

## ICAR-AICRP on MICRO AND SECONDARY NUTRIENTS AND POLLUTANT ELEMENTS IN SOILS AND PLANTS, ICAR-IISS, BHOPAL

### MANDATE

- To carryout basic and applied research on micro- and secondary nutrients and pollutant elements in soils and plant.
- To delineate and/or reassess and mapping of micro- and secondary nutrients (MSN) deficient and toxic areas using GPS/GIS, and developing amelioration techniques for their correction.
- Revisiting the critical limits of micro- and secondary nutrients and establishing phytotoxic limits of heavy metals in different soils and crops.
- To develop suitable techniques for increasing fertilizer-use-efficiency along with inclusion of nano-fertilizers, organic manures, sewage sludge for ameliorating the MSN deficiencies in crops and soils.
- To develop agronomic biofortification approaches for micronutrients enrichment and to identify mechanism and processes of micronutrients enrichment and their role in reproductive physiology.
- To study micronutrients in soil-plant-animal and/ human continuum
- Dissemination of micronutrients technologies.

### SIGNIFICANT ACHIEVEMENTS

- Delineated soils of 20 states of the country – Average deficiency: S 33%, Zn 41%, Fe 14.8%, Cu 5.2%, Mn 6.8%, and B 22.5%.
- Zinc deficiency in soils has declined from 49% during 2001 to 41% in 2015-16 due to wide spread awareness created by the project and its regular use by farmers.
- Among the multiple micronutrients, deficiency of Zn and B was upto 10% in some state, while Sulphur and Zn deficiency are very common across the country.
- Forecasting of micronutrients deficiencies through nutrient indexing showed Mn and Zn deficiency in most of the crops and cropping system studied.
- Developed critical limits for Zn, B and S for Rice, wheat, mustard and onion.

- Several new products have been tested against the standard sources of micronutrients and recommended, if found suitable and economic.
- Developed package for production of micronutrients enriched organic manures so that input cost could be reduced.
- Developed technologies for optimizing the use of zinc, boron, iron, manganese, sulphur deficiencies for different crops and cropping systems in different soils.
- Identified genetically efficient cultivars capable of accumulating adequate micronutrient contents even from soils having low micronutrients supply.
- Developed agronomic and physiological biofortification strategies to enrich edible plant parts of cereals and pulses with micronutrients.
- Developed protocol and studied micronutrients in soil-plant-animal and/ human continuum.
- Studied the extent of heavy metal pollution in soil-plant system in selected peri-urban areas occurred through sewage, industrial effluents.
- State- wise micro- and secondary nutrients recommendations have been developed and published in vernacular language for public use.

### FIVE BEST TECHNOLOGIES/PRODUCTS

- Techniques for correcting Zn, Fe, Cu and Mn deficiencies in crops and cropping systems.
- Developing balanced fertilization schedule by inclusion of sulphur.
- Enriched organic manures with micronutrients for enhancing its use efficiency.
- Agronomic biofortification techniques for Zn enrichment in edible plant parts and its bio-assimilation.
- Techniques for Fe Enrichment in rice, maize and pulses to combat Fe malnutrition
- Developed phytotoxic loading limits of different heavy metals in different crops.

### NEW INITIATIVES

- Micronutrients in soil-plant-animal and/ human continuum.
- Revisiting critical limits through on-farm trials.

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### COLLABORATIVE PARTNERS

The AICRP-MSN has 23 cooperating centers spread across the country. Also, efforts have also been made to strengthen research collaborative activities with micronutrient entrepreneurs in the country, IZA, FAI, IPNI and AIIMS.

### THRUST AREAS FOR XII PLAN

- ❖ Delineation of micro- and secondary nutrients in uncovered areas, assessment, mapping and forecasting of micro- and secondary nutrients deficiencies.
- ❖ Enhancing nutrient use efficiency through nano technology/ new products/ SSNM packages
- ❖ Biofortification of crops with micronutrients
- ❖ Establishing link of micronutrients in soil-plant-animal/ human continuum
- ❖ Monitoring heavy metal pollution in soil-plant system
- ❖ Dissemination of micronutrients technologies through FLDs and Farmers Fairs etc.

### EXTERNALLY FUNDED PROJECTS/CONSULTANCY

Foreign aided projects : Nil  
 Externally funded Projects : 1 (NAIP-4)  
 Other sponsored projects : 3

### QRT

Period : 2007 to 2012  
 Chairman : Dr. Pratap Narain, Ex. VC  
 SKRAU, Raj Vihar  
 Dehradun – 248006  
 Next QRT : 2013 to 2018

### PUBLICATIONS (previous year)

No. of papers in NAAS rated journals  
 (a) No. of papers in score <6 = 49  
 (b) No. of papers in scores >6 = 18  
 (c) Total = 67

### FINANCIAL OUTLAY (in lakh)

	XI Plan actual utilization	XII Plan	Last year budget (2015-16)		
			RE	Actual Expenditure	% Utilization
Plan	1623.08	4827.9	720.0	720.0	100
Non Plan	152.88	230.0	52.0	52.0	100

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