



# Review Paper on Determining Stocking Rate in Tropical Countries by the Use of Tropical Animal Unit Month (Taum)

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**Abstract:** This review paper is prepared with objective of to revise scientific information about how carrying capacity of a grazing land calculated in tropical Africa. An animal unit month (AUM) is the amount of dry forage one mature cow of approximately 250kg with a calf requires for one month in the tropical countries. Stocking rate is commonly stated as hectare per animal unit month (AUM) or its reciprocal, AUM's per hectare. One Tropical Livestock Unit (TLU) denotes the feed requirement of a standard animal of a certain live weight (usually 250 kg). Carrying capacity can be calculated either by Animal Unit Equivalents or Average Animal Weight. The steps followed to calculate stocking rate using Animal Unit Equivalents are determining total production of the area, calculating total "available" forage by using the "take half, leave half" method, either divide total production by 2, or multiply by 0.5, determine kilograms of forage eaten by cattle per month, calculate proper stocking rate for cattle, convert for Animal type you are using with Animal Unit Equivalents, and lastly calculating number of animals you can keep over the time needed consecutively. I case of Average Animal Weight Method the steps followed are determining total production of the area, calculate total "available" forage, calculate the required forage for the animal, regardless of the breed or species, and determine the daily and monthly forage requirement for their size by using the conversion factor of 2.667%, calculate proper stocking rate for class of livestock you are using and lastly determining the number of animals you can graze over the time needed.

**Keywords:** Stocking Rate, Grazing Land, Tropical Animal Unit Month, Animal Unit Equivalent

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## 1. Introduction

The Animal Unit Month (AUM) concept is the most widely used method to determine the carrying capacity of grazing animals on grazing lands (FCAD, 2015). The AUM provides us with the approximate amount of dry grass forage a 250kg cow with calf will eat in one month. It was standardized to the 250kg cow/calf when they were the most prevalent form of livestock on rangeland. For grazing land to qualify for agricultural special appraisal, it must support a one animal unit as a basic minimal requirement. This is a part of the Degree of Intensity requirement which is specified annually. Land failing to meet the degree of intensity requirements for a specific use cannot receive agricultural appraisal. All other animals were then converted to an "Animal Unit Equivalent" of this cow/calf. For example, a mature sheep has an Animal Unit Equivalent of 0.10. This means a sheep eats about 10% of the forage a cow will eat in one month. This allows property owners or ranch managers

to match the number of animals with the amount of available forage. Wise and prudent land management helps prevent the dangers of overstocking. While there are numerous ways to calculate how many animals can be carried on a particular parcel, based on what is available and what is being consumed. How it can be altered depends on your management goals and management intensity. Stocking rate is commonly stated as acres per animal unit month (AUM) or its reciprocal, AUM's per acre (Manske, L. L. 1998a). To manage grasslands properly, the producer must know the number of cows that can be grazed on a grassland unit for a specified length of time. This number is termed the stocking rate (Manske, L. L. 2004). An animal unit month (AUM) is the amount of dry forage one mature cow of approximately 250kg with a calf requires for one month in the tropical countries. Determining stocking rate for a parcel of grassland by using range site identification and range condition assessment is a complex, time-consuming process. Most grassland managers have not had and most likely will not

have a detailed range stocking rate evaluation completed for their land. However, completion of some level of stocking rate evaluation is an essential step in the development of a pasture and forage inventory (Manske, L. L. 1995). Forage dry matter intake of grazing animals is affected by the size of the cow. Large cows consume more forage than medium- and standard-sized cows. A more accurate estimate of daily or monthly forage demand of livestock on grazing lands can be determined with the metabolic weight of the animal than with its live weight. Metabolic weight is live weight to the 0.75 power. The amount of forage dry matter consumed in one month by one animal unit, a 250kg cow with a calf, is an animal unit month (AUM). The daily dry matter allocation for a cow with a calf on pasture is different from the daily dry matter requirement for just the cow during the same production periods (Manske, L. L. 1998b). Therefore, this review paper is prepared to give some immense point how we can calculate the stocking rate for grazing land to alleviate/bottlenecking overgrazing problem in the tropical country in which feed resource is scanty.

## 2. Determining Stocking Rate in Tropical Countries by the Use of Taum

To determine how many animals a pasture or range land will support (stocking rate), we need to know two things: firstly how much forage the particular animal or group of animals we have on our range or pasture land will consume, and secondly how much forage we have available. The two methods of determining stocking rate in tropical countries are discussed below.

### 2.1. The Tropical Animal Unit Month (Taum)

The TAUM concept is the most widely used way to determine the carrying capacity of grazing animals on grazing land and helps to calculate and plan the quantity of feed for a herd during a certain period. To make comparison possible, animals are converted to the same unit. This is called TAUM. One Tropical Livestock Unit (TLU) denotes the feed requirement of a standard animal of a certain live weight (usually 250 kg). With TLU it is possible to compare feed needs for sheep, goats, calves and other animals with those of dairy cows. The TLU provides us with the approximate amount of forage a 250 kg animal will eat in one month. It was standardized to the 250kg animals when they were the most prevalent on grazing land. This TLU was established to be 250kg of forage on a dry weight basis (not green weight) for lactating and dry cow. All other animals were then converted to an "Animal Unit Equivalent" of this cow. This allows managers to match the number of animals with the amount of available forage. While there are numerous ways to calculate how many animals can be carried on a particular range, based on what is available and what is being eaten, the following table is a starting point. How it can be altered depends on your management goals and management intensity.

Table 1. Conversion Table.

Type of livestock	TLU	Norm (average Dutch herd)
Cow →in lactation	1	88%
Cow →dry	1	12%
Heifer >18 month	0.8	40%
Yearling 12-18 month	0.6	14%
Calf 3-12 month	0.4	20%
Calf 1-3 month	0.3	20%
Calf 0-1 month	0.3	10%
Bullock	0.8	
Donkey	0.7	
Sheep, Goat	0.1	
Horse, Buffalo, Mule	1.0	
Camel	1.1	

Source: Naseri, A., & Kabul-Afghanistan, A. K. F (2005)

The original theory of TAUM behind the method was to make an easy standard approach for everyone to calculate stocking rates on rangelands. They took the average sized cow with calf and determined the amount of forage the animal would require. This was based on the metabolic requirements of the animal. The Average Animal Weight method (explained below) can also help to determine a more accurate Stocking Rate. Working through and determining our own stocking rate is something every livestock producer should do. The steps to calculate stocking rate using Animal Unit Equivalents and the Average Animal Weight Method is listed below with an example problem.

### 2.2. Classic Stocking Rate Problem

1. Determine total production of the area
2. Calculate total "available" forage by using the "take half, leave half" method, either divide total production by 2, or multiply by 0.5.
3. Determine kilograms of forage eaten by cattle per month. This is generally 80% of the body weight of a 250kg cow.
4. Calculate proper stocking rate for cattle:  
Stocking Rate =
5. Convert for Animal type you are using with Animal Unit Equivalents:  
Tropical Animal Unit Months for your animal =
6. Determine number of animals you can keep over the time needed:  
Number of Animals =

### 2.3. Example of Stocking Rate Problem

Step 1. Determine Total Production of the Area.  
Information

If natural pasture DM yields from 0.5m<sup>2</sup> plot of Abarnosa rangeland was 0.6kg and the total area of Abarnosa range land is 4000 m<sup>2</sup>

Step 2. Calculate Total Available Forage:

Total Available Forage =

Total Available Forage = 4800kg

Step 3. Determine pounds per month intake for a 250kg animal.

Intake = 250kg animal X 80% of bodyweight

Intake = 200 kg/month

Step 4. Calculate Proper Stocking Rate:

Stocking Rate =

Stocking Rate =

Stocking Rate = 24 animals/month

Step 5. Convert for animal type you are using with Animal Unit Equivalents:

Information:

The cow herd on the allotment has an average weight of 300kg.

Animal Unit Month for class of livestock =

Animal Unit Month for class of livestock =

Animal Unit Month for class of livestock = 20 animals/month

Step 6. Determine amount of animals that can be grazed over allotted time:

Information:

The rangeland can be grazed for 4 months

Number of Animals =

Number of Animals = Number of animals = 10 animals

#### **2.4. Average Animal Weight Method of Determining Stocking Rate**

The Average Animal Weight (AAW) method of determining stocking rate is a more accurate method than the classic stocking rate method. The Average animal weight method uses one conversion factor, 0.02667. This number was derived using the metabolic rate requirements of a cow with calf. In order to achieve its daily metabolic requirement, a cow with calf needs to consume 2.667% of its body weight each day. This number can vary depending on animal and forage conditions (Mindy Pratt and G. Allen Rasmussen, 2001). To determine your herds stocking rate using the Average Animal Weight method, use the following steps:

Step 1. Determine total production of the area

Step 2. Calculate total "available" forage. First you need to determine the percentage of use you would like on the area. This number varies based on your management objectives. A conservative figure often used is the "take half, leave half" (or 50%) rule of thumb. Calculate your available forage by multiplying total forage by your percentage of use (0.5 in the case of 50% use).

Step 3. The Average Animal Weight method allows you to calculate the required forage for the animal, regardless of the breed or species, and determine the daily and monthly forage requirement for their size by using the conversion factor of 2.667%.

a. Estimate your average size of animal (in kilograms).

b. Multiply this number by the Average Animal Weight method conversion factor (0.02667)

c. Multiply this figure by 30 days/month to get your herds AUM consumption Monthly Forage Requirement = Average Animal Size X 0.02667 X 30 days/month

Step 4. Calculate proper stocking rate for class of livestock you are using

Stocking Rate =

Step 5. Determine the number of animals you can graze

over the time needed:

Number of Animals = (from Zobell, personal communication)

#### **2.5. Example Average Animal Weight (AAW) Problem**

Step 1. Determine Total Production of the Area.

Information: If natural pasture DM yields from 0.5m<sup>2</sup> plot of Abarnosa rangeland was 0.6kg and the total area of Abarnosa range land is 4000 m<sup>2</sup>, what about the total available forage of the range land?

Step 2. Calculate Total Available Forage:

Total Available Forage =

Total Available Forage = 4800kg

Step 3. A) Determine average animal size in kilograms:

Information: If the cattle you raising average weight is 300kg, what about the forage consumed per day?

B) Multiply this number by the conversion factor to determine amount of forage consumed per day:

Forage consumed per day = Animal Weight X AAW Conversion Factor

Forage consumed per day = 300kg X 0.02667

Forage consumed per day = 8.001kg forage eaten per day

C) Multiply this figure by 30 days/month to determine the amount of forage consumed per month:

Monthly intake = 8.001kg X 30 days

Monthly intake = 240.03kg

Step 4. Calculate Proper Stocking Rate:

Stocking Rate =

Stocking Rate = 19.998 animals/month

Step 5. Determine amount of animals that can be grazed over allotted time:

Information: If the allotment can be grazed for 4 months, what about the number of animals in allotment time?

Number of Animals =

Number of animals = 4.999 animal

### **3. Conclusion**

The Tropical Animal Unit Month (AUM) concept is the most widely used method to determine the carrying capacity of grazing animals on grazing lands. Stocking rate is commonly stated as hectare per animal unit month (AUM) or its reciprocal, AUM's per hectare. One Tropical Livestock Unit (TLU) denotes the feed requirement of a standard animal of a certain live weight (usually 250 kg). A more accurate estimate of daily or monthly forage demand of livestock on grazing lands can be determined with the metabolic weight of the animal than with its live weight. Carrying capacity can be calculated either by Animal Unit Equivalents or Average Animal Weight. The Average Animal Weight (AAW) method of determining stocking rate is a more accurate method than the classic stocking rate method. The Average animal weight method uses one conversion factor, 0.02667. This number was derived using the metabolic rate requirements of a cow with calf. In order to achieve its daily metabolic requirement, a cow with calf needs to consume 2.667% of its body weight each day. This

number can vary depending on animal and forage conditions

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