Curriculum Vitae

Name : Dr. Uday Mandal, PhD, ARS

Designation : Senior Scientist, Soil & Water Conservation Engineering

Qualification : B.Tech (Agril. Engg., BCKV); 2009
: M.Tech (S&WC Engineering, IIT Kharagpur); 2011
: PhD (IIT Kharagpur); 2019

Email ID : udaymandal_icar@yahoo.co.in
: uday.mandal@icar.gov.in

Mob No : +91-7579043146

Date of Birth : 17-03-1987

Service Particulars
: Joined at NAARM, Hyderabad (ICAR) as Scientist on **1st January 2013**
: Scientist (01-01-2013 to 31-12-2017) at ICAR-IISWC Dehradun
: Scientist (Senior Scale; 01-01-2018 to 31-12-2022) at ICAR-IISWC Dehradun
: Senior Scientist (01-01-2023 to till date) at ICAR-IISWC Dehradun

Research Area
: Soil Erosion; Soil and Water Conservation
: Groundwater Modelling; Surface Water Modelling
: River Basin hydrology/ Watershed Hydrology
: Remote Sensing & GIS Application
: Sustainable Land and Water Resources Management
: Climate Change Impact on River Basin Hydrology

Publication : 19 Number (15-International and 4-National); Conference Paper: 5 Number

Award &Recognition
: AICTE GATE Fellowship for M. Tech. (2009)

: MHRD Doctoral Fellowship. (2011)

: Recipient of Indian Association of Soil and water Conservationist (IASWC) Budding Scientist for the Year 2020

Capacity Building

Sl No	Training Organized	Stake holder	Duration
1	In-plant training	B.Tech/ M.Tech Students	1 to 3-month
2	Outreach Internship	M.Tech Students	45-days
3	ICAR Sponsor	ICAR Institute Technical Staff	15-days
4	Institute Sponsor/ State Govt.	Farmers	1 to 7-days
5	NICRA Project Sponsor	Scientist/ SRF/JRF/ Technical Staff	10-days
6	On-line Training	B.Tech. students	1-month
7	Certificate Course on "Soil and Water Conservation and Watershed Management"	State Govt. officials (Agriculture and soil conservation Dept.)	4-month

Ph.D. Thesis Title : Enhancement of Sustainable Agricultural Production in a Tropical River Basin under Climate Uncertainty.

M.Tech Thesis Title : Integrated Land and Water Management Framework for Hirakud Canal Sub-command (India) using Grey System Analysis

Guided : 3 (M.Tech.)

Web Reference : https://scholar.google.co.in/citations?user=eDdGr9oAAAAJ&hl=en&oi=ao
: https://www.researchgate.net/profile/Uday_Mandal
: https://orcid.org/0000-0003-2822-3268

Details of Publications:

A. Peer Review Journal

1. **Mandal*, U.**, Dhar, Anirban, Panda, N., Sudhindra, Sena D.R., (2022). Spatiotemporal Evaluation and Assessment of Shallow Groundwater Quality for Irrigation of a Tropical Coastal Groundwater Basin. Environmental Science and Pollution Research**.** https://doi.org/10.1007/s11356-022-22266-8. [**Q1**]
2. **Mandal, U.**, Dhar, A., and Panda, S. N. (2013). Integrated land and water resources management framework for Hirakud canal subcommand (India) using gray systems analysis, **Journal of Water Resources Planning and Management**, 139(6), 733–740. [**Q1**]
3. **Mandal*, U.**, Sahoo, S., Munusamy, S. B., Dhar, A., Panda, S. N., Kar, A., & Mishra, P. K. (2016). Delineation of Groundwater Potential Zones of Coastal Groundwater Basin Using Multi-Criteria Decision Making Technique. **Water Resources Management**, 30(12), 4293–4310. [**Q1**]
4. **Mandal*, U.**, Sena, D.R., Dhar, A., Panda, S.N., Adhikary, P.P., Mishra, P.K. (2021). Assessment of climate change and its impact on hydrological regimes and biomass yield of a tropical river basin. **Ecological Indicators**, 126(4), 107646. [**Q1**]
5. **Mandal*, U.**, Dhar, A., Panda, S. N. (2021). Enhancement of sustainable agricultural production system by integrated natural resources management framework under climatic and operational uncertainty. **Agricultural Water Management** 252(9):106903. https://doi:10.1016/j.agwat.2021.106903. [**Q1**]
6. **Mandal*, U.**, Panda, R.K., Mishra, P.K., Alam, N. M., Kar, G. (2017) Conceptualization of community-based integrated farming system model design with multi-objective optimization management, **Current Science**, 112(11), 2234-2242. [**Q2**]
7. Kumar, G., Sena, D.R., Rao, B.K., Kurothe, R.S., Yadav, N., Bhatnagar, P.R., **Mandal*, U.** (2021). Empirical evaluation of sand filters to evolve practical designs for artificial recharge through dry wells. **Journal of Hydrology** 593, 125839. DOI:10.1016/j.jhydrol.2020.125839. [**Q1**]
8. Kumar, G., Nath, V., **Mandal, U*.**, Sena, D. R., Pongener, A., Ranjan, R., Madhu, M. (**2023**). Climate and soil suitability zonation for Litchi (Litchi chinensis) in India

using geo-science tool-based analytical hierarchy process. **The Egyptian Journal of Remote Sensing and Space Science**, 26(3), 581-594. [**Q1**]

9. Kumar, G., Kurothe, R.S., Viswakarma, A.K., Mandal, D., Sena, D. R., **Mandal, U*.,** Pande, V.C., Dinesh, D. (**2023**), Assessment of soil vulnerability to erosion in different land surface configurations and management practices under semi-arid monsoon climate, **Soil and Tillage Research**, 230, 105698. ISSN: 0167-1987. [**Q1**]

10. Alam, N.M.; Jana, C.; Mandal, D.; Meena, S.K.; Shrimali, S.S.; **Mandal, U.**; Mitra, S.; Kar, G. Applying Analytic Hierarchy Process for Identifying Best Management Practices in Erosion Risk Areas of Northwestern Himalayas. **Land** 2022, 11, 832. https://doi.org/10.3390/land11060832 [**Q2**]

11. Dash, S.S., Sena, D.R., **Mandal* U.**, Kumar, A., Kumar, G., Mishra, P.K., and Rawat, M. (2021). A Hydrological Modelling Based Approach for Vulnerable Area Identification in Changing Climate Scenario. **Journal of Water and Climate Change**, IWA 12(2), 433-452. [**Q3**]

12. Behera, M., Sena, D. R., **Mandal, U.***, Kashyap, P. S., & Dash, S. S. (2020). Integrated GIS-based RUSLE approach for quantification of potential soil erosion under future climate change scenarios. **Environmental Monitoring and Assessment**, *192*(11). [**Q2**]

13. Mandal, D., Chandrakala, M., Alam, N.M., Roy, T., **Mandal, U**. (2021). Assessment of soil quality and productivity in different phases of soil erosion with the focus on land degradation neutrality in tropical humid region of India, **Catena**, 204, 105440. [**Q1**]

14. Adhikary, P. P., Sena, D. R., Dash, C. J., **Mandal, U**., Nanda, S., Madhu, M., Sahoo, D. C., and Mishra, P. K. (2019). Effect of Calibration and Validation Decisions on Streamflow Modeling for a Heterogeneous and Low Runoff–Producing River Basin in India, **Journal of Hydrologic Engineering** 24 (7), 05019015-(1-12). [**Q2**]

15. Dhar, A., Sahoo, S., **Mandal, U.**, Dey, S., Bishi, N., and Kar, A., (2015). Hydro-environmental assessment of a regional ground water aquifer: Hirakud command area (India), **Environmental Earth Science**, 73(8), 4165-4178. [**Q2**]

16. Dash, Ch. J., Adhikary, P. P., Das, N. K., Alam, N. M., **Mandal, U.**, and Mishra, P. K. (**2018**). Comparison of rainfall kinetic energy–intensity relationships for Eastern Ghats Highland region of India. **Natural Hazards**, 93(1), 547–558. [**Q1**]

17. Roy, T., **Mandal, U.**, Mandal*, D., and Yadav, D. (2021). Role of arbuscular mycorrhizal fungi in soil and water conservation: a potentially unexplored domain, **Current Science**, 120 (10), 1573-1577. [**Q2**]

18. **Mandal, U.**, Chowdhury, A., Dutta, A., Roy, T. (2021) comparative study for estimating reference evapotranspiration using artificial neural network and empirical techniques. **Indian Journal of Soil Conservation,** 49(2), 22-129. [**Q2**]

19. Jana C., Rawat M., Sena D.R., Alam N.M., **Mandal U.**, Kaushal R. and Mishra P. K. (2016). Application of SEBAL model to estimate evapotranspiration in Doon Valley, India. **Indian Journal of Soil Conservation**, 44(2), 191-197. [**Q2**]

B. Conference Paper

1. **Mandal, U.**, Dhar, A., & Panda, S. N. (2014). Inexact Sector-wise Planning of Land and Water Resources in a Large Canal Command in the Sub-Humid Region of Eastern India, International Symposium on Integrated Water Resources Management (IWRM–2014) February 19–21, CWRDM, Kozhikode, Kerala, India.1014–1022.
2. **Mandal, U.**, Dhar, A., Panda, S. N., and Mishra, P. K. (2016). Groundwater Management of a Canal Command in Eastern India Using Modflow. International Symposium on "International Groundwater Conference (IGWC-2015)". Paper ID-**TS6-06,** TSVI-(34-44).
3. Ahmed A, **Mandal U.**, Tomar JMS, Singh S K, Narsimlu B, Sahay C S. (2014). Rooftop water harvesting: Ideal drinking water solution for hilly region and poor water quality areas. Conference on Farmers First for Conserving Soil and Water Resources in Northern Region at IASWC, Dehradun, March 22-24, 2014.
4. Mishra, P. K., **Mandal*, U.**, &Alam, N. M. (2016). Impact of Climate Change on Rainfall Erosivity in the North-West Himalayan Region of India, ISAE Convention, January 19-21, 2016 OUAT, Bhubaneswar, India.
5. Roy, T. and **Mandal, U.** (2021). Waste to wealth: Utilizing different agro-industrial wastes for successful reclamation of soil acidity and sustainable soil management in foothills of North-west Himalayan region. International Web-Conference on "Smart Agriculture for Resources Conservation and Ecological Stability, Oct 29-31. **Best Paper Award Winner** for Oral Presentation.

C. Book Published

1. Nath, V., Kumar, G., Pongener, A., Pandey, S.D., Singh, S.K., **Mandal, U.**, Marboh, E.S. (2020). Litchi Production: Suitability of Indian States. ICAR-National Research Centtre on Litchi, Muzaffarpur (Bihar), PP. 384. (**ISBN: 978-81-948055-6-4**) Publisher: Dr. Vishal Nath, Director, ICAR-NRC on Litchi, Muzaffarpur

D. Book Chapter

1. **Mandal*, U.**, Sena, D. R., Kumar, G., Patra, S., Rasid, S., (2021). Climate Change Impacts on Hydrology of a Small Watershed in a River Valley Project Catchment of Southern India. In: Adhikary, P. P., Shit, P. K., Santra, P., Bhunia, G. S., Tiwari, A. K., Chaudhury, B. S. (Eds.), Geostatistics and Geospatial Technologies for

Groundwater Resources in India. In: Cerezal, S., Carlos, J. (Eds.), **Springer Hydrogeology**. Springer, Cham, pp. 567–583. https://doi.org/10.1007/978-3-030-62397-5_29

2. Dash, Ch. J., Adhikary, P.P., **Mandal*, U.** (2021). Spatial Mapping of Groundwater Depth to Prioritize the Areas under Water Stress in Rayalaseema Region of Andhra Pradesh, India. In: Shit, P. K., Bhunia, G. S., Adhikary, P. P., Dash, Ch. J. (Eds.), Groundwater and society. **Springer**, Cham. pp. 429-444. https://doi.org/10.1007/978-3-030-64136-8_20

E. Policy Brief

Vanitha, S. M., Hombegowda H.C., Kannan, K., Mandal, D., Dogra, P., Kumar, G., Kaushal, R., Roy, T., Islam, S., Madhu, M. and **Mandal, Uday (2023)** Policy brief on "Soil erosion status, priority treatment areas and conservation measures for different districts of Chhattisgarh" **ISBN: 978-93-94687-29-5.**

F. Others Publication

1. Sharma, N. K., **Mandal, U.**, Maurya, S. S., Jesmita, B. (2020). Technical Report on National Mission for Sustaining the Himalayan Ecosystem on Himalayan Agriculture for Lower and Middle Himalaya. ICAR-Institute of Soil and Water Conservation, Dehradun, India, pp. 1-179. [**Report** submitted to DST]

2. Sharma, N. K., **Mandal, U.**, Maurya, S.S., and Jesmita, B. (2020). Final Report on National Mission for Sustaining the Himalayan Ecosystem on Himalayan Agriculture for Lower and Middle Himalaya. ICAR-Institute of Soil and Water Conservation, Dehradun, India, pp. 1-280. [**Report** submitted to DST]

3. Published Calendar for farmers for "engineering measures for Soil and water conservation in North-Western Himalayas.

4. Training manual on "Application of Remote Sensing and GIS in Natural Resource Management" Page: 1-110.

5. **Popular article** on "Jaivik Kheti ke Labh". Page no-92-93.

6. **Popular article** on "Small area estimation through a regional model using data from two surveys" page no 65-69.

7. ICAR-IISWC holds drive against Use of Plastics Published as **web article** 20th Sept 2019.

8. टिकाऊ कृषि के लिए मृदा एवं जल संरक्षण , गोपाल कुमार अशोक कुमार देवीदीन यादव, उदय मंडल एवं वाई वी. सिंह , म खेती दिसंबर २०२० पेज नो. ४२ - ४३.

G. Copyright Received

1. **Uday Mandal**, Gopal Kumar, D Mandal, P R Ojasvi, M Madhu. (2023) **received** copyright on "Saturated Hydraulic Conductivity Map of India" (**L-134677/2023)** on 12-10-2023 from Copyright Office, Government of India. **[**Literary/ Dramatic Work Saturated Hydraulic Conductivity Map of India]

2. P K Mishra, C Jana, **Uday Mandal** (2023) received copyright on "online software for design of grass waterway" (**SW-17625/2023)** on 23-11-2023 from copyright office, Government of India. [Computer Software Work]

3. Gopal Kumar, **Uday Mandal**, M. Madhu (2023) received copyright on Litchi Productivity Potential Zone Map of India (**L-139207/2023)** on 22-12-2023 from copyright office, Government of India. [Literary/ Dramatic Work the Litchi Productivity Potential Zone Map of India using 8 soil based parameters and 5 climatic based parameters combinedly]

Sponsor Research Project as Co-PI

1. REWARD (Rejuvenating Watersheds for Agricultural Resilience through Innovative Development) Project Funded by World Bank from 2021-26 budget Rs. 1146.2 Lakhs. (2021-2026).
2. **Developing vegetation based technologies for dust and erosion control along national highways** funded National Highway Authority of India (NHAI) Govt. of India (2021-2024).
3. **Task Force on Himalayan Agriculture-NMSHE (2nd Phase)** funded by DST (2021-2026).
4. To Study Effectiveness of Nano Urea Fertilizer in Terms of Crop Production, Soil Health and Environmental Health Funded by **DST SERB from 2023** budget Rs. 41.094 Lakhs (2023-2026)
5. National Mission for Sustainable Himalayan Eco-system (NMSHE)-Task Force on Himalayan Agriculture for Lower and Middle Himalayan Region Funded by DST from 2015-16 to 2020-21, budget Rs. 970.94 Lakhs
6. Effect of climate change on hydrology of small watersheds vis-à-vis soil and water conservation measures (NICRA) funded by ICAR from 2014-15 to 2019-20, budget Rs. 165.194 Lakhs
7. Efficient groundwater management for enhancing adaptive capacity to climate change in sugarcane-based farming system in Muzaffarnagar district, UP from 2014-15 to 2016-17 funded by DST, budget Rs. 459 Lakhs

Research Project as PI

1. Application of Integrated Spatial Science Tools for prediction of Soil Erosion map under Changing Climate Scenario for the Uttarakhand state (2014-2018, Completed)
2. Assessment of Potential Soil Erosion of India (2018-2022, on-going)
3. Assessment of variability and trend of climatic parameters at various time scales in different regions of India (2022-2028, on-going)

Training Conducted

2. In-plant training conducted for the B.Tech and M.Tech student for a period of 1 to 3 month from 2015 to 2021 every year except 2020.
3. Given Training to Indian Forest Service (IFS) Probationary in the year 2021.
4. Given training to Farmers field for different aspect of soil and water conservation and having working experience in farmers field
5. Conducted training-cum-workshop on "Capacity building in SWAT Modelling for NICRA project" during 26th Nov. to 2nd Dec. 2015 under the NICRA (Effect of climate change on hydrology of small watershed vis-à-vis soil and water conservation measures) project.
6. Conducted a training program on "Application of RS/GIS in natural resources management" from 18-27th Sep 2017 at IISWC Dehradun, sponsored by ICAR.
7. Conducted Training Programme (3-month) on Soil erosion loss estimation to Scientist on "Preparing Soil Erosion Map of Nagaland State, India using spatial science tools" from 23rd November 2016 to 22nd February 2017.
8. Conducted a training Programme (3-month) to scientist on "Evaluation of APSIM modelling framework in Simulating the Effects of Nitrogen and FYM Treatments on Popular Rice Verieties of Eastern Odisha" from 18th Nov 2016 to 18th Feb 2017.

Software Developed*

1. Online software for Design of Waterway/ Diversion drain/ Open channel
2. Online software for Contour Bund Design & Costing
3. Online software for Graded Bund Design & Costing
4. Online software for Rainfall Energy & Intensity.
5. Online software for Loose Boulder Check Dam design and cost estimation
6. Online software for Brushwood Check Dam design and estimation
7. Online software for Gabion Structure design and cost estimation
8. Online software for Soil Erodibility Factor (K-factor) estimation

*** https://rewardiiswc.in/online_software.php**

Brief About Dr. Uday Mandal

Dr Uday Mandal has more than 11-years of experience in research, training, and extension in the field of Soil and Water conservation, Soil Erosion Modelling, Watershed Management, Surface-and Groundwater Modelling, Remote Sensing and GIS application on Natural Resources Management, Geo-statistics, and Climate Change. He identified groundwater potential zone based on RS and GIS application with multi-criteria decision making technique. He assessed the climate change impact on hydrological fluxes and yield of Subarnarekha River basin. He also developed integrated land and water resources management framework for optimum allocation of land and water resources (Surface-and Groundwater) for sustainable development of agricultural production system. Further he developed a 3-D groundwater flow model to quantify the groundwater resources assessment to a coastal Indian River basin. Dr Mandal developed rainfall erosivity estimation equation for the Uttarakhand State based on event wise real time breakpoint rainfall data and modifyed the coefficient of Arnould's equation in Indian context. Now one able to estimate rainfall erosivity based on easily available monthly rainfall data of any area. The most significant outcome from his research will be useful to estimate potential soil erosion maps of the country. Further he produced potential soil erosion map of Uttarakhand State of India. Dr. Mandal is presently working on the project "Potential Soil Erosion map of India". Besides this Dr Mandal developed a protocol for multiple-site calibration approach versus single-site calibration for improving the performance of hydrological modelling and applied to various Indian River basins. Dr. Mandal also developed online software for various soil and water conservation measures. Presently he is serving as Senior Scientist at ICAR-Indian Institute of Soil and Water Conservation, Dehradun.