

## Integrated Nutrient Management: A Sustainable Approach to Enhance Soil Fertility

Vinisha Taneja<sup>1</sup>, Vinod Kumar<sup>2\*</sup>

<sup>1</sup>M.Sc. Research Scholar,  
Department of Soil Science,  
College of Agriculture, Jawahar  
Lal Nehru Krishi

Vishwavidyalaya Jabalpur-  
482002 (Madhya Pradesh)

<sup>2</sup>M.Sc. Research Scholar,  
Department of Agricultural  
Extension & Communication, N.  
M. College of Agriculture,  
Navsari Agricultural University,  
Navsari- 396450 (Gujarat)



\*Corresponding Author  
**Vinod Kumar\***

**Available online at**  
<http://sunshineagriculture.vitalbiotech.org/>

### Article History

Received: 7.09.2023

Revised: 12.09.2023

Accepted: 15.09.2023

This article is published under the  
terms of the [Creative Commons  
Attribution License 4.0](https://creativecommons.org/licenses/by/4.0/).

### INTRODUCTION

Integrated Nutrient Management refers to the maintenance of soil fertility and of plant nutrient supply at an optimum level for sustaining the desired productivity through optimization of the benefits from all possible sources of organic, inorganic and biological components in an integrated manner.

### Concepts

1. Regulated nutrient supply for optimum crop growth and higher productivity.
2. Improvement and maintenance of soil fertility.
3. Zero adverse impact on agro - ecosystem quality by balanced fertilization of organic manures, inorganic fertilizers and bio- inoculant

### Component of INM

1. **Testing procedures to determine nutrient availability and deficiencies in plants and soils.** These are:
  - Plant symptom analysis – visual clues can provide indications of specific nutrient deficiencies. For example, nitrogen deficient plants appear stunted and pale compared to healthy plants
  - Tissue analysis and soil testing – where symptoms are not visible, post-harvest tissue and soil samples can be analysed in a laboratory and compared with a reference sample from a healthy plant.
2. **On-site Resource Generation:** Resource production on-site mandates the recycling of crop leftovers, animal dung, etc.
3. **Mobilisation of Off-site Nutrient Resources:** The addition of chemical nutrients from external sources is required when off-site nutrient resources are mobilized.
4. **Resources Integration:** Chemical forms of nutrients and other management elements that increase productivity must be properly integrated with the resources in charge of on-site production of nutrients and energy.

5

5. **Resources Management:** The integrated nutrient supply system calls for the management of the farming system, including the use of chemicals to transform plant, animal, and poultry resources into food grains and other types of food.

#### Advantages

1. **Soil Health:** The physical features of the soil, such as granulation, porosity, water-holding and drainage capacity, aeration, etc., are improved by the INM. Additionally, it improves the amount of organic matter in the soil, resulting in healthy soil.
2. **Better Yield:** Greater nutrient absorption and balanced crop nutrition promote better plant growth and productivity.
3. **Environmental Benefits:** INM reduces nutrient losses to ground and surface water bodies as well as to the atmosphere, which slows down the deterioration of soil, water, and ecosystems.
4. **Utilization of Farm Waste:** INM encourages using farm wastes as manure and a source of nutrients for crops.
5. **Cost Reduction:** Since some organic sources are readily available at low prices, they aid in lowering production costs.
6. **Judicious Use:** In Indian agriculture, the overuse of artificial fertilizers is a major problem. INM thus supports the wise application of chemical fertilisers.

#### Goals of INM:

1. To ensure productive and sustainable agriculture.
2. To reduce expenditure on costs of purchased inputs by using farm manure and crop residue, etc.
3. To utilize the potential benefits of green manures, leguminous crops and biofertilizers.
4. To prevent degradation of the environment.

5. To meet the social and economic aspiration of the farmers without harming the natural resource base of agricultural production.

#### Disadvantage

1. **Lack of Knowledge:** Farmers frequently lack the information necessary to utilize fertilizers in a balanced ratio.
2. **Funding:** Farmers, particularly those in rural areas, lack access to loans. They do not have enough money to purchase fertilizer and manure, which are essential for INM.
3. **Land Degradation:** One of the biggest challenges for INM is the deterioration of lands due to intensive cultivation and over-exploitation due to the tremendous pressure of the ever-increasing population.
4. **Monsoon Vagaries:** The monsoon is essential to Indian agriculture. The greatest hindrance to the usage of fertilizers is thought to be the risk of water shortage during drought-prone seasons. Water erosion poses a severe danger to soil fertility and productivity during monsoons.
5. **Limitation of Small Holdings:** The majority of farmers in India have small holdings since the country's land is divided. This makes it impossible to use INM on a commercial scale.
6. **Limitation of Biofertilizers:** The use of biofertilizers is restricted to certain crops and geographical areas, has a short shelf life, requires careful handling, and has other drawbacks that make it difficult to efficiently use and spread.

#### CONCLUSION

INM is a sustainable way of agriculture. It not only increases crop productivity but also helps in soil, water, and biological restoration. Developing awareness among the farmers by extension agencies about the deteriorating soil health, unsustainable production and environmental pollution due to non-use of organics is important to promote INM in India.