



MARUMEGH

Kisaan E- Patrika

Available online at www.marumegh.com



ISSN : 2456-2904
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Received: 26-04-2022

Accepted: 28-04-2022

SSNM: A TOOL TO ENHANCE NUTRIENT USE EFFICIENCY

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Abstract :

Conversion of tradition farming to modern farming to achieve self-sufficiency in food grain production in country due to green revolution technologies (GRTs) such high yielding variety, mechanization and supply agricultural input (fertilizers and pesticide). Sustainability of natural resources is under threat due to various factors: lower nutrients use efficiency, multiple nutrient deficiency, land degradation (physical and chemical soil properties), depletion of groundwater, pollution associated with air, water and soil, GHGs emission etc. All these problems are addressed by adaptation of site-specific nutrient management (SSNM).

Introduction :

A lucrative, productive, and ecologically sound agricultural system is built on a foundation of healthy soil. It is feasible to develop a crop and soil management system that improves and sustains soil health over time by understanding how management methods impact the soil processes that promote plant growth and environmental quality. Soil is a valuable resource, and how it is handled has the potential to increase or damage its quality. Living microbes and plant roots bind mineral particles and organic matter together to form a dynamic framework that controls water, air, and nutrients in the soil. Soil health in agriculture refers to the soil's ability to support agricultural output while also protecting natural resources. Nutrient cycling, biological control of plant pests, and water and air supply modulation are just a few of the activities that a healthy soil performs to promote plant development. The interconnected physical, chemical, and biological features of soil, many of which are susceptible to soil management approaches, impact these functions.

The usage of different fertilisers on a global scale has made a significant contribution to increasing food production. Nutrient inputs are thought to be responsible for 30–50 percent of crop output. However, factors like low NUE and the pollution it causes, as well as global warming, have raised severe questions about current nutrient management approaches.

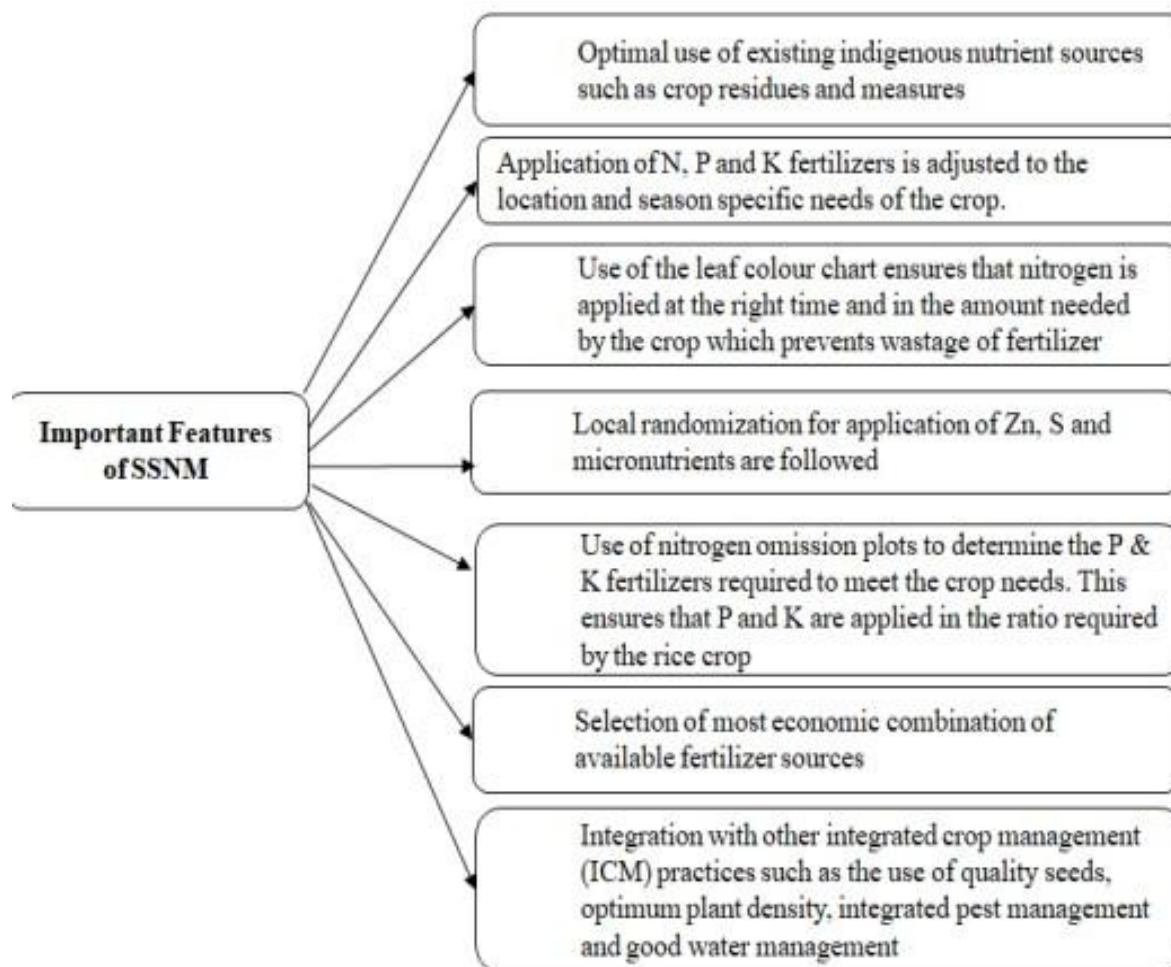
The recovery efficiency of fertiliser nutrients is around 20–40%, 15–20%, and 40–50% for N, P, and K, respectively, whereas it is significantly lower for secondary and micronutrients ranging between 5–12%. Continuous nutrient mining from the soil due to unprovoked nutrient use (7:2.8:1 NPK) leading to depletion of NPK, Ca Mg S and Zn, Mn, Fe, B, decreasing use of organic nutrient sources like FYM, compost, and integration of green manures/grain legumes in cropping systems leading to deficit reduction of some of the major, secondary, and micro nutrients.

Site Specific Nutrient Management :

Site specific nutrient management (SSNM) is a set of nutrient management principles combined with good crop management practices that realize high yield high profitability both in the short and medium-term will help to farmers. The principles of SSNM have been basic and also applicable to rice, wheat, maize and other crops. SSNM provides an approach for the timely application of fertilizers at optimal rates to fill the deficit between the nutrient needs of a high yielding crops and the nutrient supply from naturally occurring indigenous sources, including soil, crop residues, manures and irrigation water.



Applying the right nutrient source, at the right rate, at the right time, in the right place is essential to nutrient stewardship. 4 R nutrient stewardship for best management fertilizer practices is an approach that considers economic, social and environmental dimensions of nutrient management. The site-specific mode takes into account the spatial variations in nutrient status cutting down the possibilities of over use or under use of the costly inputs.



SSNM in Enhancing Nutrient Use Efficiency :

1. Nutrient usage efficiencies (NUE) might be enhanced by making nutrient management technologies/practices adaptable to various production systems as outlined in the domains for scaling up and out accessible.
2. Capturing contemporary tools and technology, as well as farmer improvements on traditional nutrient management approaches, may aid in improving fertiliser usage efficiency.
3. Based on the concepts of SSNM, the new decision support technologies (Nutrient Expert, Green Seeker, remote sensing, etc.) assist extension staff in swiftly developing fertiliser recommendations in the presence or absence of soil test data to improve nutrient usage efficiency.
4. These technologies give crucial nutrient management help to resource-poor small and marginal farmers who do not have access to soil testing, allowing them to boost their productivity.
5. If smallholder farmers are given timely and appropriate information, information and communication technologies (ICTs) can help them optimise the return on agricultural inputs.

Several private service providers, such as Tata Kisan Sansar and IFFCO Kisan Sanchar Ltd, are using such decision-making support tools based on modern communication platforms as a "one-stop solution" for effective last-mile delivery, ensuring the availability of the right products at the right time and at a fair price, as well as free farm advisory services.

6. IFFCO Kisan Sanchar Ltd has its own Agriportal where farmers may get localised text messages (SMS) and voice warnings about weather and crop management alternatives via their registered mobile phones.

7. Information on various crop management strategies is also available on demand via mobile phones via Interactive Voice Response Systems (IVRS), which are activated by a farmer's coded SMS.

Conclusion :

Site specific nutrient management (SSNM) is a viable option for nutrient management practice in intensive farming. The SSNM approach provides idea to need based feeding of crops with nutrients while recognizing the inherent spatial variability.

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