

# Surinder S Kukal, PhD, FNAAS, FISSS

Brief bio data

**Current Position:** *MEMBER, Punjab Water Regulatory & Development Authority*

**Organization:** **Government of Punjab  
Chandigarh, India**

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Residence +91-9872777626 (M)

**Date of birth:** 20<sup>th</sup> February, 1963

**Educational qualifications:** B.Sc. Agriculture (GNDU 1985) (**Gold Medalist**), M.Sc. Soils (PAU 1988), Ph.D. Soils (PAU 1998)

## Positions held/being held:

1. *Assistant Professor of Soil Conservation* - 9 years and 10 months (9<sup>th</sup> September 1988 to 23<sup>rd</sup> July 1998) at PAU, Ludhiana, India.
2. *Associate Professor of Soil Conservation* - 8 years (24<sup>th</sup> July 1998 to 27<sup>th</sup> July 2006) at PAU, Ludhiana, India.
3. *Professor of Soil Conservation* – 9 years 09 months (27<sup>th</sup> July 2006 to 8<sup>th</sup> Mar 2016) at PAU, Ludhiana, India.
4. **Director, School of Climate Change & Agric Met (Additional Charge)** – 11 months (15<sup>th</sup> March 2013 to 18<sup>th</sup> February 2014) at PAU, Ludhiana.
5. **Head, Department of Forestry & NR (Additional Charge)** – 01 month (5<sup>th</sup> August to 30<sup>th</sup> August 2013) at PAU, Ludhiana
6. **Director, Electron Microscopy & NanoScience Laboratory (Additional Charge)** – 1 year and 02 months (7<sup>th</sup> July 2014 to 15<sup>th</sup> March 2016) at PAU, Ludhiana
7. **Additional Director of Research (Natural Resource & Plant Health Management)** – 1 year 03 month (9<sup>th</sup> March 2016 to 30<sup>th</sup> May 2017)
8. **Additional Director of Research (Natural Resource & Plant Health Management)** (Additional Charge) – 03 months and 15 days (30<sup>th</sup> May 2017 to 14<sup>th</sup> September 2017)
9. **DEAN, Postgraduate Studies**, PAU, Ludhiana (Additional Charge) – 03 months and 16 days (22<sup>nd</sup> Jan 2018 to 8<sup>th</sup> May 2018)
10. **Dean, College of Basic Sci & Humanities**, PAU, Ludhiana (Additional Charge) – 8 months
11. **DEAN, College of Agriculture**, PAU, Ludhiana – 3 years 02 month (30<sup>th</sup> May 2017 to 3<sup>rd</sup> Aug 2020)
12. **MEMBER, Punjab Water Regulatory & Development Authority**, Govt. of Punjab, Chandigarh (4<sup>th</sup> Aug 2020 till date)

## Research projects completed

- i) **DST (GOI)**, New Delhi sponsored project entitled, “Evaluation of gully control measures in foothills of lower Shiwaliks” as **Principle Investigator**.
- ii) **ICAR** sponsored NATP sub-project, “Reducing water and nutrient losses in rice grown in different soils” as **Coordinating Center-Principle Investigator**.
- iii) **DST (GOI)** sponsored project, “Behaviour and patterns of gully erosion in foothills of lower Shiwaliks” as **Principal Investigator**.
- iv) **ACIAR (Australia)** Project LWR2/2000/89 on Permanent beds for irrigated rice-wheat and alternative systems in northwest India and southeast Australia as **Principle Soil Physicist**.
- v) **DST (GOI)** New Delhi sponsored research project entitled “Gully erosion management in foothills of lower Shiwaliks” as **Principle Investigator**.

- vi) **IRRI (Philippines)** - sponsored project-Farmer participatory evaluation of alternative wetting and drying technologies of rice at PAU (**Principle Investigator**)
- vii) **SRTT**-sponsored research project (RGR Cell) on Exploration of the potential of Direct-seeded rice in Punjab as **Co- Principle Investigator**.
- viii) **MOWR (GOI)** - sponsored project “Farmers’ Participatory Research on IW conservation” (**Co-Principle Investigator**)
- ix) **IRRI-IFAD-funded** research project on, “Accelerating RCTs Adoption to Improve Food Security and Rural Livelihoods while Reducing Adverse Environmental Impacts in IGPs” (**Principle Investigator**)
- x) **IPI-sponsored** research project on, “Role of potassium in mitigating water stress in maize and wheat crops” (**Principle Investigator**)
- xi) **NRTT-funded** research project on “Development and Demonstration of Runoff Farming System on micro-watershed basis in foothills of lower Shiwaliks” (**Co-Principle Investigator**)
- xii) **IRRI-funded** research project on “Medium term impact of conservation tillage and mulch on soil physical environment and crop performance in rice-wheat cropping system in NW India (**Principle Investigator**)
- xiii) **GFC-funded** research project on “Use of polycoated urea for higher N use efficiency in irrigated and dryland conditions” (**Co-PI**)
- xiv) **DST (GOI) funded Network Project** on “Revival of village ponds” (**Network Co-ordinator**)

#### Editorial Accomplishments

- **Editor-in-Chief**, Bulletin of World Association of Soil and Water Conservation
- **Associate Chief Editor**, International Soil and Water Conservation Research, China
- **Chief Editor**, Indian Journal of Ecology, Ludhiana (2005-2008)
- **Editor**, Journal of The Indian Society of Soil Science, N Delhi (2007-2014)
- **Editor**, Indian Journal of Ecology, Ludhiana (1998-2005)
- **Chief Editor**, Annual Report of Department of Soil Science, PAU, Ludhiana (2010-11)
- **Editor (Soil & Water Conservation Section)**, Annual Report of Department of Soil Science, PAU, Ludhiana (2004-12)
- **Reviewer** of International journals - Soil & Tillage Research, Agricultural Water Management, Catena, Geoderma, Field Crops Research, Journal of Irrigation and Drainage Engineering, Pedosphere, Water International and Pakistan Journal of Scientific and Industrial Research
- **Reviewer** of National journals of repute (Indian Journal of Agricultural Sciences, Journal of The Indian Society of Soil Science, Indian Journal of Ecology).

<b>Research publications</b>	<b>326</b>
Peer reviewed research papers	129
International	66
National	63
Peer reviewed Review papers	10
International	05
National	05
Peer reviewed Encyclopedia paper	01
Conference Proceedings papers	21
International	11
National	10
Popular/technical articles in magazines	70
Research bulletins/Practical Manuals	11
Book Chapters	18
Books	04
Papers presented at conferences (abstracts)	62

Invited	15
Volunteered	47

<b>Participation in Seminar/Symposia/Workshops</b>	<b>62</b>
International	31
National	31

#### Visits Abroad

- i) As **Delegate** at 7<sup>th</sup> International Congress of Soil Science held at **Faisalabad, Pakistan** (December 9-12, 1998).
- ii) As **Delegate** at 8<sup>th</sup> International Congress of Soil Science held at **Islamabad, Pakistan** (November 13-16, 2000).
- iii) As **Sponsored-delegate** at World Congress of Soil Science held at **Bangkok, Thailand** (August 14-21, 2002).
- iv) As **Visiting Scientist**, CSIRO, Land and Water, **Griffith, Australia** (February 24 to March 23, 2005).
- v) As **Invited Speaker** at Regional Asia-Pacific Workshop on Water in Agriculture (FAO/IAEA/ISSCAS) held at **Nanjing, China** (November 21-23, 2005).
- vi) As **Visiting Scientist**, CSIRO, Land and Water, **Griffith, Australia** (May 12 to June 05, 2006).
- vii) As **Special Invitee to IEDA-IAEA** Asia-Pacific Workshop on Improving Crop Water Productivity and Enhancing Plant Transpiration through Aquacrop Modeling and the Use of Isotopic and Related Techniques held at **Beijing, China** (October 20-24, 2008)
- viii) As **Keynote Speaker** in International Conference on Land Degradation and Conservation held at University of **Belgrade, Serbia** (May 25-30, 2009)
- ix) As **Sponsored-delegate at 19<sup>th</sup> World Congress of Soil Science** held at Convention Centre, **Brisbane, Australia** (August 1-6, 2010)
- x) As **Invited Speaker** in International Conference on Land Degradation on Agricultural Lands held at **Xian, China** (October 11-17, 2010)
- xi) As **Invited Speaker** in 2<sup>nd</sup> WASWAC World Conference on Multi-discipline Knowledge for Water Disaster Management held at **Chiang Rai, Thailand** (September 4-7, 2013)
- xii) As **Special Invitee** (Water management expert) in Plenary Meeting of Sustainable Rice Platform and Rice for Tomorrow Symposium held at **Bangkok, Thailand** (November 25-26, 2013)
- xiii) As **Advisory Committee Member** of Sustainable Rice Platform (UNEP) in 4<sup>th</sup> Annual Plenary Meeting and Stakeholders' Dialogue – The future of rice-the partnership for sustainability, held at **Bangkok, Thailand** (October 27-28, 2014)
- xiv) As **Advisory Committee Member** of Sustainable Rice Platform (UNEP) in Standards and Protocols Workshop held at **Bangkok, Thailand** (February 16-17, 2015)
- xv) As **Advisory Committee Member** of Sustainable Rice Platform (UNEP) Fundraising Strategy Workshop held at **Bangkok, Thailand** (March 24-25, 2016)
- xvi) As **Advisory Committee Member** of Sustainable Rice Platform (UNEP) 6<sup>th</sup> Annual Plenary Meeting and General Assembly held at **Singapore** (December 7-9, 2016)

#### Recognitions at International level

- i) Member, Advisory Committee, Sustainable Rice Platform (UNEP) (2010-2016)
- ii) Associate Chief Editor, International Soil and Water Conservation Research (China) (2009-till date)
- iii) Editor-in-Chief, Bulletin, World Association of Soil and Water Conservation (China) (2006-2011)

#### Recognitions at National level

- i) **Member**, QRT of ICAR-National Bureau of Soil Science and Landuse Planning (2018-19)
- ii) **Member**, Advisory Board of The Journal of Research ANGRAU, Guntur, AP (2018-till date)
- iii) **Member**, Advisory Board of TERI-Deakin Nano Biotechnology Centre, TERI, New Delhi (2017-19)
- iv) **Member**, Faculty of Agriculture, Shere Kashmir University of Agricultural Sciences & Technology-Jammu (J&K) (2016-18)
- v) **Member**, Board of School of Life Sciences, Central University of Jammu (2014-17)
- vi) **Expert Member**, Apex Body for Sustainable Development, THDC India Ltd (Joint Venture of Govt. of India and UP) (2012-13)
- vii) **Expert Member**, Below Board Level Committee, THDC India Ltd (Joint Venture of Govt. of India and UP) (2013-19)

#### **Awards/Distinctions**

- i) **Professor J.S. Bali Award** for Soil and Water Conservation Research, Soil Conservation Society of India (2019)
- ii) **Fellow, Indian Society of Soil Science**, New Delhi (2016)
- iii) **Fellow, National Academy of Agricultural Sciences**, New Delhi (2015)
- iv) **Honorary Member, Watershed Management Society of Iran** (2015)
- v) **Dr G S Khush Distinguished Professor Award** (PAU) 2013-2016
- vi) **12<sup>th</sup> International Congress Commemoration Award** by Indian Society of Soil Science (December 3, 2012)
- vii) **PAU Merit Certificate for Outstanding Research, Teaching & Extension** for the year 2011-12 (November 12, 2012)
- viii) **First Best Paper Award** for research paper presented at National Seminar, “Engineering Applications of Remote Sensing, held at SGSITS, Indore, India (October 1989)
- ix) **Appreciation Letter from Dean PG Studies** for Academic Excellence (May 2014)
- x) **Appreciation letter from Dean**, College of Agriculture, PAU, Ludhiana for efficient organization of UG Advisory Group meetings at HOD level (December 2003)
- xi) **Merit Scholarship of PAU (1985-87)**, Ludhiana for standing first in M.Sc. Soils program
- xii) **Gold Medal** for standing first in B.Sc. (Hons.) Agriculture program in GNDU, Amritsar (1985)

#### **Honors/Recognitions**

- i) **Co-Chairman**, Technical Session on “Soil Physics and Soil & Water Conservation” during 80<sup>th</sup> Annual Convention of Indian Society of Soil Science held at UAS, Bengaluru from Dec 5-8, 2015.
- ii) **Chairman, Group Discussion** on “Soil Degradation & Soil Pollution” during ‘National Dialogue on Efficient nutrient management for improving soil health’ (TAAS) at IARI, New Delhi (Sep 2015).
- iii) **Expert Member, Below Board Level Committee (BBLC)** for Sustainable Development in THDC, India Ltd. (Joint Venture of Govt. of India and Govt. of UP) for the period (2013-2015).
- iv) **Expert Member, Apex Advisory Committee for Sustainable Development** in THDC, India Ltd. (Joint Venture of Govt. of India and Govt. of UP) for the period (2012-2013).
- v) **Chairman of Technical Session II** at National Conference on Environmental Pollution, Soil Health and Sustainable Agriculture, at Amity University, UP from Jan 15-17, 2013.
- vi) **Chairman of Technical Session III** on Indigenous Practices, Conservation Agriculture at 2<sup>nd</sup> J&K Science Congress held at SKUAST-Jammu from Dec 15-17, 2012.
- vii) **Chairperson of Technical Session IV** at UGC-sponsored National Seminar held at G.H.G. Khalsa College, Gurusar Sadhar Dist. Ludhiana on 4<sup>th</sup> March 2011.

- viii) **Rapporteur of the Technical Session II** of Research & Extension Specialists Workshop for Soil and Water Conservation held at PAU Ludhiana on 9<sup>th</sup> May 2011.
- ix) **Keynote Speaker** in International Conference on Land degradation held at University of Belgrade, Serbia from May 25-30, 2009.
- x) **Rapporteur of the Technical Session I** of Research & Extension Specialists Workshop for Soil and Water Conservation held at PAU Ludhiana on 4<sup>th</sup> May 2010.
- xi) **Co-Chairman of the Plenary Session** at State Level Seminar on Future Strategies for Conservation and Management of Natural Resources organized by SLUB, Department of Soil and Water Conservation, Punjab held at Mohali on February 27, 2009.
- xii) **Rapporteur of the Plenary Session II** of 12<sup>th</sup> Punjab Science Congress held at PAU Ludhiana from February 7-9, 2009.
- xiii) **Chairman, Technical Session on Flood Hazards and Soil Erosion** at National Workshop on Environmental Geo-hazards (Earthquakes, Landslides, Floods) Management and Mitigation Strategy for Himachal Pradesh, from June 4-5, 2007.
- xiv) **Chairman of the Technical Session** at ACIAR-International Workshop on Permanent Beds for Rice-wheat in IGPs, held at PAU, Ludhiana from September 5-7, 2006.
- xv) **Member, Consultation Board, World Journal of Agricultural Sciences** (2006-08).
- xvi) **Guest of Honour at Seminar** on “Water and Punjab -- Crisis past and present”, during Sarbat Vikas Utsav organized by Kheti Virasat, Punjab on March 16, 2004.
- xvii) **Rapporteur of the Technical Session** (Degradation of Land and its management) at International Conference on Sustainable Management of natural resources (land, water and forest) held at BHU, Varanasi from February 11-14, 2004.
- xviii) **Chairman of the Technical Session** at 8<sup>th</sup> International Congress of Soil Science, held at NARC, Islamabad, Pakistan during November 2002.
- xix) **Rapporteur of the Technical Session** at 7<sup>th</sup> International Congress of Soil Science, held at University of Agriculture, Faisalabad, Pakistan during March 1998.
- xx) **Member of the Poster Judging Committee** at 7<sup>th</sup> International Congress of Soil Science, held at University of Agriculture, Faisalabad, Pakistan during March 1998.

#### **Membership of Scientific Societies/Associations**

**Honorary Member, Watershed Management Society of Iran**  
**Life Member, World Association of Soil and Water Conservation**  
**Life Member, Indian Association of Soil and Water Conservationists**  
**Life Member, Indian Society of Remote Sensing**  
**Life Member, Indian Science Congress Association**  
**Life Member, Punjab Academy of Sciences**  
**Life Member, Indian Ecological Society**  
**Life Member, Indian Society of Life Cycle Assessment**  
**Life Member, Range Management Society of India**  
**Life Member, Indian Society of Agribusiness Professionals**  
**Life Member, Soil Conservation Society of India**  
**Life Member, Association of Agro-meteorologists of India**  
**Member, Indian Society of Soil Science**

#### **PG research guidance**

<b>Major advisor</b>		<b>14</b>
M Sc students	12	
Ph D students	01	
<b>Member, Advisory committee</b>		<b>37</b>
M Sc students	25	
Ph D students	12	
<b>Member, Advisory committee of Ph D</b>		

students in foreign universities

02 (*Sudhir Yadav*, Adelaide University, Adelaide, Australia; *Naveen Gupta*, Charles Stuart University, Wagga Wagga, Australia)

### Post-Doctoral Research Guidance

**Dr Mitu Abolanle Busari**, from Nigeria awarded Dr C V Raman International Post-Doc Fellowship for African Researchers 2014-15 to work on water management under my guidance.

### Lead/Invited lectures delivered at Workshops/Advanced Training programs/Farmers' Field days etc.

Regional	82
National	47
International	07
Total	136

Radio/TV Talks delivered 11

Training programs/Workshops/Conventions/Seminars/Dialogue Meets organized/coordinated 19

### Major Research Achievements

- Irrigation scheduling on the basis of soil matric potential measured with locally fabricated, cheap and farmer-friendly tensiometers, could help save 31-50% of irrigation water in rice compared to farmers' conventional practice of irrigation in the region with fast depleting ground water resources (**Kukal et al., 2005; Irrigation Science**). The development of simple tensiometer for the purpose is an achievement as it has been modified for the use of illiterate farmers, is easy to read, cheap and sturdy to use at the farmers' fields.
- The percolation losses of water in rice fields were observed to be a direct function of clay content of 0-1 cm soil layer after puddling, whose increase with increase in puddling intensity was a direct function of pre-puddling tillage (**Kukal and Sidhu, 2004; Soil & Tillage Research**).
- Percolation rate of water in rice fields was found to decrease with decrease in ponding water depth. Seepage ratio (ratio of seepage + percolation to percolation alone), increased with increase in puddling intensity, indicating that the magnitude of under-bund percolation was a direct function of puddling intensity. The hydraulic conductivity of puddled layer was found to decrease with increased puddling intensity whereas hydraulic gradient between puddled and unpuddled layers increased with increase in puddling intensity (**Kukal & Aggarwal, 2002; Agricultural Water Management**).
- Puddling at a shallow depth (5-6 cm) was found to minimize the chances of subsurface compaction in rice fields which was a common feature in coarse and medium textured rice fields in the region and causes aeration stress in the succeeding wheat crop (**Kukal and Aggarwal, 2003a; Soil & Tillage Research**). This minimized the adverse effects of puddling on the performance of succeeding wheat crop (**Kukal & Aggarwal, 2003b; Soil & Tillage Research**).
- Puddling with two passes of tractor-drawn cultivator in 4-5 cm standing water followed by one planking was found to be optimum for sandy loam and loamy sand soils, whereas for silty clay loam soil, one puddling followed by a planking was sufficient (**Singh et al., 2001; Indian J. Agricultural Sciences**).
- A strategy for gully erosion management in foothill of Shiwaliks was suggested based on the studies of behaviour and patterns of gully erosion in the region, which is expected to be successful and cost-effective (**Kukal & Bawa, 2004; Indian Journal of Soil Conservation**).
- A modified hydrometer technique was developed for soil particle size analysis which considered decay of suspension density proportional to square of particle size and combines Stoke's law. This method takes only 2 hours to analyze a sample compared to 8 hours in Day's hydrometer method (**Sur & Kukal, 1990; Soil Science**).
- A technique of measuring and monitoring puddling depth in sandy loam rice fields was developed which is simple and quick to measure (**Kukal, 2001; Soils & Crops**).

- The stability of soil aggregates from agricultural fields and other landuses were made to increase with the application of PVA at 0.05% concentration (**Kukal et al., 2007; Catena**). \* The stability of soil aggregates from different land uses was measured in relation to antecedent moisture content and aggregate size, with the help of single raindrop technique and the erodibility index ( $EI_{SRT}$ ) developed (**Kukal et al., 2008; Arid Land Research & Management**).
- The soil physical environment was shown to improve with agro-forestry with higher SOC sequestration compared to that under sole crop (wheat) (**Gupta et al., 2009; Agroforestry Systems**)
- The long-term application of balanced inorganic fertilizers and organic manures in rice-wheat and maize-wheat were found to improve soil physical properties and sequester higher organic carbon from the atmosphere (**Rehana-Rasool et al., 2007, 2008; Soil & Tillage Research**). The SOC sequestration rates were observed to be higher with organic manures than with balanced inorganic fertilization and in rice-wheat than in maize-wheat (**Kukal et al., 2008; Soil & Tillage Research**).
- The decline in rice yield with time on permanent raised beds for RW over time (**Yadvinder-Singh et al., 2008; Field Crops Research**) was ascribed to the compaction of bed slopes (where the rice seedlings were transplanted) by the tractor tyres during renovation of the beds after wheat and rice harvest, resulting in restricted root growth towards the beds (**Kukal et al., 2008; Soil & Tillage Research**).
- The rice grown on permanent and fresh raised beds did not help save irrigation water when the furrows are filled to the brim. Irrigating the furrows with half furrow depth on the basis of soil matric potential has potential of higher irrigation water productivity in rice grown on fresh raised beds (**Kukal et al., 2010; Field Crops Research**).