



FAO Ration Tool

User Guide

*Before use, please ensure that your administrator has checked and validated the file for proper use in your area of work.
(If you are user as well as an administrator, please ensure that you first read the User guide for administrators and update the FEED DATABASE sheet in the Excel file)*

Quick use:

- Open the file and allow macros;
- Enter or select values in white cells and calculate rations :

1. Select each tab one after the other to enter your values

3. Read and check animal needs

4. Click to calculate ration

2. Select or enter the appropriate values in white cells

5. Read calculated intake nutrient values, ration price and economical data

6. Print datas & results

7. Click to quit the application

FAO Ration Tool

Food and Agriculture Organization of the United Nations

Cow data | Ration calculation | Milk Income less Feed Cost (MIFC) | Acknowledgment

Data inputs

Live weight (kg)	475
Pregnancy (mth)	2
Milk volume (kg)	10
Milk fat (%)	3,3
Milk protein (%)	2,8
Live weight gain/loss (kg/d)	0
Stage of lactation	Early lactation

Energy needs

51,891	MJ ME/d
0	MJ ME/d
47,3	MJ ME/d
0	MJ ME/d

Dairy Cow Ration Calculation

Calculate ration

Needs

Energy	99,191
Crude Protein	2,28
Ca	114
P	57
Max intake	14,25
NDF min	30
Concentrate max	50

Intake

116	MJ/d
2,48	kg/d
13,17	g/d
24,19	g/d
12,42	kg DM/d
50,32	% DM
29,59	% DM

Feed Cost (/d) 49,75

MIFC (/d) 70,25

Ration price (/kg) 1,07

Admin | Print | Quit



Detailed user guide:

Excel settings

To use the file, Microsoft Excel has to be installed. Current version of the file has been optimized for Excel 2016 version and could run improperly on other versions.

The file contains VBA programs, known as « macros ». Please ensure your computer settings authorize you to open macros or notify you when Excel files contain such programs. To do so:

1. Click on « File » tab.
 2. Then in the « Security Warning » area, click « Enable Content ».
 3. Under « Enable Content », click « Always enable this document's active content ».
- The file becomes a trusted document.

The program uses a special add-in of Excel called « Solver ». It needs to be installed:

1. Click on « File » tab
2. Click on « Options »
3. Select « Add-ins »
4. Click « Go...» button
5. Select « Solver Add-in »
6. Validate.

You might also install the Solver program in the VBA section, or check it has been installed in that section. To do so:

1. Click on « File » tab
2. Click on « Options »
3. Select « Add-ins »
4. Click « Go...» button
5. Select « Analysis ToolPak VBA»
6. Validate.
7. Go to the « Developer » tab
8. Click on the « Visual Basic » button
9. Click on the « Tool » tab
10. Click on « References... »
11. Select « Solver »
12. Validate.

Open the file

Double click on the file icon named “FAO Ration Tool.xls”

A window or a security warning should be displayed as bellow:

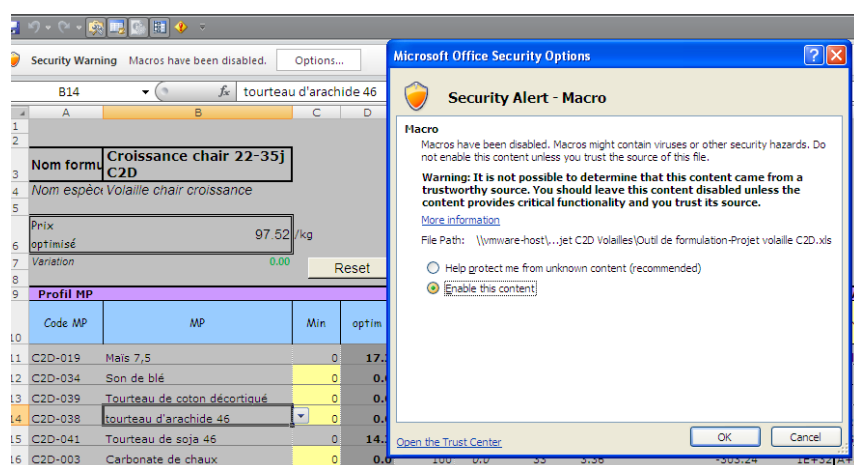
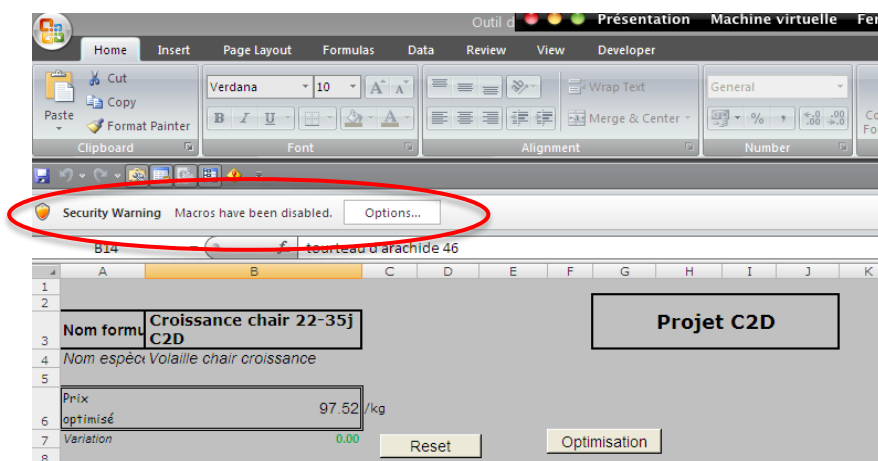
On the message bar click « Enable Content » as follow:



The following image is an example of the Message Bar when macros are in the file.



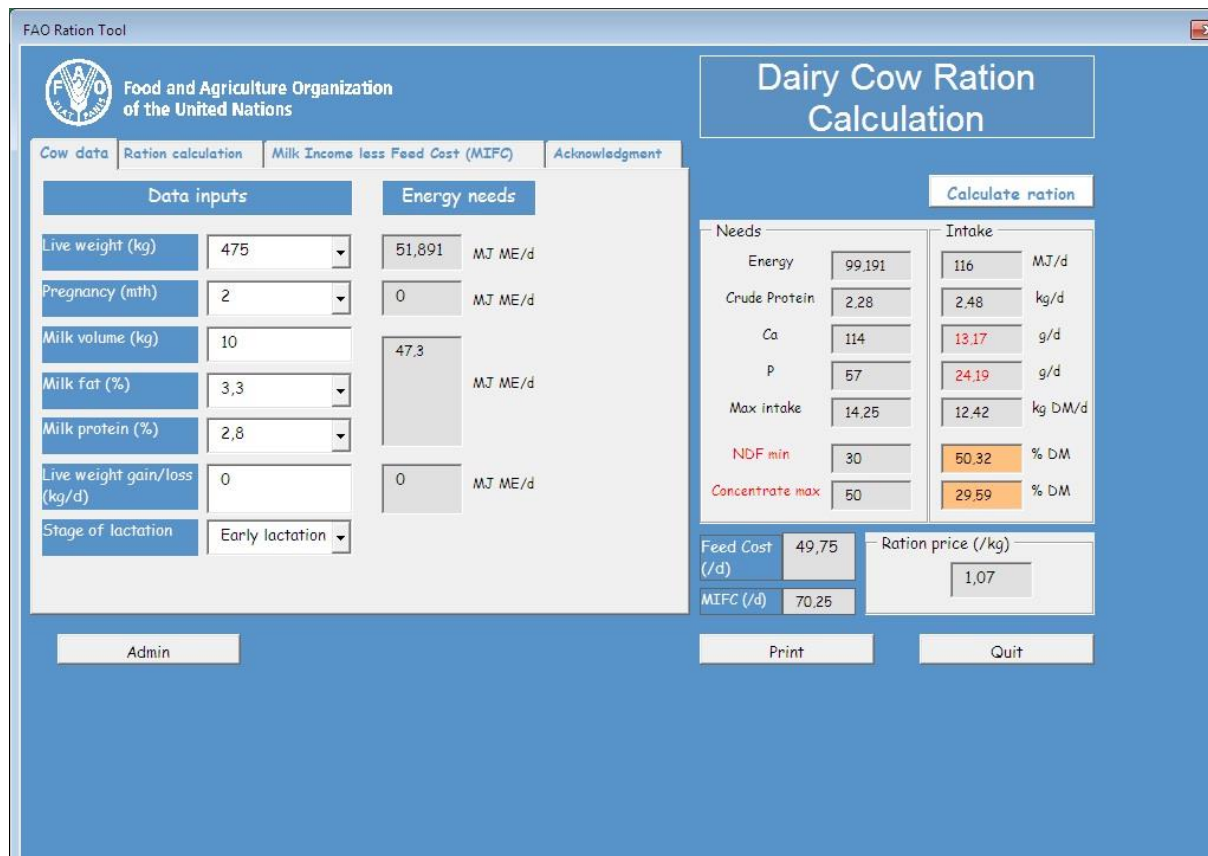
Or click on the “Option” button, and enable the content to activate macros or activate the macros directly if you’re invited to do so. If you don’t activate the macros the program will not work.



User form

After you've activated the macros, the file opens and a user form should be displayed.

If you don't see any user form and only see the Excel file, please contact your administrator who gave you the file.



FAO Ration Tool

Food and Agriculture Organization of the United Nations

Cow data | Ration calculation | Milk Income less Feed Cost (MIFC) | Acknowledgment

Data inputs

Live weight (kg): 475

Pregnancy (mth): 2

Milk volume (kg): 10

Milk fat (%): 3,3

Milk protein (%): 2,8

Live weight gain/loss (kg/d): 0

Stage of lactation: Early lactation

Energy needs

51,891 MJ ME/d

0 MJ ME/d

47,3 MJ ME/d

0 MJ ME/d

Calculate ration

Needs

Energy: 99,191

Crude Protein: 2,28

Ca: 114

P: 57

Max intake: 14,25

NDF min: 30

Concentrate max: 50

Intake

116 MJ/d

2,48 kg/d

13,17 g/d

24,19 g/d

12,42 kg DM/d

50,32 % DM

29,59 % DM

Feed Cost (/d): 49,75

MIFC (/d): 70,25

Ration price (/kg): 1,07

Admin | Print | Quit

Important !

You should only work using the user form, not directly on the Excel file! If in case of error you access the Excel file, please close the file and re-open it.

User form is composed of 4 different tabs and a main information panel:

1. Cow data. This tab concerns data input about cow description and characteristics. Values in white cells can be modified. User can use the dropdown list to select the correct input or enter the value directly in the cell. Animal energy needs for each criteria are calculated and displayed automatically depending on data input; total energy need is displayed on the panel on the right of the user form.



2. Ration calculation. This tab is used to select ingredients (dropdown list), enter their prices on fed basis, and set the maximum quantities the farmer can give to his/her cow per day. If the administrator has already entered the prices in the Feed database sheet, these will be displayed by default and you might not need to change it. However, if the prices have changed, you can make the change here. Pay attention not to select the same ingredient twice. Prices are per kg and quantities are maximum available in kg per day per cow. Both these parameters are on as-fed basis and NOT dry matter basis. Nutritional value parameters (under both 'Needs' and 'Intake'; in the right-hand block) are displayed as-fed basis except NDF, Max intake and concentrate max which are on DM basis. User has to keep an eye on concentrate and NDF values and make manual adjustments on ingredients if necessary.

FAO Ration Tool

Food and Agriculture Organization of the United Nations

Tab: Cow data | **Ration calculation** | Milk Income less Feed Cost (MIFC) | Acknowledgment

	Ingredient name	Price (/kg)	Max (kg/d)	Fresh feed intake
Feed 1	Fresh grass	0.2	4	41.94 kg/d
Feed 2	Corn stover	0.5	5	0 kg/d
Feed 3	Brewers grain	4	5	1.22 kg/d
Feed 4	Soybean cake	12	3	3 kg/d
Feed 5	Rice straw	1.2	3	0.4 kg/d
Feed 6	Bean silage	0.2	2	0 kg/d
Feed 7	<Empty>	0	5	0 kg/d
Feed 8	<Empty>	0	5	0 kg/d
Feed 9	<Empty>	0	20	0 kg/d
Feed 10	<Empty>	0	20	0 kg/d
Feed ingredient intake, as fed				46.56 kg/d

Dairy Cow Ration Calculation

Calculate ration

Needs		Intake	
Energy	94	116	MJ/d
Crude Protein	2.16	2.48	kg/d
Ca	114	13.17	g/d
P	67	24.19	g/d
Max intake	14.25	12.42	kg DM/d
NDF min	30	50.32	% DM
Concentrate max	60	29.59	% DM

Feed Cost (/d) 49.75 Ration price (/kg) 1.07

MIFC (/d) 58.25

Buttons: Admin, Print, Quit

Attention!

Set all prices in the same currency and per kg as fed, or the calculation will be incorrect! The currency is not defined to allow user to use the currency of one's choice, but it has to be always the same.

Maximum quantities available (with the farmer) are entered in kg per day per cow under the column **Max (kg/d)**. [Note: Please do not leave any box under the column **Max (kg/d)** blank. The software might not work properly. There should be some value under this column]



Quantities of ingredients (fresh feed in kg per day) can be modified manually (even if cells are in grey color) and results are displayed automatically (nutritional analysis and price of the ration).

It is possible to launch the automatic calculation of a least cost optimized ration, by clicking on the “Calculate ration” button. If an optimal solution has been found, quantities of ingredient are displayed under the column “**Fresh feed intake**” and nutritional values and price are displayed. If no solutions are possible or if the calculation has encountered a problem, a warning message is displayed. [Notes: 1. If no solutions are possible and a warning message is displayed. On pressing OK on the warning message, in some cases, the software gives an approximate solution. Please note that this solution is not the optimum solution. It is the nearest solution the software has found. In such a situation you either include another ingredient under the column “**Ingredient name**” or manually change the amount of ingredient available in the column “**Max (kg/d)**” column in order to maximize the chances to get an optimal solution, and then press the button: **Calculate ration** to arrive at the optimum solution. If protein is deficient (under **Intake** column) than the needed amount (under **Need** column), you may have to either increase manually the amount under the column **Fresh feed intake** of the already entered ingredient that is rich in protein or select another protein-rich ingredient under the column **Ingredient name**, and then press **Calculate ration** button. Same approach could be used for the energy. 2. Intake values appear in red if it is below requirement or above maximum value].

If you need to add another ingredient that does not appear in the top down menu, please contact your administrator or refer to the administrator guide.

If you have to deselect an ingredient under the column **Ingredient name**, select <empty> from the drop down menu. [As an administrator when you are entering feed ingredients, their chemical composition, price etc. in the Excel sheet: Feed database, please do not touch the <Empty> row. Do not replace <Empty> with another feed ingredient. This row (<Empty>) is vital for deselecting a feed ingredient. Also do not delete < or > sign which is before and after Empty respectively]



3. Milk Income Less Feed Cost (MIFC)

The tab allows user to calculate the incomes of the farmer's milk production per day. Only milk return per kg is required, the other values are calculated automatically from inputs of tabs "Cow data" and "Ration calculation".

FAO Ration Tool

Food and Agriculture Organization
of the United Nations

Dairy Cow Ration Calculation

Calculate ration

Cow data	Ration calculation	Milk Income less Feed Cost (MIFC)	Acknowledgment
Live weight	Pregnancy (mth)	Live weight gain/loss	Stage of lactation
450	1	0	Early lactation

	DM (kg)	Energy (MJ ME)	Protein (kg/d)	NDF (% DM)	Ca (g/d)	P (g/d)
Nutrient requirement	13,50	94,00	2,16	30,00	108	54
Nutrient supply	9,49	82,48	1,50	55,37	4,3	7,6

	Milk prod (kg/d)	Milk fat (%)	Milk protein (%)	Milk return (/kg)	Milk return (/d)
Milk yield	9,00	3,50	3,10	12	108,00

Needs	Intake	
Energy	94	82 MJ/d
Crude Protein	2,16	1,50 kg/d
Ca	114	4,28 g/d
P	57	7,58 g/d
Max intake	14,25	9,49 kg DM/d
NDF min	30	55,37 % DM
Concentrate max	50	11,57 % DM

Feed Cost (/d)	Ration price (/kg)
22,69	0,53
MIFC (/d)	85,32

Admin

Print

Quit



4. Acknowledgment

The team and people who have participated to make this program are presented here.

The screenshot shows the 'FAO Ration Tool' window with the 'Acknowledgment' tab selected. The main area displays the following text:

Creation : FeedAccess

Software inputs : John Moran, FAO
Harinder Makkar, FAO

Suggestions : Olaf Thieme, FAO

June 2016

At the bottom left is an 'Admin' button. On the right side, there is a 'Dairy Cow Ration Calculation' section with a 'Calculate ration' button. Below this, there are two columns of input fields: 'Needs' and 'Intake'.

Needs	Intake
Energy	94
Crude Protein	2,16
Ca	108
P	54
Max intake	13,5
NDF min	30
Concentrate max	50

Below the input fields, there are two summary boxes:

Feed Cost (/d)	40,05
MIFC (/d)	67,95

Ration price (/kg)	1,73
--------------------	------

At the bottom right are 'Print' and 'Quit' buttons.

The user form has 2 buttons available anytime:

1. "Quit" button to exit the program
2. "Admin" button to access the Excel file and change values and setting. A password is required to access this function and is reserved for administrators.

Contact at FAO:

Harinder P.S. Makkar
Animal Production and Health Division
Food and Agriculture Organization of the United Nations (FAO)
Rome, Italy

E-mail: Harinder.Makkar@fao.org