

# GUIDELINES FOR RATION CALCULATION FOR VARIOUS BREEDS, HEIFERS, LACTATION STAGE (RUMEN8) – Level 3

Topic	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
- ❑ How to use Rumen 8 to determine rations of various breeds, heifers, lactation stage considering their body requirements.



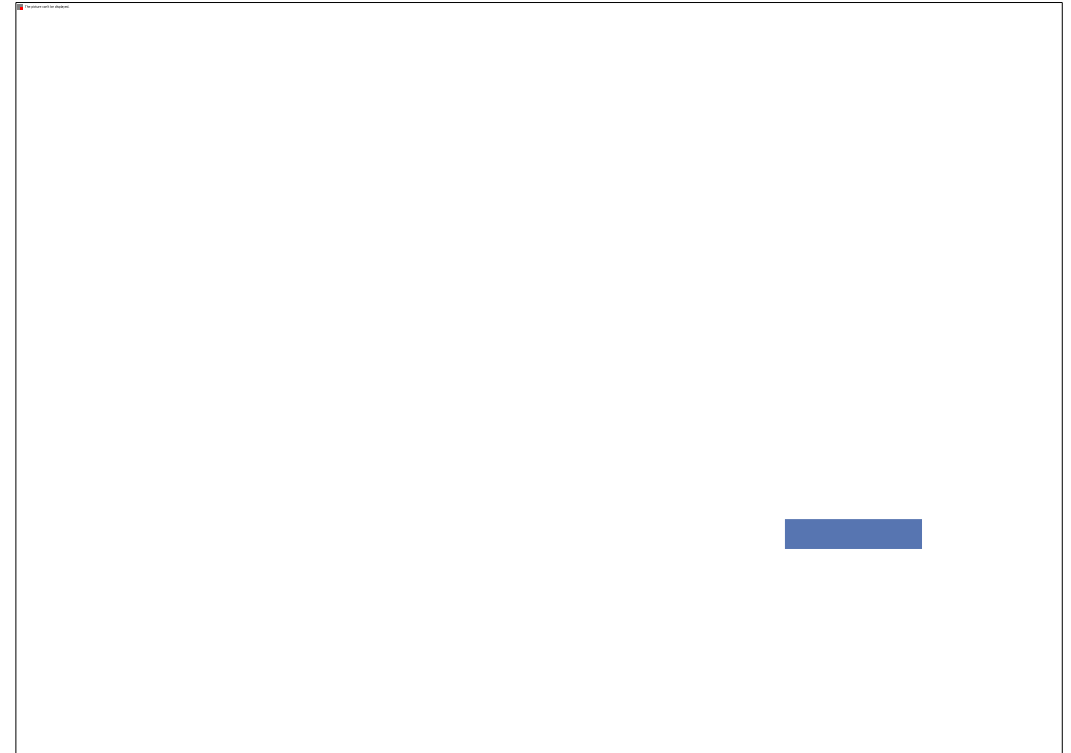
**IMPORTANT**

*This module has three parts; this is part I – download Part II and III to cover to END.*



## 2. Background

- Rumen8 is a free access software application that allows farmers and livestock consultants to easily manage dairy, dual-purpose and beef cattle rations to optimize animal performance, reduce feed costs and maximize margin above feed costs.
- Rumen8 allow users to design rations from 2 up to 15 feeds or mixes, while ensuring the dietary needs of animals are met.
- Multiple diets can be stored and compared and the difference between feed prices and returns from milk and/or meat calculated.
- Reports can be printed or saved as excel or PDF files.



\* Screenshot of the opening page of the rumen8 software.

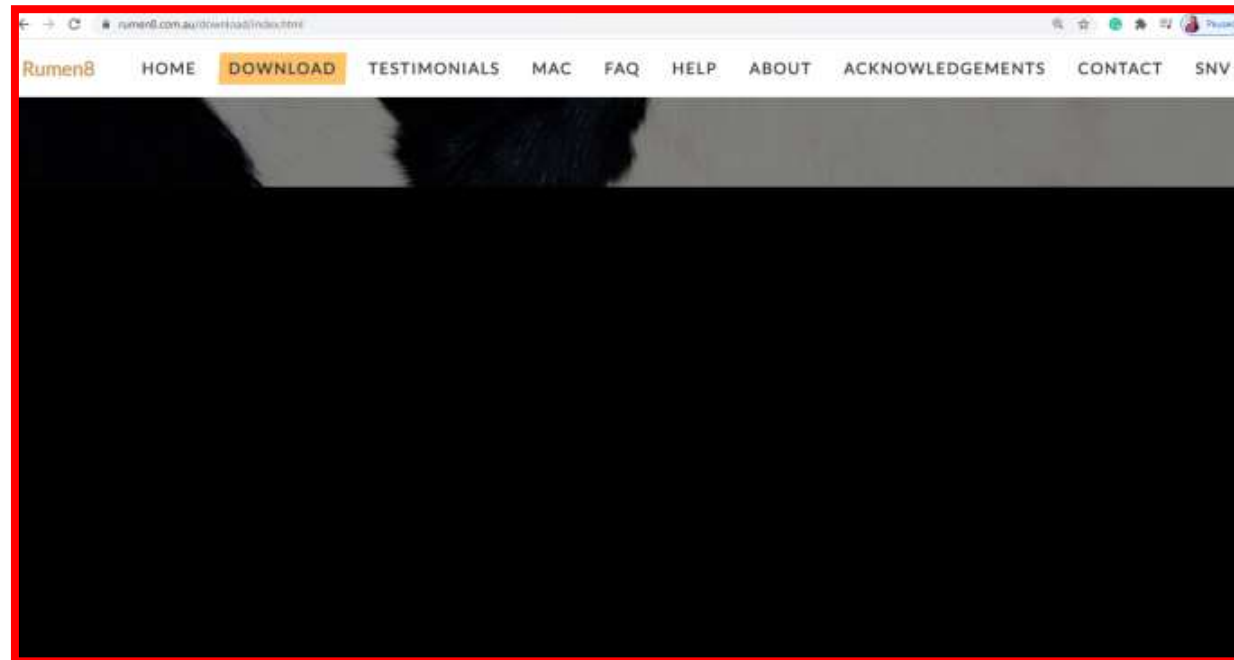
## 2.1 Background Cont'd...

- Rumen8 is a computer-based tool that does not need the internet to use. It is easy to navigate and interact with to design a dairy cow ration.
- It factors in the main nutritional parameters, giving the user an easy-to-read indication of how the formulated ration meets specified requirements; and the expected returns based on current or projected milk prices.



## 2.2 Background Cont'd...

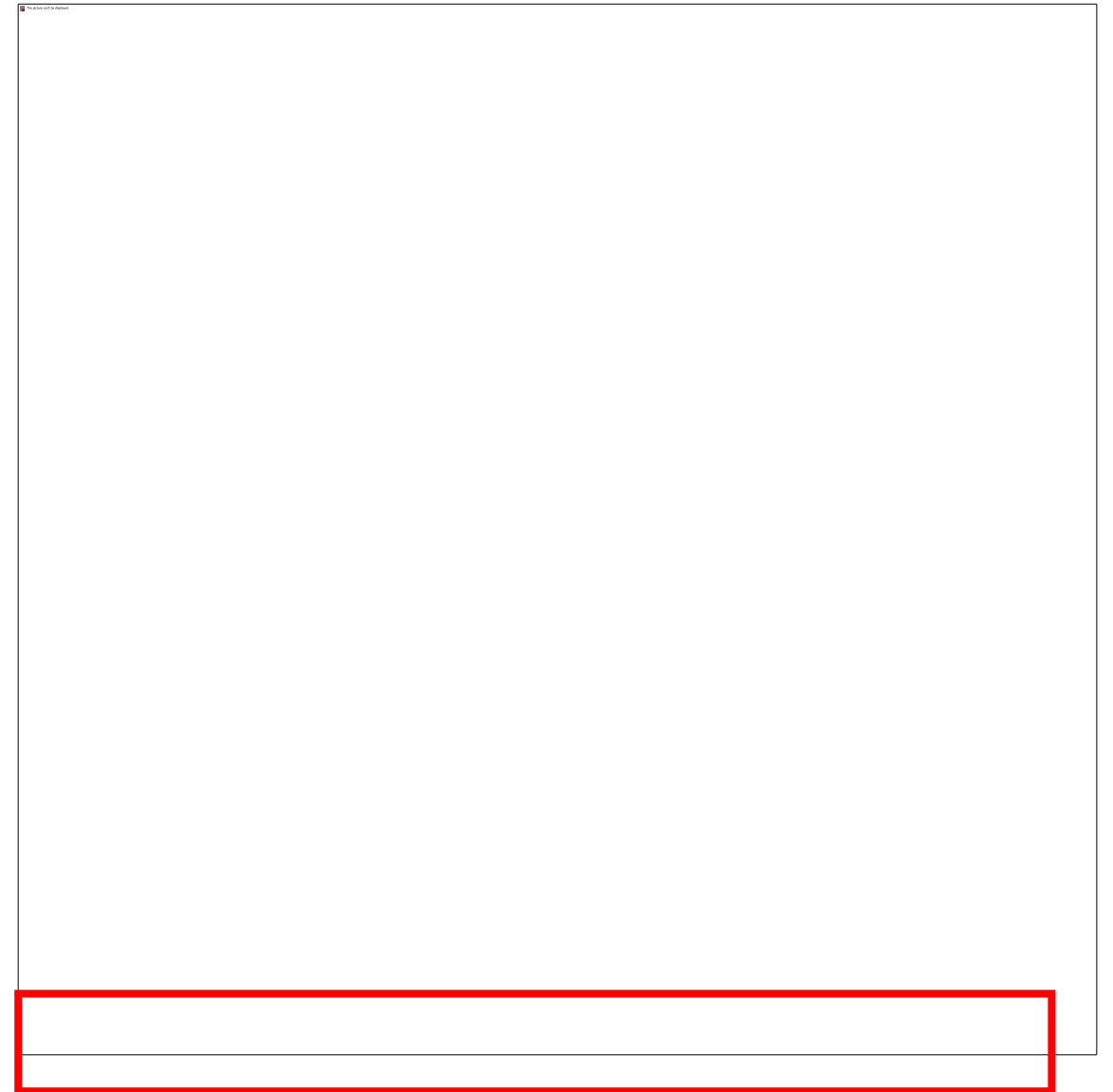
- The program gives easy to read outputs which are generated from detailed calculations built-in 'behind the scenes.'
- The program is easy to use and helps extension staff and farmers know some of the principles of dairy (ruminant) nutrition on which it is based and from which it generates animal responses.



\* Screenshot of the rumen8 webpage.

### 3. How to download rumen8

- To download Rumen8 to your computer, use the following links;
  - i. <https://www.rumen8.com.au/download/index.html>
  - ii. <https://cowsoko.com/rumen8>
- It is advisable to use Google Chrome when downloading the software and feed library.
- Several steps should be followed to have a well-functioning ready to use application.



\* Left screenshot of the Cowsoko/rumen8 webpage

## 4. Rumen8 registration

- Send an e-mail to [support@rumen8.com.au](mailto:support@rumen8.com.au) with your name and your preferred email address (Yahoo, Gmail, etc.)
- You will receive your registration key which you will use to log in to the Rumen8 software.
- After successful registration, the next step is uploading the feed library that matches your region.



## 4.1 Rumen8 registration – Feed Library

- The software automatically uploads the feed library from Australia.
- In the following slides, that is after a brief mention on the landing page immediately after logging in, you will be guided on how to download the SNV Tropical Feed Library.

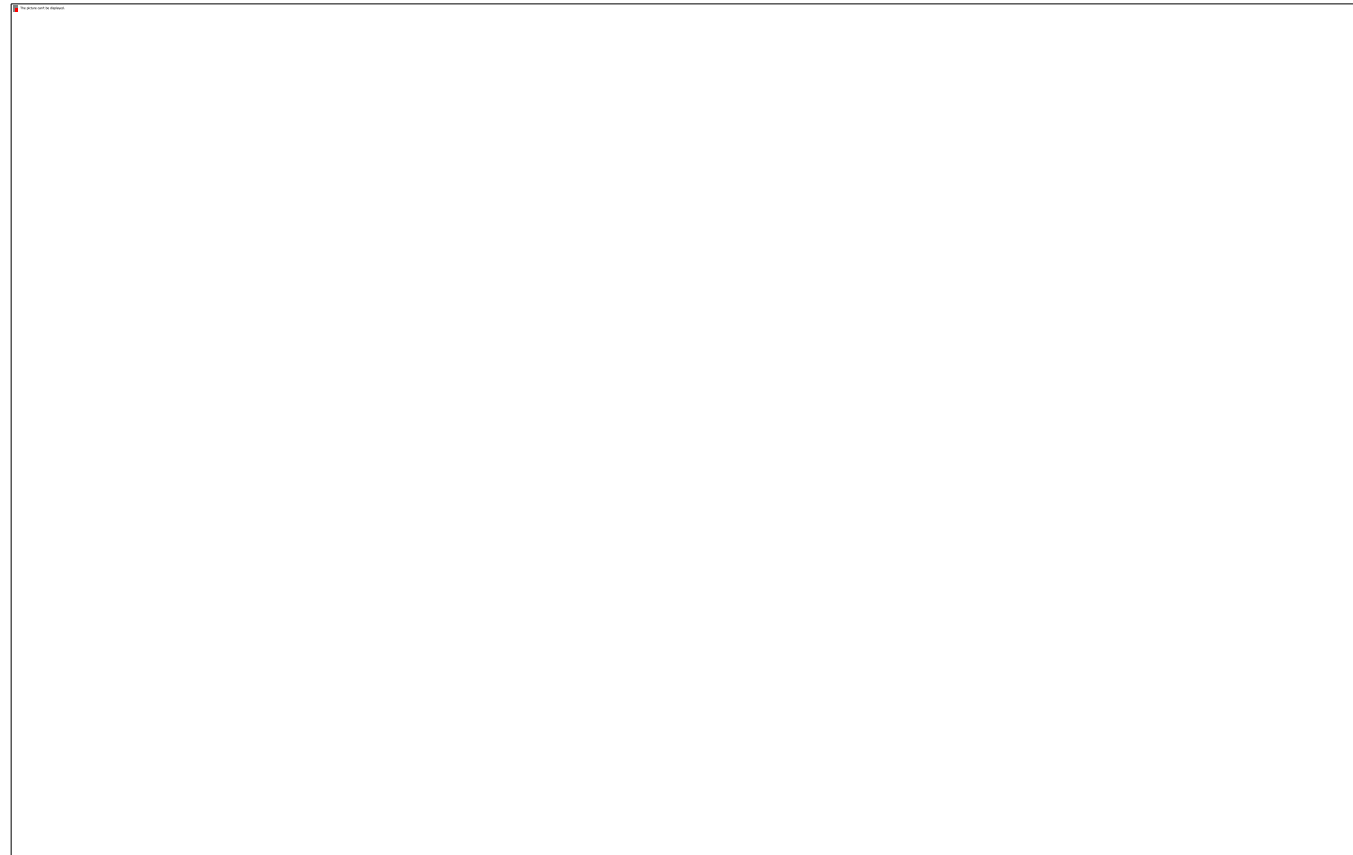


\* Screenshot of the Cowsoko/rumen8 webpage



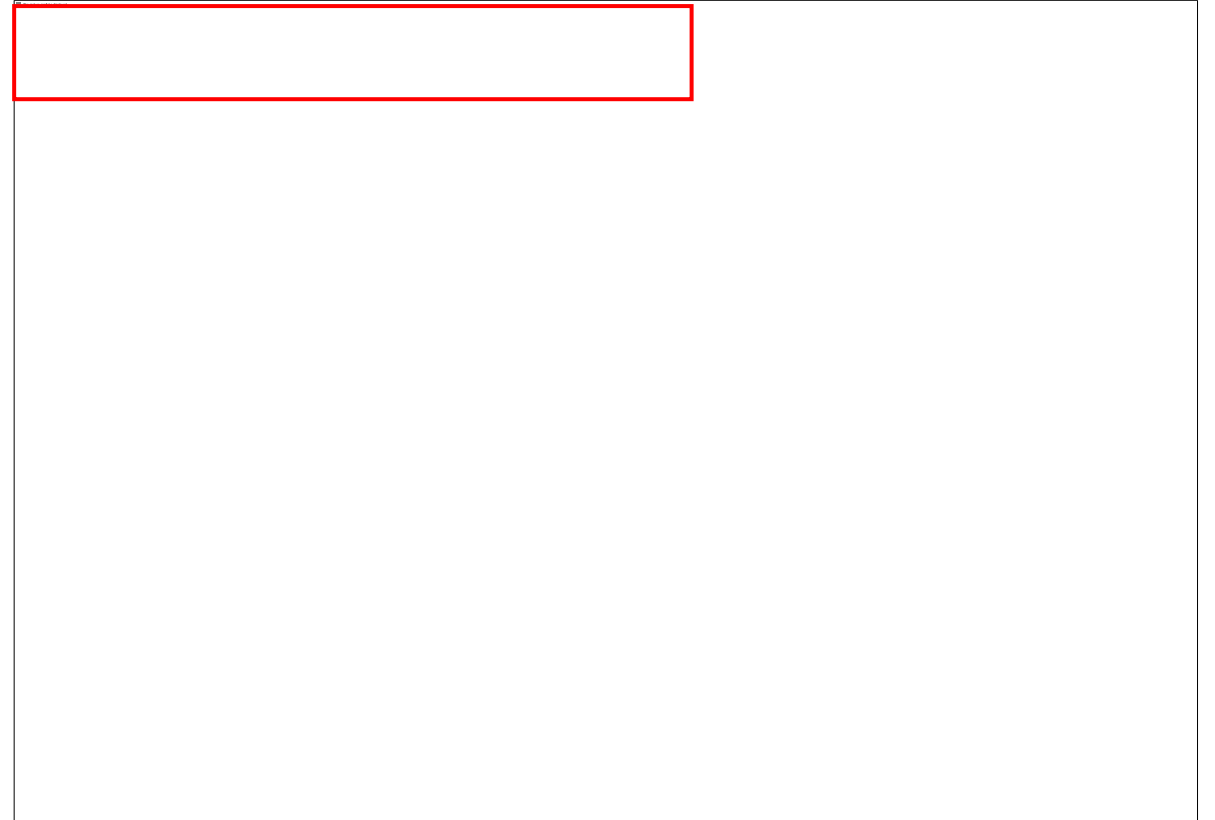
## 5. Rumen8 landing page

- Here is the default Dairy Rumen8 landing page/screen.
- The landing page has several features that are easy to use and guide you to successfully set animal parameters and make a ration.



## 5.1 Rumen8 landing page Cont'd...

- Here is part of the landing page/screen when enlarged.
- The landing page has several features that are easy to use and guide you to successfully make a ration.
- On the top left-hand side is the section you can choose between the following tabs;
  - File
  - Edit
  - Animal
  - View
  - Help



## 6. Features of Rumen8 landing page

The landing page has several features;

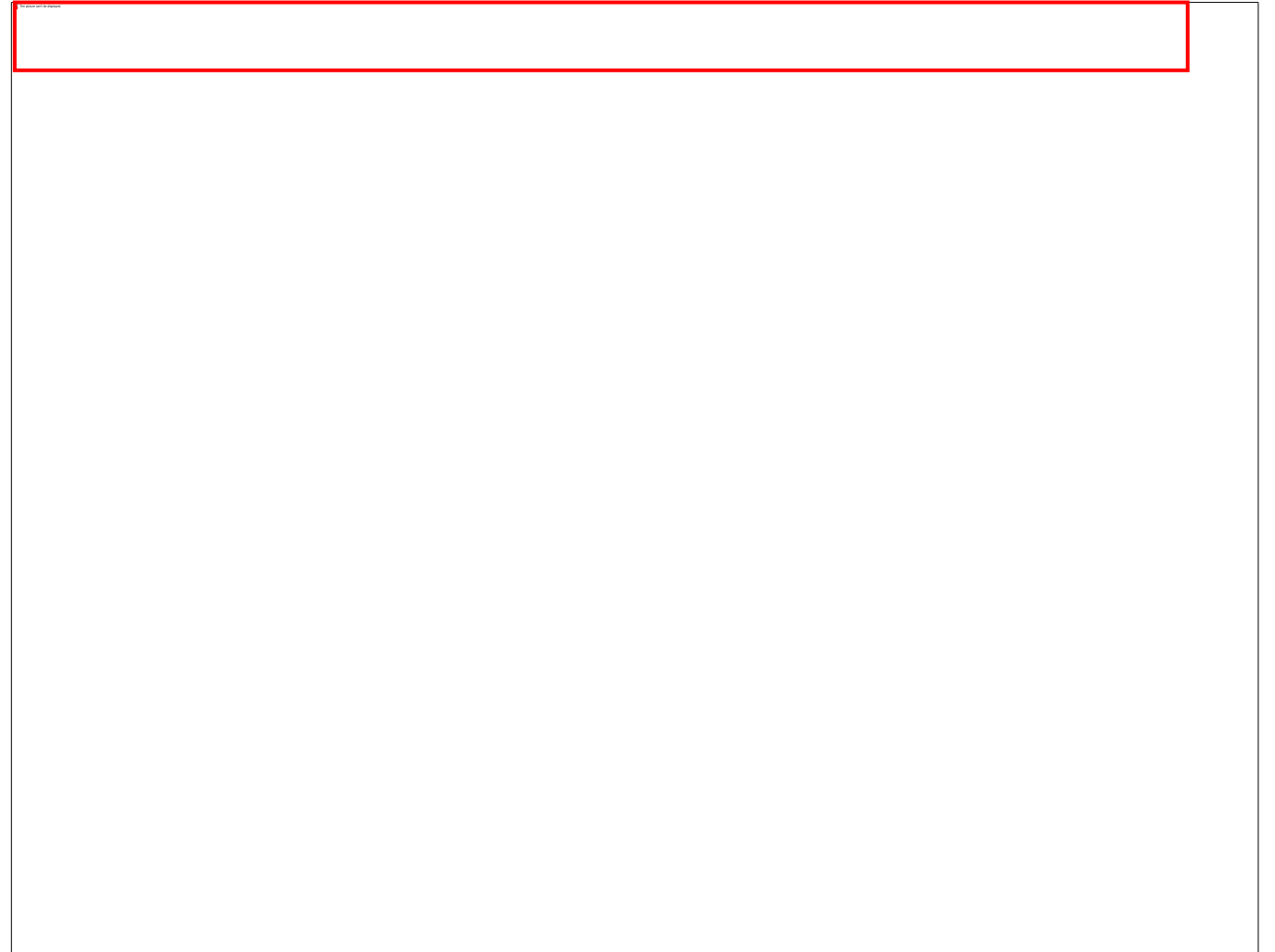
- On the left-hand side is the ration ingredients where you can choose up to 15 ingredients from the feed library and enter their quantity in kilograms (kg) per day 'as fed' or on 'dm' basis.
- The feed intake of the ration ingredients is accumulated and presented below the maximum 15 ingredients as "Total daily intake" (kg/d).



## 6.1 Features of landing page Cont'd...

Other features on the landing page are;

- On the 'tabs' right-hand side;
  - Dairy (animal)
  - Diet,
  - Diet detail,
  - Price (of milk and milk components),
  - Feed cost,
  - Compare (diets),
  - Split Herd,
  - Notes



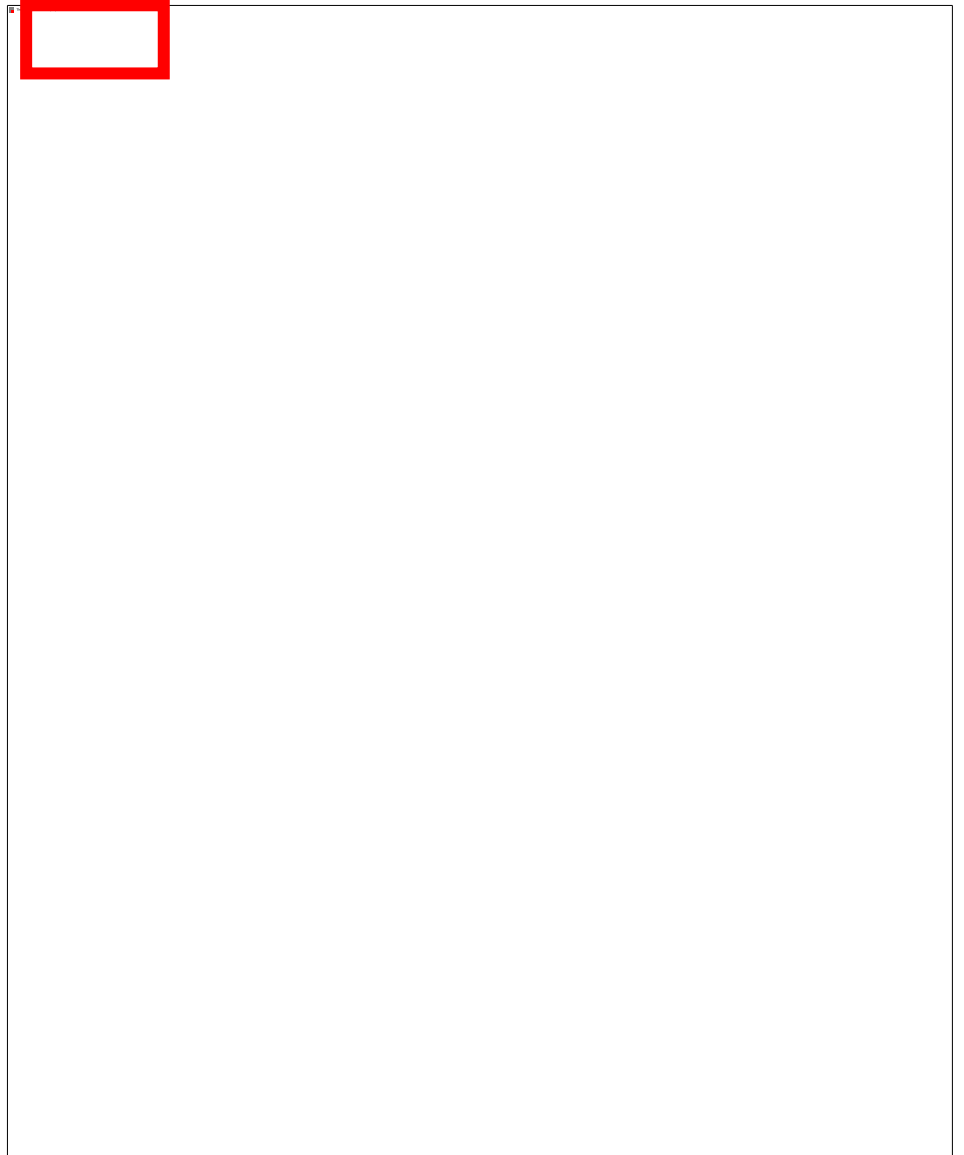
## 6.2 Features of landing page Cont'd...

- The bottom of the landing page calculates total feed costs, total milk income, feed efficiency, and Margin.



## 7. 'File' tab

- Under the file tab there are different options you can choose from, as shown alongside.
- Under the file tab you can also save 'Save', 'Save As' or 'Save as with Libraries' if you want to save a diet (ration) together with the feed library you used to make the ration.
- Under the option 'Reports' you can save the diet (ration) as a printable PDF file.



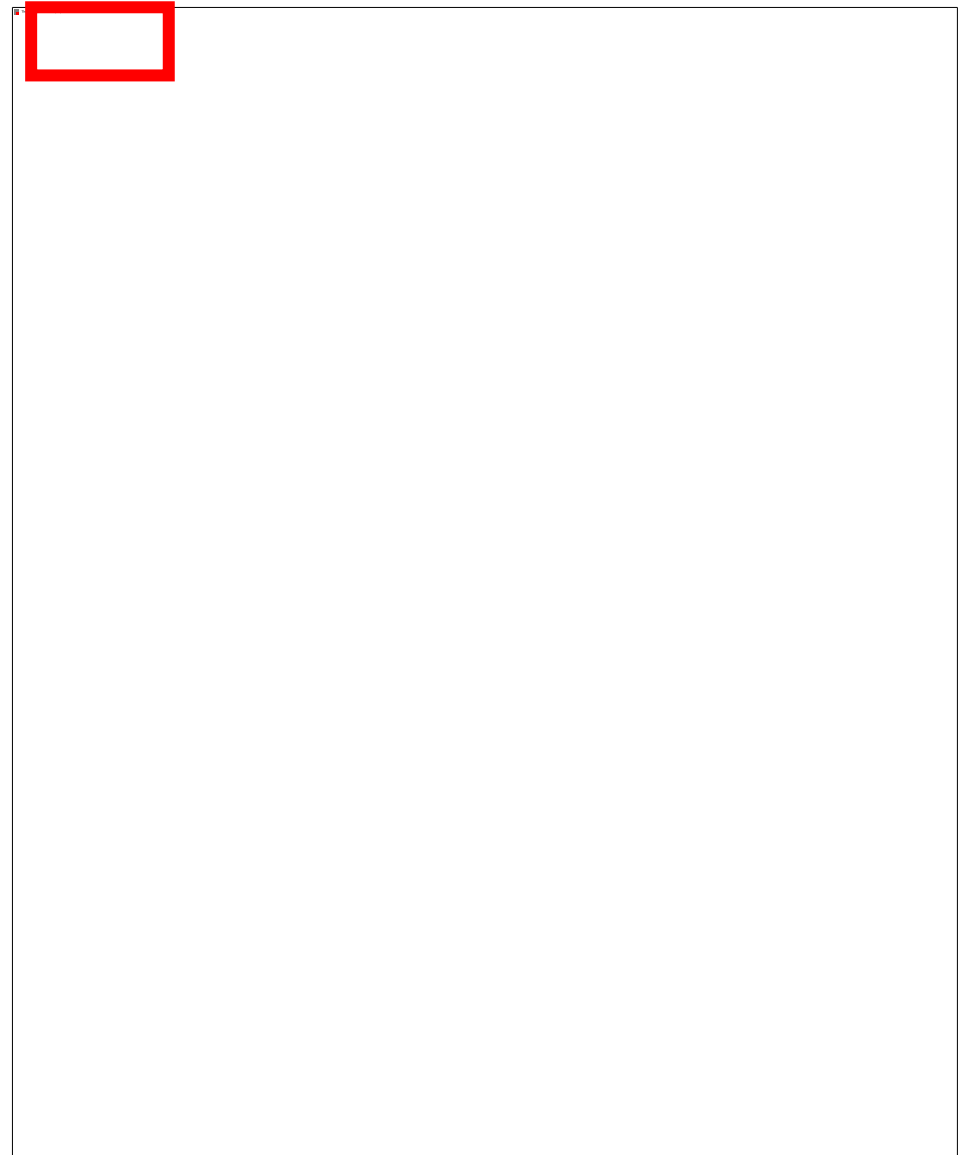
## 7.1 'File' tab Cont'd...

- The option 'Preference' is where you can change settings. The tabs 'general', 'advanced', 'recommended levels', and 'standard cows' will be visible when selected.
- The options 'Standard mode' and 'Compact mode';
  - 'Compact mode' is Rumen8 basic and easy when starting to use the software.
  - 'Standard mode' is for advanced users and provides additional details and functions.

### Notes:

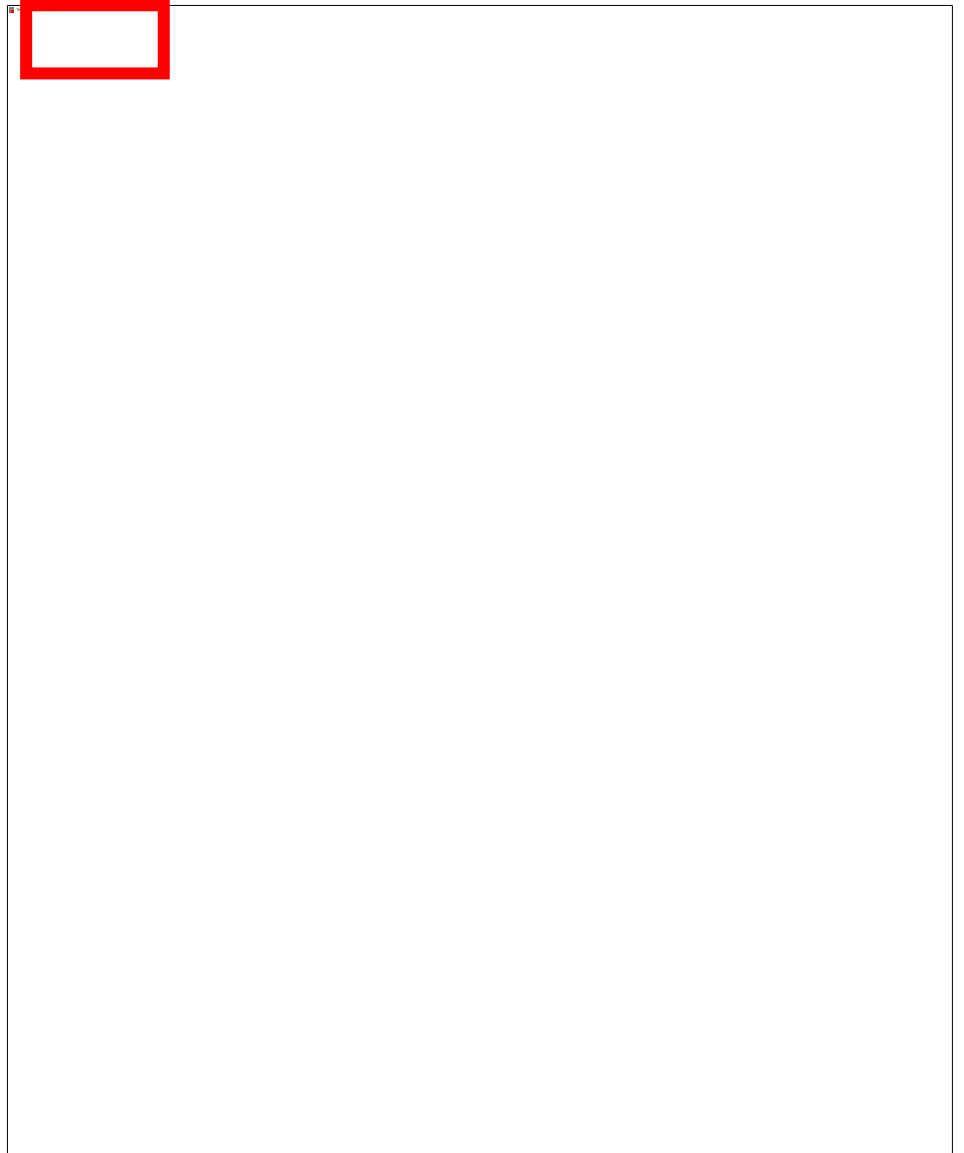
\*The Standard mode shows many more parameters, but it requires knowledge of ruminal nutrition to interpret it.

\*When hovering your mouse over the term and for most terms, a tooltip will appear providing a detailed explanation.



## 7.2 'File' tab Cont'd: Dairy/Beef mode

- The option 'Dairy' or 'Beef' mode.
  - **Dairy mode** is used for dairy cows, and the
  - **Beef mode** for dual purpose cows, beef cows and bulls, or steers, for finishing.
- In this module we restrict ourselves to the mode 'Dairy cows.'
- When clicking the option 'Exit' you go back to the landing page.





## 8. 'Dairy Preferences' feature

- Under the option 'Preferences' you can click on the following tabs;
  - General
  - Advanced
  - Recommended levels
  - Standard cows
- One can also set;
  - Milk yield expressed in liters or kilograms
  - Milk components expressed in mass/volume% or mass/mass%
  - Feed concentration unit's g/kg or percentage
  - Feed proportion units
  - Fat to protein ratio
  - Tool tops detail.



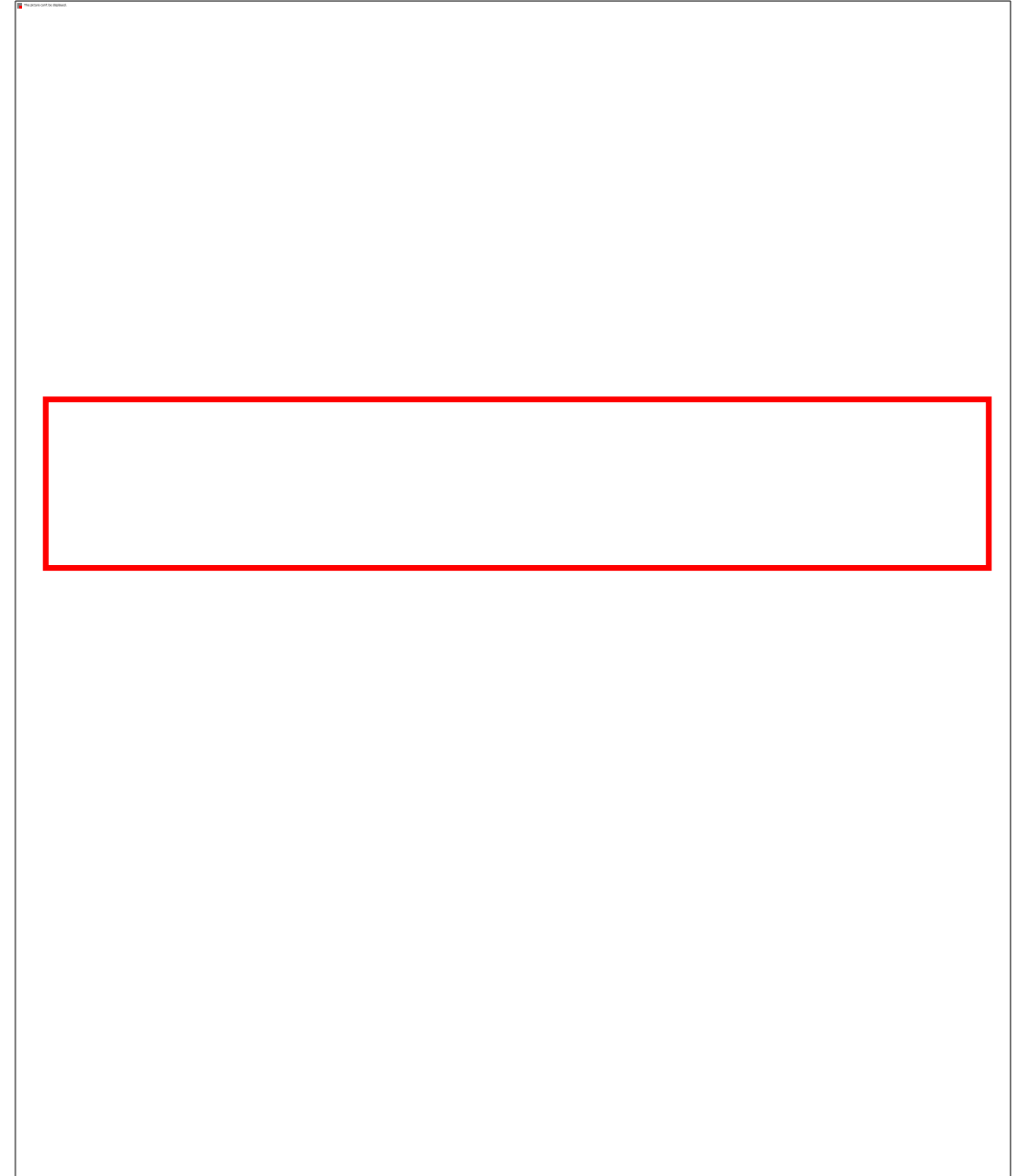
## 8.1 'Dairy Preferences': General

- Dry matter intake estimate (in the green box), you can choose between the conventional methods (Kg Dm/d) and PDF intake (% of live weight).
- Under the conventional method it's advised to use the following;
  - Cow (Lactating cow): NRC Equation (Eqn.).
  - Dry (Far-off dry cow): 11.0
  - Close-up cow: 10.0
  - Heifer: AFRC equation (Eqn.).

\*NRC – National Research Council

\*AFRC – Agricultural and Food Research Council

\*Eqn. – Equation

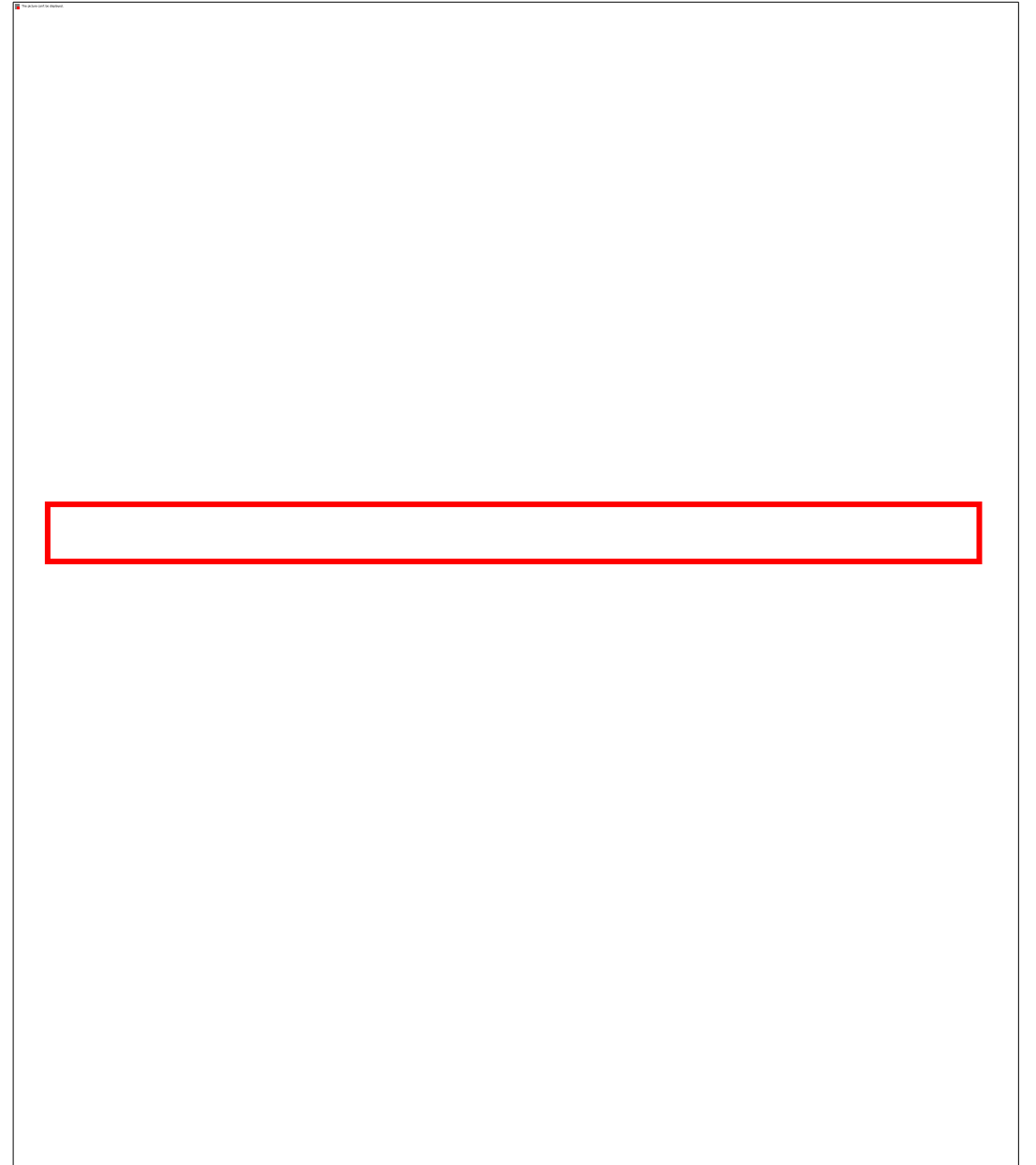


## 8.2 'Dairy Preferences': General Cont'd...

- Dry matter intake estimate;

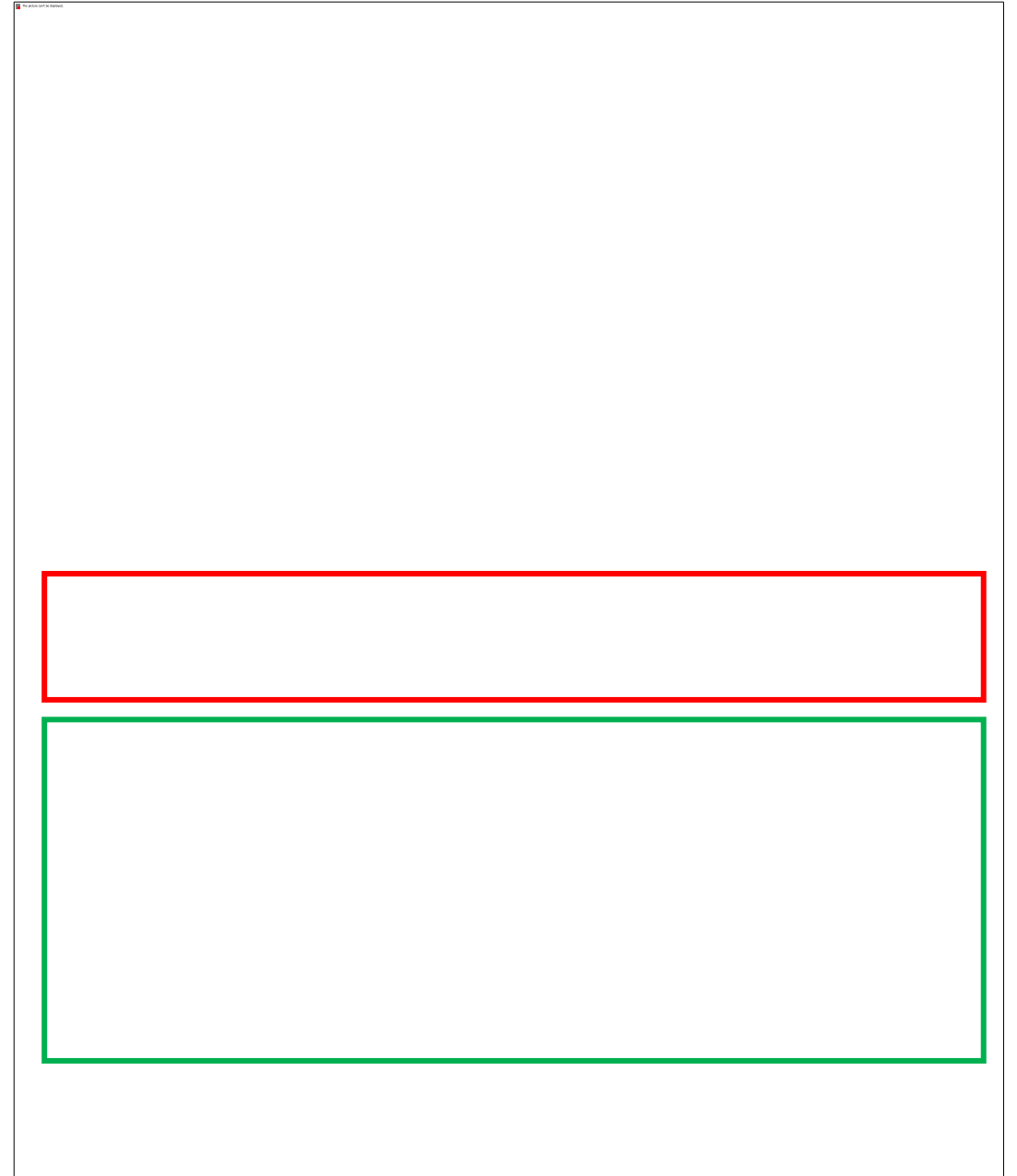
NDF intake (% of live weight) for the Tropical region is advised to be calculated using the following percentages;

- Cow(Lactating cow): 1.3
- Dry (Far-off dry cow): 1.0
- Close-up cow: 0.8
- Heifer: 1.0



## 8.3 'Dairy Preferences': Currency

- Under the tab 'General', you can set the currency and related settings such as;
  - 'System'- Selecting this the Rumen 8 will use the current settings for your computer.
  - 'Do not display cents'- For cents display
  - Currency option drop-down list to select a favorable currency.
  - 'Currency divisor'- All currency values are assumed to be divided by the selected number/amount.
- The other parameter (Green box) are to be set as is.



## 8.4 'Preferences' functions

- 'Cd 100' (currency divisor 100) – When this flag is visible, it means all the currency values displayed in Rumen8 have been divided by the divisor set in the 'Preferences'. This allows currencies with large value to be used. In the case of 'Cd 100', all the prices have been divided by 100, therefore to get the correct price, multiply by 100.
- 'P' – means the current preferences library is not the default. When the letter color is black the library file is in the same folder as the save file, otherwise, the color is white by default.



## 8.5 'Preferences' functions Cont'd...

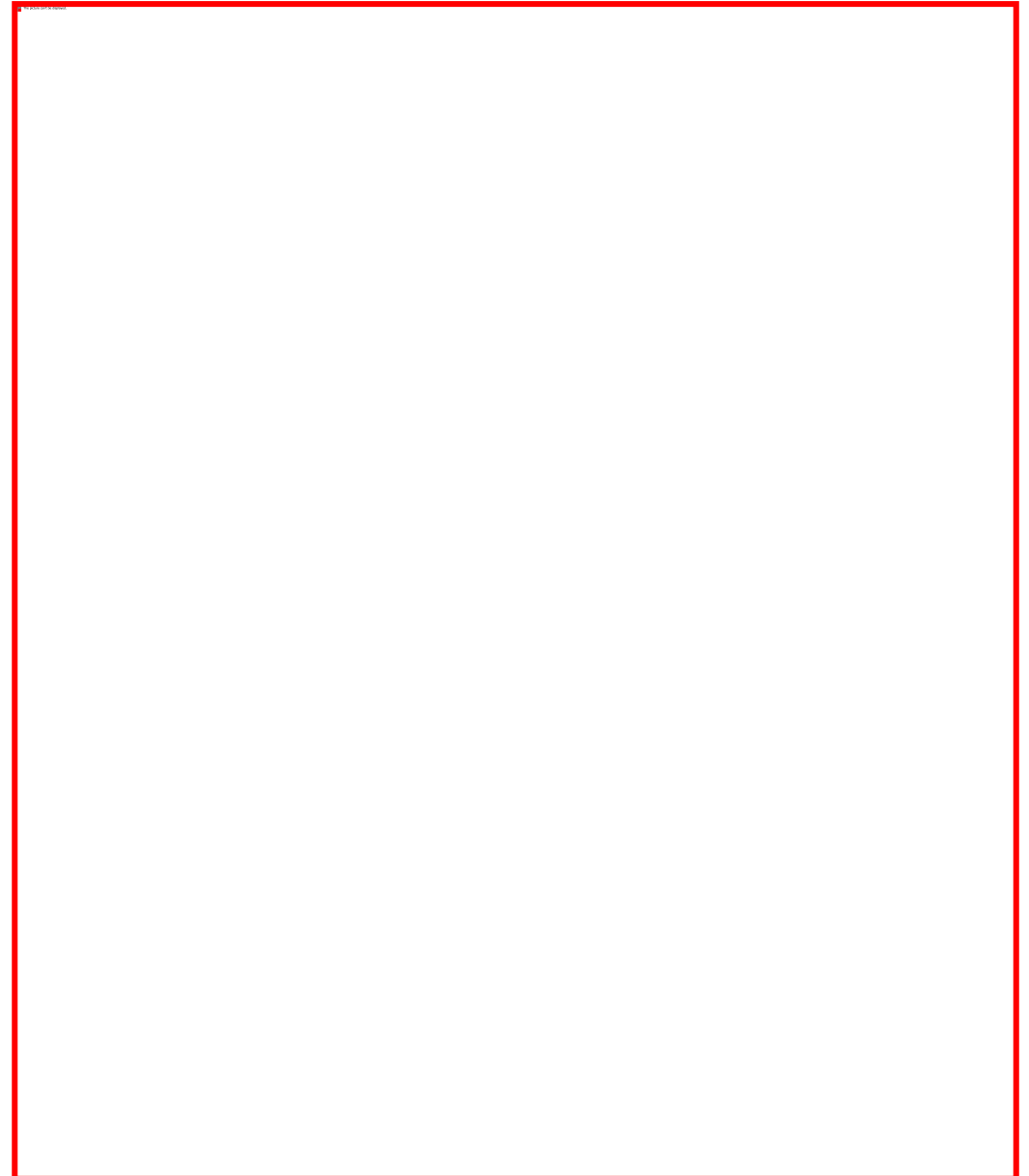
- 'M' – means the current preferences Milk Price library is not the default.
- 'SFL' – A shared Feed Library is in use (the SNV Tropical Library).
- 'UFL' – A 'User feed library' is in use e.g. the Uganda farms feed library.

\*For 'SFL' and 'UFL', when the letter color is black the library file is in the same folder as the save file, otherwise the color is white by default.



## 8.6 'Dairy Preferences': **Advanced set-up**

- Advanced setting can be set by an experienced user under tab <File> then click on <Preferences> tab <Advanced>.
- It is advisable not to change any parameter.



## 8.7 Recommended levels preferences setting

- The 'Diet detail' tab is a very valuable one in that it allows evaluation of a diet against recommended levels of nutrients and other targets.
- The recommended levels can be set by an experienced user under <File> <Preferences> <Recommended levels>.
- The 'Recommended level set' (Red box) represents the different lactation stages of a cow using numbers;
  - One - Early lactation cow
  - Two - Mid lactation cow
  - Three - Late lactation cow
  - Four - Dry cow
  - Five - Transition cow





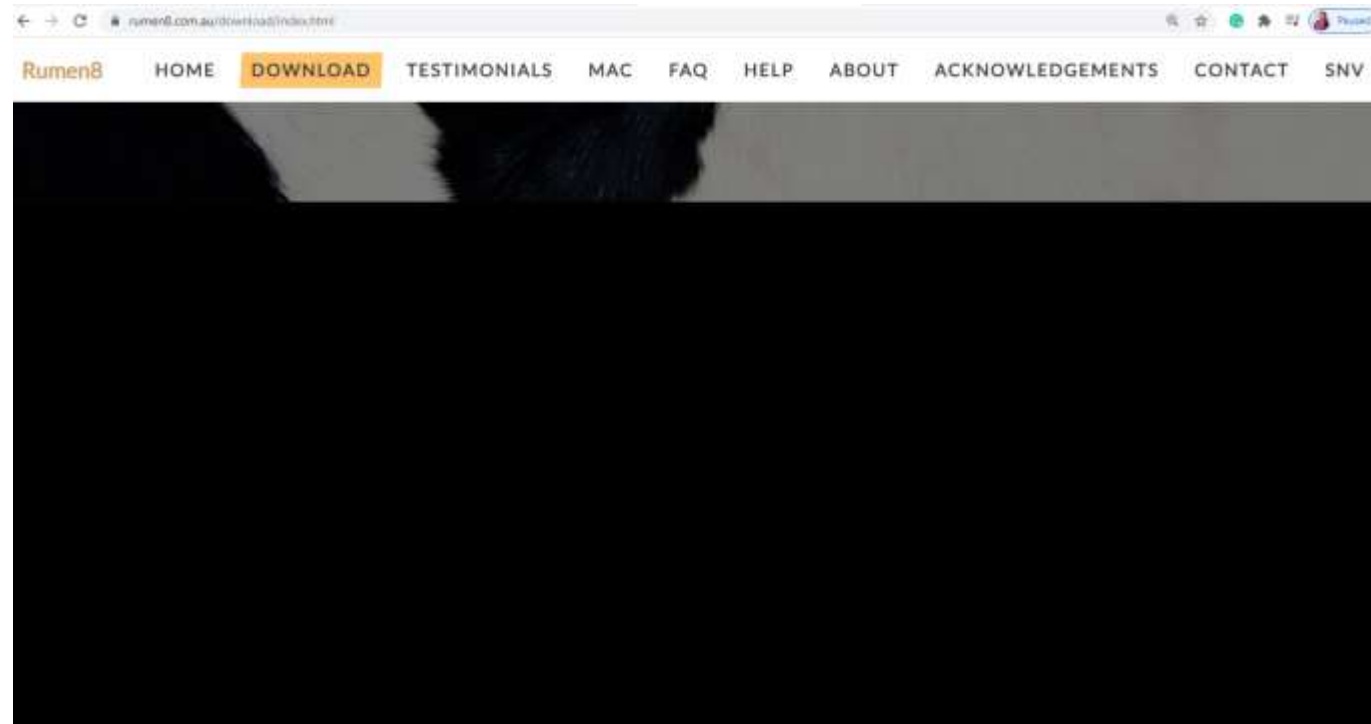
## 8.8 Lactation stage preferences set-up

- It is advisable to use the recommended five physiological sets and settings as shown in the figure on the right. However, for experienced persons these parameters can be adjusted.
- Those differ from the simplified example of Early Lactation (up to day 60 against day 100 in the table attached).
- The transition or close-up period is the last 4 weeks before calving and is linked to days pregnant. Rumen8 assumes a gestation length of 285 days.

Variable	Early lactation	Mid lactation	Late lactation	Dry	Transition
Levels set	№ 1	№ 2	№ 3	№ 4	№ 5
Days in milk	1-100	101-200	201-end lact.	dry	>257 d.i.c.
NDF % in DM	35-45	40-50	45-55	50-60	45-55
eNDF % of NDF	60-75	65-80	70-80	70-80	70-80
Sugar % in DM	3-8	2-8	2-6	2-4	2-5
Starch % in DM	10-24	10-22	5-20	0-15	10-20
Fat % in DM	2-5	2-5	1-5	1-5	2-5
RDP %	65-70	68-72	70-74	75-80	75-80
UDP %	30-35	28-32	26-30	20-25	20-25
Forage % in F:C	40-70	45-70	50-80	80-100	75-85
Feed % income	40-60	50-60	50-60	-	-
ME per kg DM	10-12	10-11	10-11	9-10	10-11
CP % (as proxy for MP)	15-19	14-17	12-15	≈ 12	≈ 14
Body wt change, kg/d	- 0.6	0.0	+ 0.6	-	-

## 9. Rumen8 Feed Library

- The SNV tropical feed library is for reference and guidance purposes only.
- Forages have a wide range of nutritional value and it is recommended to use accurate laboratory analyses of the feeds used.
- Alternatively, use your own knowledge and expertise on the nutritional value of forages to adjust the parameters of the feeds, in order to be more compliant with the reality on the farm after a farm walk.



## 9.1 Introduction to Feed Library

- For use in tropical countries, it is recommended to use Rumen8 with the SNV Tropical Feed Library that contains about 230 tropical forages, co-products, grains, legumes, etc.
- Tropical forages have higher levels of neutral detergent fiber (NDF) and lower levels of crude protein (CP). Data for the SNV Tropical Feed Library were obtained from trusted published sources.
- The library was developed for use in East Africa but has relevance for most lower latitude regions and new feeds or different qualities of the same feeds can easily be added.



\* Screenshot of the Cowsoko/rumen8 webpage

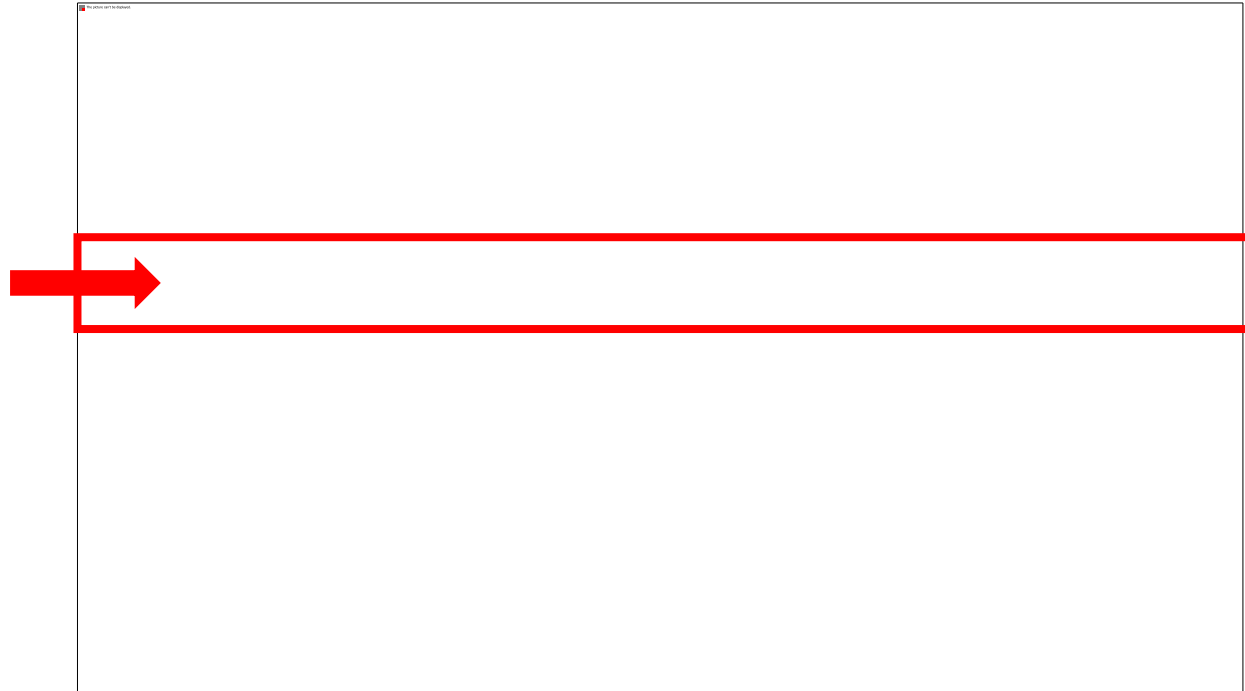
## 9.2 Before saving the SNV Tropical Feed Library

- Once the installation of Rumen8 software is complete, go to the Rumen8 folder (which was created during the installation process in your 'Documents' folder). The folder 'Libraries' is saved hereafter downloading.
- Create a new folder named <Shared Library>.
- Create a second new folder in the Rumen8 folder called <Empty Feed Library>
- And create a third new folder in the Rumen8 folder called <Your Surname Library>.
- Alternatively, you can name this folder after the farm, organization or country you want to use it for, (E.g. Uganda Farms Library).



## 9.3 Online location of SNV Tropical Feed Library

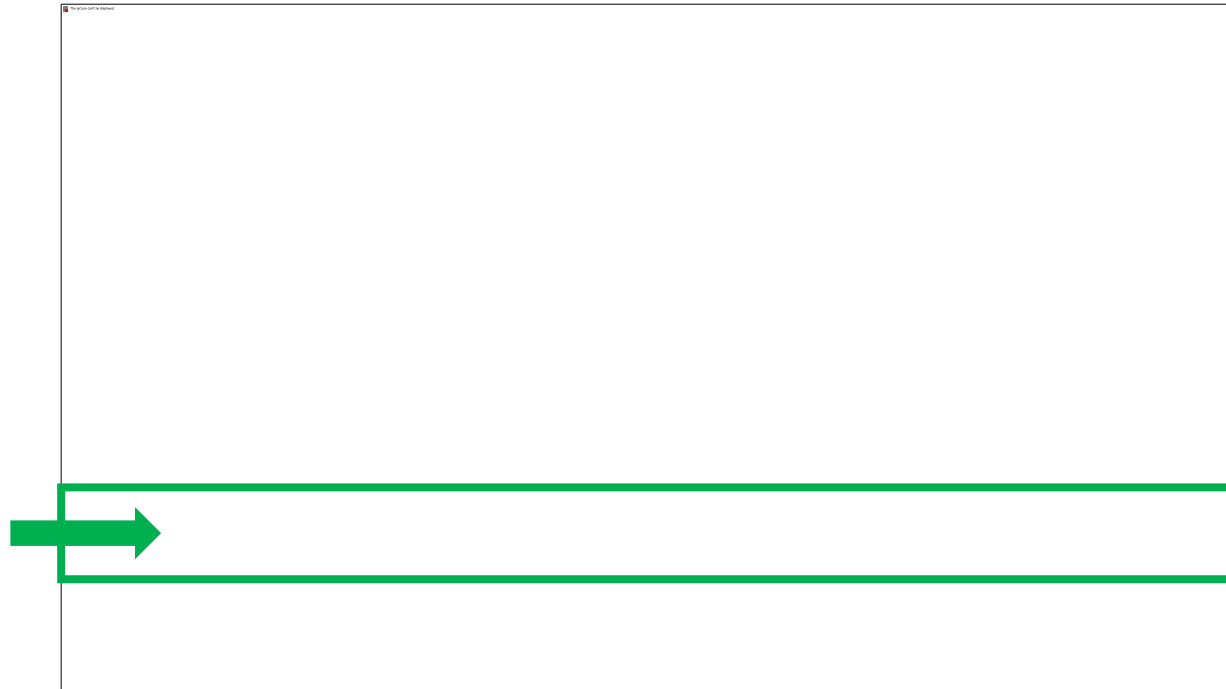
- Download the SNV Tropical Feed Library from this link shown on the right-hand side in the screenshot from the Cowsoko web page and save in the file **SNVFeedLibrary.db3** in a new folder, you just named “shared library” folder, under the Rumen8 folder on your computer.
- <https://cowsoko.com/rumen8> (see web page screenshot).



\* Screenshot of the Cowsoko/rumen8 webpage

## 9.4 Empty Feed Library

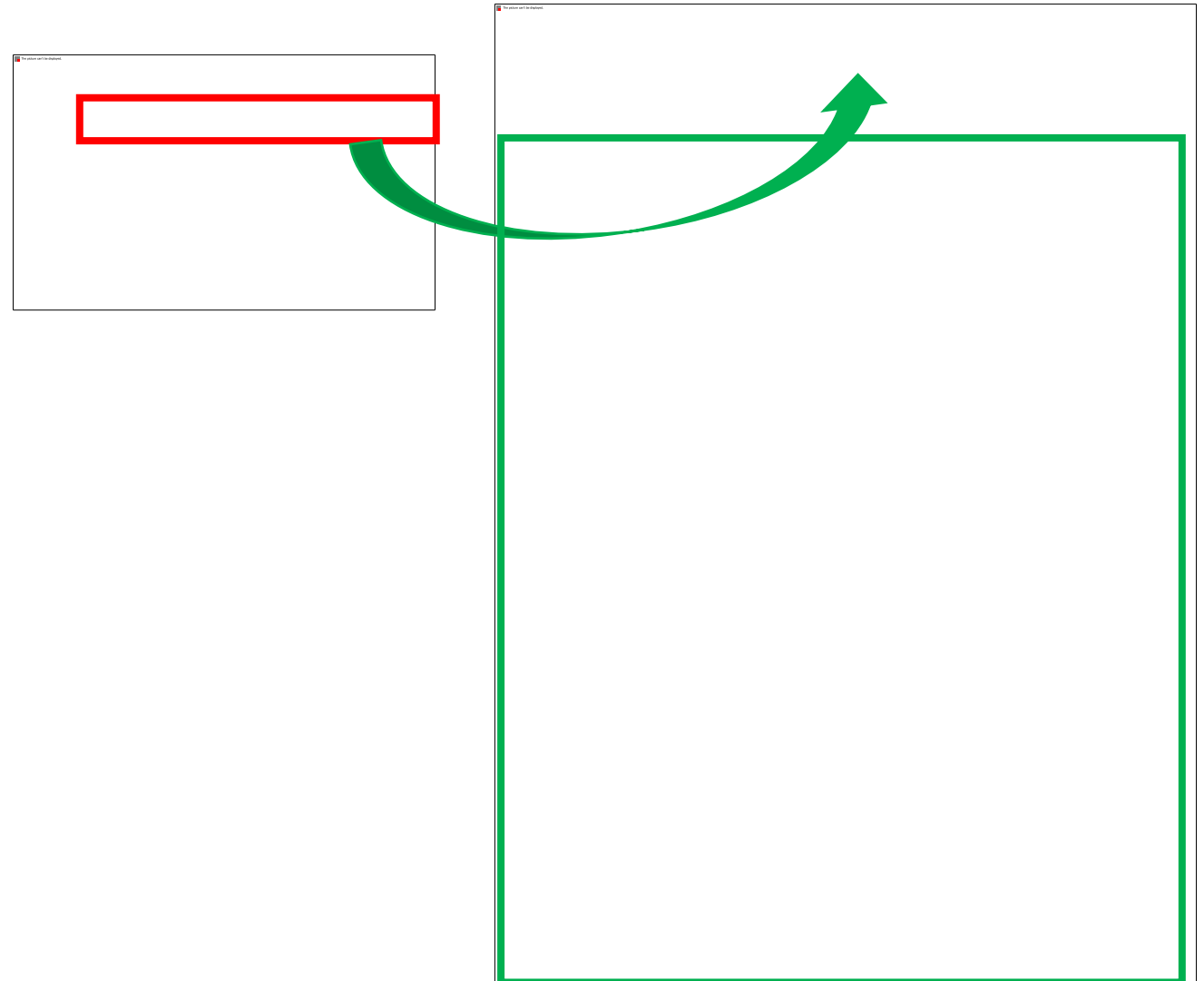
- In the next step, download the empty Feed library (with empty it is meant that this library has not yet been populated and it, therefore, gives you room to create your own library with feeds commonly used on your farm/s).
- Click on the highlighted section to download.
- Save the empty feed library file under the folder 'Empty Feed Library' in your Rumen8 folder.



\* Screenshot of the Cowsoko/rumen8 webpage

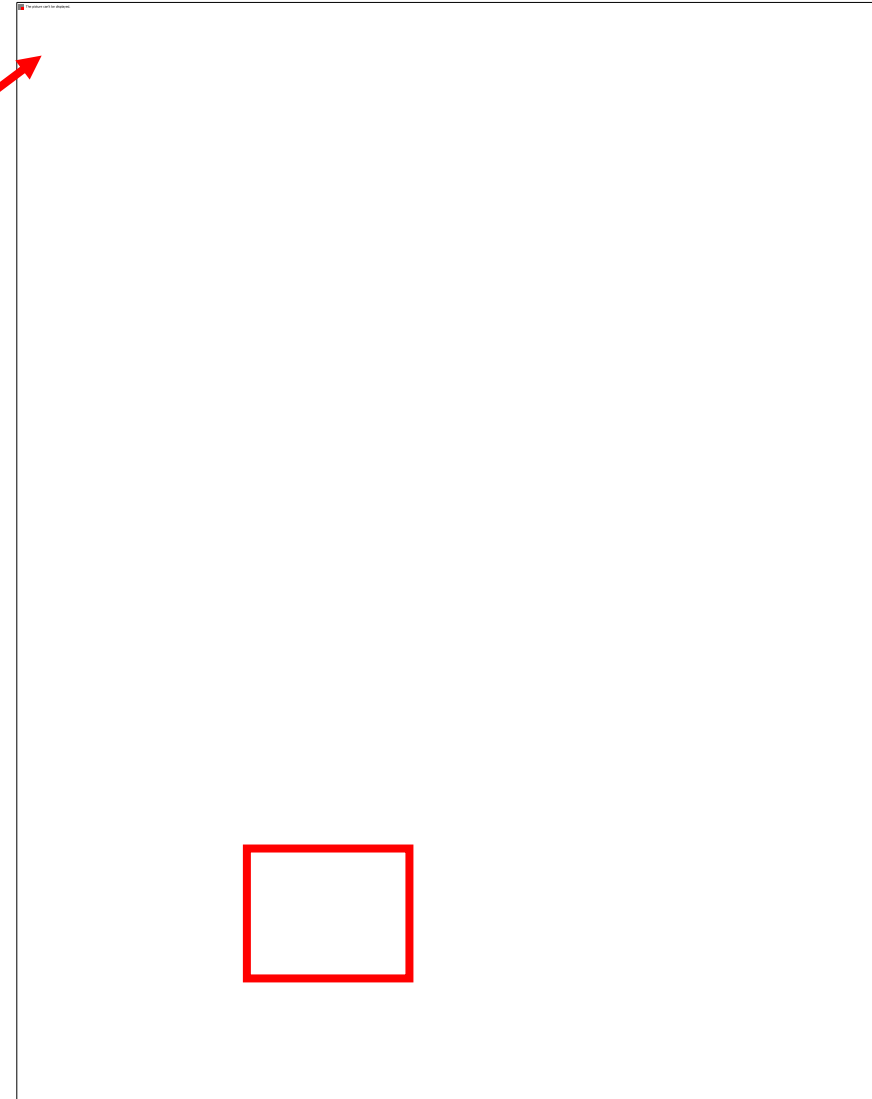
## 9.5 Changing from the Australian Feed Library to the SNV Tropical Feed library

- The Australian Feed library is saved under the folder 'Libraries'. In this folder, nothing should be edited, deleted or added.
- To view the Australian Feed Library before changing it to the SNV Tropical Feed library click on <'Edit'> (on the Rumen 8 landing page) then 'Edit Feeds'.
- Then, click on <Manage libraries and Ingredient visibility> as indicated by the green arrow in the figure, the green box shows the Australian Feed Library. You can scroll to see more ingredients.



## 9.6 Open SNV Tropical feed library (under the folder Shared library)

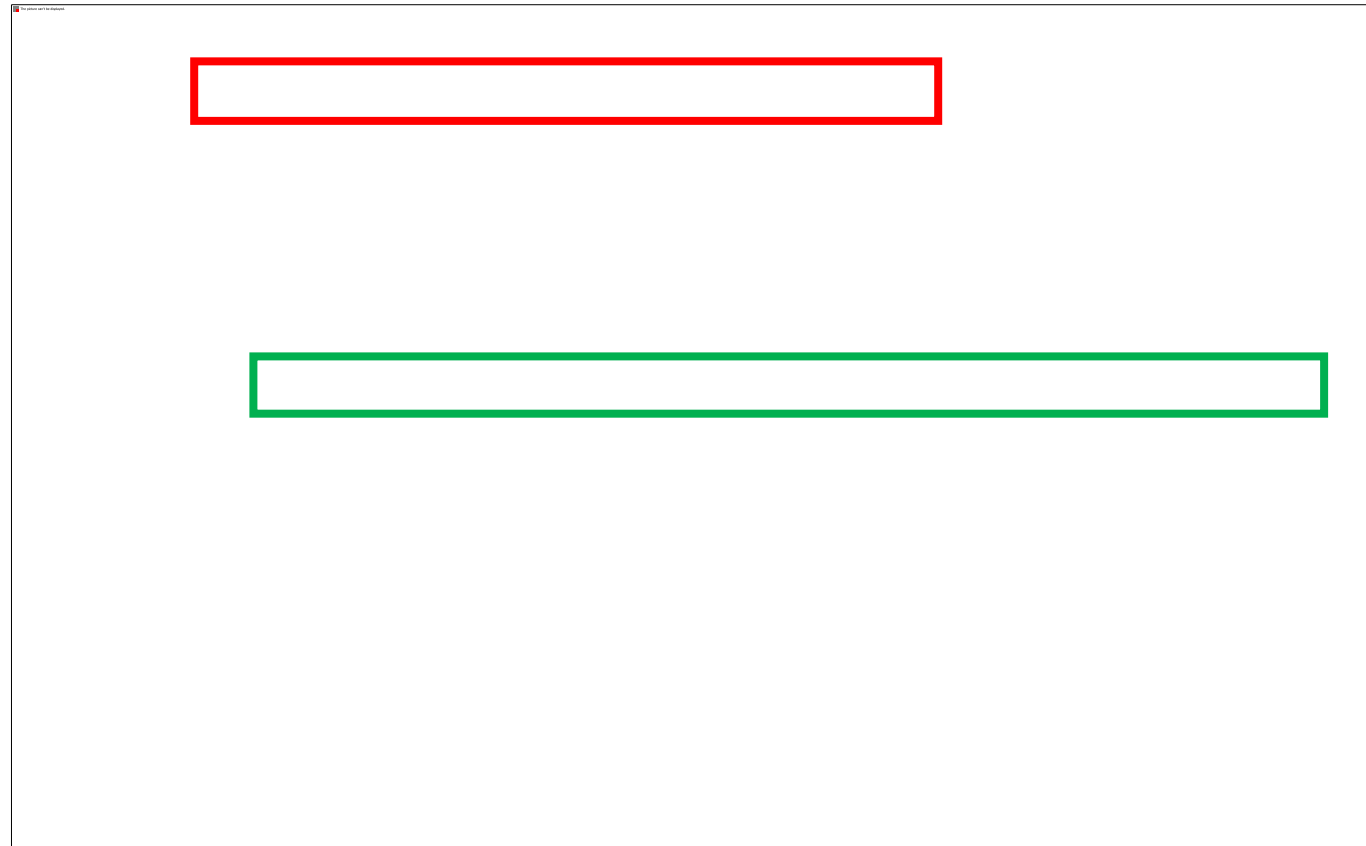
- To change the Australian Feed Library to SNV Tropical Library, go to the right hand of the page named Library management.
- On the bottom of the right-hand section highlighted in the red box as 'Shared feed library', Click 'Open'.





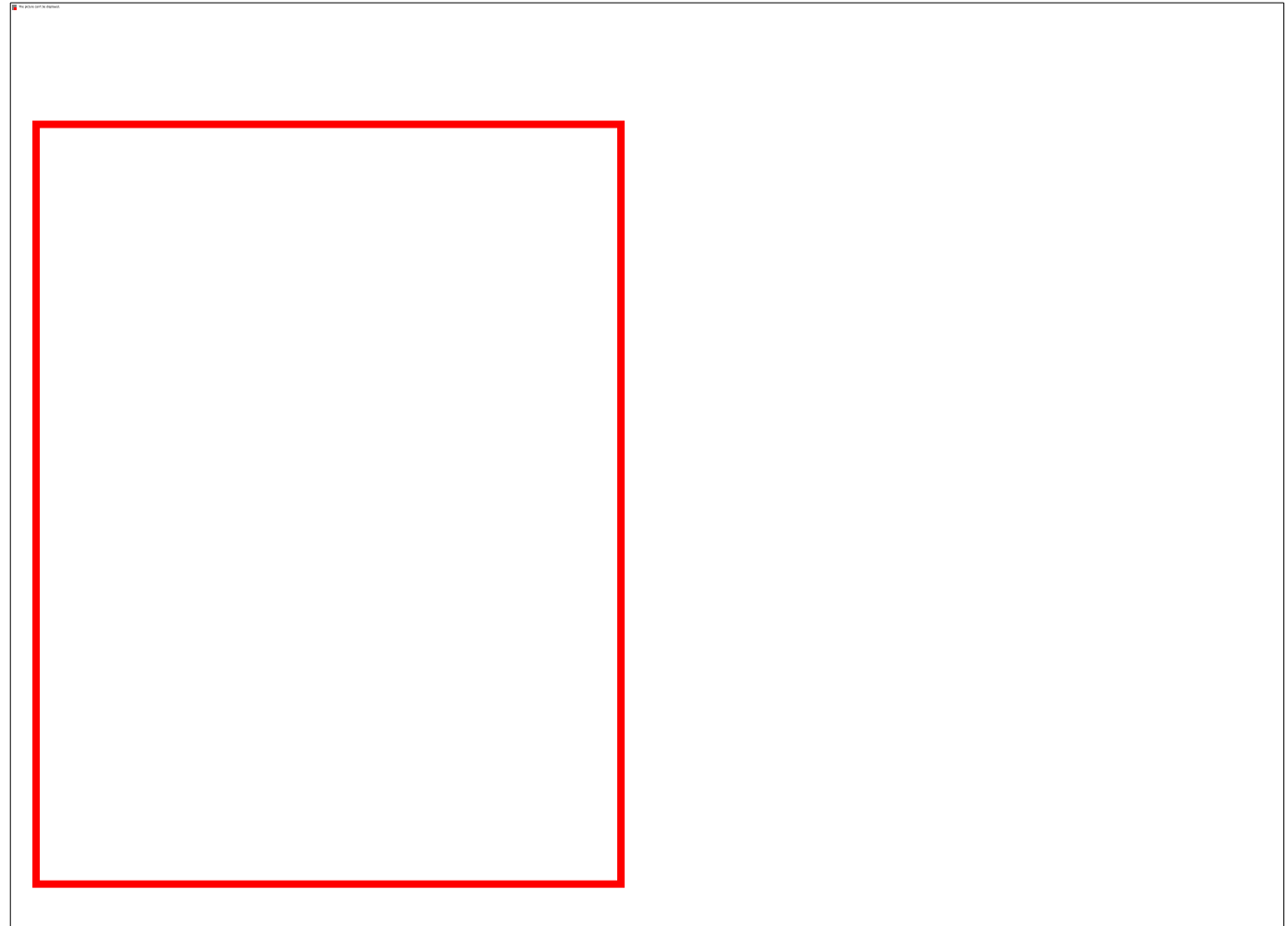
## 9.7 Open SNV Tropical feed library (under the folder Shared library) Cont'd...

- Clicking 'Open' in the Rumen 8 software will direct you to the Rumen 8/ 'Shared library' folder (red box).
- Select the '**SNVFeedLibrary2.0**' (green box) and click open (blue box).



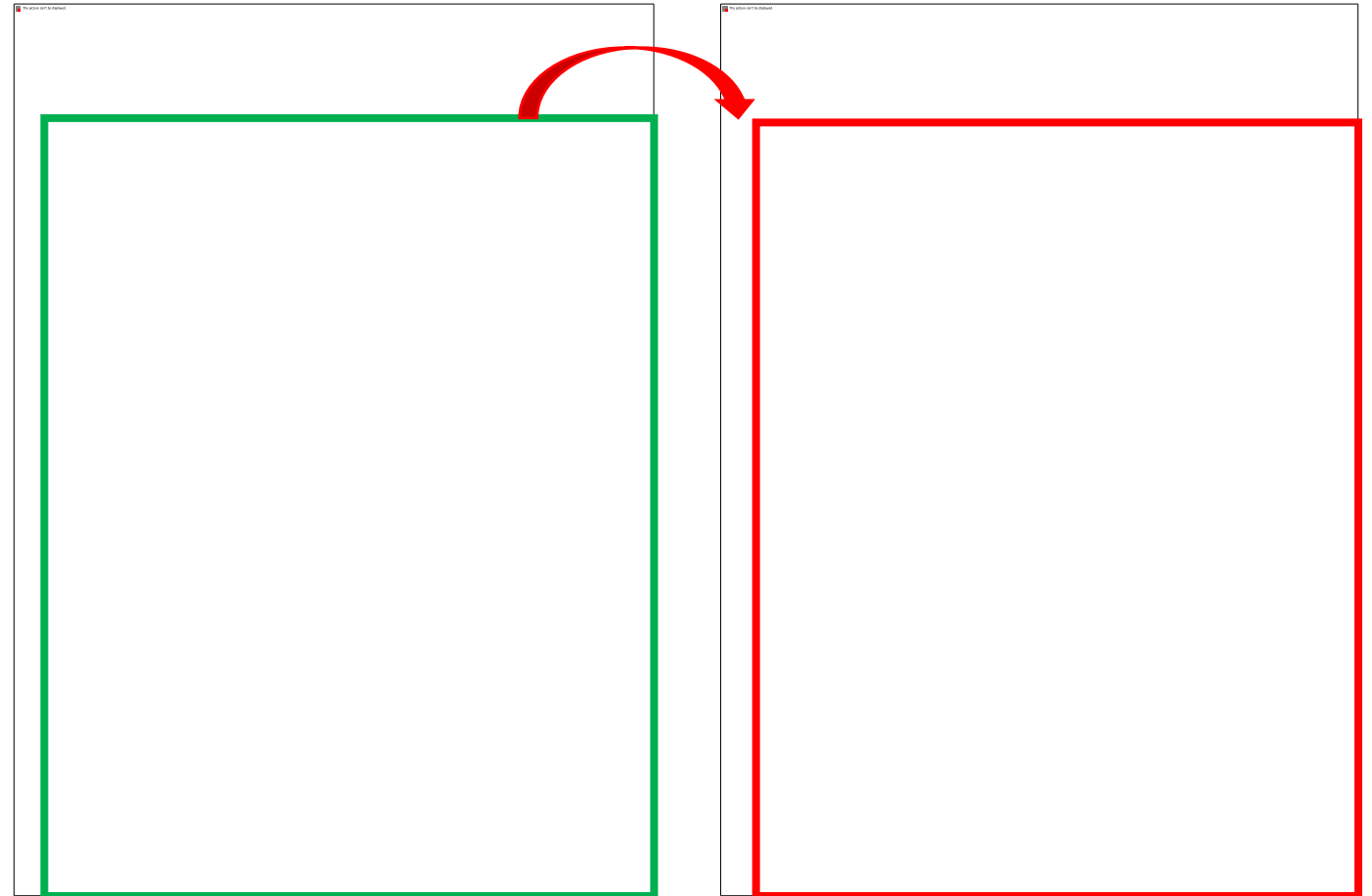
## 9.8 The SNV Tropical Feed Library

- The figure on the right shows the SNV Feed Library active for use. Notice the difference from the Australian Feed Library is the slides before.
- The SNV Tropical Feed library is used as a reference and cannot be edited (the grey/faint in color).
- The grey feeds were duplicated and made active for user to use as is (the black/dark in color).

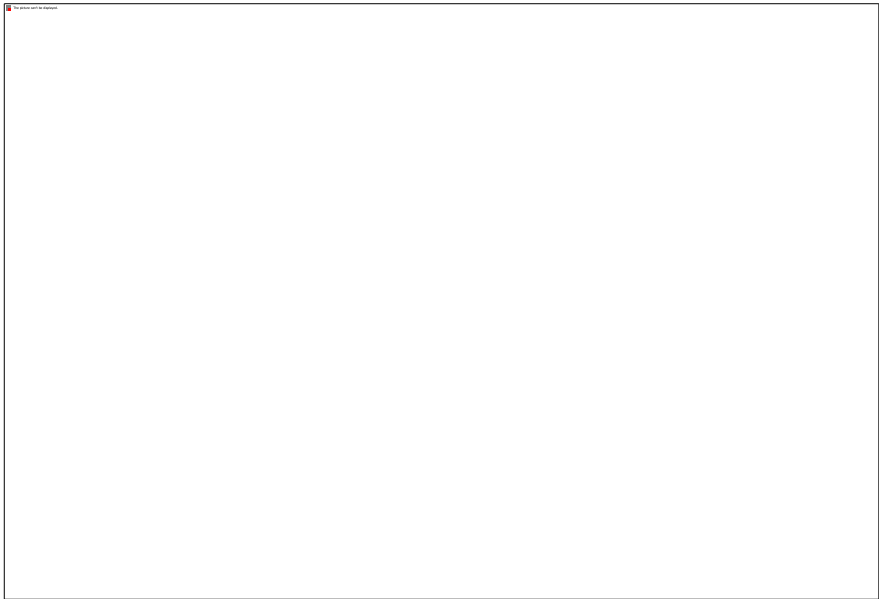


## 9.9 The Empty Feed Library

- The Empty feed library was created from the SNV Tropical Feed Library (green box).
- This is to help a user to create their own feed library, with the available feeds/ingredients from the farm.
- This marks as a starting point; and some examples are given in the empty feed library, it has some feeds in dark/black color meaning it has few feeds populated/copied as examples (red box).



## 10. Important note: Download Part II and III



*This module continues in Part II  
and ends with Part III...*

**- PROCEED TO PART II -**