



FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

Nutrient use efficiency

Nutrient use efficiency (NUE) is a measure of how well plants use the available mineral nutrients. It can be defined as yield (biomass) per unit fertilizer (fertilizer, nutrient content).

NUE is the fraction of fertilizer nutrients removed from the field with the crop harvest.

$$\text{NUE} = (\text{crop nutrient removal} / \text{nutrient input}) * 100$$

NUE is a workable indicator to assess and monitor sound fertilizer use.

Also, NUE is defined as the amount of dry matter produced per unit of nutrient supplied or absorbed.

$$\text{NUE} = \text{Physiological efficiency} * \text{Apparent recovery efficiency}$$

Classification of NUE

1. Agronomic efficiency

It is defined as the economic production obtained per unit of nutrient applied. It is calculated by the following equation:

$$\text{Agronomic efficiency} = \frac{(\text{grain yield of fertilized crop in kg}) - (\text{grain yield of unfertilized crop in kg})}{(\text{quantity of fertilizer applied in kg})}$$

2. Physiological efficiency

It is defined as the biological production obtained per unit of nutrient

(Total dry matter yield of fertilized crop in kg) - (total dry matter yield of unfert

Physiological efficiency = $\frac{(\text{Total dry matter yield of fertilized crop in kg}) - (\text{total dry matter yield of unfert$

$\frac{(\text{nutrient uptake by fertilizer crop in kg}) - (\text{nutrient uptake by unfertilized crop in kg})}{(\text{quantity of fertilizer applied in kg})}$

3. Apparent nutrient efficiency

It is defined as the quantity of nutrient absorbed per unit of nutrient applied.

Apparent nutrient efficiency = $\frac{(\text{nutrient uptake by fertilized crop}) - (\text{nutrient uptake by unfertilized crop})}{(\text{quantity of fertilizer applied})}$ Time of fertilizer application

1. Prior to sowing

Some of water insoluble fertilizers such as rock phosphate and basic slag are applied 2 to 4 weeks before sowing to enable conversion of water insoluble form to soluble form for efficient crop utilization.

2. At sowing

Application of fertilizer at the time of sowing or just before sowing is called basal application.

3. After sowing the crop

Application of fertilizers after the crop establishment of crop is called top dressing.

4. Split application

When fertilizer is applied in 2 or more different time, the system is called a split application

Method of fertilizer application

- a. Soil application
 - 1. Broadcasting
 - 2. Band placement
 - 3. Point placement
 - 4. Fertigation
- b. Application to plant
 - 1. Root dipping
 - 2. Foliar application