

## Integrated Nutrient Management (INM) for Sustainable Agriculture

Th. Anupama Devi and S. Bijayalakshmi Devi

M.Sc (Agri.), Department of Agronomy, College of Agriculture, CAU, Imphal, Manipur

### SUMMARY

The increasing food demands of a growing human population and the need for an environmentally friendly strategy for sustainable agricultural development require significant attention when addressing the issue of enhancing crop productivity. Integrated Nutrient Management (INM) is an approach that seeks to increase both quality of production and protection of environment for posterity. INM enhance the availability of applied as well as native soil nutrient, increases water-use efficiency, and the economic returns to farmers, while improving grain quality and soil health and sustainability. Various approaches and perspectives for further development of INM in the near future are much needed.

### INTRODUCTION

The world population is expected to double within the next 3–5 decades, thus making the task of several national agricultural systems more difficult to provide the needed food security. The ‘green revolution’, which launched intensive use of high-yielding varieties of crops coupled with other inputs like chemical fertilizers and irrigation water, was both a success in boosting food supply and at the same a challenge in terms of combating the threat of imbalance fertilization the primary cause of soil degradation and decline in soil fertility. The country’s researchers and policy-makers have considered several soil and plant nutrient management options to sustain soil fertility in their continuing effort to close the food and population gaps, which primarily include the Integrated Nutrient Management (INM), the balanced use of chemical based fertilizers and sourcing and processing all possible use of organic manures, biofertilizers, as well as the Integrated Farming System (IFS) which improved both cropping systems and livelihood opportunities of small farmers (Rao and Reddy, 2005). INM plays an important role which involves integrated use of organic manures, crop residues, green manures, biofertilizers etc. with inorganic fertilizers to supplement part of plant nutrients required by various cropping systems and thereby fulfilling the nutrient gap.

### Concept’s of INM:

Integrated nutrient management is a practice that combines old and modern techniques of fertilizer use and nutrient management. The idea of INM depends on a number of factors, including harmony in nutrient properties, a balance between crop nutrient demands, what sort of nutrient, in general, is available in soil and in the farmer’s hand, information and skills about the most suitable nutrient can be harmonized in combination, and which materials can be safely used that lead to increase nutrient-use efficiency. Additionally, it is a method and a way of disposing organic wastes safely and also an effective method of recycling wastes into good-quality compost. The key components of the INM concept includes increasing the farmer’s awareness about the valuable use of INM practices, inviting them to forget the excessive use of chemical fertilizers, and encouraging them to focus on long-term plan for sustainable agriculture. Moreover, farmers must have greater consideration for environmental impacts and producing safety food rather than only focusing on profit, which can be obtained. It must always be remembered that food safety is much preferred by many customers, regardless of the price, and it can raise the farmer’s returns by following such practices.

### Why INM ?

Continuous use of suboptimal doses of nutrients in the intensive cropping system has led to severe depletion of nutrient reserves in soil, causing multiple nutrient deficiencies. The use of high-analysis fertilizers devoid of micronutrients has also aggravated micronutrient deficiencies causing significant decline in crop productivity. No single dose of plant nutrient applied through chemical fertilizers, organic manures, crop residues or bio- fertilizers can meet the entire nutrient need of a crop in modern intensive agriculture. So, integrated use of chemical fertilizers with organic manure is becoming a quite promising practice not only for maintaining higher productivity but also for greater stability to crop production. Key goal of INM is to reach the eco-friendly practice through the harmonious properties of both sources by making a combination that can be used for decreasing the

enormous use of chemical fertilizers and accreting a balance between fertilizer inputs and crop nutrient requirement, maintaining the soil fertility, optimizing the level of yield, maximizing the profitability, and subsequently reducing the environmental pollution. It is ultimately viable to achieve such a target through the wise application of integrated nutrient management (INM) approach, which is known as a balanced mixture of organic, inorganic, and bioorganic microorganisms in combinations in different practices. Also, it can improve all the characteristics of molecule absorption of macronutrients (NPK) and micronutrient inputs. In addition, it can match the crop nutrient requirements and alleviate the constraints of nutrient deficiency without any harmful effects in the environment and products. (Selim, 2009)

### **Components of INM:**

The key components of INM system includes the following items:

#### **Organic Manure:**

Organic manures like urban compost, FYM, crop residue, human excreta, rural compost, sewage and sludge, non-edible oilcake, pressmud and other agro-industrial wastes have large nutrient potential.

#### **Legumes:**

Legume could prove an important component of INM when grown for grain or fodder in cropping systems or when introduced for green manuring

#### **Biofertilizers:**

It is the materials containing living beneficial microorganisms that play an important role in improving soil fertility and crop productivity due to their ability to fix atmospheric nitrogen, solubilize and mobilize phosphorous and decompose farm waste resulting released of plant nutrients.

#### **Fertilizers:**

The dependence on chemical fertilizers has been increasing constantly because of need to supply of large amount of nutrients in intensive cropping with high productivity(Yadav et al., 2016)

### **CONCLUSIONS**

Widespread nutrient deficiencies and deteriorating soil health are the cause of low nutrient use efficiency, productivity and profitability. There is need to adoption of site specific balanced and integrated nutrient management involving conjunctive use of organic manure along with inorganic fertilizers and biofertilizer inoculation which not only resulted higher and sustainable crop yields but also enhanced the efficiency of added fertilizers as well as fertility status of soil with higher economic returns. Creating awareness amongst farmers on the benefits of balanced fertilizers also needed.

### **REFERENCES**

- Rao, A.S. and Reddy, K.S. (2005). Integrated nutrient management vis-à-vis crop production/productivity, nutrient balance, farmer livelihood and environment.
- Selim, M. (2009). Introduction to the Integrated Nutrient Management Strategies and Their Contribution to Yield and Soil Properties. Int. J. Agron. pp.14.
- Yadav. R.K., Sharma, V.K. and Kumawat, C. (2016). Integrated nutrient management: concept and components. Biotech Articles.