

## **Dr. R. N. Sahoo**

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### **PROFESSIONAL SUMMARY**

Veteran researcher and scientific leader with **24+ years** of experience in remote sensing, GIS, soil physics, plant phenomics, and precision agriculture. Combines deep technical expertise in hyperspectral, drone, aerial and satellite remote sensing with strong leadership in large-scale, multidisciplinary, multi-institutional research programmes. Proven track record in establishing advanced research laboratories, mobilizing major research funds, mentoring students, and leading national-level precision agriculture and imaging spectroscopy initiatives.

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### **CORE COMPETENCIES**

- Remote Sensing & GIS for Soil and Crop Health Monitoring
  - Hyperspectral Imaging, Drone & Aerial Remote Sensing
  - Precision Agriculture & Site-Specific Nutrient Management
  - Plant Phenomics, High-throughput Phenotyping
  - Soil Physics & Soil Attribute Modelling
  - Big Data Analytics & Sensor-based Agriculture
  - Project Planning, Funding Mobilization & Programme Leadership
  - Research Management, Training & Capacity Building
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### **CURRENT POSITION**

**Principal Scientist & Program Leader** — Division of Agricultural Physics, ICAR-IARI, New Delhi

- Leads national-level research and development programmes in precision agriculture, remote sensing and plant phenomics.
- Heading projects such as the national network programme on Precision Agriculture (NePPA), involving multiple ICAR institutes.

- Oversees development and operation of cutting-edge facilities: hyperspectral remote sensing labs, drone-remote sensing units, plant-phenomics centres, and big-data analytics platforms.
  - Supervises research on soil and crop health, stress monitoring (biotic/abiotic), nutrient management, high-throughput phenotyping under varied field and controlled conditions.
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## PREVIOUS RESPONSIBILITIES & ROLES

- Led and contributed to multiple externally funded, multi-institutional and multidisciplinary research programs amounting to significant budgets over the past two decades.
  - Guided postgraduate (M.Sc.) and doctoral (Ph.D.) students — supervised several theses in remote sensing, soil physics, and precision agriculture.
  - Participated in national- and international collaborations: assignment as visiting faculty/researcher at universities abroad; deputations for international conferences and R&D collaborations.
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## EDUCATION

- **Ph.D. — Soil Physics / Agricultural Physics** — ICAR-IARI, New Delhi ([Indian Agricultural Research Institute](#))
  - **M.Sc.** — Odisha University of Agriculture & Technology, Bhubaneswar ([Indian Agricultural Research Institute](#))
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## SELECTED RESEARCH, PROGRAMMES & ACHIEVEMENTS

- Developed state-of-the-art labs for **hyperspectral remote sensing, drone remote sensing, big-data analytics**, and the **National Facility on Plant Phenomics** at IARI.
- Serving as National Co-ordinator (or PI) for the programme Imaging Spectroscopy and Applications (NISA) under Department of Science & Technology (DST) — involving ~37 research institutes across India.
- Leading the national Network Programme on Precision Agriculture (NePPA) by ICAR, coordinating multi-institutional teams focused on precision farming, remote sensing, and sustainable agriculture.

- Over **240 publications**, including **~130+ peer-reviewed journal articles**, in peer-reviewed national and international journals — mainly on remote sensing, soil & crop health monitoring, phenomics, nutrient estimation, and precision agriculture applications.
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### SELECTED RECENT PUBLICATIONS & WORKS

- “Detecting Brown Planthopper ... Damage in Rice Using Hyperspectral Remote Sensing” — *Archives of Insect Biochemistry & Physiology* (2025) (with co-authors)
  - “Image-based phenotyping of seed architectural traits and prediction of seed weight using machine learning models in soybean” — *Frontiers in Plant Science*
  - “Leaf-count aided novel framework for rice genotypes discrimination in phenomics using computer-vision and deep-learning” — *Plants* journal.
  - Numerous studies on soil nutrient estimation (S, P, K), soil fertility mapping, soil microbial indicators, remote-sensing based nutrient & stress monitoring, crop simulation and yield forecasting using satellite imagery and ground truth data.
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### TRAINING, CAPACITY BUILDING & TEACHING

- Organized and led training programmes and workshops (e.g. drone remote sensing, GIS/RS methods, plant phenomics) for students, scientists and researchers — more than **500 participants** trained over years.
  - Supervised M.Sc. and Ph.D. students (at least 2 M.Sc. + 7 Ph.D. theses) in Agricultural Physics / Remote Sensing / Soil Physics at IARI.
  - Visiting faculty / researcher roles at international institutions/universities (e.g. in USA, Canada), contributing to capacity building and international collaboration in precision agriculture & remote sensing.
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### PROFESSIONAL SERVICE & COLLABORATIONS

- Expert / member in various scientific committees and working groups under Indian Space Research Organisation (ISRO), NITI Aayog (for drone remote sensing and crop-insurance policy), Ministry of Agriculture, DST, DBT, and other national agencies.
- Coordinated multi-institutional, multi-disciplinary network programmes — integrating remote sensing, soil science, plant phenomics, data analytics and agronomy for national-scale agricultural research

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## **AREAS OF INTEREST**

- Remote Sensing & Hyperspectral Imaging for Soil & Crop Monitoring
- Drone / UAV-based Precision Agriculture & High-throughput Plant Phenotyping
- Soil-Plant-Environment modelling, Nutrient Management & Stress Detection
- Big Data Analytics, Machine Learning / Deep Learning in Agriculture
- Sustainable Agriculture, Smart Farming, Climate-resilient Crop Management
- Capacity Building, Technology Transfer, Agri-innovation & Policy Interface