Curriculum Vitae

Mahesh Prasad Tripathi, Ph.D.
Assistant Professor, Agricultural Engineering (Sr. Scale)
Dr. Khem Singh Gill Akal College of Agriculture,
Eternal University, Baru Sahib, Himachal Pradesh.
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Research Area: Agricultural Engineering, Water Management, Polyhouses, shade net houses (Protected cultivation), and sprinkler/drip irrigation systems, IoT sensor-based irrigation systems, Automatic weather stations, Renewable Energy (Solar dryers and photovoltaic systems, Biogas production unit), Composting and Vermicomposting, Waste water management, Farm machinery and power, Soil and water conservation engineering, Irrigation and drainage systems, Post-harvest technology and food processing.

EDUCATION:

- Ph.D. (Soil and Water Engineering), Department of Soil and Water Engineering, University of Jawaharlal Nehru Krishi Vishwa Vidyalaya (JNKVV), Jabalpur, Madhya Pradesh. 2018, OGPA- 6.77
- M.Tech. (Soil and Water Conservation Engineering), Department of Soil and Water Engineering, University of Sam Higginbottom Institute of Agriculture, Technology & Sciences (Formerly Allahabad Agricultural Institute – Deemed University), Allahabad, India, 2012, CGPA- 7.28
- B.Tech. (Agricultural Engineering), Sam Higginbottom Institute of Agriculture, Technology & Sciences (Formerly Allahabad Agricultural Institute – Deemed University), Allahabad, India, 2007, CGPA- 6.26

Ph.D. Dissertation:

Title: A Study on Improvement of Water Productivity in Minor Irrigation Project

Abstract: Irrigation plays a most important role in crop production from beginning of civilization. The efficient irrigation water management can increase the crop productivity manifolds. A study had been conducted to evaluate the effect of irrigation on yield, water productivity and production which should be consistently evaluated across the area of the entire country in order to meet the needs of increasing population and achieving the food sustainability. The study evaluated the wheat yield and water productivity for different varieties, irrigation method and depth of irrigation in Khapa and Magardha command area, which is located in Mandla district of Madhya Pradesh (India). In this study, Different irrigation application methods i.e. (sprinkler irrigation system, Border irrigation and flood irrigation) and different sowing methods were applied on wheat crop. The study results involved measurement of different crop growth parameter, crop yield and eventually water productivity analysis had been performed on different selected parameters. The results indicated that water productivity is significantly impacted by changing crop varieties as well as depth of irrigation.

The study suggested that efficient management of crop variety, depth of irrigation water and

sowing date can significantly improve the farm income for water scares area.

Considering the importance of irrigation management and the water user's participation in increasing water productivity and the development of existing irrigation command area, this study was carried out in Tribal minor irrigation command area of Khapa and Magardha minor. In order to assess the present irrigation system of command area and to perform diagnostic study for the possible improvement in existing canal network, the study has been divided in three phases. In first phase, the primary data were collected from the study area through a combination of formal and informal farm surveys and direct observation through reconnaissance survey. The secondary data was collected from various government agencies and literature. The entire command has been divided in three part to study and understanding the problem areas in the head, middle and tail command of canal. The study area has a gross command area of 716.29 ha. Considering 20% losses during conveyance the water available the head of field will be 172.73 ha-m. The major crop of the area is Wheat followed by small area under Gram and Vegetable during Rabi, whereas, Paddy is grown during Kharif season. The total demand of water had been estimated using crop water requirement of individual crops. The water availability has also been assessed considering existing tank, canal, dug well and ponds. The Demand and supply analysis of water utilization had been performed in order to check the surplus-deficit of water resource. Discharge measured in Khapa and Magardha canal varies from 0.416 m^3/sec and 0.324 m^3/sec at head reach, 0.123 m^3/sec and 0.121 to 0.013 m^3 /sec at middle and 0.026 m^3 /sec and 0.001 m^3/sec at tail reach. Discharge reaching to farmer's field is changing from 2.74 to 6.85 lps. Seepage in Khapa minor was measured as 32.33 m^3 /M m^2 at head reach to 26.46 m^3 /M m^2 at middle reach. Computed seepage rate from Khapa canal is 37.46 m^3 / M m^2 at head reach to 33.61 m^3 /M m^2 at middle reach. Overall irrigation efficiency is computed to be 40 per cent. In the second phase the study, supplemental irrigation application methods (Boarder irrigation, Flood, sprinkler irrigation to supplement rainfall), soil fertility management (N: P: K ratio as 120:60:40), deep ploughing, different varieties of seeds, different depth of irrigation (35 cm to 40 cm), different sowing methods like broadcasting as well as using seed drills were selected as influential parameters which can impact the water productivity of irrigation command. Total 36 fields were selected for Rabi session for Wheat crop in the year 2016-2017. In Rabi session, the main focus of study was to increase the water productivity. In Rabi session, the water productivity ranges obtained in yield (0.50 to 0.60 kg/m^3) are compared with the water productivity obtained with selected strategies (0.58 to1.56 Kg/m^3) adopted. After selecting the point of interventions, a strategic plan was prepared and implemented for the Rabi seasons on the selected tribal villages Khapa, Magardha and Dhundwa. Total 36 (wheat) fields were used for conducting this study. Yield of test plots was compared with untreated fields. In third phase of the study, the water utilization pattern was studied in selected tribal villages namely Khapa, Magardha and Dhundwa. The evaluation of existing canal project, had also been performed using parameters given by Nelson (2005) for Water deliveries, Maintenance, Financial and Sustainability and indicators given by Molden (1998) to investigate; Output per cropped area, Output per unit command, Output per unit irrigation supply, Output per unit water consumed, Relative water supply, Relative irrigation supply, Water delivery capacity, Gross return on investment, Financial self- sufficiency.

Advisor: Prof. R. K. Nema (Department of Soil and Water Engineering)

Committee Members:

Prof. M. K. Awasthi (Department of Soil and Water Engineering)

Prof. Y. K. Tiwari (Department of Soil and Water Engineering)

Prof. L.D. Koshta (Department of Forestry, College of Agriculture)

M.Tech. Project: Generation of autoregressive time series model for rainfall runoff and sediment yields for Karso watershed of Damoder catchment, Jharkhand.

Project description:

Time series analysis and forcasting has become a major tool in different applications in hydrology and environmental management fields. In the present study was conducted with prime objective to develop a stochastic time series model for prediction of rainfall, runoff and sediment yield in Karso watershed of Dmodar area is located in Jharkhand state. The area of the watershed is 2793 ha. And the data of 13 years from 1991 to 2003 were used to developed the model Autoregressive (AR) models of order 0, 1 and 2 were tried to develop a autoregressive time series model for annual rainfall, runoff and sediment yield. The various parameters of model were estimated by the general recursive formula, The goodness of fit and adequacy of model were tested by Box-Pierce Portmonteau test, Akaike information criterion (AIC) and by comparison of measured and predicted correlogram. The AIC value for AR(1) model (105.12) is laying between AR(0) (121.97) and AR (2) (108.50) which is satisfying the selection criteria. The mean prediction error is less in case of runoff by AR (1) model. The graphical representation between measured and generated correlogram is show that there is close agreement between rainfall and runoff. The comparison between the measured and predicted rainfall, runoff and sediment yield by AR (1) model, clearly shows that the developed model can be use efficiently for the prediction of rainfall, runoff and sedimentation yield for water harvesting, ground water recharge, flood control and development of their water management strategies.

Objectives

- To develop a stochastic time series model for prediction of rainfall, runoff and sediment yield for Karso watershed in Hazaribag district of Jharkhand.
- To estimate the parameters of autoregressive model for prediction of rainfall, runoff and sediment yield for Karso watershed in Hazaribag district of Jharkhand.
- To test the validity of the predicted rainfall, runoff and sediment yields with measured and evaluate the performance of the developed model.

FIELD EXPERIENCES:

Ph.D. Field Research Work:

- The study was conducted in the command area of the Khapa Tank irrigation project, located 48 km from JNKVV, Jabalpur, in Jabalpur district of Madhya Pradesh. Khapa Tank is a minor irrigation project with a live storage capacity of 249.79 ha-m and a total command area of 716.29 ha. The tank has an outlet at the main canal, which supplies water to a command area of about 172.73 ha-m. The major Rabi crop cultivated in the area covers about 47% of the command area.

  The field trial was conducted in the villages of Khapa and Magardha, on farmers' fields within the command area of Khapa Tank. The objective was to measure water productivity during the Rabi season using different varieties of wheat.

Project Leader (Summer 2015 & 2016):

- We conducted our research on farmers' fields and compared the yield and improved water productivity in Khapa and Magardha villages, Bijadandi Tehsil , Mandla District, M.P. India.

M.Tech. Field Research work:

- Perform to develop a stochastic time series model for prediction of rainfall, runoff and sediment yield for Karso watershed in Hazaribag district of Jharkhand.
- Measure the parameters of autoregressive model for prediction of rainfall, runoff and sediment yield, to test the validity of the predicted rainfall, runoff and sediment yields with measured and evaluate the performance of the developed model.

Intern (Summer 2006):

- Learnt all farm machineries usage, their mechanism, and how to work with them - Indian government training program during my undergraduate study at Farm machinery training, Central Farm Machinery Training and Testing Institute, Budni, Madhya Pradesh, India.
- Successfully conducted a one-month hands-on training program with various tools and machinery at ICAR–Central Institute of Agricultural Engineering, Bhopal.

PROFESSIONAL EXPERIENCE:

1. **Assistant Professor**, Agricultural Engineering (Sr. Scale) Dr. Khem Singh Gill Akal College of Agriculture, Eternal University, Baru Sahib, Himachal Pradesh, India (December 2018-Present).
   - Taught Departmental Courses- Introductory Soil and Water Conservation Engineering (Soil-102), Farm Machinery and Power (FMP-201), Remote Sensing and Geographical Information (503), Disaster Management (PGS-506), Environmental Studies and Disaster Management (Env-201), Renewable Energy and Green Technology (RE-202), Introductory Agro-metrology & Climate Change (Agron-204), Protected Cultivation and Secondary Agriculture (PCS-302).
   - Establishing a Sub-surface drip irrigation system unit in Chappang research farm funded by Unnat Bharat Abhiyan (UBA), the Ministry of Education (MoE), Government of India,
   - Design of Course structure and preparing the course materials and prepared four manuals; Introductory Soil and Water Conservation Engineering, Farm Machinery and Power, Renewable Energy and Green Technology, Protected Cultivation and Secondary Agriculture
   - Setting up the laboratory for the subjects of Agricultural Engineering, Farm Power Machinery, Weather station and Agricultural Metrology
   - Conducting independent research and promoting the research activities towards the overall career development of students
   - Received Seed grant project (7.5 lac), and sanctioned projects in different agencies (UBA, NABARD, GIZ)
   - Head of the Department (HOD) Section of Agricultural Engineering, Member of Board of Studies (BOS) and Committee member of NAAC criteria VII
   - In-charge of Weather station, Editor (Science section) EU Magzine, Conveyor of Rural Agricultural Work Experience (RAWE) program, a training program for agricultural students.
   - Successfully completed 6 Master students and 2 supervising as main advisor.
2. **Senior Research Fellow (SRF),** Department of Agricultural & Food Engineering at Indian Institute of Technology Kharagpur (IIT-KGP), Kharagpur,, India (June 2012– September 2013)
   a. Development, of e-courses for B.Tech Agricultural Engineering.
   b. Learnt Moodle, a popular open-source Learning Management System (LMS) software, at ICAR-NAARM (National Academy of Agricultural Research Management) in Hyderabad, which helps in developing e-content for courses.
   c. Involved in various project activities, including workshops and other related events.

3. **Research Associate (RA),** Kanwal Rekhi School of Information Technology, Indian Institute of Technology Bombay (IIT-Bombay) Powai, Mumbai, India (July 2008- September 2009).
   a. Involved extension activities of the aAqua portal, developed by IIT-B and funded by ICAR, were conducted at UAS-Dharwad, G.B. Pant University of Agriculture and Technology, and various KVKs. Scientists were trained on the use of aAqua and informed about smart farming techniques.
   b. Involved in various project activities, including workshops, conference and other related events.
4. **Senior Research Fellow (SRF),** University of Agricultural Science Raichur, Karnataka (UAS-Raichur) (June 2009-June 2010)

a. Developed a database of farmers' contact details, 1.5 lac. (Name, Address, Mobile Number, Crops Grown, etc.) to provide region-wise crop and weather-related information to their mobile phones twice a day.
b. Involved in various project activities, including workshops, training, conference and other related events.
c. My project was conferred the eIndia Jury Award for the Best ICT-Enabled Agricultural Initiative of the Year in the eAgriculture category on 5th August 2010, at the Hyderabad Iternational Convention Center by the IT Minister, Government of India.

ACHIEVEMENTS:

a. **(2021)** Best Young Scientist Award, presented by Novel Research Academy, Puducherry, India
b. **(2022)** Best Paper Presentation Award, presented by College of Agriculture, Bheemarayangudi, UAS, Raichur, Karnataka, India
c. **(2020 to Present)** As a Coordinator ,presented by Indian Institute of Remote Sensing (IIRS), Dehradun, India
d. **(2020)** Geographical Information System, presented by Indian Institute of Remote Sensing (IIRS), Dehradun, India
e. **(2021)** Fundamentals of Remote Sensing and GIS Technology (Course in Hindi) and Basic of RS GIS & GNSS presented by Indian Institute of Remote Sensing (IIRS), Dehradun, India
f. **(2022)** Fundamentals of Remote Sensing & GIS Technology (Course in Hindi) & Basics of "Remote Sensing, Geographical Information System and Global Navigation Satellite System presented by Indian Institute of Remote Sensing (IIRS), Dehradun, India
g. **(2023)** RS & GIS Applications in Natural Resource Management presented by Indian Institute of Remote Sensing (IIRS), Dehradun, India
h. **(2021)** Editorial Board Member presented by Journal of Acta Scientific, India
i. **(2021)** Editorial Board Member presented by Medicon Journals, India
j. **(2020-Present)** Reviewed 50 research papers for *Agricultural Water Management* (Elsevier); received a certificate of recognition.

SOFTWARE SKILLS:

a. GIS and RS software (ArcGIS, QGIS, DSSAT 48, HEC-HMS 4.8 and CROPWAT 8.0)

PROGRAMMING SKILLS:

b. C++ and Python,

SERVICES AND LEADERSHIP ACTIVITIES

a. **(2021-Present)** Head of the Department (HOD) Section of Agricultural Engineering,
b. **(2021- Present)** Member of Board of Studies (BOS)
c. **(2023 -Present)** Committee member of NAAC criteria VII
d. **(2021-Present)** Incharge of Agro metrology lab, Agricultural Engineering and Weather Station
e. **(2021-Present)** Editor (Science section) EU Magazine
f. **(2023-Present)** Conveyor, Green Energy and Sustainability club, Eternal University
g. **(2020-2024)** Chairman, Photography club, Eternal University
h. **(2025-Present)** Member, Moderation of Question Papers, Eternal University

PUBLICATIONS:

- **Tripathi Mahesh P**.*, Nema R.K., Awasthi M.K. and Tiwari Y.K. (2018) Impact Assessment of Water Productivity and Yield in Rabi Session for Different Wheat Varieties Under Different Irrigation Depth and Irrigation Methods. International Journal of Agriculture Sciences, 10:5014- 5016.
- **Mahesh P. Tripathi***, R.K. Nema, M.K. Awasthi and Y.K. Tiwari (2018) Performance Evaluation of a Minor Irrigation Project Using Canal Performance Indicator. International Journal of Current Microbiology and Applied Sciences,7:1895-1903.
- **Mahesh Prasad Tripathi***, C. John Wesley, Sandeep Kumar Pandey (2018) Simulation Optimization Modelling of Rainwater Harvesting Form Karso Watershed of Damoder Catchment. International Journal of Current Microbiology and Applied Sciences,7(5):2850-2856.
- Cutting Nikhil Gladwin1, Pandey Sandeep Kumar, **Tripathi Mahesh Prasad** and Imtiyaz M (2016) Development of SCS-CN Method and Autoregressive time series model for the Estimation of runoff of upper Sewani watershed of Damodar catchment, Jharkhand, India. International Journal of Agriculture Sciences, 8:1668-1672.
- Rishi Pathak, S.K. Sharma, **Mahesh P. Tripathi,** Sudhir Thakur, Satish Singh and Nidhi Pathak (2016) Prioritization of sub-watersheds in barchha nala area of Narsinghpur district (India) based on land use, drainage density and slope analysis using remote sensing and GIS, Research in Environment and Life sciences, 9(4) 452-45.
- Devi Kavita, **Tripathi Mahesh** (2022) Growth Attributes and Their Interaction in Toria (Brassica campestris) as Influenced by Various Levels of Phosphorus and Sulphur in Mid Hill Zone of Himachal Pradesh. International Journal of Plant & Soil Science 34(24): 588-593.
- **Tripathi Mahesh** et al. (2023) "Modern Farming is a Great Career Choice, and New Technologies Increase Farming Profits". Acta Scientific Agriculture, Volume 7, (ISSN: 2581-365X), Issue 5 May 2023: 18-21.
- **Mahesh P Tripathi**, RK Nema, MK Awasthi, YK Tiwari, RN Srivastava and Sandeep K Pandey (2019) "Water Productivity Concept, Importance and Measurement in the Khapa Minor Irrigation Project"". International Journal of Chemical Studies; 7(6): 2861-2863.
- Shiv Singh, **Mahesh Tripathi*** , and Rishi Pathak. 2023. "Estimation of Runoff Using USDA SCS-Curve Number and Autoregressive Time Series Model Parameters for Kachhinda Watershed, Morena District, Madhya Pradesh, India". International Journal of Environment and Climate Change 13 (10):2939-48.

BOOK CHAPTERS:

- **Tripathi Mahesh,** (2022) Subsurface Drip Irrigation and Conservation in Hill Agriculture, ENVIS Bulletin Himalayan Ecology, G.B. Pant National Institute of Himalayan Environment(An Autonomous Institute of Ministry of Environment, Forest and Climate Change, Government of India) Kosi-Katarmal, Almora-263 643, Uttarakhand, India Vol. 30, 2022. pp 25- 29: ISSN:2455-6815(Online)
- **Tripathi Mahesh,** (2022) Components of Automatic Irrigation System. In: M. Nemichandrappa, Rajkumar R Halidoddi, Advanced Innovative Technologies in Agricultural Engineering for Sustainable Agriculture (Volume- 5). AkiNik Publications, Delhi, pp 01-13: ISBN: 978-93-5570-439-9.
- **Tripathi Mahesh,** (2025) Geo-spatial Technology for Pest and Diseases Management. Devesh Pathak, Ravi Dhanker, Himanshu Tripathi, Vaibhav Pratap Singh, Innovative Approaches in plant protection under changing Climatic scenarios. Content vibes, publisher,Karnal, ISBN: 978-93-67554-39-5.

MASTER STUDENTS RESEARCH PROJECTS:

- Ms. Lalita Kumari (Enrollment No: BS18MSAGN003) M.Sc. (Agronomy) Thesis Title: "Effect of Integrated Nutrient Management on Growth and Yield of Black Gram" Supervisor: **Dr. Mahesh Tripathi.**
- Ms. Ruchika Thakur (BS19MSAGN005) Degree: M.Sc. (Agronomy) Thesis Title: Effect of Different Levels of Irrigation and Phosphorus on Growth, Yield, and Quality of Green Gram Supervisor: **Dr. Mahesh Tripathi.**
- Ms. Yavnika Saini Enrollment No.: BS20MSAGN002 Program: M.Sc. (Agronomy) Thesis Title: Effect of Integrated Nutrient Management on Growth and Yield of Barley (Hordeum vulgare L.) in Himachal Pradesh Supervisor: **Dr. Mahesh Tripathi.**
- Ms. Kavita Devi Enrollment No.: BS20MSAGN007 Degree: M.Sc. (Agronomy) Thesis Title: Effect of phosphorus and sulphur on growth and yield of toria (Brassica campestris L. var. toria) in mid hill zone of Himachal Pradesh Advisor: **Dr. Mahesh Tripathi.**
- Ms. Ritika (BS22MAGN006) M.Sc. Agronomy Thesis: Effect of Different Levels of Nitrogen and Azospirillum on Growth and Yield of Maize (Zea mays L.) Supervisor: **Dr. Mahesh Tripathi.**
- Ms. Ruchi Bhardwaj (BS22MAGN007) M.Sc. (Agronomy) Thesis: Effect of Integrated Nutrient Management on Growth and Yield of Hybrid Maize (Zea mays L.) Supervisor: **Dr. Mahesh Tripathi.**

DISTINGUISHED ALUMNI OF THE DEPARTMENT

- Ms. Kavita Devi M.Sc. (Agronomy), Ph.D. (Pursuing) Research Scholar, Ph.D. Agronomy Punjab Agricultural University (PAU), Ludhiana, India.
- Ms. Lalita Kumari M.Sc. (Agronomy) Research Assistant, CSIR-Institute of Himalayan Bioresource Technology (CSIR-IHBT), Palampur, India.
- Ms. Ruchi Bhardwaj, M.Sc. (Agronomy) Project Officer, Japan International Cooperation Agency (JICA), Himachal Pradesh, India.

INTERNATIONAL CONFERENCES:

- Presented a paper titled "Enhancing Water Productivity in Irrigated Agriculture in the Face of Water Scarcity" at the International Conference on "Land, Soil & Territory in the South's of the World", organized by ABMSP's Anantrao Pawar College of Engineering & Research, Pune, India, held on 20th–21st February 2025.
- Presented a paper entitled "Estimate Water Productivity in Minor irrigation project, Madhya Pradesh, India the International e-Conference on Water Source Sustainability, jointly organized by the Indian Water Resources Society (IWRS) and the Department of Water Resources Development and Management, IIT Roorkee, held during June 18–20, 2021, Roorkee, India.
- Tripathi, Mahesh. (2019). Improved water productivity: Concept, importance and measurement in the area of minor irrigation project. Presented at the 3rd World Plant Genomics and Plant Science Congress, Meetings International. Osaka Japan.
- Presented a paper titled "Improved water project in Khapa Irrigation project" at the International Conference on "Global Approaches in Natural Resource Management for climate smart agriculture (GNRSA-2020)", organized by Shobhit Deemed University, Modipuram, Meerut, UP, India, held on 26th–28th February 2021.
- Presented a paper titled "The effect of water productivity for different wheat varieties under different irrigation depth and irrigation methods" at the National Conference on "India's Challenge-Contemporary Farming to Smart Farming", organized by Chandigarh University, Mohali, Punjab, India, held on 8th–9th April,2021.
- Has participated in the National Web Conference on Augmenting Vegetable Productivity Through Recent Techniques, organized by Bihar Agricultural University, Sabour, Bhagalpur held on 9-10th September, 2020.
- Presented a paper titled "Automated Drip Irrigation and Fertigation Management System" at the International Conference on "Global Approaches in Natural Resource Management for climate smart agriculture (GNRSA-2020)", organized by Shobhit Deemed University, Modipuram, Meerut, UP, India, held on 26th–28th February 2021.

REFRESHER COURSES/ORIENTATION PROGRAMMES/FDPS

- Tripathi, Mahesh. (2024, August 6–16). *FDP on NEP 2020 Orientation & Sensitization Programme under Malaviya Mission Teacher Training Programme (MM-TTP)*. UGC-MMTTC (GAD-MMTTC), Sri Guru Tegh Bahadur Khalsa College, University of Delhi.
- Tripathi, Mahesh. (2025, February 11–18). *FDP on NEP 2020*. UGC-MMTTC (GAD-MMTTC), Sri Guru Tegh Bahadur Khalsa College, University of Delhi.
- Tripathi, Mahesh. (2021, August 2–6). *FDP on Urban Hydrology* (AICTE Training and Learning – ATAL). College of Technology, G. B. Pant University of Agriculture and Technology.
- Tripathi, Mahesh. (2021, August 9–13). *FDP on Disaster Resilience Infrastructure* (AICTE Training and Learning – ATAL). University Institute of Technology, Himachal Pradesh University, Shimla.
- Tripathi, Mahesh. (2022, February 14 – March 16). Hands-on Training on Remote Sensing and GIS using QGIS. NAHEP-CAAST-CSDA, College of Agricultural Engineering, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur.

PROFESSIONAL ORGANIZATIONS MEMBERS:

- (2020) Life Membership (Member No: 271745) presented by International Association of Engineers (IAENG).