# Mohammad Reza Eini

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## RESEARCH INTERESTS

Developing innovative methodologies to assess the impacts of climate change on long-term surface and subsurface water storage, flood and drought occurrences, ecosystem health, and agricultural productivity. My research focuses on integrating novel modeling techniques with advanced observational data to create comprehensive models that can predict and mitigate adverse environmental effects. I aim to enhance the accuracy and efficiency of hydrological models by incorporating sustainable technologies and local practices. Additionally, I am interested in exploring the socio-economic implications of water resource management, working collaboratively with stakeholders to design and implement adaptive strategies that ensure water security and sustainability in the face of changing climatic conditions.

## TECHNICAL SKILLS

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|---|---|
| Modeling: | Soil and Water Assessment Tool (SWAT, SWAT+), Integrated Surface and Groundwater Modeling (SWAT-MODFLOW), Army Corp of Engineers HEC-HMS Model, Statistical Downscaling Models, Long Ashton research station weather generator (LARS-WG), Geospatial Monitoring and Modeling Software (TerrSet), Data Driven Methods in Water Science (ANN, WANN, FUZZY, GEP, ANFIS, SVM, BN) |
| Computing Languages: | R, MATLAB, Fortran, Python |
| Applications: | ArcGIS, QGIS, ENVI Remote Sensing, SWAT-CUP, Surfer, MS Visual Studio |
| Lab/Field Procedures: | Wastewater Treatment Lab, College of Chemical Engineering, University of Tehran |

## EDUCATION

**Warsaw University of Life Sciences – SGGW**

PhD student 2020 Oct. – April 2024 (waiting for defense session)

Emphasis: Environmental Engineering

Thesis title: Integrated modeling of hydrological and agricultural aspects of droughts in Odra river basin under a changing climate

**University of Tehran**- College of Aburaihan

M.Sc. 2015 - 2017

Emphasis: Water Resources Engineering

Thesis title: Development of comprehensive karstic watershed model in order to estimate and precise the components of the water balance

**Tabriz University**- Agriculture Faculty

B.S 2011 - 2015

Major: Water Engineering

Minor: Water Resources Engineering

***Fellowships***

- Research Institute for Geo-Hydrological Protection, National Research Council of Italy – IRPI-CNR, Perugia, Italy (Spring and Summer 2022) – [supervised by Dr. Luca Brocca and Christian Massari] – Supported by SGGW

- Potsdam Institute for Climate Impact Research – PIK, Potsdam, Germany (Spring and Summer 2023) – [supervised by Dr. Tobias Conradt] – Supported by NAWA

- Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany (Fall 2023) – [supervised by prof. dr. Martin Volk and Dr. Michael Strauch] – Supported by HIDA-Helmholtz

## PUBLICATIONS

Published and Accepted

23 Ghezelayagh, P., Oleszczuk R., Stachowicz M., **Eini M. R.**, Kamocki A., Banaszuk P., and Grygoruk M. 2024. Developing a remote-sensing-based indicator for peat soil vertical displacement. A case study in the Biebrza Valley, Poland. Ecological Indicators 166:112305.

22 Delavar, M., Raeisi, L., **Eini, M. R.**, Morid, S., Mohammadi, H., & Abbasi, H. (2024). Assessing the Effectiveness of Water-Saving Plans at the Farm and Basin Level

Using Agrohydrological Modeling and Water-Accounting Approaches. Journal of Irrigation and Drainage Engineering, 150(4), 04024009.

21 **Eini, M. R.**, Rahmati Ziveh, A., Salmani, H., Mujahid, S., Ghezelayagh, P., & Piniewski, M. (2023). Detecting drought events over a region in Central Europe using a regional and two satellite-based precipitation datasets. Agricultural and Forest Meteorology, 342, 109733.

20 **Eini, M. R.**, Najminejad, F., & Piniewski, M. (2023). Direct and indirect simulating and projecting hydrological drought using a supervised machine learning method. Science of The Total Environment, 165523.

19 Szyga-Pluta, K., Tomczyk, A. M., Piniewski, M., & **Eini, M. R.** (2023). Past and future changes in the start, end, and duration of the growing season in Poland. Acta Geophysica, 1-15.

18 **Eini, M.R.**, Massari, C. & Piniewski, M., (2023). Satellite-based soil moisture could enhance the reliability of agro-hydrological modeling in large transboundary river basins. Science of The Total Environment, p.162396.

17 Salmani, H., Javadi, S., **Eini M.R.,** & Golmohammadi, G. (2023). Compilation simulation of surface water & groundwater resources using the SWAT-MODFLOW model for karstic basin. Hydrogeology Journal.

16 **Eini, M. R.**, Motehayeri, S. M. S., Rahmati, A., & Piniewski, M. (2023). Evaluation of the accuracy of satellite-based rainfed wheat yield dataset over an area with complex geography. Journal of Arid Environments, 212, 104963.

15 **Eini, M.R.**, Salmani, H. and Piniewski, M., (2023). Comparison of process-based and statistical approaches for simulation and projections of rainfed crop yields. Agricultural Water Management, 277, p.108107.

14 Piniewski, M., **Eini, M.R.**, Chattopadhyay, S., Okruszko, T. and Kundzewicz, Z.W., (2022). Is there a coherence in observed and projected changes in riverine low flow indices across Central Europe?. Earth-Science Reviews, p.104187.

13 **Eini, M. R.**, Rahmati, A., Salmani, H., Brocca L., and Piniewski, M. (2022). Detecting characteristics of extreme precipitation events using regional and satellite-based precipitation gridded datasets over a region in Central Europe. Science of The Total Environment:158497.

12 Delavar, M., **Eini, M. R.**, Kuchak, V. S., Zaghiyan, M. R., Shahbazi, A., Nourmohammadi, F., and Motamedi, A. (2022). Model-based water accounting for integrated assessment of water resources systems at the basin scale. Science of the Total Environment, 830, 154810.

11 **Eini, M. R.**, Rahmati, A., and Piniewski, M. (2022). Hydrological application and accuracy evaluation of PERSIANN satellite-based precipitation estimates over a

humid continental climate catchment. Journal of Hydrology: Regional Studies, 41, 101109.

10 Tomczyk, A. M., Piniewski, M., **Eini, M. R.**, and Bednorz, E. (2022). Projections of changes in maximum air temperature and hot days in Poland. International Journal of Climatology, 42(10), 5242– 5254.

9 **Eini, M.R.**, Olyaei, M.A., Kamyab, T., Teymoori, J., Brocca, L. and Piniewski, M., (2021). Evaluating three non-gauge-corrected satellite precipitation estimates by a regional gauge interpolated dataset over Iran. Journal of Hydrology: Regional Studies, 38, p.100942.

8 **Eini, M.R.**, Javadi, S., Hashemy Shahdany, M. and Kisi, O., (2020). Comprehensive assessment and scenario simulation for future of the hydrological processes in Dez river basin, Iran. Water Supply.

7 **Eini, M.R.**, Javadi, S., Delavar, M., Gassman, P.W. and Jarihani, B., (2020). Development of alternative SWAT-based models for simulating water budget components and streamflow for a karstic-influenced watershed. Catena, 195, p.104801.

6 **Eini, M.R.**, S. Javadi, M. Delavar, J. A. F., Monteiro, and M. Darand, (2019) High accuracy of precipitation reanalyses resulted in good river discharge simulations in a semi-arid basin, Ecological Engineering, 131, 107-119.

5 **Eini, M.R.**, (2019) Discussion of "Intra- and interannual streamflow variations of Wardha watershed under changing climate" (2018) by Naga Sowjanya. P, Venkata Reddy K & Shashi M (ISH Journal of Hydraulic Engineering, DOI: 10.1080/09715010.2018.1473057), ISH Journal of Hydraulic Engineering.

4 **Eini M.R.**, S. Javadi, M. Delavar, (2018) Evaluating the performance of CRU and NCEP CFSR global reanalysis climate datasets, in hydrological simulation by SWAT model, Case Study: Maharlu basin, WATER RESOURCES RESEARCH 14(1), 32-44 (In Persian).

3 **Eini, M.R.**, S. Javadi, M. Delavar, and M. Darand (2018) Assessment of Asfezari national database precipitation data in runoff evaluating and monitoring regional drought, Iranian Journal of EcoHydrology, (5)1, 95-110, http://dx.doi.org/10.22059/ije.2017.235625.643 (In Persian).

2 **Eini M.R.**, S. Javadi, M. Delavar, (2019) Development of Comprehensive Karstic Watershed Model in Order to Estimate and Precise the Components of the Water Balance, IRAN-WATER RESOURCES RESEARCH 14(5), 133-145 (In Persian).

1 **Eini, M.R.**, S. Javadi, M. Delavar, and M. Darand (2019) Recognition of accuracy of PERSIANN-CDR precipitation satellite database in simulation of runoff in SWAT

model on Maharlu Basin, Journal of Physical Geography Research Quarterly (In Persian).

### *Manuscripts under Review*

Fallah Kaki, M., Delavar, M., **Eini, M. R.**, Morid S., Nourmohammadi, F., & Motamedi, A. (2023). An ensemble multi-model approach for long-term river flow forecasting in managed basins **Journal of Hydrology**

Marcinkowski, P., **Eini, M.R.,** Venegas, N., Piniewski, M. (2023) Diverging projections of future droughts in high-end climate scenarios for different PET methods: a national-scale assessment for Poland. **Journal of Hydrology**

### *Manuscripts in Preparation*

- Identification of features and variations of precipitation concentration indicators over Poland and two large-scale transboundary river basins in the Baltic Sea region

### *Current Projects*

Dry Nexus: Pioneering Hybrid Modeling with AI, Process-based Models, and Satellites (DryAPS) – Under review

### *Scientific achievements*

- A national project: Integrated modeling of hydrological and agricultural aspects of droughts in Odra river basin under a changing climate (period: October 2020- September 2024). Funded by: The National Science Centre, Poland, (PRELUDIUM-BIS1, UMO-2019/35/O/ST10/04392)

- Scholarship for an internship for a six-month period (Awarded February 2023)
  Funded by: Polish National Agency for Academic Exchange– Internship at Potsdam Institute for Climate Impact Research (PIK), Potsdam, Germany (March 2023- August 2023)

- Helmholtz Visiting Researcher Grant - HIDA (Awarded February 2023)
  Funded by: Helmholtz Association for an internship at Helmholtz Centre for Environmental Research, Leipzig, Germany (September 2023- December 2023)

- SGGW's Own Scholarship Fund for outstanding PhD Students and Employees (Awarded January 2022)
  Funded by: Warsaw University of Life Sciences – SGGW for a three-month internship at Research Institute for Geo-Hydrological Protection, National Research Council, Perugia, Italy

## TEACHING

**2020- now: Lecturer, Warsaw University of Life Sciences, Warsaw, Poland**

- Course: Climate Change and Water Resources (Master and Bachelor in Civil Engineering and Environmental Engineering)

**2017 – 2020: Lecturer, Ale-Taha University, Tehran, Iran**

- Course: Advanced Engineering Hydrology (Master of Civil Engineering, Water Resources)
- Course: Mathematical Models in Hydrology (Master of Civil Engineering, Water Resources)
- Course: Groundwater Hydrology (Master of Civil Engineering, Water Resources)
- Course: Applied Hydrology (Master of Civil Engineering, Water Resources)

***Students (mentor)***

- Haniyeh Salmani, MSc, (2017-2019). Using a new hydrological model (SWAT-Karst-Modflow)
- Aida Shahsavan, MSc, (2017-2018). Effect of climate change on sediment and crop yield.
- Neda Shahsavan, MSc, (2017-2018). Effect of climate change on runoff and crop yield.
- Sogand Ostadi, MSc, (2019-2020). Monitoring of drought using some drought indices and different rainfall datasets over Iran.

## ACADEMIC & PROFESSIONAL PRESENTATIONS

***Oral presentations (important events)***

EGU 2024, EGU 2023
IUGG 2023 – Berlin, Germany
SWAT conference 2024 – Strasburg, France
SWAT conference 2023 – Aarhus, Denmark
SWAT conference 2022 – Prague, the Czech Republic
Soil Moisture conference – Perugia, Italy (2022)
Drought and Climate Change Conference – Warsaw, Poland (2023)

***Scientific Reviewer (Journals)***

Reviewer of Journal of Hydrology, International Journal of Climatology, Regional Studies in Marine Science, Environmental Earth Sciences, Water Supply, Environmental Science & Technology (ASCE), and many other high-quality journals.

## OTHER INFORMATION

***Online channels***

ResearchGate: www.researchgate.net/profile/Mohammad_Reza_Eini
Google Scholar: https://scholar.google.com/citations?user=8WN65OIAAAAJ&hl=en
Scopus: https://www.scopus.com/authid/detail.uri?authorId=57207841053
LinkedIn: https://www.linkedin.com/in/MREini/

***Language Skills***

| Language | Dominance |
|---|---|
| Persian | Fluent |
| Azeri-Turkish | Fluent |
| English | C1 level |

***References***

Dr. Luca Brocca [National Research Council of Italy]
luca.brocca@irpi.cnr.it

Dr. Tobias Conradt [Potsdam Institute for Climate Impact Research]
conradt@pik-potsdam.de

Dr. Philip W. Gassman [Iowa State University]
pwgassma@iastate.edu