < 30%	v	1.31 0	5.00 \$	
2 [	Napier fresh mature > 120 cm	¥	6,99 🛊	30.00 😫	
3 [	Maize bran	÷	1.77 🔹	2.00 🔹	
4	Limestone (CaC03)	v	0.02	0.02 🗘	
5		~	0.00 ‡	0.00 +	
6		~	0.00 0	0.00 \$	
7.		~	0.00 ‡	0.00 ‡	3
8.		~	0.00 0	0.00 1	
9		×	0.00 \$	\$ 00.0	
10: [		~	0.00 ÷	0.00 \$	
1. [		~	0.00 0	0.00 \$	
12. [			0.00 0	0:00 😳	
13. [		~	0.00 1	0.00 ‡	
14. [		~	0.00 🗘	0.00 ‡	
15. [		4	0.00 0	0.00 \$	
fotal d	aily intake (kg/d)		10,1	37.0	
F	eed costs	N	filk income	i.	
	Jsh/t DM 6057	U	Ish/L raw mil	k	8.00
1	Jsh/MJ ME 0.713	U	ish/kg ECM		8.56

61.11

Ush/cow/d

Ush/cow/d

Dairy Diet Diet detail Price Feed cost Compare Splitherd Notes

Dry M	atter Intake			95	% Limit
Metat	oolisable Energy			100	% Req't
Metat	olisable Protein			53	% Req't
Calcia	im			69 %	Req't
Phos	phorus.			135 %	Req't
Magn	esium			183 %	Req't
NDF (	% DM)	61 %	•		1.
Starc	h (%-DM)	10 %			
Forag	e:Conc. ratio	82:18	0		
	Feed efficiency				M ER U
00	kg ECM/kg DM	0.7		Margin Ush/cow/d	-4.31
56	g F+P/kg DM	45		Ush/herd/d	-
21	Ush Milk/Ush Feed	0.929		Food % income	109
80				Milk yield ()/c	t) 7.1

## **3. Case study 1: Improve forage quality - Napier grass**

- Advise the farmer to harvest the forage at an earlier vegetative stage and improve silage quality.
- In this case (blue box) use Napier grass harvested at an average of 60 cm high instead of overgrown height of 150 cm.
- Try out using the improved forages in your ration to achieve a balance.
   Maintain the same amount of forage and milk (green box) then notice the difference in the bars.
- We can see that the percentage of metabolizable protein and energy in the dry matter of the forages are of better quality(red box) if harvested at the right stage.

File	Edit Animal View Help		DM	As Fed	Dairy Diet Diet detail Price F	Feed cost Co	mpare	Splitherd Notes			
1.	Maize silage DM < 30%	Ŷ	1.31 🐳	5.00 💠	Dry Matter Intake				80	% Limit	
2	Napier fresh 60 cm		6.24 2	30.00 🗘	Address of the owner						
3	Maize bran	v	1.77 🗣	2.00 🗘	Metabolisable Energy				109	% Req't	
4.	Limestone (CaC03)	×	0.02 ‡	0.02 🔹							
5		ŵ	0.00 ‡	0.00 ‡	Metabolisable Protein				142	% Req't	
6		÷	0.00 \$	0.00 \$							
7		4	0.00 \$	0.00 \$	Calcium		-		71	% Req't	
8		v	0.00 \$	0.00 ‡	and the second se					- 23	
9.		÷	0.00 \$	0.00 \$	Phosphorus				101	% Req't	
10.		~	0.00 0	0.00 ‡							
11		~	0.00 \$	0.00.0	Magnesium				167	% Req't	
12		-	0.00 \$	0.00 ‡			1-1			_	
13	1	v	0.00 \$	0.00 \$	NDF (% DM)	56 %	0				
14.		Ŷ	0.00.0	0.00 ‡	Starch (% DM)	11 %					
15	1	÷	0.00 \$	0.00 1	Forage:Conc. ratio	81:19	0				
Tota	l daily intake (kg/d)		9.3	37.0				121	日前	100 11110	121
	Feed costs	3	Milk income		Feed efficiency			Margin	14 M	MED	Call
	Ush/t DM 6543		Ush/L raw milk		8.00 kg ECM/kg DM	0.7		Ush/caw/d		-4	.31
	Ush/MJ ME 0.678	į.	Ush/kg ECM		8.56 g F+P/kg DM	50		Ush/herd/d			7
	Ush/kg CP 50.22	1	Ush/kg F+P		121.21 Ush Milk/Ush Feed	0.929		Feed % inc	ome	14	08.0
	Ush/cow/d 61.11	5	Ush/cow/d		56.80			Milk	yield (I	(d)	7.1 🛊

# 4. Case study 1: Improve forage quality - Maize silage

- Improve the quality of maize silage also. Notice the dry matter content improved from less than 30% to more than 30% (blue box).
- The red box shows the outcome to be better than the quality of ration before.

File	Edit Animal View	Help		DM.	As Ead	Dairy I	Diet	Diet detail Price	Feed cost C	Compare	Splitherd f	Votes		
1.	Maize silage DM <> 30-35	W	¥	1,68	5.00 ‡	Dry	Matte	r Intake				82	% Limit	é
2	Napier freish 60 cm		Y	0.24 💽	30,00 💼			-			-			
3	Maize bran		¥	1.77 🔹	2.00 ≑	Met	tabolis	able Energy				115	% Req't	
4.	Limestone (CaC03)		$\sim$	0.02	0.02 ‡	Anna C	CALCERS.	ala de la com				2.022	-	
5.			÷	0.00 0	0.00 ‡	Met	tabolis	able Protein				142	% Req't	é.
6			~	0.00 ‡	0.00 \$									ł.
7.			÷	0.00 2	0.00 1	Cal	lcium					73	% Req't	
8	1		×.	0.00 2	0.00 \$	-							- E	
9	1		¥.	0.00 0	0.00 \$	Pho	osphon	B				102	% Req't	1
0			Ŷ	0.00 \$	0.00 \$		an a					1.121	a caracteria	
1.	1		4	0.00 \$	0.00 0	Mag	gnesiu	m				169	% Req't	
2	1		~	0.00 2	0.00 \$									
3			~	0.00 0	0.00 \$	ND	F (% D	M)	55 %	0				
4			-	0.00 \$	0.00 \$	Sta	urch (%	DM)	13 %					
5	1			0.00 0	0.00 \$	For	nage: Co	onc. ratio	82 18	0				
ota	daily intake (kg/d)			9.7	37.0							· Internet in the	Mail Inventoria	
	Feed costs			Wilk income				Feed efficiency			Me	argin	ME	1
	Ush/t DM	5524		Jsh/L rew mill	k	8.00		kg ECM/kg DM	0.7			h/cow/d	3	3.16
	Ush/MJ ME	0.563	1	Jsh/kg ECM		8.56		g F+P/kg DM	48		Us	h/herd/d		-
	Ush/kg CP	43.05	1	Jsh/kg F+P		121.21		Ush Milk/Ush Fee	ed 1.059	i	Fei	ed % income		94
	Ush/cow/d	53.64	1	Jsh/cow/d		56.80						Milk vield il	Va)	7.18

#### 5. Case study 1: Increase milk yield after improving forage quantity

- After using better quality forages (blue box), the metabolizable energy (ME) and metabolizable protein was oversupplied for the cow producing 7.1 L/d.
- The ration with these better quality forage can only produce 9.4L/d (green box) with margins - a low of Ush.22.56.
- How to calculate the margin is explained in the next slide.

			DM	As Fed							
1.	Maize silage DM $>$ 30-35%		1.68 🗘	5.00 \$	Dry Ma	atter Intake			8	2 % Limit	
2.	Napier fresh 60 cm		6.24 \$	30.00 ‡	1000						
3	Maize bran	14	1.77	2.00 \$	Metab	olisable Energy			100	0 % Req't	
4.	Limestone (CaC03)		0.02	0.02 \$	and the second						
5		19	0.00 \$	0.00 0	Metab	olisable Protein			12	2 % Req't	
6			0.00 \$	0.00 ‡							
7	-		0.00 \$	0.00 0	Calciu	m			6	3 % Req't	
8.			0.00 \$	0.00 +					2.02	125 13 4 1 4 1 9 1 9	1
9.		9	0.00.0	0.00 ‡	Phosp	Phosphorus				9 % Req't	1
10.		2	0.00 \$	0.00 ‡							1
11.		82	0.00 0	0.00 ‡	Magne	sium			14.	7 % Req't	Ŭ.
12			0.00 0	0.00 ‡	1000000	2014-04.4	114.5497	1.1			
13.		~	0.00 0	0.00 \$	NDF (	% DM)	55 %	0			
14.			0.00 \$	0.00 \$	Starch	(% DM)	13 %				
15			0.00 \$	0.00 ‡	Forage	Conc. ratio	82.18	0			1
Total	l daily intake (kg/d)		9.7	37.0					(match P	MEE	
	Feed costs		Milk income			Feed efficiency			Margin	- m 640	10.54
	Ush/t DM 552	4	Ush/L raw mill	¢	8.00	kg ECM/kg DM	0.9		Ush/cow/d	21	.56
	Ush/MJ ME 0.56	3	Ush/kg ECM		8.56	g F+P/kg DM	64		Ush/herd/d		
	Ush/kg CP 43.0	5	Ush/kgF+P		121.21	Ush Milk/Ush Feed	1.402		Feed % income	60	71
	Ush/cow/d 53.64	4	Ush/cow/d		75.20				Milk yield	(1/d)	9.4

# 6. Case study 1: Margin calculation

- At the bottom of the Rumen8 landing page, you can find the display 'Feed cost', 'Milk income' and 'Margin'.
  From the original feed ration and cows producing 9.4 L/d, the following are the costs;
  \*Note: For all prices in this example the currency divisor is 100 (Cd 100).
  - Feed cost; Ush.53.64/cow/d (red box)
  - Milk income; Ush.75.20/cow/d (green box)
  - Margin; Ush.21.56/cow/d (Margin = Milk price Feed cost) (blue box)
- While making the ration always put in mind the margin. Your goal should be getting the highest margins.

15.		∽ 0.00 € 0.00 €	Fora	ge:Conc. ratio	82:18 😑		
Total daily intake (kg/d)		9.7 37.0					SFL UFL
Feed costs		Milk income		Feed efficiency		Margin	
Ush/t DM	5524	Ush/L raw milk	8.00	kg ECM/kg DM	0.9	Ush/cow/d	21.56
Ush/MJ ME	0.563	Ush/kg ECM	8.56	g F+P/kg DM	64	Ush/herd/d	12
Ush/kg CP	43.05	Ush/ka F+P	121.21	Ush Milk/Ush Feed	1.402	Feed % income	71 🧧
Ush/cow/d	53.64	Ush/cow/d	75.20			Milk yield (I/d)	9.4 🗢

#### 7. Case study 1: Dry matter intake

- There is room for the cow to eat more since the current dry matter intake (red box) is 82%. We can add more feed ingredients and focus on increasing margin.
- When you increase the feed ingredients to achieve the recommended dry matter intake of a 500kg cow, you will notice other bars will increase their percentages too.

ile Edit Animal Vie	w Help	DM	As Fed	Dairy Die	t Diet detail Price F	feed cost Co	impare Sp	olit herd Notes		
Maize silage DM <> 3	30-35%	· 1.68 🗘	5.00 \$	Dry M	atter Intake			82	% Limit	
Napier fresh 60 cm		- 6.24 \$	30.00 \$	1	State of the local division of the local div					
Maize bran		· 1.77 🛊	2.00 \$	Metat	oolisable Energy		-	100	% Req't	
Limestone (CaC03)		0.02	0.02 🕏	And Address of the Owner of the O						
5. [		0 00 0	0.00 \$	Metat	olisable Protein			122	% Req't	
i. [		0.00 \$	0.00 \$							
7.		0.00 \$	0.00 0	Calciu	ım			63 %	6 Req't	
1.		0.00 \$	0.00 \$				-			
). [		0.00 0	0.00 \$	Phos	ohorus			89 %	Req't	1
		0.00 \$	0.00 \$							
i l		0.00 0	0.00 \$	Magn	esium			147 %	Req't	
2		0.00 0	0.00 \$							
		0.00 0	0.00 \$	NDF (	% DM)	55 %	0			
ŧ. [		0.00 \$	0.00 \$	Starc	h (% DM)	13 %				
5.		0.00 \$	0.00 \$	Forag	e:Conc. ratio	82.18	0			i.
otal daily intake (kg/d)		9.7	37.0					PROPERTY AND	-	-
Feed costs		Milk income			Feed efficiency			Margin	M EE	12
Ush/t DM	5524	Ush/L raw mi	lk	8.00	kg ECM/kg DM	0.9		Ush/cow/d	21.	56
Ush/MJ ME	0.563	Ush/kg ECM		8.56	g F+P/kg DM	64		Ush/herd/d		
Ush/kg CP	43.05	Ush/kg F+P		121.21	Ush Milk/Ush Feed	1.402		Feed % income		71
Ush/cow/d	53.64	Ush/cow/d		75.20				Milk yield ()/d	5) 5	9.4

# 8. Case study 1: Dry matter intake Cont'd...

- Before you take any step to adjust the feeds ingredients in the ration, a consultant should consider the following;
  - The seasons and forage availability(quantity); wet and dry season,
  - The quality of forage,
  - The cost of nutritive value of the feeds i.e. the cost of crude protein (CP) and metabolizable energy(ME). Use the cheapest and readily available.
  - Achieving high margin rather than milk quantity i.e. try to optimize the milk production and maximize the margin.



### 9. Case study 1: Feeds cost nutritive value of feeds ingredients

- Tab 'feed cost' clearly indicated the cost/price of every feed ingredient. The red box shows the feed cost per ton as fed and per dry matter of a feed-in ton. You can edit any figure here in case of different prices in your locality or in case of price changes in the market.
- The blue box shows the price of ME in Mega joules (per MJ ME) and the price per kg of crude protein (per kg CP) per ration ingredient.
- As a consultant you need to identify the cheapest feed ingredient terms of ME and CP (blue box) within the limits of formulating a healthy ration. In this case, energy (ME) and protein (CP) are produced the cheapest when Napier grass is fed (no feeding losses are assumed).

File	Edit Animal View Help								otes	
		DM	As Fed	Ush/t DM	Ush/t as fed	Losses (%)	+losses DM	+losses as fed	per MJ ME	per kg CP
1.	Maize silage DM <> 30-35% ~	1.68 🗘	5.00 🜩	4478 🕏	1500 🕏	0	4478	1500	0.418	65.85
2.	Napier fresh 60 cm 🗸 🗸	6.24 ≑	30.00 🜩	4808 🖨	1000 🗘	0 🖨	4808	1000	0.534	31.42
3.	Maize bran $\checkmark$	1.77 ≑	2.00 🖨	9019 ≑	8000 🖨	0 🖨	9019	8000	0.758	90.19
4.	Limestone (CaC03)	0.02 🜩	0.02 🜩	7500 🖨	7500 🖨	0	7500	7500	0.000	0.00
5.	~ ·	0.00 🗘	0.00 🗘			•				

# **10. Case study 1: Feeding during the wet season**

- Try to utilize the natural resources the farmer has. However, consider the quality of the forages that may be available.
- Low-quality forages such as maize stover, banana pseudo stems, or rice straw may be available in plenty but will not meet the nutritional requirement of dairy cows.
- Advice farmers to use available green forages at the most nutritious growing stage. During the wet season conserve surplus in the form of silage or hay for dry season.



### **10.1 Case study 1:** Feeding during the wet season Cont'd...

- During the wet season fresh-cut Napier grass is available for feeding the cows.
- Maize silage can be preserved for dry season when Napier grass is scarce or not available.
- Start by feeding the cow some Napier grass (enter the kilograms fed y farmer in the 'As fed').
- The dry matter intake (potential) bar will turn green in color.
- Notice the other bars (Me, MP, Ca, P, Mg) turn yellow meaning there is oversupply of ME, MP and minerals.

			DM	As Fed	Construction of the	
1. Napier In	esh 60 cm	÷	6.51	31.30 🗘	Dry M	atter Intok
2 Maize br	80	.4	5.77 🖨	6.50 \$	-	
3. Limeston	e (CaC03)	÷	0.09	0.09	Metab	olisable l
4.		Y	0.00 +	0.00 +		
5.		-	0.00 \$ }	0.00.0	Metab	olisable
6.		4	0.00 \$	0.00 \$		
7.		4	0.00 \$	0.00 \$	Calciu	m
8		Ŷ	0.00 \$	0.00 \$		
9		4	0.00 ‡	0.00 \$	Phosp	ohorus
10.		~	0.00 \$	0.00 \$		and the second second
11		4	0.00 \$	0.00 \$	Magne	sium
12		4	0.00 \$	0.00 \$	1.1	
13		4	0.00 \$	0.00 \$	NDF (	% DM)
14		4	0.00 \$	0.00 \$	Starch	1 (% DM)
15.		¥.	0.00 \$	0.00 \$	Forag	e:Conc. r
Total daily intak	e (kg/d)		12.4	37.9		
Feed co	sts		Ailk income			Fee
Ush/t DM	6792	٤	Jsh/L raw mil	k	8.00	kg E
Ush/MJ N	1E 0.660	3	Jsh/kg ECM		8.56	g F+
Ush/kg C	P 53.41	1	Jsh/kg F+P		121.21	Ush
Ush/cow/	d 84.01	1	Jsh/cow/d		75.20	

airy Div	et Diet detail Price F	eed cost Co	ompare	Split herd	Notes		
Dry M	latter Intake				100	% Limit	
Metal	bolisable Energy				136	% Req't	
Metal	bolisable Protein				144	% Req't	
Calci	um				137	% Req't	
Phos	phorus				118	% Req't	
Magn	esium				195	% Req't	
NDF	(% DM)	53 %	•				
Starc	h (% DM)	18 %					
Foraç	pe:Conc. ratio	53:47					ŧ.
	Feed efficiency				Aargin	M	UFL
8.00	kg ECM/kg DM	0.7			lsh/cow/d	-8	81
8.56	g F+P/kg DM	50			ish/herd/d		
1.21	Ush Milk/Ush Feed	0 895		F	eed % income	1	12 😐
5.20					Milk yield	(l/d)	94 \$

#### **11. Case study 1:** Napier grass as the main forage

- With the oversupply of these feed ingredients, the cow can produce more than 9.4 L/d.
- Increase (red arrow) the milk yield (red box) until the oversupplied metabolizable energy (ME) bar turns green.
- Metabolizable protein (MP) is now supplied at 108% of the total requirement of the cow.
   \*Note: With the increase of milk the margin also increases.
- The only component which is now deficient is the mineral phosphorus, with the red bar.

				DM	As Fed			
1. N	apier fresh 60 cm		2118	6.51 🗘	31,30 💲	Dr	y Matt	ter Int
2 M	laize bran		918	5.77 🜲	6.50 😫			-
3. L	imestone (CaC03)		31	0.09 😫	0.09	M	etabol	isabk
4			200	0.00 \$	0.00 \$			
5			9	0.00 ‡	0.00 \$	M	etabol	isable
6.			-	0.00 \$	0.00 \$			
7:				0.00 \$	0.00 \$	Ca	lcium	
8			9	0.00 ‡	0.00 \$			
9			2	0.00 ‡	0.00.0	Ph	ospho	orus
10.			2	0.00 *	0.00 \$			
11			9	0.00 \$	0.00 \$	Ma	agnes	um
12				0.00 0	0.00 \$			
13:			9	0.00 ‡	0.00 \$	N	)F (%	DM)
14.			9 [	0.00 0	0.00 2	St	arch (	% DM
15.			-	0.00 \$	0.00.\$	Fo	rage:	Conc
Total da	ly intake (kg/d)			12.4	37.9			
Fe	ed costs		MiD	t income	i.			Fe
Us	ih/t DM	6792	Ush	/L rew mi	k	8.00		kg
Lis	h/MJ ME	0.660	Ush	/kg ECM		8.56		g F
Us	ih/kg CP	53.41	Ush	kg F+P		121.21		Us
Us	h/cow/d	84.01	Ush	(cow/d		125.60		

Dairy Die	1 Diet detail Price F	eed cost (	Compare	Split herd	Notes	
Dry M	atter Intake				100	% Limit
Metal	oolisable Energy				100	% Req't
Metal	oolisable Protein				108	% Req't
Calcin	IM				100	% Req't
Phos	ohorus				89 1	% Req't
Magn	esium				143	% Req't
NDF (	% DM)	53 %	•			
Starc	h (%: DM)	18 %				
Forag	e:Conc. ratio	53:47				1
					Enter B	M
8.00	Feed efficiency kg ECM/kg DM	1.3	2		Margin Jsh/cow/d	41.59
8.56	g F+P/kg DM	84			/sh/herd/d	-
21.21	Ush Milk/Ush Feed	1.495	5	ŧ	Feed % income	67
25.60					Milk yield (l)	d) 15.7

#### **12. Case study 1: Mineral supplements**

- The farmer was only supplementing with limestone and from the previous slide, you noticed that phosphors requirement was not met.
- Add a mineral supplement for lactating cows. For example in our case, mineral 'Maclick Super'.
- The provided mineral supplement, 'Maclick Super' contains a wide range of minerals among others calcium, phosphorus, magnesium as per the label on the packaging.

				DM	As Fed	t
1	Napier fresh 60 cm		10	6.51 0	31.30	
2	Maize bran		3 [	5.77 🕯	6.50 🗣	
3.	Minerals Maclick Super	e)	16	0.04	0.04 💠	
4.	Limestone (CaC03)		3.0	0.07	0.07 🛟	
5.			][	0.00 ‡	0.00	
6.			1.0	0.00 ‡	0.00 ‡	
7.	[		1	0.00 ‡	0.00 \$	
8.			11	0.00 ‡	0.00 \$	
9			1.[	0.00 ‡	0.00 \$	
O.			3 [	0.00 \$	0.00 2	
1.			11	0.00.0	0.00 \$	
2			3 [	0.00 \$	0.00 0	
3			11	0.00 \$	0.00 \$	
4.			11	0.00 \$	0.00 \$	
5.			3 [	0.00 \$	0.00 \$	
otal	daily intake (kg/d)			12.4	37.9	
	Feed costs		Mi	lk income	i i	
	Ush/t DM	6933	Us	h/L raw mi	lk	
	Ush/MJ ME	0.675	Us	h/kg ECM		19
	Ush/kg CP	54.61	Us	h/kgF+P		12
	Ush/cow/d	85.90	Us	h/cow/d		12

Dairy Die	t Diet detail Price F	eed cost C	ompare	Split herd	Notes	
Dry M	atter Intake				100	% Limit
Metal	oolisable Energy				100	% Req't
Metal	oolisable Protein				108	% Req1
Calcie	im				102	% Req't
Phos	ohorus				101	% Req't
Magn	esium				151	% Req't
NDF (	% DM)	53 %	•			
Starc	h (% DM)	18 %				
Forag	e:Conc. ratio	53:47				3
	Feed efficiency			78	Margin	M EEE ME
8.00	kg ECM/kg DM	1.2			Jsh/cow/d	39.70
8.56	g F+P/kg DM	84		1	Jsh/herd/d	-
1.21	Ush Milk/Ush Feed	1.462			Feed % income	68
15 60					Milk yield (I	(d) 15.7

#### 13. Case study 1: Ration 1 - Wet seasons

- The farmer can feed this ration to each cow in early lactation stage. The feed ingredients can be mixed into a total mixed ration. Also, maize bran and the minerals can be mixed as a compounded feed mix and fed 3-4 times per day in separate feedings.
- Assuming management is constant, the cows will be able to produce an average of 15.7L/d and a margin of Ush.39.70 per cow per day (red box).

\*Note: For all prices in this example the currency divisor is 100 – so multiply Ush.39.70 by 100 to get the correct figure of Ush.3970.

- <u> </u>		-	DM	As Fed
Napier fresh 60 on	n	~	6.51 🗢	31.30
Maize bran		v	5.77 🕄	6.50
Minerals Maclick S	luper	v	0.04 2	0.04
Limestone (CaC0)	3)	÷	0.07	0.07
		×	0.00 \$	0.00
		×	0.00 \$	0.00
[		÷.	0.00 \$	0.00
1		Y	0.00 \$	0.00
		~	0.00 \$	0.00
		v)	0.00 \$	0.00
		×	0.00 \$	0.00
			0.00 \$	0.00
		×	0.00 0	0.00
		4	0.00 0	0.00
-		¥	0.00 0	0.00
daily intake (kg/d)			12.4	37.9
Feed costs		- 6	Milk income	
Ush/t DM	6933	1	Jsh/L raw mi	lk :
Ush/MJ ME	0.675	1	Jsh/kg ECM	
Ush/kg CP	54.61	4	Jsh/kg F+P	
Ush/cow/d	85.90	1	Jsh/cow/d	

Diet Diet detail Price Feed cost Compare Splitherd Notes Dairy 100 % Limit **Dry Matter Intake** Metabolisable Energy 100 % Reg't Metabolisable Protein 108 % Reg't Calcium 102 % Reg't Phosphorus 101 % Reg't Magnesium 151 % Reg't 53.% NDF (% DM) Starch (% DM) 18.% Forage:Conc. ratio 53:47 MARKED IN MARKED LIFE Feed efficiency Margin kg ECM/kg DM 1.2 Ush/cow/d 8.00 39.70 84 Ush/herd/d 8.56 g F+P/kg DM 121.21 Ush Milk/Ush Feed 1.462 Feed % income 68 . 125 60 Milk yield (I/d) 15.7 😜

## 14. Case study 1: Save ration 1

- Save the first ration (blue box) under the 'Compare' tab this will allow you to make more alternative rations for the farmer to compare the different types and quantities of feed ingredients against the margin.
- Click the 'Compare' tab, then click 'S' (red box) for saving ration one.

11.

12. 13. 14.

15. Tot

- Name the ration as 'Wet season ration'.
- After saving the first ration you can go back to make other alternative rations.

ile Edit Animal Vie		DM As Fe		Diet Diet detail Price	2. S R C	3. S R C
Napier fresh 60 cm	~	6.51 31.3	Name	Wet season ration		
Maize bran	~	5.77 0 6.5	1	6.51kg Napier fresh 60 cm		
Minerals Maclick Sup	er V	0.04 😫 0.04		5.77kg Maize bran	*	28
Limestone (CaC03)	<i></i>	0.07 🔹 0.0	÷ 4	0.04kg Minerals Maclick Super 0.07kg Limestone (CaC03)		15 14
	~	0.00 \$ 0.0	5 5			
	~	0.00 0.00	\$ 6	÷	*	
		0.00 0 0.0		- -	-	-
·	~	0.00 \$ 0.00	9	÷	÷	3
	~	0.00 0 0.00	10	* *	*	9 
		I Andrese I Const	- 12	а. С		17 14
	<u> </u>	0.00 \$ 0.00	13		*	22 22
2	~	0.00 0.00	0 14			
8	~	0.00 \$ 0.0			2	
	~	0.00 \$ 0.0	÷ DMI	15.71.3.60%.3.00% 12.4kg (100/100 % DMI)	*	*
8 <u>[</u>	~	0.00 \$ 0.0		127 / 127 MJ		8
	~	0.00 \$ 0.0	* MP Margin	1162 / 1075 g (13%) Ush39.70/cowld		
tal daily intake (kg/d)		12.4 37.5				interest and the second period
Feed costs		Milk income		Feed efficiency		Margin
Ush/t DM		Ush/L raw milk	8.00	kg ECM/kg DM	12	Ush/cowid 39.70
Ush/MJ ME		Ush/kg ECM	8.56	g F+P/kg DM	B4	Ush/herd/d -
Ush/kg CP	54.61	Ush/kg F+P	121.21	Ush Milk/Ush Feed	1,462	Feed % income 68
Ush/cow/d	85.90	Ush/cow/d	125.60			Milk yield (l/d) 15.7

#### 15. Case study 1: Dry season ration

- During the dry season, the farmer can for example feed his cows with the Maize silage.
- Replace Napier grass with maize silage and formulate a ration with other available feeds (red box).
- When you enter the kilogram of Maize silage fed to the cow to meet the Dry matter intake potential, you see a warning on the screen that the starch level is high and the cow is at a higher risk of experiencing ruminal acidosis (green box).

			DM	As Fed		
1.	Maize slage DM $>$ 30-3	15% Y	14.61 🛊	43.60 🗘	Dry M	latter
۷.	1		0.00.4	0.00.0		
3	Minerals Maclick Super	ú	0.04 🗘	0.04 \$	Meta	bolisa
4.	Limestone (CaC03)	~	0.07	0.07 🔹		
£	(	9	0.00 \$	0.00 \$	Meta	bolisa
5	1	0	0.00 \$	0.00 \$		
7	T.	~	0.00 \$	0.00 \$	Calci	um
5	[	<i>ц</i>	0.00 \$	0.00 \$		2
È.			0.00 \$	0.00 \$	Phos	phorus
È.	1	×	0.00 \$	0.00 \$		
	<u>[</u>		0.00 ‡	0.00 \$	Magn	esium
É.		Ý	0.00 \$	0.00 \$	1.0	
e.	C		0.00 0	0.00 0	NDF	(% DM
ĕ	<u> </u>	0	0.00 \$	0.00 \$	Starc	h (% C
5	1		0.00 \$	0.00 0	Forag	e.Cor
ota	daily intake (kg/d)		14.7	43.7		
	Feed costs		Milk income			
	Ush/t DM	10960	Ush/L raw mi	ile	8.00	- 3
	Ush/MJ ME	1.032	Ush/kg ECM		8.56	13
	Ush/kg CP	162.39	Ush/kg F+P		121.21	
	Ush/cow/d	161.33	Ush/cow/d		125.60	

Starch	% DM) h (% DM) e:Conc. natio	44 % 27 % 100.0	•	Marning - St of ruminal ac	arch level is h idosis	tigh. H	figh risk	
Magne	esium				-	80	% Req't	
Phosp	horus					81 %	% Req't	,
Calciu	m	1					% Req't	
1	olisable Energy olisable Protein						% Req't	
-	otter Intoke olisable Energy					124	% Limit % Reg't	

#### **16. Case study 1: Introduce wet Brewers spent grain**

- Feeding maize silage only will show that the protein requirement is not covered (MP is at 56% of the requirement). This means a milk yield of 15.7L/d is not likely.
- In this case we would need to introduce a protein-dense feed ingredient. For example in our case, wet brewers spent grain.
- Now you can try to balance the ration using maize silage and wet brewers spent grain by increasing or decreasing the amount as fed.
- When metabolizable energy requirement is met for the cow producing 15.7L/d, MP, Ca, P, and Mg requirements are not met.

			DM	As Fed
I. Ma	ize silage DM ⇔ 30-35%	~	10.35	30.90
2 Bre	wers spent grain wet	Ŷ	1.60 0	6.80 \$
3. Min	erals Maclick Super	Y	0.07	0.07 ‡
4. Lin	estone (CaC03)	~	0.04	0.04
5		v	0.00	0.00 0
6		÷	0.00 \$	0.00.0
7.		×	0.00 0	0.00 \$
8.		~	0.00	0.00 ‡
9.			8.00 \$	0.00 \$
0.		~	0.00.0	0.00 \$
1. [		1	0.00 0	0.00 0
2		×	0.00 \$	D.00 \$
3.			0.00 \$	0.00
4.		~	0.00 \$	0.00 \$
5.		v	0.00 0	0.00 \$
otal daily	intake (kg/d)		12.1	37.8
Fee	d costs		Milk income	
Ush	/t DM 1085	3	Ush/L raw mil	k
Ush	/MJ ME 1.03	D	Ush/kg ECM	
Ush	/kg CP 116.3	9.0	Ush/kg F+P	
Ush	/cowld 130.8	9	Ush/cow/d	

10000				85 %	Limit
	itter Intake				
Metabo	olisable Energy			100 %	Req't
Metabo	olisable Protein			56 %	Reg't
Calciu	m			73 % F	t'pe?
Phosp	horus			101 % F	leq't
Magne	sium			80 % F	leq't
NDF (?	6 DM)	46 %	•		_
Starch	(% DM)	24 %	0		
Forage	Conc. mtio	87:13	•		
	Feed efficiency			Margin	
8.00	kg ECM/kg DM	12		Ush/cow/d	-5.29
8.56	g F+P/kg DM	26		Ush/herd/d	
21.21	Ush Milk/Ush Feed	0.960		Feed % income	104

### 17. Case study 1: Dry season ration milk price

- Note that at the first instance we assume that the milk price has not changed (red box).
- The aim is to formulate a healthy balanced ration at the same time maximizing the margin.
- In our case wet brewers' spent grain is cheap but prices of feed ingredients may differ in a different location in the country.

File	Edit Animal View Help		DM	As Fed	Dairy	Diet Diet detail Price Fe	ed cost Comp	pare Splitherd Notes
1.	Maize silage DM ⇔ 30-35%	~	7,77 🔹	23 19 🗘		Price	Equiva	alent Payment by
2	Brewera spent grain wet	1	5.48 2	23.32 🗘		(Ush/L)	(Ush/k	
3	Minerals Maclick Super	~	0.09	0.09	01	8.000	12	121.21
4.	Limestone (CaC03)	-	0.05	0.05 ‡	02	8.000		0.00
5		~	0.00 \$	0.00 \$	03	0.000		0.00
6		9	0.00 \$	0.00 \$	O4	0.000		0.00
7		÷	0.00 \$	0.00 \$	05	0.000		0.00 ¥ Sets and library price files
8.		~	0.00 ‡	0.00 \$	06	0.000		0.00
9.	-	Ψ.	0.00 \$	0.00 \$	07.	0.000		0.00
0.		~	0.00 \$	0.00 ‡	08	0.000		0.00
1.		÷.	0.00 \$	0.00 \$	09.	0.000		0.00
2	[	~	0.00 \$	0.00 \$	O 10	0.000		0.00
3		÷	0.00 \$	0.08 +	O 11.	0.000		0.00
4		~	0.00 \$	0.00 ‡	O 12.	0.000 0		0.00
5		÷	0.00	0.00(‡)				
otal	daily intake (kg/d)		13.4	46.7				CENTRE M CENTRE
	Feed costs	3	Milk income			Feed efficiency		Margin
	Ush/t DM 8523		Jsh/L raw mil	k	8.00	kg ECM/kg DM	1.3	Ush/cow/d 29.87
	Ush/MJ ME 0.821		Jsh/kg ECM		8.56	g F+P/kg DM	89	Ush/herd/d -
	Ush/kg CP 57.95 Ush/cow/d 114.13		Jsh/kg F+P Jsh/cow/d		121.21	Ush Milk/Ush Feed	1.262	Feed % income 79 Milk yield (I/d) 18.0

# 18. Case study 1: Ration 2

- When balancing, remember to pay attention to the recommended forage to concentrate ratio, NDF content in the ration (as a percentage of DM) and starch content in the ration (on DM basis).
- After ME and MP are balanced, add mineral mixtures to meet the mineral requirements of the cows.
- With this ration as depicted in the picture alongside, the cow can produce 18L/d in the dry season.

File Edit	Animal View Help				Dair
_			DM	As Fed	
1 Maize	silage DM ⇔ 30-35%	2	7.77 🗘	23.20 \$	
2 Brewe	ns spent grain wet		5.48	23.30	
3 Minera	ls Maclick Super	2	0.09	0.09	
4 Limest	one (CaC03)	- 24	0.05	0.05	
5		X	0.00 0	0.00 \$	
6		Ŷ	0.00 \$	0.00 0	
7		4	0.00 0	0.00 \$	
8		~	0.00 \$	0.00 ‡	
9		Ų	0.00 \$	0.00 \$	
0			0.00 \$	0.00 \$	
1		~	0.00 \$	0.00 ‡	
2		×	0.00 \$	0.00 \$	
3		10	0.00 \$	0.00 0	
4		×	0.00 \$	0.00 \$	
5			0.00 \$	0.00 \$	
otal daily int	ake (kg/d)		13.4	46.6	
Feed	osts		Milk income		
Ush/t D	M 8523		Ush/L raw mi	lk	8.0
Ush/M.	ME 0.821		Ush/kg ECM		8.5
Ush/kg	CP 57.95		Ush/kg F+P		121.2
Ush/co	w/d 114,13		Ush/cow/d		144.0

Dairy	Diet	Diet detail	Price	Feed cost	Compare	Split herd	Notes	
D	ry Matt	er Intake					101	% Limit
м	letaboli	sable Energy	,				100	% Req't
м	letaboli	sable Proteir					103	) % Req't
c	alcium						9	% Req't
P	hospho	rus					135	i % Req't
M	lagnesi	um					101	% Req't
N	DF (%	DM)		49 '	s 😑			
S	tarch (S	% DM)		18 1				
F	orage: C	Conc. ratio		59:41				1
		Feed effi	ciency				Margin	M EEE DEL
8.00		kg ECM/kg	100.00		1.3		Jsh/cow/d	29.87
8.56		g F+P/kg	MC		89	t	Jsh/herd/d	
21.21		Ush Milk/U	Ish Feed	1 1,2	62	F	Feed % income	79 (
44.00							Milk yield	(l/d) 18.0 🗘

### **19. Case study 1: Save the dry season ration**

- Save this ration under the tab 'Compare' as ration 2 and name it 'Dry season ration'.
- You can make another alternative ration to compare with the dry season ration.

	L.	_	DM	As Fed		1. 5 R C	2. S R C	3. 5 A C	
1.	Maize silage DM ⇔ 30-35%	~	7.77	23.20	Name	Wet season ration	Dry season ration		
2	Brewers spent grain wet	~	5.48	23.30 🕏	1	6.51kg Napier fresh 60 cm	7.77kg Maize silage DM $\odot$ 30-	-	
3.	Minerals Maclick Super	×	0.09	0.09	2	5.77kg Maize bran	5.48kg Brewers spent grain wet	4	
4.	Limestone (CaC03)	~	0.05	0.05 🗣	3	0.04kg Minerals Maclick Super 0.07kg Limestone (CaC03)	0.09kg Minerals Maclick Super 0.05kg Limestone (CaC03)	-	
5		~	0.00 \$	0.00 0	5		a) Obranaranan nyananana a	5 C	
6	[ [	~	0.00 0	0.00 0	6	(*) (*)	·彩 シ	3 -	
7.		~	0.00 \$	0.00 0	8				
8		~	0.00 0	0.00 0	9			•	
9.		×	0.00 0	0.00 0	10	(*) (*)	5) 10	4 2	
		~	0.00 \$	0.00 0	12	-	8	-	
		÷	0.00 \$	0.00 0	13 14		40 14	-	
Ł		~	0.00.0	0.00 \$	15	•			
s. 1		4	0.00 2	0.00 0	Milk	15.7 I. 3.60%, 3.00% 12.4kg (100/100 % DMI)	18.01, 3.60%, 3.00% 13.4kg (101/101 % DMI)	4	
		~	0.00 \$	0.00 0	ME	127 / 127 MJ	139 / 129 MJ	4	
5		Ų.	0.00 \$	0.00 0	MP Margin	1162 / 1075 g (13%) Ush39 70/cow/d	1200 / 1166 g (15%) Ush29.87/cow/d	4	
otal	daily intake (kg/d)		13.4	46.6		and a second second	a anne a mir channa	and the second second second	
	Feed costs	3	Milk income			Feed efficiency		Margin	ETE NE
	Ush/t DM 8523		Ush/L raw mill	k-	8.00	kg ECM/kg DM	1.3	Ush/cow/d	29.87
	Ush/MJ ME 0.821	1	Ush/kg ECM		8.56	g F+P/kg DM	89	Ush/herd/d	
	Ush/kg CP 57.95	1	Ush/kg F+P		121.21	Ush Milk/Ush Feed	1.262	Feed % income	79
	Ush/cow/d 114.13	: ji	Jsh/cow/d		144.00			Milk yield (I/d)	18.0

# **20. Case study 1: Further improvement of dry season ration**

- The previous ration (dry season ration) was not completely balanced after viewing the tab 'diet detail'.
- Based on the metabolizable protein (ME) requirement information on the tab 'Diet detail' we have an oversupply of BY 35g (red arrow).
- However, the rumen degradable protein (RDP) and undegradable protein (UDF) ratios (red box) are not balanced i.e. they are not at the recommended nutritive level.
- To utilize this balance of metabolizable protein we can introduce an energy-dense feed ingredient.

Dairy	Diet	Diet detail	Price	Feed cost C	ompare Split	nerd Notes		
Meta	bolisal	ole energy		NDF (%DM)	49.0 🥯	Starch (%DM)	18.3	•
Suppl	ly (MJ)		139	NDF (kg)	6.566	Sugar (%DM)	1.6	
Dema	and (MJ)		139	eNDF (%NDF)	56.1 🧧	NFC (%DM)	25.6	
Balan	ice (MJ)		0	NDF frg (%ND	F) 52.4	Forage : Conc	59:41	
Densi	ity (MJ/I	(g DM)	10.4	NDF frg (%lw)	0.69	Ash (%DM)	6.4	
Meta	Metabolisable protein		0	RDP/UDP pr	otein	Enteric methane		
Suppl	Supply (g)		1200	RDP (%CP)	57.8 🧕	Total (g/cow)	302	
Dema	and (g)		1166	UDP (%CP)	42.2 9	Intensity (g/L)	16.8	
Balan	ice (g)		35	Excess protein	forgone			
CP (%	6DM)		14.7	milk	0.1 - 0.4 L	Fat (%DM)	4.2	
DM in	ntake e	stimate	•	Calcium (g)	9	Phosphorus (g)	0	
Max.	NDF int	ake%	101	Supply	73.8	Supply	55.6	
Maxin	num DN	11%	89	Demand	74.3	Demand	41.3	
DMI a	as % live	eweight	2.7	Balance	-0.4	Balance	14.3	
Activ	e recomn	ended levels		Magnesium	(g) 💮	DCAD		1
00	ne	O Four		Supply	24.8	Calculated	-	
OT	wo	◯ Five		Demand	24.6	Recommended	>250	
OT	hree	OOff		Balance	0.2			
Early	/ Lactatio	n (1-100days)						

#### **21. Case study 1: Introduce Molasses in ration 3**

- For this example, introducing molasses as an energy-dense feed ingredient improves the margin and maintains the high milk yield with a balanced ration.
- Molasses does not have NDF meaning it should affect dry matter intake.
- This ration closely meets the cow's requirement and can be fed during the dry seasons compared to the previous dry season ration.
- Save this ration under the tab 'Compare' as ration 3 and name it 'Dry season balanced ration'.

		100		DM	As Fed	
1. M	laize silage DM <> 30-3	15%	-	7.77 🔹	23.20 🗘	
2 B	rewers spent grain wet		~	5.52 🕄	23.50	
3. N	linerals Maclick Super		2	0.09 \$	0.09 \$	
4. L	imestone (CaC03)		v	0.05 -	0.05 😂	
5 N	lolasses (cane)		2	0.38	0.50 🜲	
6.			~	0.00 \$	0.00 \$	
7.			v)	0.00 0	0.00 ‡	
a [			~	0.00	0.00 ‡	
9			2	0.00 \$	0.00 \$	
0			y]	0.00 \$	0.00 ‡	
1.			2	0.00	0.00 \$	
2			×	0.00 ‡	0.00 \$	
3			9	0.00 0	0.00 \$	
4			9	0.00 \$	0.00 ‡	
5.			2	0.00 0	0.00 ‡	
otal dai	ly intake (kg/d)			13.8	47.3	
Fe	ed costs		1	Ailk income		
Us	h/t DM	9005	1	Jsh/L raw mil	lk .	
Us	h/MJ ME	0.863	1	Jsh/kg ECM		
Us	h/kg CP	62.23	1	Jsh/kg F+P		
Us	h/cow/d	124.36	1	Jsh/cow/d		

Dairy	Diet	Diet detail Pric	e Feed cost	Company	e Splitherd	Notes	
D	ry Matt	er Intake				101	% Limit
M	letaboli	sable Energy				100	% Req't
M	letaboli	sable Protein				100	% Req't
С	alcium					102	% Req't
P	hospho	irus				131	% Req't
M	lagnesi	um				104	% Req't
N	DF (%	DM)	48	% 📀			
S	tarch (	% DM)	18	% 🔵			
F	orage:(	Conc. ratio	57:43				1
Metabolisable Energy Metabolisable Protein Calcium Phosphorus Magnesium NDF (% DM) 48 %			M ITT UP				
			T.:		13	Margin	
253				0.22		Jsh/cow/d Jsh/herd/d	27.64
- 222		-				eed % income	82 .
2.00		USh Milk/USh P	660 1.	idd	'	eed % income Milk yield (	

## 22. Case study 1: Introduce maize grain

- For this example, introduce maize grain as an energy-dense feed ingredient alternative to molasses in order to achieve a balanced ration.
- Maize grain has NDF hence affecting the dry matter intake. Therefore, introducing maize grain will mean reducing the other feed ingredient so as to give room for maize grain.
- The picture shows a result of ration after using maize grain.

			DM	As Fed
1	Maize silage DM <> 30-3	5% V	7.54 🗘	22.50
2	Brewers spent grain wet	Ŷ	5.40 💠	23.00
3.	Minerals Maclick Super	~	0.10	0.10
4	Limestone (CaC03)	~	0.06 🗘	0.06
5	Maize grain	5	1.24 🛊	1.40
6		~	0.00 \$	0.00 \$
7.		~	0.00 1	0.00 \$
8	(	3	0.00 \$	0.00
9.		V	0.00 0	0.00 0
10			0.00 \$	0.00 \$
11.		~	0.00 0	0.00 \$
12		4	0.00 \$	0.00
13.		~	0.00 0	0.00
14.	1		0.00 \$	0.00 \$
15,		Ŷ	0.00 \$	0.00
Total	l daily intake (kg/d)		14.3	47.1
	Feed costs		Milk income	
	Ush/t DM	8928	Ush/L row mi	lk
	Ush/MJ ME	0.837	Ush/kg ECM	
	Ush/kg CP	62.50	Ush/kgF+P	
		128.02	Lish/cow/d	

D

12

Diy m	atter Intake		Customize and control Goo
Metab	oolisable Energy		103 % Req't
Metab	oolisable Protein		100 % Req't
Calciu	im		103 % Req't
Phos	ohorus		131 % Req't
Magn	esium		99 % Req't
NDF (	% DM)	46 % 🙃	
Starc	h (%-DM)	23 % 🔵	
Forag	e:Conc. ratio	53:47 🔵	4
	Feed efficiency		Margin
)	kg ECM/kg DM	1.3	Ush/cow/d 30.38
3	g F+P/kg DM	91	Ush/herd/d -

#### 23. Case study 1: Ration 4 - with maize grain

- The margin is seen to be the highest of the three rations formulated before. This can also be an alternative during the dry season.
- This ration 4 has the highest margin in the dry season.
   Compare the margin highlighted by the red box and green box for the ration with maize grain.

2			DM	As Fed		1. S R C	2. S R C	3. S R C
1	Maize silage DM <> 30-35%	~	7.54	22.50 🗘	Name	Wet season ration	Dry season ration	Dry season balanced ration
2	Brewers spent grain wet	÷.	5.40 🕏	23.00 🗘	1	6.51kg Napier fresh 60 cm	7.77kg Maize silage DM ⇔ 30-	7.77kg Maize silage DM $\diamondsuit$ 30-
	Minerals Maclick Super	~	0.10 🔹	0.10 🗘	2	5.77kg Maize bran	5.48kg Brewers spent grain wet	5.52kg Brewers spent grain wet
	Limestone (CaC03)	÷.	0.06	0.06	3	0.04kg Minerals Maclick Super 0.07kg Limestone (CaC03)	0.09kg Minerals Maclick Super 0.05kg Limestone (CaC03)	0.09kg Minerals Maclick Super 0.05kg Limestone (CaC03)
	Maize grain	~	1.24	1.40 2	5	5	0	0.38kg Molasses (cane)
		-	0.00 \$	0.00 \$	6 7	24 10	22	
		~	0.00.0	0.00 0	B		2 3	
	1	~	0.00 \$	0.00 \$	9		(#	122
		~	0.00 \$	0.00 \$	10	2		
		~	0.00 \$	0.00 0	12		8	142 C
		~	0.00 ‡	0.00 \$	13 14	*	8 9	
	Í	~	0.00 \$	0.00 0	15	2	<u>\$</u>	6
		4	0.00 \$	0.00 0	DMI	15 7 1, 3.60%, 3.00% 12.4kg (100/100 % DMI)	18.01, 3.60%, 3.00% 13.4kg (101/101 % DMI)	19.01, 3.60%, 3.00% 13.8kg (101/101 % DMI)
		~	0.00 \$	0.00 \$	ME	127 / 127 MJ	139 / 139 MJ	144 / 145 MJ
	1	4	0.00 ‡	0.00 ‡	MP Margin	1162./ 1075 c (13%) Ush47.52/cow/d	1200 / 1165 g (15%) Ush29.87/cow/d	1219 / 1223 p (14%) Ush27.64/cowld
tal	I daily intake (kg/d)		14.3	47.1				CENCE P M BRU
	Feed costs		Ailk income			Feed efficiency	Г	Margin
	Ush/t DM 8928	L	lsh/L røw mil	k	8.00	kg ECM/kg DM	1.3	Ush/cow/d 30.3
	Ush/MJ ME 0.837	L	lsh/kg ECM		8.56	g F+P/kg DM	91	Calificatio
	Ush/kg CP 62.50	L	lsh/kg F+P		121.21	Ush Milk/Ush Feed	1.237	Feed % income 8
	Ush/cow/d 128.02	L	lsh/caw/d		158.40			Milk yield (l/d) 19.

#### 24. Case study 1: Making ration 4 completely balanced

- To further balance the ration, always view the tab 'Detail diet'.
- From the ration with maize grain the rumen degradable protein (RDP) and undegradable protein (UDF) ratios (red box) are not balanced i.e. the ration does not meet the recommended nutritive level of 65%:35% respectively.
- Save this ration as 'Dry season ration 4' at the tab 'Compare' by replacing the ration with molasses.

227576 122 ISP	-			71-75 WAR-1212		
Metabolisable energy	0	NDF (%DM)	45.8 😐	Starch (%DM)	22.9	•
Supply (MJ)	153	NDF (kg)	6.571	Sugar (%DM)	1.6	٠
Demand (MJ)	148	eNDF (%NDF)	55.7 🧶	NFC (%DM)	29.4	
Balance (MJ)	5	NDF frg (%NDF)	50.8	Forage : Conc	53:47	٠
Density (MJ/kg DM)	10.7	NDF frg (%lw)	0.67	Ash (%DM)	6.2	
Metabolisable protein		RDP/UDP protein	1	Enteric methane		
Supply (g)	1269	RDP (%CP)	56.2 😐	Total (g/cow)	306	
Demand (g)	1275	UDP (%CP)	43.8 😐	Intensity (g/L)	15.5	
Balance (g)	-6	Excess protein forgo	one			
CP (%DM)	14.3	milk	100	Fat (%DM)	4.3	•
DM intake estimate		Calcium (g)	0	Phosphorus (g)	0	
Max. NDF intake%	101	Supply	78.8	Supply	59.0	
Maximum DMI%	91	Demand	76.6	Demand	45.0	
DMI as % liveweight	2.9	Balance	2.2	Balance	14.0	
Active recommended levels		Magnesium (g)		DCAD		
One OFour		Supply	26.1	Calculated		
O Two O Five		Demand	26.3	Recommended	>250	
◯ Three ◯ Off		Balance	-0.3			
Early Lactation (1-100days)						

#### 25. Case study 1: Ration 4 diet detail information

- Rumen degradable protein(RDP) and undegradable protein (UDF) ratios (red box) are now balanced i.e. the ration meets the recommended nutritive level.
- This is after adding protein source ingredients to balance the RDP and UDP at 65%:35% respectively.
- With this healthy balanced ration, the margin is lower than the recent rations.

			DM	As Fed	Dairy D
Maize silage DM <	> 30-35%	4	7.04	21.00 \$	Metabol
Brewers spent gra	in wet		5.17	22.00 ‡	Supply (N
Minerals Maclick S	uper	1	0.05	0.05 ‡	Demand ( Balance (
Limestone (CaC03	)	-	0.70	0.70 🗘	Density (1
Maize grain		9	0.71 🖨	0.80	Metabol
Sunflower seed me	al partly dehulled (		1.18 🗣	1.30 🗘	Supply (g
Urea		~	0.09	0,10 🕏	Demand ( Balance (
		2	0.00 ‡	0.00 ‡	CP (%DV
			0.00 \$	0.00 ‡	DM intel
		$\sim$	0.00 ‡	0.00 ‡	Max. NDF
		~	0.00 \$	0.00 ‡	Maximum DMI as %
		¥ [	0.00 ‡	0.00 ‡	Active rec
		-	0.00 \$	0.00 \$	Olne
		-	0.00 \$	0.00 ‡	⊖ Two ⊖ Three
-		~	0.00 \$	0.00 ‡	Early Lac
aily intake (kg/d)			14.9	46.0	
Feed costs		м	lk income	R	
Jsh/t DM	9781	Us	h/L raw mil	k	8.00
Jsh/MJ ME	0.975	Us	h/kg ECM		8.56
Jsh/kg CP	57.57	Us	h/kg F+P		121.21
Jsh/cow/d	146.13	Us	h/cow/d		157.60

UDP (%CP) Excess protein forgi mile Calcium (g) Supply Demand Balance Magnesium (g) Supply Demand Balance	65.0 🤷 35.0 🔶	Fat (%DM) Phosphorus (g) Supply Demand Balance DCAD Calculated Recommended Calculated Recommended Margin Ush/cow/d Ush/herd/d Feed % income	15.8 4.1 61.4 47.7 13.7 93
Excess protein forg Calcium (g) Supply Demand Balance Mognesium (g) Supply Demand Balance	65.0 • 35.0 • 290.1 73.1 217.0 35.2 27.7	Phosphorus (g) Supply Demand Balance DCAD Calculated Recommended	4.1 • 61.4 47.7 13.7 • >250
Excess protein forg Calcium (g) Supply Demand Balance Magnesium (g) Supply Demand Balance	65.0 • 35.0 • 290.1 73.1 217.0 35.2 27.7	Phosphorus (g) Supply Demand Balance DCAD Calculated Recommended	4.1 • 61.4 47.7 13.7 • >250
Excess protein forgi Calcium (g) Supply Demand Balance Magnesium (g) Supply Demand	65.0 • 35.0 • 290.1 73.1 217.0 35.2 27.7	Phosphorus (g) Supply Demand Balance DCAD Calculated Recommended	4.1 • 61.4 47.7 13.7 • >250
Excess protein forgi Calcium (g) Supply Demand Balance Magnesium (g) Supply Demand	65.0 • 35.0 • 290.1 73.1 217.0 35.2 27.7	Phosphorus (g) Supply Demand Balance DCAD Calculated	4.1 * 61.4 47.7 13.7
Excess protein forgi Calcium (g) Supply Demand Balance Magnesium (g) Supply Demand	65.0 • 35.0 • 290.1 73.1 217.0 35.2 27.7	Phosphorus (g) Supply Demand Balance DCAD Calculated	4.1 * 61.4 47.7 13.7
Excess protein forgi Calcium (g) Supply Demand Balance Magnesium (g) Supply Demand	65.0 • 35.0 • 290.1 73.1 217.0 35.2 27.7	Phosphorus (g) Supply Demand Balance DCAD Calculated	4.1 * 61.4 47.7 13.7
Excess protein forgi mille Calcium (g) Supply Demand Balance Magnesium (g)	65.0 • 35.0 • one 290.1 73.1 217.0	Phosphorus (g) Supply Demand Balance DCAD	4.1 * 61.4 47.7 13.7
Excess protein forg	65.0 • 35.0 • one 1 301 290.1 73.1	Phosphorus (g) Supply Demand Balance	4.1 • 61.4 47.7 13.7
Excess protein forgi mille Calcium (g) Supply Demand	65.0 • 35.0 • one 1 301 290.1 73.1	<b>Phosphorus (g)</b> Supply Demand	4.1 • 61.4 47.7 13.7
Excess protein forgi mille Calcium (g) Supply Demand	65.0 • 35.0 • one 1 301 290.1 73.1	<b>Phosphorus (g)</b> Supply Demand	4.1 • 61.4 47.7
Excess protein forg	65.0 • 35.0 • 11 3.0 L 290.1	Phosphorus (g) Supply	4.1 °
Excess protein forg	65.0 🤷 35.0 🔶		
	65.0 🤷 35.0 🔶	Fat (%DM)	
	65.0 🤷 35.0 🔶	107 - 2048/44	
UDP (%CP)	65.0 🤷		15.8
		Intensity (g/L)	
RDP (%CP)	n	Total (g/cow)	312
RDP/UDP protei	67.5	Enteric methane	
NDF frg (%lw)	0.62	Ash (%DM)	10.1
NDF frg (%NDF)	47.1	Forage : Conc	50:50 💿
eNDF (%NDF)	54.1 😐	NFC (%DM)	24.5
NDF (kg)	6.620	ougu (repin)	1.8 😐
		Sugar (%DM)	
	eNDF (%NDF)	eNDF (%NDF) 54.1 .	eNDF (%NDF) 54.1 . NFC (%DM)

### **26. Case study 1: Compare all rations**

- In the tab 'Compare' you can • view three rations while in the other section on the left-hand side; while at the bottom you can view the balanced ration that is not yet saved.
- The red box and green show • the margin for the four rations. You can compare the margin to advice the farmer with the best and healthy ration for his cows.
- While using the same milk ٠ price for the wet season, it is evident that the dry season rations calculated with this milk price have low margins.

File	Edit Animal View Help		DM	As Fed	Dairy	Diet Diet detail Price F 1. S R C	Feed cost Compare Splithe 2. S R C	and Notes 3. S R C
1.	Maize silage DM $ imes$ 30-35%	~	In the second se	0.000	Name	Wet season ration 1	Dry season ration 2	Dry season ration 4
2	Brewers spent grain wat	4	5.17 💠	22.00 \$	1	6.51kg Napier fresh 60 cm	7.77kg Maize silage DM $\bigcirc$ 30-	7.54kg Maize silage DM $\odot$ 30-
3	Minerals Maclick Super	~	0.10	0.10	2	5.77kg Maize bran	5.48kg Brewers spent grain wet	5.40kg Brewers spent grain we
4.	Limestone (CaC03)	0	0.06 \$	0.06	3 4	0.04kg Minerals Maclick Super 0.07kg Limestone (CaC03)	0.09kg Minerals Maclick Super 0.05kg Limestone (CaC03)	0.10kg Minerals Maclick Super 0.06kg Limestone (CaC03)
5.	Maize grain	~	0.71	0.80	5			1.24kg Maize grain
6	Sunflower seed meal partly dehulk	ed ( 🖂	1.18	1.30	6	-	8. 6	40 20
7.	Urea	Ψ.	0.09	0.10 +	8		18	
8.	1	÷	0.00 \$	0.00 \$	9	* 		10
9.		~	0.00 0	0.00 \$	10 11	2	22 22	
10	-	-	0.00 \$	0.00 \$	12	8	<u>a</u>	<del>2</del> 8
11.	1		0.00 \$	0.00 \$	13	8	8	53
	-	_	1		14 15			
12.	<u>[</u>	×	0.00 \$	0.00 \$	Mik	15.71.3.60%. 3.00%	18.01.3.60% 3.00%	19.81, 3.60%, 3.00%
3.	1	~	0.00 \$	0.00 ‡	DMI	12.4kg (100/100 % DMI)	13.4kg (101/101 % DMI)	14.3kg (101/101 % DMI)
14.	1	~	0.00 \$	0.00 \$	ME	127 / 127 MJ	139 / 139 MJ	1537 148 MJ
15.	Î.	-	0.00 \$	0.00 0	MP	1162 / 1075 o (13%) Ush47 52/cow/d	1200 / 1166 a (15%) Ush29.87/cow/d	1269 / 1275 o (14%) Ush30 38/cowld
53	daily intake (kg/d)		14.4	45.4	margin	Ush+/.52/00//d	08623.07/G0W/Q	Usriad.ad/cow/d
		123	2000 2020-2020			121111111111111111		EGING P. M. SEL
	Feed costs Ush/t DM 9944		lilk income sh/L raw mil	i.	8.00	Feed efficiency kg ECM/kg DM	1.3	Margin Ush/cow/d 14.1
	Ush/MJ ME 0.952		sh/kg ECM	5	8.56	g F+P/kg DM	91	Ush/herd/d
	Ush/kg CP 56.21		sh/kg F+P		121.21	Ush Milk/Ush Feed	1.104	Feed % income
	Ush/cow/d 142.70		sh/cow/d		157.60	Can hind can Leed	1.104	Milk yield (Ud) 19

14.90

91 0 19.7 3

#### **27. Case study 1:** Ration 2, 4 & 5 milk price change

- During the dry season most • processors increase the price of milk.
- With better experience, a ٠ consultant can help the farmer calculate milk prices against the same rations.
- In this case for the rations fed ٠ during the dry season the milk price change increase from Ush.800 to Ush.1000 per liter.
- Notice the change of margins for ٠ dry season rations red boxes.

File	Edit Animal View Help	DM	As Fed	Dairy	Diet Diet detail Price	Feed cost Compare Splithe 2. S R C	and Notes 3. S. R
1.	Maize silage DM $\diamondsuit$ 30-35% $\checkmark$	7.04	21.00	Name	Wet season ration 1	Z- 3 n C Dry season ration 2	Jry season ratio
2	Brewers spent grain wet	5.17 \$	22.00	1	6.51kg Napier fresh 60 cm	7.77kg Maize silage OM $\diamond$ 30-	7.54kg Maize s
3.	Minerals Maclick Super 🛛 🗸	0.10 \$	0.10	2	5.77kg Maize bran	5.48kg Brewers spent grain wet	5.40kg Brewers
4.	Limestone (CaC03)	0.06 🗘	0.06 \$	3	0.04kg Minerals Maclick Super 0.07kg Limestone (CaC03)	0.09kg Minerals Maclick Super 0.05kg Limestone (CaC03)	0.10kg Mineral 0.06kg Limesto
5	Maize grain 👻	0.71 🕏	0.80	5	14 14		1.24kg Maize g
6.	Sunflower seed meal partly dehulled ( $\stackrel{\circ}{\searrow}$	1.18	1,30 🗘	6	19 19	94 14	6 54
7	Urea 🗸	0.09 😫	0.10 🔹	8		20 2	
8		0.00 ‡	0.00 \$	9 10	82 94	22 22	74 55
9	*	0.00 ‡	0.00 \$	11	17 27	а Э	3
10	~	0.00 \$	0.00 \$	12	<u>j</u>	1	
11.	~	0.00 \$	0.00 0	13 14	94 1	3	8
12	~	0.00 \$	0.00 \$	15	1	decrease and	
13	v.	0.00 \$	0.00 \$	Milk DMI	15.71, 3.60%, 3.00% 12.4kg (100/100 % DMI)	18.01, 3.60%, 3.00% 13.4kg (101/101 % DMI)	19.81, 3.60%, 3 14.3kg (101/10
14	Ý	0.00 \$	0.00 \$	ME	127 / 127 MJ	139 / 139 MJ	153 / 148 MJ
15.	÷	0.00 \$	0.00 \$	MP Margin	1162 / 1075 g (13%) Ush47 52/cowld	1200 / 1166 a (15%) Ush65 87/cowld	1269 / 1275 a ( Ush69 98/cow/a
Total	daily intake (kg/d)	14.4	45.4				(18/100)
	Feed costs	Milk income			Feed efficiency		Margin
	Ush/t DM 9944 Ush/MJ ME 0.952	Ush/L raw mil Ush/kg ECM	k	10.00	kg ECM/kg DM g F+P/kg DM	1.3 91	Ush/cow/d
	Ush/kg CP 56.21	Ush/kg F+P		151.52	Ush Milk/Ush Feed	1.388	Feed % incon
1	Ush/cow/d 142.70	Ush/cow/d		198.00			Milk yie

season ration 4 4kg Maize silage DM <> 30-

Okg Brewers spent grain wet Okg Minerals Maclick Super

IN PLAN SEL UP

55.30

72

19.8

#### **28. Case study 1:** Wet and dry season margins

- Remember to always calculate margins with the correct milk prices. If the prices are different in different seasons then it should be noted.
- From the red box you can notice that if prices are better in the dry season than in the wet seasons, the farmer receives better margins.
- Feeding your cow with a healthy balanced diet is the key here, but most farmers might go with the lowest in cost of production. As a consultant, it is your place to advise the farmer properly.

Edit Animal View Help	DM	As Fed	Dairy
Maize silage DM $\bigcirc$ 30-35%	7.04	1.	1200
Brewers spent grain wet	5.17	22.00	Name 1
Minerals Maclick Super	0.10	0.10	2
Limestone (CaC03)	0.06	0.06 \$	3
Maize grain	0.71	• 0.80 •	5
Sunflower seed meal partly dehulled (	1.18	\$ 1.30	6
Urea	0.09	÷ 0.10÷	8
	0.00	\$ 0.00 \$	9 10
	- 0.00	\$ 0.00 \$	11
3	0.00	0.00 0	12
	0.00	0.00 0	13 14
	0.00	\$ 0.00 \$	15
	0.00	0.00 0	DMI
	0.00	0.00 0	ME
	0.00	0.00 0	MP Margir
daily intake (kg/d)	14.4	45.4	10.08
Feed costs	Milk inco	ome	
Ush/t DM 9944	Ush/L rav	v milk	10.00
Ush/MJ ME 0.952	Ush/kg E	CM	10.69
Ush/kg CP 56.21	Ush/kg F	*P	151.52

142.70

Ush/cow/d

Ush/cow/d

	1. S R C	2. S R C	3, 5 R C		
Name	Wet season ration 1	Dry season ration 2	Dry season ration 4		
1	6.51kg Napier fresh 60 cm	7.77kg Maize silage DM $\odot$ 30-	7.54kg Maize silage DM $\diamondsuit$ 30-		
2	5.77kg Maize bran	5.48kg Brewers spent grain wet	5.40kg Brewers spert grain we 0.10kg Minerals Maclick Super 0.06kg Limestone (CaC03)		
3	0.04kg Minerals Maclick Super	0.09kg Minerals Maclick Super			
4	0.07kg Limestone (CaC03)	0.05kg Limestone (CaC03)			
5	li.		1.24kg Maize grain		
5	24	3			
7	+	2. 2.	8		
В		e.			
9	17 <u>1</u>	2	1		
10	24 - C	22	6		
1	17. C	37	3		
2	37	2	2		
13	22	2	5		
14	94 1	2	5 C		
15	St	×	B		
Milk	15.71, 3.60%, 3.00%	18.01, 3.60%, 3.00%	19.81, 3.60%, 3.00%		
DMI	12.4kg (100/100 % DMI)	13.4kg (101/101 % DMI)	14.3kg (101/101 % DMI)		
ME	127 / 127 MJ	139 / 139 MJ	153 / 148 MJ		
MP	1162 / 1075 g (13%)	1200 / 1166 a (15%)	1269 / 1275 a (14%)		
Margin	Ush47.52/cowld	Ush65 87/cowld	Ush69.98/cow/d		
			INTER M IN COLUMN		
	Feed efficiency		Margin		
0.00	kg ECM/kg DM	1.3	Ush/cow/d 55.		
0.69	g F+P/kg DM	91	<u>Ushtherdid</u>		
1.52	Ush Milk/Ush Feed	1.388	Feed % income		
8.00			Milk yield (l/d) 19		

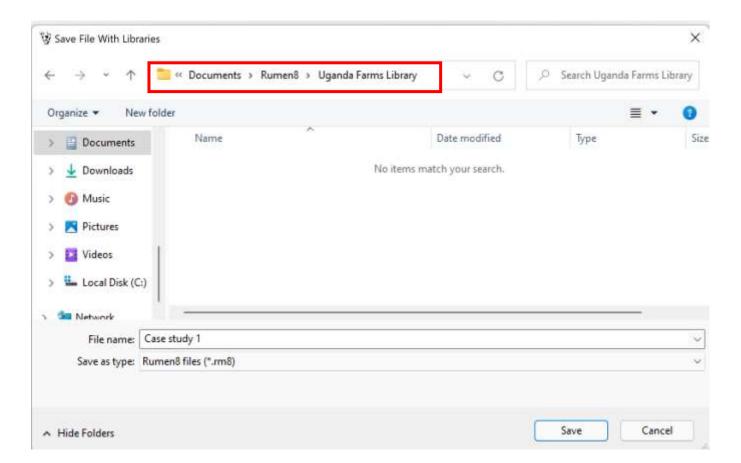
# 29. Case study 1: Conclusion

- The more the nutritional parameters ٠ that you try to satisfy/perfect/balance (minerals, NDF, RDP, UDP, and starch) in your ration, the more expensive it becomes.
- This is because the feed costs will ٠ increase and the margin will reduce.

Dairy Diet Diet detail	Price	Feed cost Com	ipare Splithe	rd Notes	
Metabolisable energy		NDF (%DM)	44.3 🔍	Starch (%DM)	18.7 🔎
Supply (MJ)	150	NDF (kg)	6.620	Sugar (%DM)	1.8 😐
Demand (MJ)	150	eNDF (%NDF)	54.1 😐	NFC (%DM)	24.5
Balance (MJ)	0	NDF frg (%NDF)	47.1	Forage : Conc	50:50 😑
Density (MJ/kg DM)	10.0	NDF frg (%lw)	0.62	Ash (%DM)	<u>10.1</u>
Metabolisable protein	0	RDP/UDP prote	ein	Enteric methane	
Supply (g)	1363	RDP (%CP)	65.0 😐	Total (g/cow)	312
Demand (g)	1277	UDP (%CP)	35.0 😐	Intensity (g/L)	15.8
Balance (g)	86	Excess protein for	gone		
CP (%DM)	17.0	milk	1.1 - 3.6 L	Fat (%DM)	4.1 👄
DM intake estimate		Calcium (g)	0	Phosphorus (g)	0
Max. NDF intake%	102	Supply	290.1	Supply	61.4
Maximum DMI%	95	Demand	73.1	Demand	47.7
DMI as % liveweight	3.0	Balance	217.0	Balance	13.7
Active recommended levels		Magnesium (g)	0	DCAD	
One OFour		Supply	35.2	Calculated	
O Two O Five		Demand	27.7	Recommended	>250
◯ Three ◯ Off		Balance	7.5		
Early Lactation (1-100days)					

## **30. Case study 1: Save ration for this case**

- Save the rations you have calculated using the following steps;
  - Click 'Files' then click 'Save As with libraries', Rumen8 folder will open in your computer in the documents folder.
  - ii. Select the fodder you want to save these rations, in our case we had created a folder called 'Uganda Farms Library'. Open it, then name the ration files 'Case study 1' and click 'Save' to save the rations.



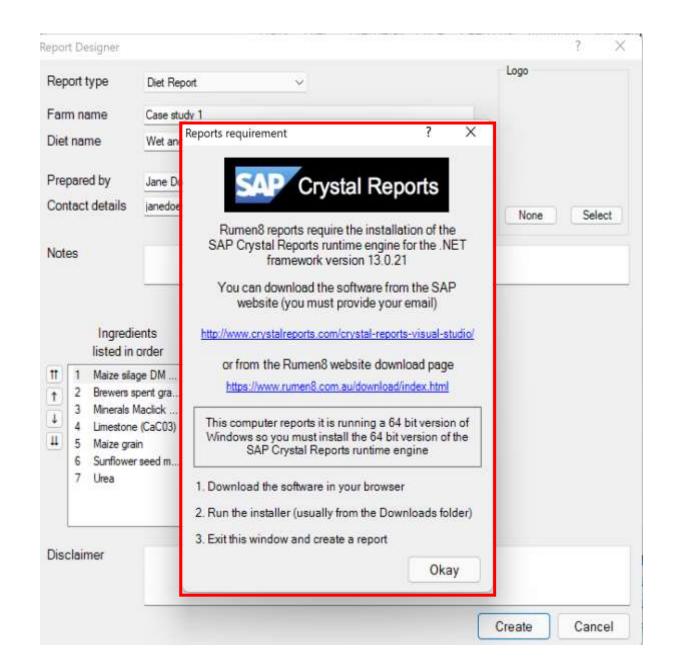
# **31. Case study 1: Share PDF** report

- To print or share a PDF report, click the tab 'File', the click option 'Report'.
- Firstly, select the diet report from the options in the 'Report type'. Selecting this will create a report for one ration that is recently opened under the landing page.
- To create a report for the ration saved under the 'Compare' select option 'Diet comparison report' and all the ration will be captured.
- After this fill in the other details as shown and click 'create' to create a PDF report. You can add notes or disclaimers to your report (optional).

		? >
Report type	Diet Report	Logo
Farm name	Case study 1	
Diet name	Wet and Dry season diet	
Prepared by	Jane Doe	
Contact details	ianedoe@hmail.com	None Select
1 2 Brewers s 3 Minerals 1 4 Limestone	ge DM	
1 2 Brewers s 3 Minerals I 4 Limestone	pent gra Aaclick e (CaC03)	
t 2 Brewers s  J 3 Minerals I  4 Limestone  4 5 Maize gra	pent gra Aaclick e (CaC03)	
t 2 Brewers s  A Minerals I  A Limestone  Small S Maize gra  G Sunflower	pent gra Maclick e (CaC03) in	

# **32. Case study 1: PDF report** saving and printing

- After clicking create, a report requirement pop-up with links to guide to download a report creating software.
- Follow the link and guidelines with the installation and set up process.



# **33. Case study 1: Share PDF** report

- After successful installation, go back to creating your report.
- A pop-up screen will appear with a report (red box) you can choose to save or print for sharing the report.

Image: State of the intervence      Image: State of the intervence      Image: State of the intervence        Name Report      Image: State of the intervence        All in Report      Image: State of the intervence      Image	Save report as PDF							
DIET REPORT        Case shudy 1      Wat and Dry season ration        Det created by Jane Coe janedoe @hmalcom      janedoe @hmalcom        Amma      Wronge (ng)      00        Uvronge (ng)      05      Mikt bit (h)      55      Pri (ng)      0.70        Uvronge (ng)      05      Mikt bit (h)      50      Pri (ng)      0.70        Dig to privat      0      Mikt privati (h)      50      Pri (ng)      0.70        Dig to privat      0      Mikt privati (h)      50      Privati (h)      1.31        Distromitar      migradent (h)      1.51      Distromitar (h)      1.52      Distromitar (h)      1.51        Distromitary      Not (h) As field Mic (h)      0.71      1.50      1.53      4.77      7.77        1 Matte singe Chi < 307.51%      7.01      2.02      7.57      1.50      1.54      7.77      2.5        1 Matte singe Chi < 307.51%      0.10      0.10      0.02      0.02      2.02      1.03      1.02      7.7      7.7      2.5      1.55      7.7      7.7      2.5      2.02	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	н н [1	/1 🕅 🔍 •	6				
Case s Mudy 1      Wat and Dry season ration      Det created by Jane Detereated by Jane Determined by Jane Determ			DIFTRE	PORT				
janedoe@hmal.com        Anmal      Status								
Live-septi (kg)    500    Nox yies (i)    555    Fit (kg)    0.70      Ur crange (kg)    0.6    Nitk (kg)    3.0    Fit (kg)    0.39      Days pregnant    0    Nitk prosen (kg)    3.0    Fit (kg)    0.39      Dationwr/day    40    Pat Fraten (kg)    1.31    1.32      Hingradent    60    Pat Fraten (kg)    0.33    1.47    7.7      J Marken (kg)    1.43    7.0    2.130    7.3    4.77    1.0      J Marken (kg)    1.43    5.7    2.00    5.27    1.00    1.41    7.7      J Mineks (kg)    0.01    0.05    0    2.24    1.0    5.5    4.7    7.5      J Mineks (kg)    0.01    0.05    0.0    0			π					
# Ingradiant      Ng DM Ng As Fed      Mc (MA)      CP (g)      Ca (g)      P (g)      Mg (g)        1      Misste single 2014 ~ 30-30%      7.04      21:00      7.55      479      10:0      14.1      1.77        2      Brevers Scort you wet      5:17      22:00      52:0      15:8      3:4:4      11:8        3      Minevers Macrine Spectrum      0:0		Uverveight (kg) 500 UV change (kg/d) -0.6 Cays pregnant 0	Milk fat (%) Milk protein (%)	3.6 3.0	Protein (kg) Pat + Protein (kg)	0.59		
Supply      14.4      45.4      150      1,354      82,77      66.9      31.5        Demmol Statroce      1      14.9      1,210      74.8      44.9      92.5      52.        Statroce      1      102      7.6      02.0      5.2      53.        Total Dial      100.5      100.1      110.5      14.8.1      119.6        Subtroc      100.1      100.5      100.1      110.5      14.8.1      119.6        Subtroc      100.1      102.4      g ECM/kg DM      1.3      Mike/iscone      196.00        NDP (NDM)      451      CP (NDM)      177      g F+Arkig DM      91      Paed coat      142.70        Statroc (NDM)      135      RDP (NDP)      65.5      Lan Mike/Lan Feed      1.30      MAPC      142.70        Statroc (NDM)      135      RDP (NDP)      65.5      Lan Mike/Lan Feed      1.90      MAPC      55.30        Porage:concrated      50.50      UDP (NDP)      35.5      All currency values have been divised by 100      All currency values have been divised by 100		# Ingredient 1 Matte single DM ~ 30-35% 2 Brevies spert gran wet 3 Minerks Matrix Super 4 Limestone (CaCO) 5 Matte gran 6 Sufforder sald mear party defuiled (	7.04 21.00 5.17 22.00 6.10 0.10 0.06 0.08 0.71 0.60 1.18 1.30	76.3 52.7 0.0 0.0 0.0 11.9	470 100 141 1,360 165 264 0 204 10,0 0 204 0,0 0 02 1,0 386 61 11,6	77 79 36 05 87 71		
% of DM limit      102      ME denoity (MLkg DM)      1.4      kg EC/Mig DM      1.3      Miki Income      196.00        NDP (%DM)      45.1      CP (%DH)      17.7      g F+Ahig DM      91      Paed coat      142.70        Samth (%DM)      15.5      RDP (%CP)      85.5      Len Mike/Lan Feed      1.39      MAFC      55.30        Porage:Conc.ratio      50.50      UCP (%CP)      55.5      All currency values have been divised by 100		Supply Cremand Satance		150 149 1	1,364 82.7 66.9 1,282 74.8 44.9 102 7.8 22.0	31.5 35.3 5.2		
		% of DMI limit      102      ME density (N        NDP (%DM)      45.1      CP (%DM)        Starch (%DM)      19.5      RDP (%CP)        Forage:Concirate      50.50      UCP (%CP)	L1kg DM) 10.4 k 17.7 g 65.0 L	g ECMkg DM   F+Pkg DM Jah Milk/Ush Fee	1.3 Milk Income 91 Peed coal d 1.39 MAFC	196.00 142.70 86.30		