

Training report on Rumen8 computer software for dairy cows feed rations for Youth Agripreneurs, dairy experts, teaching staff, researchers and extension staffs in Tanga and Kilimanjaro Region

David Ngunga and Beatus Nzogera



2021

Table of Contents

1. Introduction	3
2. Objective of the training	3
3. Training sessions covered	4
a) Nutrient requirement of dairy cows:	4
b) Introduction of Rumen8 computer software, Installation and practices:	4
4. Dairy feed management plan (FMP) checklist	5
5. Observations	5
6. Recommendation after Rumen8 training	6
7. Evaluation	6
8. Final remarks	8
9. Way forward	8

1. Introduction

Dairy farming in Tanzania is dominated by smallholder farmers. Despite the fact that small-scale milk production is widely distributed in different parts of Tanzania, mainly where the climate is favorable, the supply of milk and milk products in these regions has not kept up with the rapid increase in the human population. Productivity of existing small dairy herds is limited primarily by lack of feed supply, lack of infrastructure for feed input and output markets, milk and dairy byproducts and a low flow of information.

The current situation in accessing quality and quantity dairy feeds in Tanga and Kilimanjaro is unpredictable especially in the dry season of the year. The main on-farm feed resources obtained in these area include grasses, legumes, crop residues, cereals and oil seed products which often do not satisfy feed demand of dairy animals (Maleko et al. 2016 and Lukuyu et al., 2016). This has resulted in dairy farmers to purchasing off-farm feed, feed less feed with low nutrient values, and feed excessive levels of concentrates, which is a costly strategy for most small dairy farmers.

Irrespective of all those challenges, there still opportunities that if strategically applied can enhance accessibility of quality and quantity feed to feed dairy cows with rations that contain enough nutrients for growth, maintenance, pregnancy, activity, reproduction and milk production. Avoiding excessive amounts of nutrients is important as it could affect cow health, reduce feed conversion efficiency (kg of milk per kg of feed and reduce) margin over feed costs. As well underfeeding will impact performance and will impact on cow health and fertility if severe. Cow requirements are assessed on several nutritional factors. Aside from water, which is a critical input, feed inputs and feed requirements are measured in terms of energy, protein, fibre, fat, vitamins and minerals. Factors such as cow age and weight, milk yield, stage of lactation, pregnancy, activity and environmental conditions will all affect feed requirements.

Thus, this training on using Rumen8 software was to help dairy farmers to specify their cows for which the ration is to be designed depending on feed stuff available and/or be accessed depending on where they are.

2. Objective of the training

- To obtain dairy feed management plan (FMP) checklist that normally available in the two regions Tanga and Kilimanjaro.
- Equip Youth, dairy farmers and dairy extension staffs with skills on using Rumen 8 computer software in developing dairy feed rations.

The training bring together the animal health (AH), artificial insemination (AI), forage producers-youth agripreneurs and extension officers from Tanga and Kilimanjaro Regions.

3. Training sessions covered

There were two main training sessions;

- a) Nutrient requirement of dairy cows: During lactation, lactating cows have very high nutritional requirements relative to most other animals. Meeting these requirements especially for the energy and protein is challenging in many small dairy keepers. Thus, it necessitate dairy keepers to prepare diets of sufficient nutrient concentrations to support production and metabolic health, while supporting rumen health and the efficiency of fermentative digestion.

- Training participants were given an opportunity to discuss and share their experiences of feeding dairy cows and the challenges arises in field and alternatives to the challenges occurs in obtaining feed for dairy cows and general management of dairy cows practiced by dairy farmers in their areas of work.

Think of Feed intake:

DMI values are in the range of 3.5%–4% of body wt.

DMI is affected by both animal and feed factors. Body size, milk production, and stage of lactation or gestation are the major animal factors.

Feed factor: Total ration moisture concentrations >50% generally decrease DMI, Rations high (>30%) in neutral detergent fiber (NDF) may also limit feed intake

- b) Introduction of Rumen8 computer software, Installation and practices:

Rumen8 is a simple computer based tool that 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 diet meets specified requirements and what the expected return will be based on current or projected milk prices. The rumen8 software can accommodate 15 feed ingredients during dairy feed formulation. Thus, it allows a farmers to have a wide choice of diets to develop for feeding a dairy cow.

The steps taken during the training on Rume8 was as follows:

- To download the tool
- Install the tool
- Create folder with Rumen8 – Document
 - Create folder with a name of participant/owners laptop
 - Create a shared Library
- Registration
- Go to File and change to Standard mode from compact mode
- EDIT – Edit feed
 - Create mixes
 - Edit feed parameters

4. Dairy feed management plan (FMP) checklist

Participants were given an opportunity to develop a dairy feed management plan (FMP) checklist that normally available in wet and dry season in their environments (Tanga and Kilimanjaro regions)

Dairy feed checklist mentioned in two regions Tanga and Kilimanjaro

Region	Feed type	Tanga		Feed type	Kilimanjaro	
		Wet	Dry		Wet	Dry
1	Natura grass mixture	√	√	Natura grass mixture		
2	Guinea grass	√		Guatemala		
3	Brachiaria	√	√	Brachiaria	√	√
4	Rhodes grass hay	√	√	Rhodes grass hay	√	√
5	Rice straw		√	Rice straw		√
6	Napier	√		Banana leaves	√	
7	Leucaena	√	√	Been haulms		√
8	Desmodium	√		Desmodium		

Having dairy feed checklists from both regions helped the participants to develop dairy rations. Participants mentioned the type of feeds and the amount offered to dairy cattle, and were added in the Rumen 8 software.

5. Observations

The amount of food fed to dairy cows had two major effects:

- i. The dairy cows were given large amount of feeds compared to their body size and production (milk yield per day). Excessively dry matter intake was seen in the diet provided.
- ii. The diets offered to dairy cattle missed important mineral contents like Calcium and Phosphorus.

After having practiced on the ingredients provided with participants, the following parameters was put into considerations:-

- The body size of the dairy cattle (weight of the cow)
- The amount of milk the dairy cows was providing
- Days pregnant
- Days a dairy cow in milk
- Distance covered (walked) per day.

It was observed that when the dairy diets prepared while considering these parameters, it helps to attain an exact amount of feed given to dairy per day that meets the DMI of an animal. It also, helps to develop a ration that contains ingredients where important minerals like calcium and phosphorus is mate in the diets.

6. Recommendation after Rumen8 training

Finally, participants were asked to propose opportunities to be prioritized in dairy cow feeding in their areas. The discussions around this topic, insinuated the following recommendations:-

- The Rumen8 program should widen the scope of interventions, be trained to many extensor officers, dairy specialist, students in colleges and all other important actors of dairy.
- Public awareness on different technology packages Pasture establishment, harvesting, storage, feed management and utilization techniques should be invested to dairy keepers.
- Improve natural vegetation and introduction of improved pasture
- Formalize and strengthen fodder value chain.
- Capacity building on pasture production, utilization, and conservation
- Impart knowledge /skills to the rural people on quality and production of Dairy

7. Evaluation

As part of the closing of the training, the facilitator requested participants to evaluate the training by providing information of what went well and what ought to be done differently in the future. In this exercise, participants were provided with piece of paper, whereas each participant was supposed to fill in the paper. The responses obtained thereof, are presented as follows:-

SN	WHAT WENT WELL	WHAT COUD HAVE BEEN DONE DIFFERENTLY
1	The first and second sessions went well. It was a nice session because, we refreshed our knowledge on Dairy feed requirements and Feed intake and through Rumen8 Software we had an opportunity to learn and understood more things that we did not know before	Limited time it should be 2 days

SN	WHAT WENT WELL	WHAT COUD HAVE BEEN DONE DIFFERENTLY
2	Practiced adding different feed stuffs in the tool, which brought good results.	Time was short that did not allow to learn more things that are in the software
3	The training objectives were met, and the time was well managed	Time was too short. I wanted to practice like four different diets
4	The time management conducted well since morning	Lack of facilities (Laptop to participants).
6	The training environment was good and conducive	Time was not enough for discussion
7	Organization of the workshop and presentation from the scientists	The Rumen8 software did not work in the smartphone
8	The training was participatory	People doesn't know a simple way of weighing forages
9	Participation of all involved was really good	Few female participants
10	The topics were well presented, and the participation of the audience was good	Limited time
11	The facilitators were friendly and cooperative	Not enough to discuss things deeply
12	Full participation and engagement of participants	Not enough time
13	The flow of the training from the beginning to the end was good, there was also good time management and member cooperation, and participation was good	The workshop should be organized for 2 days
14	Well organized such that we managed to finish	Time limitation it should be 2 days
15	Well organized, topics, presentation flow and it is well participatory	
16	Involvement of different participants on the training which helped to increase the understanding	
17	The training helped participants to understand in deep the importance of dairy feed formulation in dairy production	The network at the training centre was not efficient

SN	WHAT WENT WELL	WHAT COULD HAVE BEEN DONE DIFFERENTLY
18	The food was good and delicious	
19	Objectives were clear to all participants	
20	Organization of the training was well and fantastic	

8. Final remarks

The Alliance of Bioversity International and International Center for Tropical Agriculture (CIAT) would like to thank all the participants for their high level and quality of participation, as well as the SNV and Solidaridad office in Hai and Tanga respectively for their dedicated and outstanding administrative support before, during and after the training. The training was officially closed at 5pm by David Peter Ngunga, Feed & Fodder and Environment consultant – CIAT - Arusha

9. Way forward

The knowledge acquired in this training would help in developing diets for dairy cows in Tanga and Kilimanjaro Regions in building sustainable dairy cattle production. Some important steps to be taken the training participants are:-

- To train dairy producers/farmers on the use of Rumen8 computer software in dairy feed formulation.
- Practice dairy feed formulation to at least five (5) dairy household keepers by using Rumen8 computer software.
- Record milk yield, feed intake before and after use of Rumen8 computer software.