Nutrient Management in Crops: Importance and Judicious & Balanced Use of Fertilizers Through 4R Principles

(IFDC's Interventions Under APART Project in Assam)

a) What Are Plant Nutrients?

- Nutrients are essential substances for plant survival, growth, and reproduction, which can be derived from soil, water, and air.
  - *Primary nutrients*: Nitrogen, phosphorus, potassium.
  - *Secondary nutrients*: Calcium, magnesium, and sulphur.
  - *Micronutrients:* Iron, copper, boron, zinc, manganese, molybdenum.
- For obtaining higher crop yields, the soil needs to be added with nutrients when the ones existing aren't enough.
- Commercial fertilizers and organic materials like manure, compost, etc, are used to enrich the soil with nutrients.

b) Nutrient Management in Crops: What & Why?

- Refers to the judicious use of agricultural nutrients to maximize output while minimising negative effects on the environment.
- Relies on matching the amount of nutrients added to the soil with the amount of nutrients needed by the crops.
- Adding nutrients helps generate maximum crop yields, but only if done so in the right amounts and at the right times.
  - Too little – limits production.
  - Too much - is wasteful and potentially harmful to the environment.
    - If not absorbed by the plants properly, the unused nutrients may seep into the ground or run off into surrounding bodies and contaminate surface and groundwater, and on-farm drinking water, community wells and other drinking water sources.
    - Valuable nutrients could be lost, resulting in reduced crop yields or additional costs for commercial fertilizers.
    - When nutrients like nitrogen and phosphorus are present in high enough concentrations, they can degrade aquatic ecosystems and threaten human health.

c) Nutrient Management Planning

- Nutrition Management Planning aims to ensure no excessive usage of nutrients to help protect water quality and the least impact on the environment while still getting the best crop yield for economic gain.
- Do keep a track of all the nutrients to figure out what nutrients the soil will need.
- Plan how, when, where, and how many and how much of nutrients to put in the cropland, through the following sequence of activities:
  - Test the soil to see what nutrients are in it (crop growing or harvested land).

- Decide what needs to be added to meet the needs of the crop, based on the following criteria –
  - type of land
  - crops being grown
  - type of nutrient
  - how close the land is to water, and
  - how it is applied

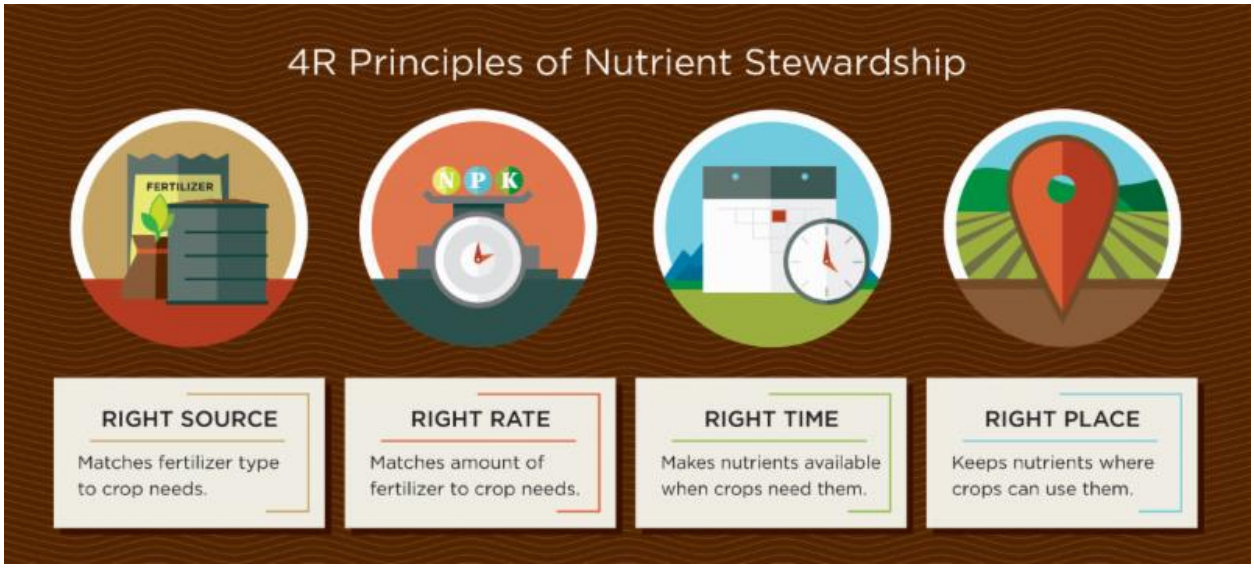
- Maintain a record of how much, when, and how nutrients are applied (to help plan).

Judicious & Balanced Use of Fertilizers Through 4Rs

The objectives of balanced use of fertilizers are:

- Increased production
- Increased farmer profitability
- Enhanced environmental protection, and
- Improved sustainability

What are 4R principles?



What are the advantages of 4R principles?

i) *Improve agricultural productivity*:

- Optimizing nutrient management is a smart business for coping with fluctuating fertilizer and crop prices.
- Better crop and soil management increases yields.
- Improved fertilizer efficiency enhances per-acre production without sacrificing yield potential.

ii) *Minimize impact to the environment*:

- Adopting 4Rs contributes to the preservation of natural ecosystems by growing more on less land.
- Retaining nutrients within a field's boundaries and crop rooting zone decreases the quantity not used by plants and released as pollution.

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