



ABOUT ME

Dedicated soil scientist with a strong background in soil science and agricultural research. Focused on enhancing soil health and sustainable farming practices, understanding of soil nutrient dynamics and management. Passionate about translating research into practical solutions to promote agriculture and ensure food security.

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Dr. KHUSHBOO RANI

Scientist, ICAR-IISS, Bhopal

INSTITUTE

Division of Soil Chemistry & Fertility
ICAR-Indian Institute of Soil Science, Bhopal-462038

EDUCATION

Ph.D. (Soil Science & Agricultural Chemistry)
ICAR-Indian Agricultural Research Institute, New Delhi-110012

M.Sc. (Soil Science & Agricultural Chemistry)
ICAR-Indian Agricultural Research Institute, New Delhi-110012

B.Sc. (Agriculture) College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar-751003

RESEARCH AREAS

Soil Fertility, Nutrient Dynamics, Soil Potassium and Phosphorus Fractionation, Conservation Agriculture, Quantity-Intensity Relationship of Potassium, Exploration of alternate Indigenous Nutrient Sources

AWARDS AND RECOGNITION

- ◆ **National Talent Scholarship for pursuing B.Sc. in Agriculture.** Indian Council of Agricultural Research, New Delhi (2011-2015)
- ◆ **ICAR Junior Research Fellowship for pursuing M.Sc. in Soil Science and Agricultural Chemistry (SSAC),** Indian Council of Agricultural Research, New Delhi (2015-1017)
- ◆ **IARI Ph.D. Fellowship for pursuing Ph.D.** ICAR (2017-2018)
- ◆ **National fellowship for OBC for pursuing Ph.D. in SSAC.** University Grants Commission (UGC), Govt. of India (2018-2020)
- ◆ **National Eligibility test (NET).** University Grants Commission (UGC), Govt. of India (2018).
- ◆ **National Eligibility Test.** Agricultural Scientists Recruitment Board (2018)
- ◆ **Best Ph.D. Thesis presentation award for best presentation of Ph.D. dissertation,** Indian Society of Soil Science (ISSS) (2022)
- ◆ **ISSS Commendation Certificate for participation in North zone best M.Sc. dissertation,** Indian Society of Soil Science (ISSS) (2018)
- ◆ **Best paper and poster awards by ISSS, Society for Fertilizers and Environment**

MEMBERSHIPS OF PROFESSIONAL SOCIETIES

- ◆ Indian Society of Soil Science, New Delhi, India
- ◆ Clay Minerals Society of India, New Delhi, India

SALIENT ACHIEVEMENTS

- ◆ Isolation and characterization of novel K solubilizer from mica mining soils of Jharkhand, India
- ◆ Potential of waste mica as a source of potassium nutrition in soil
- ◆ Quantity-intensity relationship of potassium in soils under conservation agriculture

RESEARCH ARTICLES

- **Rani, K.**, Biswas, D.R., Basak, B.B., Bhattacharyya, R., Biswas, S., Das, T.K., Bandyopadhyay, K.K., Kaushik, R., Das, A., Thakur, J.K., Agarwal, B.K. (2024) Exploring waste mica as an alternative potassium source using a novel potassium solubilizing bacterium and rice residue in K deficient Alfisol. *Plant and Soil*. <https://doi.org/10.1007/s11104-024-06879-1>
- **Rani, K.**, Biswas, D.R., Bhattacharyya, R., Biswas, S., Das, T.K., Bandyopadhyay, K.K. and Kaushik, R. (2022) Bio-activation of waste mica through potassium solubilizing bacteria and rice residue. *The Indian Journal of Agricultural Sciences*, 92(1), 77-81.
- **Rani, K.**, Datta, A., Jat, H. S., Choudhary, M., Sharma, P. C., & Jat, M. L. (2023). Assessing the availability of potassium and its quantity-intensity relations under long term conservation agriculture based cereal systems in North-West India. *Soil and Tillage Research*, 228, 105644.
- **Rani, K.** and Das, A. (2022) Overcoming the barriers of utilization of mica waste as a potassic fertilizer. *Current science*, 123(2), 141
- Das, A., Purakayastha, T.J., Ahmed, N., Das, R., Biswas, S., Shivay, Y.S., Sehgal, V.K., **Rani, K.**, Trivedi, A., Tigga, P., Sahoo, J., Chakraborty, R. and Sen, S. (2023). Influence of clay mineralogy on soil organic carbon stabilization under tropical climate, India. *Journal of Soil Science and Plant Nutrition*, 23(1), 1003-1018.
- Das, A., Purakayastha, T.J., Ahmed, N., Das, R., Biswas, S., Shivay, Y.S., Sehgal, V.K. and **Rani, K.** (2023). Assessment of soil carbon mineralization and stock in mineralogically different agricultural soils of India. *Journal of the Indian Society of Soil Science*, 71(2), 180-191.
- Malgaya, G., Vishwakarma, A.K., Kushwah, S.S., Wanjari, R.H., Jha, P., Biswas, A.K., Hati, K.M., **Rani, K.**, Das, A., Parmar, B. and Para, P.K. (2023). Standardization of Management Strategy for Chickpea (*Cicer arietinum* L.) under Different Levels of Crop Residue Retention in Conservation Agriculture. *International Journal of Plant & Soil Science*, 35(14), 175-182.
- Malgaya, G., Vishwakarma, A.K., Kushwah, S.S., Wanjari, R.H., **Rani, K.**, Das, A., Meena, B.P. and Parmar, B. (2023). Crop residue retention and herbicide application on performance of maize (*Zea mays* l.) Under conservation agriculture in vertisol of central India. *Annals of Plant and Soil Research*, 25(4), 595-602.

BOOK CHAPTERS

- **Rani, K.**, Tigga, P., Roy, A., Das, A. and Trivedi, A. (2022) Nutrient Availability and Plant Productivity through PGPR: Mechanisms, Potential and Constraints. In advances in agricultural biotechnology. Mishra, S., Kumar, S (eds.) (pp. 138-153). AkiNik Publications. (ISBN 978-93-5570-234-0)
- Das, A., **Rani, K.**, Trivedi, A., Kumar, A. and Amat, D. (2024). Impact of long-term agricultural management practices on rhizospheric microbiome vis-à-vis soil and plant health. In Applications of Metagenomics, Thatoi, H., Pradhan, S. and Kumar, U. (eds.) (pp. 23-52). Academic Press. (ISBN 978-0-323-98394-5)
- Sen, M., Roy, A., **Rani, K.**, Nalia, A., Das, T., Tigga, P., Rakshit, D., Atta, K., Mandal, S., Vishwanath and Das, A. (2024) Crop residue: Status, distribution, management, and agricultural sustainability. In Waste Management for Sustainable and Restored Agricultural Soil, Meena, V.S., Rakshit, A., Meena, M.D., Baslam, M., Fattah, IM. R., Lam, S.S., Kaba, J.S. (eds.) (pp. 167-201). Academic Press. (ISBN 9780443184864)
- Abinash, D., Mishra, R., **Rani, K.**, Kundu, S., and Jayaraman, S. and Srinivasa Rao, Ch. (2021) Improving nutrient use efficiency: Research, technology and policy. In: Innovations and Advances in Agricultural Research, Technology and Policy. Rao, S. Ch., Balakrishnan, M., Sumanth Kumar, V.V., Krishnan, P., and Soam, S.K. (eds.). (pp. 191-227). ICAR-National Academy of Agricultural Research Management, Hyderabad.
- Das, A., Singh, S., **Rani, K.**, Gouda, H.S., Mahakuda, B., Roy, A., Chakraborty, R. and Thakur, J.K. (2024) Natural farming: Status, Challenges and Prospects. In: Futuristic Trends in Agriculture Engineering & Food Sciences, Mohapatra, B., Singh, A.K., Gaikwad, S.B., Singh, K., Ghosh, A. (eds.) (pp. 225-236). Iterative International Publishers. (ISBN 978-93-95632-65-2)
- Tigga, P., **Rani, K.**, Roy, A., Didawat, R.K., Kumar, P. Kushwah, A. and Bag, K. (2022) Potential of Soil Spectroscopy as an Alternative to Soil Testing. In Advanced Innovative Technologies in Agricultural Engineering for Sustainable Agriculture (4), AkiNik Publications, p. 81-104
- Roy, A., Bag, K., Tigga, P., Kumar, P., Didawat, R.K., **Rani, K.**, and Vishwanath. (2022) Estimation of Soil Organic Carbon by Remote Sensing. In Current research in soil science (6), AkiNik Publications, p.77-92
- **Rani, K.** (2022) Assessment of secondary soil nutrients (2022) In Training manual no. IISS/ESS/01/2022 published by IISS during High end workshop on Advanced instrumentation for assessment of soil health indicators, pollution and greenhouse emission from soil
- Lal, N., Sahu, N., Shirale, A. O., Gurav, P., **Rani, K.**, Meena, B. P., ... & Biswas, A. K. (2023). Plant Secondary Metabolites and Their Impact on Human Health. In Nano-Biofortification for Human and Environmental Health (pp. 295-321). Cham: Springer International Publishing.
- Meena, B.P., **Rani, K.**, Jha,P., Biswas,A.K., Behera, S.K. (2023) Integrated nutrient management for sustainable soil health and crop production. In Recent advances in Soil Research:IISS contribution, 87th Annual Convention of Indian Society of Soil Science, pp149-163
- Das, A., **Rani, K.** and Singh, S. (2024) Determination of soil microbial biomass carbon and nitrogen –Practical. In Training manual no. IISS/SBD/01/2024 of High-end workshop on "State-

of-the-art instrumentation for appraising soil biogeochemical processes and microbial diversity with respect to soil-climate feedback response”.

- **Rani, K.** (2024) Assessment of potassium dynamics in soil-Practical In Training manual no. IISS/SBD/01/2024 of High-end workshop on “State-of-the-art instrumentation for appraising soil biogeochemical processes and microbial diversity with respect to soil-climate feedback response”.

TECHNICAL/POPULAR ARTICLES

- Das, A., **Rani, K.**, Trivedi, A., Yadav, D.K. and Singh, A.B. (2021) Earthworm: The ecosystem engineer. *Harit Dhara* (Jan-June 2021)
- **Rani, K.**, Das, A., Abhay Omprakash Shirale, A.O., Trivedi, A. and Yadav, D.K. (2022) Unraveling the potential of waste mica as a potassic fertilizer using potassium solubilizing bacteria. *Harit Dhara* 5(1) January – June, 2022
- Das, A., **Rani, K.**, Behera, B., Trivedi, A., Yadav, D.K. (2022) Carbon farming: a shining hope for a boiling planet. *Agriculture Letters*, 3(07): 36-42.
- **खुशबू रानी**, अबिनाश दास, दिनेश कुमार यादव, अंकिता त्रिवेदी एवं आशीष कुमार बिस्वास (2022) पराली प्रबंधन के बहु विकल्प, खेती (सितम्बर, 2022)
- दिनेश कुमार यादव, अबिनाश दास, **खुशबू रानी**, संगीता लेंका और जयंत कुमार साहा (2023) कीटनाशकों का मृदा और पोषक तत्वों की उपलब्धता पर प्रभाव, खेती (फ़रवरी 2023)
- **खुशबू रानी**, प्रमोद झा, ब्रिज लाल लकारिया, ऐ के ब्रिश्चकमा एं ऐ के ब्रिस्वास, कैसे बढ़ाएं उर्वरक दक्षता खेती, (जुलाई 2023)
- अबिनाश दास, ए.बी सिंह, जे.के. ठाकुर, शुभम सिंह , पूनम सिंह राजपूत और **खुशबू रानी** (2024) प्राकृतिक खेती में रोग और कीट प्रबंधन, मृदा स्वास्थ्य आलोक, pp 53-55.

PAPERS PRESENTED IN NATIONAL/INTERNATIONAL SEMINARS/CONFERENCES

- **Rani, K.**, Datta, A., Jat, H.S., Choudhary, Madhu, Sharma. P.C., Jat, M.L., (2021) Evaluation of potassium quantity intensity relationship under long term conservation agriculture in soil of North West India, 85th Annual Convention of the Indian Society of Soil Science organized at Palli Siksha Bhavana, Institute of Agriculture, Visva-Bharati (Central University), Sriniketan (Santiniketan) DURING November 16-19, 2021
- **Rani, K.**, Datta, A., Jat, H.S., Choudhary, Madhu, Sharma. P.C., Jat, M.L., (2021) Effect of long-term conservation agriculture on potassium availability vis-a-vis soil health under cereal based system 15th Agriculture Science Congress organized by NAAS & BHU at Varanasi during Nov 13-16, 2021.
- **Rani, K.**, and Biswas, D.R., (2022) Effect of potassium solubilizers and crop residue on potassium uptake by wheat from waste mica treated soil. 9th Annual Convention and National Webinar organized by Society for Fertilizers and Environment during on 25-26th February, 2022.

- **Rani, K.**, and Biswas, D.R., (2023) Enhancing potassium availability from waste mica using indigenous potassium solubilizing bacteria. 87th annual convention of Indian Society of Soil Science organized by ICAR-Indian Institute of Soil Science, Bhopal during October 03-06, 2023
- **Rani, K.**, Dhakad, G. and Biswas, A.K, (2024) Effect of conservation agriculture on potassium availability and soil quality under rice-based cropping system in Eastern Indo Gangetic Plains. 11th Annual Convention and National Webinar, organized by Society for Fertilizers and Environment during 2024, on 23-24th February