

## BIODATA

Bhabani Sankar Das

Professor

Agricultural and Food Engineering Department

Indian Institute of Technology

Kharagpur, West Bengal 721302

INDIA

Tel.: +91 3222 283162

Mobile: +91 9434025413

FAX: +91 3222 282244

Email: [bsdas@agfe.iitkgp.ac.in](mailto:bsdas@agfe.iitkgp.ac.in)

[bhabani99@gmail.com](mailto:bhabani99@gmail.com)

---

### PROFESSIONAL INTERESTS

Conduct research and teaching in the areas of soil, hydrology, agriculture and environmental quality for sustainable management of soil and water resources and agricultural production systems with specific focus on geospatial technologies and ecological process assessment.

### EDUCATION

1996 Ph.D., Soil Physics, Kansas State University, Manhattan, Kansas, USA.

1991 M. Sc., Soil Science and Agricultural Chemistry, OUAT, Bhubaneswar, India.

1988 B. Sc., Agriculture, OUAT, Bhubaneswar, India.

### PROFESSIONAL EXPERIENCE

2014 - Present Professor

IIT Kharagpur, INDIA

2007 - 2014 Associate Professor

IIT Kharagpur, INDIA

2002 - 2003 Visiting Professor

Purdue Univ., West Lafayette, USA

1999 - 2007 Assistant Professor (Soil Science)

IIT Kharagpur, INDIA

1999 - 1999 Post-Doctorate (Hydrology)

NMIMT, Socorro, New Mexico, USA

1996 - 1999 Post-Doctorate (Soil Physics)

MSU, Bozeman, Montana, USA

1992 - 1996 Research Assistant (Agronomy)

KSU, Manhattan, Kansas, USA

1991 - 1992 Extension Specialist (Soils)

OUAT, Keonjhar, Orissa, INDIA

1989 - 1991 Jr. Research Fellow (Soil Science)

OUAT, BBSR, Orissa, INDIA

### PROFESSIONAL ACTIVITIES

Associate Editor, Agricultural Water Management

Guest Editor, Frontiers in Plant Science

Member of the Editorial Board, Indian J. Agricultural Physics

National Coordinator, Hyperspectral Remote Sensing in Water Resources, DST, New Delhi

Life Member, Indian Society of Soil Science

### TEACHING ACTIVITIES

My primary teaching responsibility is in the area of flow and transport processes in soil, introductory soil science, and modelling of agricultural systems.

### CURRENT SPONSORED PROJECTS

A. Datta and **B. S. Das**. 2018. Legacy data-based three-dimensional digital soil mapping of West Bengal, India. **Shastri Research Grant**. Can \$ 6,500.00

**B. S. Das**. 2018. Development of Spectral Algorithms for the Estimation of Soil Properties using Field and Laboratory Spectral Data, **DTRL, DRDO**, New Delhi. Amount Funded: Rs. 9,96,000.00

**B. S. Das** and S. Chakraborty. 2017. Development of Estimation of Soil Properties and Crop Residue Cover Using AVIRIS Data, **ISRO**, Amount Funder: Rs. 10,00,000.00

- B. S. Das.** 2016. Assessment of Suspended Sediments Concentration and phytoplankton contents in the Chilika Lagoon using Hyperspectral Remote Sensing. **DST, New Delhi.** Amount funded: Rs. 38,60,100/-
- B. S. Das.** 2016. Creation of Central Laboratory Facility for Eastern Region. **DST, New Delhi.** Amount funded: Rs. 1,80,68,000/-

## **PUBLICATIONS**

1. Kumar, A., Nayak, A.K., Pani, D.R. and Das, B.S., 2019. Application of Phosphorus, Iron, and Silicon Reduces Yield Loss in Rice Exposed to Water Deficit Stress. **Agronomy Journal.**
2. Ng, W., Minasny, B., Malone, B.P., Sarathjith, M.C. and Das, B.S., 2019. Optimizing wavelength selection by using informative vectors for parsimonious infrared spectra modelling. **Computers and Electronics in Agriculture**, 158, pp.201-210.
3. Vasava, H.B., Gupta, A., Arora, R. and Das, B.S., 2019. Assessment of soil texture from spectral reflectance data of bulk soil samples and their dry-sieved aggregate size fractions. **Geoderma**, 337, pp.914-926.
4. Kumar, A., Nayak, A.K., Das, B.S., Panigrahi, N., Dasgupta, P., Mohanty, S., Kumar, U., Panneerselvam, P. and Pathak, H., 2018. Effects of water deficit stress on agronomic and physiological responses of rice and greenhouse gas emission from rice soil under elevated atmospheric CO<sub>2</sub>. **Science of the Total Environment.**
5. Chakraborty, P. and Das, B.S., 2018. Measurement and Modeling of Longitudinal Dispersivity in Undisturbed Saturated Soil: An Experimental Approach. **Soil Science Society of America Journal.**
6. Gupta, A., Vasava, H.B., Das, B.S. and Choubey, A.K., 2018. Local modeling approaches for estimating soil properties in selected Indian soils using diffuse reflectance data over visible to near-infrared region. **Geoderma**, 325, pp.59-71.
7. Panigrahi, N. and Das, B. S. 2018. Canopy Spectral Reflectance as a Predictor of Soil Water Potential in Rice. **Water Resour. Res.**, 54:1-17.
8. Gupta, A, Vasava, H. B., Das, B. S., and Choubey, A. K. 2018. Local modeling approaches for estimating soil properties in selected indian soils using diffuse reflectance data over visible to near-infrared region. **Geoderma**, 325, 59–71.
9. Raj, A., Chakraborty, S., Duda, B.M., Weindorf, D.C., Li, B., Roy, S., Sarathjith, M.C., Das, B.S. and Paulette, L., 2018. Soil mapping via diffuse reflectance spectroscopy based on variable indicators: An ordered predictor selection approach. **Geoderma**, 314, pp.146-159.
10. Minasny, B., Arrouays, D., McBratney, A.B., Angers, D.A., Chambers, A., Chaplot, V., Chen, Z.S., Cheng, K., Das, B.S., Field, D.J. and Gimona, A., 2018. Rejoinder to Comments on Minasny et al., 2017 Soil carbon 4 per mille **Geoderma** 292, 59--86. **Geofisica Internacional**, 309, pp.124-129.
11. Haritha, D, Chakraborty, S., & Das, B. S. Mallick, N., Kotamreddy, N. 2017. Rapid Assessment of Algal Biomass and Pigment Contents Using Diffuse Reflectance Spectroscopy and Chemometrics. **Algal Res.** 27, 274-285
12. Chakraborty, S., Li, B., Deb, S., Paul, S., Weindorf, D. C., & Das, B. S. 2017. Predicting soil arsenic pools by visible near infrared diffuse reflectance spectroscopy. **Geoderma**, 296, 30-37.
13. Kumar, A., Nayak, A. K., Pani, D. R., & Das, B. S. 2017. Physiological and morphological responses of four different rice cultivars to soil water potential based deficit irrigation management strategies. **Field Crops Research**, 205, 78-94.
14. Minasny, B., Malone, B. P., McBratney, A. B., Angers, D. A., Arrouays, D., Chambers, A., Chaplot, V., Chen Z. S., Cheng K., Das B.S., Field D. J., Gimona A., Hedley

- C.B., Hong S.Y., Mandal B., Marchant B.P., Martin M., Mcconkey B.G., Mulder V.L., O'Rourke S., Richer-de-Forges A.C., Odeh I., Padarian J., Paustian K., Pan G., Poggio L., Savin I., Stolbovoy V., Stockmann U., Sulaeman Y., Tsui C.C., Vågen T.G., Wesemael B.V., & Winowiecki L. 2017. Soil carbon 4 per mille. **Geoderma**, 292, 59-86.
15. Chakraborty, P., Das, B. S., & Singh, R. 2017. An Ensemble Modeling Approach for Estimating Diffusive Tortuosity for Saturated Soils From Porosity. **Soil Science**, 182(2), 45-51.
  16. Gupta, A, B. S. Das, A. Kumar, P. Chakraborty, B. Mohanty. 2016. Rapid assessment of Atterberg limits using diffuse reflectance spectroscopy. **Soil Sci. Soc. Am. J.**, 80(5): 1283:1295.
  17. Panigrahi, N., C. S. Bhol, B. S. Das. 2016. Rapid assessment of black tea quality using diffuse reflectance spectroscopy. **J. Food Engg.**, 190:101-108.
  18. Kumar, A., A. K. Nayak, S. Mohanty, B. S. Das. 2016. Greenhouse gas emission from direct seeded paddy fields under different soil water potentials in Eastern India. **Agriculture, Ecosystems and Environment**, 228:111-123.
  19. Sahadevan, A. S., Routray, A., Das, B. S., & Ahmad, S. (2016). Hyperspectral image preprocessing with bilateral filter for improving the classification accuracy of support vector machines. **Journal of Applied Remote Sensing**, 10(2), 025004-025004.
  20. Sarathjith , M. C., B. S. Das, S. P. Wani, and K. L. Sahrawat. 2016. Variable indicators for optimum wavelength selection in diffuse reflectance spectroscopy of soils. **Geoderma**. 267:1-9.
  21. Mohanty, B., A. Gupta, B. S. Das. 2016. Estimation of weathering indices using spectral reflectance over visible to mid-infrared region. **Geoderma**. 266:111-119.
  22. Sarathjith, M. C., B. S. Das, S. P. Wani, and K. L. Sahrawat, A. Gupta. 2016. Assessment of nutrient contents of Indian soils using diffuse reflectance spectroscopy. **Curr. Sci.** 110(6):1031-1037.
  23. Das, B. S., Vasava, H. B., Sarathjith, M. C., & Mohanty, B. (2015). Variance of Aggregate Size Distribution as a Criterion for Soil Similarity. **Vadose Zone Journal**, 14(10).
  24. Santra, P., R. Singh, M. C. Sarathjith, N. R. Panwar, P. Varghese, B. S. Das. 2015. Reflectance spectroscopic approach for estimation of soil properties in hot arid western Rajasthan, India. **Environ. Earth Sci**. DOI 10.1007/s12665-015-4383-x.
  25. Das, B. S., M. C. Sarathjith, P. Santra, R. N. Sahoo, R. Srivastava, A. Routray, S. S. Ray. 2015. Hyperspectral Remote Sensing: Opportunities, Status and Challenges for Rapid Soil Assessment in India. **Curr. Sci.** 108(5):860-868.
  26. Dasgupta P., B. S. Das, S. K. Sen. 2015. Soil Water Potential and Recoverable Water Stress in Drought Tolerant and Susceptible Rice Varieties. **Agril. Water Manage.** 152: 110–118.
  27. Chakraborty, P. and B. S. Das. 2014. Measurement and Modeling of Diffusive Tortuosity in Saturated Soils: A Pedotransfer Function Approach **Soil Sci. Soc. Am. J.** doi:10.2136/sssaj2014.04.0175
  28. Sarathjith , M. C., B. S. Das, S. P. Wani, and K. L. Sahrawat. 2014. Dependency measures for assessing the covariation of spectrally active and inactive soil properties, **Soil Sci. Soc. Am. J.** doi:10.2136/sssaj2014.04.0173
  29. Chakraborty, S., B. S. Das, Md. N. Ali, B. Li, M. C. Sarathjith, K. Majumdar, D.P. Ray. 2014. Rapid Estimation of Compost Enzymatic Activity by Combined Spectral and Machine Learning Approach. **Waste Management**. 34. 623-631.

30. Sarathjith , M. C., B. S. Das, H. V. Vasava, B. Mohanty, S. S. Anand, S. P. Wani, and K. L. Sahrawat. 2014. Diffuse Reflectance Spectroscopic Approach for the Characterization of Soil Aggregate Size Distribution, **Soil Sci. Soc. Am. J.** 78:369–376.
31. Anand, S. S., P. Shrivastava, B. S. Das, and M. C. Sarathjith. 2013. Discrete Wavelet Transform Approach for the Estimation of Crop Residue Content from Spectral Reflectance. **IEEE, Journal of Selected Topics in Applied Earth Observations and Remote Sensing**. DOI: 10.1109/JSTARS.2013.2280894
32. Patil, M. D. and B. S. Das. 2013. Assessing the effect of puddling on preferential flow processes through under bund area of lowland rice field. **Soil and Tillage Res.** 134: 61-71.
33. Santra, P. and B. S. Das. 2013. Modeling Runoff from an agricultural watershed of Western Catchment of Chilika Lake through ArcSWAT. **J. Hydro-Environ. Res.:**1-9.
34. Santra, P., B. S. Das, D. Chakravarty. 2012. Spatial prediction of soil properties in a watershed scale through maximum-likelihood approach. **Environ. Earth Sci.**, 56(7): 2051-2061
35. Patil, M. D., B. S. Das, P. B. S. Bhadoria. 2011. A simple bund plugging technique for improving water productivity in wetland rice. **Soil and Tillage Res.** 112: 66-75.
36. Santra,P., B. S. Das, D. Chakravarty. 2011. Delineation of hydrologically similar units in a watershed based on fuzzy classification of soil hydraulic properties. **Hydrologic Processes**, 25:64-79.
37. Kulluru, P. P. , B. S. Das, and R. K. Panda. 2010. Evaluation of Sorption and Leaching Potential of Malathion and Atrazine in Agricultural Soils of India. **International J. Environ. Res.** 4:75-90.
38. Patil, M. D., B. S. Das, E. Barak, P. B. S. Bhadoria, A. Polak. 2010. Performance of polymer-coated urea in transplanted rice: effect of mixing ratio and water input on nitrogen use efficiency. **Paddy and Water Environ.** 8:189-198.
39. Garg, K. K., B. S. Das, Md. Safeeq, and P. B. S. Bhadoria. 2009. Measurement and modeling of soil water regime in a lowland paddy field showing preferential transport. **Agril. Water Manage.** 96:1705-1714.
40. Santra, P., R. N. Sahoo, B. S. Das, R. N. Samal, A. K. Pattanaik, and V. K. Gupta. 2009. Estimation of Soil Hydraulic Properties using Spectral Reflectance in Visible and Near-Infrared Region. **Geoderma.** 152:338-349.
41. Santra, P. and B. S. Das. 2008. Pedotransfer Functions for Soil Hydraulic Properties Developed from a Hilly Watershed of Eastern India. **Geoderma.** 146: 439-448.
42. Perkins, D.B., N.W. Haws, J.W. Jawitz, B.S. Das, P.S.C. Rao. 2007. Soil hydraulic properties as ecological indicators in forested watersheds impacted by mechanized military training. **Ecological Indicator.** 7:589-597.
43. Das, B. S., J. M. Wraith, G. J. Kluitenberg, H. M. Langner, P. J. Shouse, and W. P. Inskeep. 2005. Evaluation of mass recovery impacts on transport parameters using least-squares optimization and moment analysis. **Soil Sci. Soc. Am. J.** 69:1209-1216.
44. Das, B. S., N. W. Haws, and P. S. C. Rao. 2005. Defining geometric similarity in soils. **Vadose Zone J.** 4:264-270.
45. Haws, N. W., B. S. Das, and P. S. C. Rao. 2004. Dual-domain solute transfer and transport processes: Evaluation in batch and transport experiments. **J. Contam. Hydrol.** 75:257-280.

46. Das, B. S., L. S. Lee, P.S.C. Rao, and R. Hultgrens. 2004. Sorption and degradation of steroid hormones in soil during transport: Column studies and model evaluation. **Environ. Sci. and Technol.** 38:1460-1470.
47. Das, B. S., J. M. H. Hendrickx, and B. Borchers. 2001. Modeling transient water distributions around landmines in bare soils. **Soil Sci.** 166(3):163-173.
48. Das, B. S. and J. M. Wraith. 2000. Hydraulic property-based models to predict soil solution electrical conductivity under field conditions. **Water Resour. Res.** 36:3383-3387.
49. Das, B. S., J. M. Wraith, and W. P. Inskeep. 1999. Nitrate concentration in root zone estimated using time-domain reflectometry. **Soil Sci. Soc. Am. J.** 63(6):1561-1570.
50. Langner, H. W., W. P. Inskeep, H. M. Gaber, W. L. Jones, **B. S. Das**, J. M. Wraith. 1998. Pore water velocity and residence time effects on the degradation of 2,4-D during transport. **Environ. Sci. and Technol.** 32:1308-1315.
51. Wraith J. M. and B. S. Das. 1998. Monitoring water and ionic solute distribution using time domain reflectometry. **Soil and Tillage Res.**, 47:145-150.
52. Das, B. S., and G. J. Kluitenberg. 1996. Moment analysis to estimate degradation rate constants from leaching experiments. **Soil Sci. Soc. Am. J.**, 60:1724-1731.
53. Govindaraju, R. S., B. S. Das, and G. J. Kluitenberg. 1996. Cumulants-based analysis of input-output concentration data from soil column studies for system identification. American Society of Civil Engineering, **J. Hydrologic Eng.** 1:41-48.
54. Das, B. S., G. J. Kluitenberg, and G. M. Pierzynski. 1995. Temperature dependence of nitrogen mineralization rate constant: A theoretical approach. **Soil Sci.** 159:294-300.
55. Kluitenberg, G. J., K. L. Bristow, and B. S. Das. 1995. Error analysis of the heat pulse method for measuring soil heat capacity, diffusivity, and conductivity. **Soil Sci. Soc. Am. J.**, 59(3):719-726.
56. Misra, C., B. C. Mohanty, B. S. Das, and N. K. Savant. 1995. Relationship between some selected soil properties and yield of transplanted rice fertilized with urea briquettes. **Oryza** 32:178-183.
57. Misra, C., P. K. Rath, D. Jena, and B. S. Das. 1994. Hydrological properties of a TypicHaplustult measured using a neutron hydroprobe and tensiometers. **J. Indian Soil Sci. Soc.** 42:172-177.

#### **Peer-Reviewed Book Chapters and Proceeding Papers:**

1. Das, B. S. 2011. Recent developments in vadose zone hydrology: Opportunities and challenges for sustainable utilization of water and nutrients for enhancing productivity. In: Wani S. P., K. L. Sahrawat, and K. K. Garg (ed.) Use of high science tools in integrated watershed management. Proc. National Symposium, New Delhi, 127:144.
2. Hendrickx, J. M. H, B. S. Das, D.L. Corwin, J.M. Wraith, and R.G. Kachanoski. 2002. Relationship between solute concentration and apparent soil electrical conductivity. In: Hendrickx, J.M.H, J.M. Wraith, R.G. Kachanoski, and D.L. Corwin. Solute content and concentration. J.H. Dane and G.C. Topp (ed.). Methods of Soil Analysis. Part 4-Physical Methods. ASA, Madison, WI.
3. Das, B. S., R. S. Govindaraju, G. J. Kluitenberg, A. Valocchi, and J. M. Wraith. 2002. Time moment analysis and solute transport studies in soil. In Govindaraju, R. S. (Ed.) Stochastic Methods in Subsurface Contaminant Hydrology, American Society of Civil Engineers Special Publication. Citation: 4
4. Hendrickx, J. M. H, B. Borchers, B. S. Das, and Sung--Ho Hong. 2000. Enhancing dielectric constraint between land mines and the soil environment by watering:

- modeling, design, and experimental results. In Detection and Remediation Technologies for Mines and Minelike Targets V, **SPIE** Vol. 4038, 993-1000.
5. Hendrickx, J. M. H., B. S. Das, and B. Borchers. 1999. Modeling distributions of water and dielectric constants around landmines in homogenous soils. In Detection and Remediation Technologies for Mines and Minelike Targets IV, **SPIE** Vol. 3710, 728-738.
  6. S. Kar and B. S. Das. 2000. Soil water dynamics in rice eco-systems during rainy season. In Proc. National Workshop on Rainwater and Groundwater Management for Sustainable Rice Ecosystem, Agril. and Food Engg. Dept., IIT, Kharagpur.
  7. Das, B. S., and G. J. Kluitenberg. 1995. Using pore size distribution to model the unsaturated hydraulic conductivity of soil. Kearney Foundation of Soil Science Vadose Zone Hydrology Conference, Kearney Foundation of Soil Science, University of California, Davis.

**Book:**

- Govindaraju, R. S. and **B. S. Das**. 2007. Moment analysis for subsurface hydrologic applications. Springer.