

# UREA MOLASSES MULTI-NUTRIENT BLOCK PRODUCTION AND UTILIZATION MANUAL



Applicable for mid-altitude areas including Dera, South Achefer, Burie and Jabi Tehenan Districts of North-western Ethiopia

Yenesew Abebe, Agraw Amane,  
Yihenew G.Selassie and Dessalegn Molla

NOVEMBER, 2015





**Capacity building for scaling up  
of evidence-based best practices  
in agricultural production in Ethiopia**

The CASCAPE project is designed to assist the activities deployed under the Agricultural Growth Programme (AGP) by further strengthening the capacity of AGP stakeholders in identifying, documenting and disseminating best practices in agricultural production. CASCAPE is jointly executed by Ethiopian researchers from Jimma University, Haramaya University, Bahir Dar University, Hawassa University, Mekelle University, Addis Ababa University and Dutch researchers from Wageningen University and Research Centre. In each site researchers from the universities and from the RARIs from different disciplines work on the CASCAPE project. The CASCAPE project is financed by the Dutch Ministry of Foreign Affairs through the Embassy of the Kingdom of The Netherlands.

For further information and requests for copies please send an E-mail to [info@cascape.info](mailto:info@cascape.info).



## Abbreviations

ANRS

Amhara National Regional State

CP

Crude Protein

CSA

Central Statistical Agency

UMMB

Urea Molasses Multi-nutrient Block



## Table of contents

1. Introduction .....	1
2. How to make Urea Molasses Multi-Nutrient Block /UMMB/ .....	2
3. Procedures of Urea Molasses Multi-nutrient Block /UMMB/ Production .....	2
3.1 Preparation of the ingredients .....	2
3.3 Weighing and Mixing of ingredients .....	3
3.4 Casting and Molds .....	6
3.5 Drying .....	7
4. Characteristics of a good Urea Molasses Multi-nutrient Block .....	8
5. Feeding of Urea Molasses Multi-nutrient Blocks to animals .....	9
6. Precautions while supplementing Urea Molasses Multi-nutrient Block .....	9
References .....	11



## List of Figures

Figure 1. Preparation of ingredients for UMMB production.....	4
Figure 2. Using hanging scale to Weigh ingredients for UMMB production .....	5
Figure 3. Mixing the two mixtures together .....	6
Figure 4. Molding the UMMB using small plastic buckets.....	7
Figure 5. Drying the UMMB under shade using wooden racks .....	8

## 1. Introduction

The livestock population of Ethiopia is estimated to be 53.4 million cattle, 25.5 million sheep and 22.8 million goats (CSA, 2011). About one-third of the country's livestock population is found in the Amhara Region. The majority of people in the region live in rural areas and its livelihood is based on crop and livestock production. Livestock production is an integral part of the farming systems in all parts of Ethiopia. The sector plays a vital role in the livelihood of the majority of people in the country. However, the benefit obtained from the livestock resources are limited because of various factors.

Farmers in ANRS mainly depend on unimproved crop residues and natural grazing for their animal feed requirements with the annual total feed deficit of 28 - 42% per year (BoARD, 2010). Livestock diets in Ethiopia are based on fibrous feeds like mature pastures and crop residues. These feeds are deficient in CP, minerals and vitamins and are poorly digestible. Both these characteristics keep intake and productivity low. Poor nutrition and poor feed availability are the major limiting factors in productivity of animals in the country.

Supplementation with Urea Molasses Multi-Nutrient Blocks (UMMB) can increase digestibility of fibrous feeds by up to 20%, increase the nutrients the animal receives and can increase feed intake by 25 to 30% (ESGPIP, 2007). UMMBs are a convenient way to make and store molasses and urea and also feed to animals. It can easily be made and used by small-holder farmers and commercial producers. In addition, a producer may make and sell blocks to farmers as a source of income. The technology is particularly applicable in areas where ruminants basically feed on fibrous crop residues or poor quality forage diets. Several formulations are available for the production of UMMB, which allows responding to different prices and availability of potential ingredients. UMMB production and use is practiced in a number of countries and the result indicated that it improves the productive and reproductive performance of dairy cows and sheep.

UMMB can be an important source of supplement for ruminant animals to increase feed intake and productivity. This supplemental feed resource is rich in nutrients like carbohydrates, proteins and minerals.



## **2. How to make Urea Molasses Multi-Nutrient Block /UMMB/**

UMMB is made from different ingredients where each has its own contribution in the mixture. It is usually made up of molasses, urea, cement, wheat bran, protein rich by-products, salt and water which are mixed and processed to the form a block.

Molasses provides energy and minerals like sulfur. It increase its intake by the animal. Urea is a non-protein nitrogen source which is essential to improve the digestibility of the feed by providing fermentable nitrogen. Cereal bran is the most common fibrous feed used and provides energy and helps hold the block together. Noug seed cake is added to supply protein and it is a bypass protein source and provides immediate function for the animal. Salt is added to the blocks to supply minerals and to control the rate of consumption. Cement is used to make the block. It makes the block hard and provides calcium.

## **3. Procedures of Urea Molasses Multi-nutrient Block /UMMB/ Production**

Urea Molasses Multi-Nutrient Block can be manufactured on the farm. UMMB manufacture is easy and simple and can be afforded by small-holder farmers and commercial producers. Different methods exist which may be used according to local conditions. The manufacturing of UMMB can be divided into four stages as follows (ESGPIP, 2007).

### **3.1 Preparation of the ingredients**

The amount of the different ingredients needed to make the UMMB depends on the size of the block to be manufactured and the formula to be used. UMMB with different weight/size can be prepared (1kg, 5kg, 10kg etc). The weight of the block to be made determines the amount of each ingredient to be mixed. Using the following proportion, UMMB can be produced by thoroughly mixing the exact quantities of the components; 34% molasses, 10% urea, 15% cement, 25% wheat bran, 13% Noug seed cake and 3% common salt. For instance, to produce a 5 kg UMMB, 1.7 kg molasses, 0.5 kg urea, 0.75 kg cement, 0.94 kg wheat bran, 0.65 kg Noug seed cake and 0.15 kg common salt is needed.

### 3.3 Weighing and Mixing of ingredients

Before starting production of UMMB preparation of the necessary ingredients is necessary (Figure 1). Thorough mixing is a key for good UMMB making. Urea must be mixed thoroughly by breaking up lumps to avoid pockets of high concentration that could harm animals. Do the following to mix the ingredients.

- ❖ Weigh the amount of ingredients based on the proportion of the block (Figure 2);
- ❖ Add urea to the molasses while continuously mixing/stirring until the urea grains completely dissolve in molasses
- ❖ The molasses can be heated in the sun to improve handling and mixing;
- ❖ Never add water to molasses. It has to be thick
- ❖ Similarly cement and salt will be dissolved in 200 ml of water prior to being added to the first mixture of urea and molasses.
- ❖ After mixing the two mixtures (molasses & urea mixture and salt & cement mixture) together (Figure 3), little by little wheat bran and noug seed cake will be added to make the third mixture and thoroughly mix until the final mixture has a dough texture.





Figure 1. Preparation of ingredients for UMMB production



Figure 2. Using hanging scale to Weigh ingredients for UMMB production





Figure 3. Mixing the two mixtures together

### 3.4 Casting and Molds

Once the ingredients are thoroughly mixed and homogenous mixture formed, place the mixture into molds (Figure 4). Any local container, such as tin cans or small buckets can be used as a mold. Using a plastic sheet to line the molds will make block removal from the mold easier. The size of the mold to be used depends on the size of UMMB to be manufactured. For example to manufacture 5kg of UMMB we can use rectangular wooden frame of 30\*20\*20 cm depth, length and width, respectively. Compaction will be applied using a wooden bar. After this process the block will be left for 24 hours in the mold until it maintains a proper shape.



Figure 4. Molding the UMMB using small plastic buckets

### 3.5 Drying

The block will be removed from the mold after 24 hours. The UMMB will be left to dry in a well ventilated room under a shade for about 5 days depending upon the weather condition, after which it will be ready for feeding animals (Figure 5).





Figure 5. Drying the UMMB under shade using wooden racks

#### 4. Characteristics of a good Urea Molasses Multi-nutrient Block

A block is considered to be good when it fulfils the following characteristics (ESGPIP, 2007):

- ❖ Ingredients are well – distributed throughout the block
- ❖ It does not have lumps of urea
- ❖ It is hard enough not to be squashed between our fingers and should be resistant enough not to break when a person steps on it
- ❖ Our hands should feel the sticky molasses when we hold the block.

## 5. Feeding of Urea Molasses Multi-nutrient Blocks to animals

Blocks should be fed as a lick so that only the top surface is accessible to the animals. This prevents animals from pushing the blocks around, breaking them up and consuming large chunks that could cause urea toxicity (ESGPIP, 2007). It should be given for cows and oxen; sheep and goats above 6 months of age. It should not be given for calves, chicken and lambs/kids.

Blocks should be introduced to animals slowly and should be fed after animals have consumed adequate forage. This prevents animals from consuming too much at any one time. UMMB should never form the main diet. They are meant to be a supplement to a basal diet of forage. It is advisable to give access to sheep and goats for one hour during the first week of adaptation, two hours during the second week and free access after the third week. It is also advisable to give access to cattle not more than 1 - 2 hours per day for adaptation.

Block hardness will affect its rate of intake. If too soft, it is consumed too rapidly and there is a risk of toxicity. If too hard, intake may be too little. Urea at high levels is unpalatable. High levels of urea in UMMB may reduce intake of the block as well as of straw due to the bitter taste. High levels or imbalances in minerals may result in excessive consumption in a short time also leading to urea poisoning. Precautions should be taken to avoid this problem of overconsumption in drought prone areas particularly towards the end of the dry season when feed is scarce.

## 6. Precautions while supplementing Urea Molasses Multi-nutrient Block

It is essential to note the following while supplementing Urea Molasses Multi-nutrient Blocks /UMMB/ (ESGPIP, 2007).

- ❖ Feed to ruminants only (sheep, goats and cattle).
- ❖ Do not feed to monogastrics, i.e., horses, donkeys, or pigs.
- ❖ Do not feed to young ruminants less than six months of age (kids, lambs)
- ❖ Blocks should be used as a supplement and not as the basic ration
- ❖ A minimum of coarse forage in the rumen is essential



- ❖ Never give blocks to an emaciated animal with an empty stomach. There is the risk of poisoning due to excessive consumption
- ❖ The amount of blocks fed to sheep and goats should be limited to 100 grams/day while for cattle it should be limited to 700 grams/day ;
- ❖ The blocks should never be supplied in ground form or dissolved in water as this can result in over consumption
- ❖ Supply sufficient amount of water *ad lib*



## References

Bureau of Agriculture and Rural Development (BoARD), 2010. Animal Feeding Strategy. Amhara National Regional State. Bahir Dar, Ethiopia. (Unpublished).

CSA (Central Statistical Agency), 2011. Volume II: Report on livestock and livestock characteristics (Private peasant holdings), Addis Ababa.

ESGPIP (Ethiopia Sheep and Goat Productivity Improvement Program), 2007. Technical Bulletin No. 1. How to make urea molasses blocks (UMB) and feed to sheep and goats. Addis Ababa, Ethiopia.