

## ***Curriculum Vitae et Studiorum***



Dr. Maria Cristina Rulli is Full Professor of Hydrology and Water and Food Security at the Politecnico di Milano since 2019 and she is vice president of the Italian Society of Water Engineering since 2021. Her research focus is on the interaction between hydrological processes and humanity. Using the Food-Energy-Water (FEW) nexus perspective, she has been investigating the impacts on food and water security induced by global changes. She has focused on the emergent phenomenon of Large Scale Land Acquisition (LSLA) and its implication on water, energy and food security, as well as on water governance, rural livelihoods, and the emergence of water conflicts. Her most recent research concentrates on the nexus between Health and Environment focusing on the potential nexus between the unsustainable food system and the insurgence of diseases (e.g., zoonotic, food related, uncommunicable).

Department of Civil and environmental Engineering  
Politecnico di Milano

### **EDUCATION**

**PH.D. IN HYDROLOGY**, February 2000. Politecnico di Milano, Milano, Italy.

**M.S. IN ENVIRONMENTAL ENGINEERING**, 1996, University of Perugia, Italy. MAGNA CUM LAUDE DISTINCTION.

### **PROFESSIONAL EMPLOYMENT**

**FULL PROFESSOR**, September 2019-present, Department of Civil and environmental Engineering, Politecnico di Milano, Milano, Italy.

**ASSOCIATE PROFESSOR**, March 2013-September 2019, Department of Civil and environmental Engineering, Politecnico di Milano, Milano, Italy.

**ADJUNCT RESEARCHER**, National Research Council of Italy, Biometeorology division, Sassari, Italy.

**ASSISTANT PROFESSOR**, September 2003-March 2013, Department of Civil and environmental Engineering, Politecnico di Milano, Milano, Italy.

**POSTDOCTORAL RESEARCH ASSOCIATE**, March 2000-September 2003, Department of Civil and environmental Engineering, Politecnico di Milano, Milano, Italy.

**RESEARCH ASSOCIATE**, May 1998-December 1998, Department of Earth and Planetary Science, University of California at Berkeley, Berkeley, CA, USA.

### **HONORS, RECOGNITION AND AWARDS**

**2022** DISTINGUISHED LECTURE - **ACCADEMIA NAZIONALE DEI LINCEI**

LECTURE ON THE ROLE OF WATER IN ACHIEVING SUSTAINABLE FOOD AND WATER SECURITY

**2021** GENERAL LECTURE - **AGU UNION SESSION *THE GRAND TRANSFORMATION NEEDED TO ADDRESS CLIMATE CHANGE.***

LECTURE ON "FOOD, ENERGY AND WATER NEXUS IN THE CONTEXT OF GLOBAL HEALTH"

**2021** GENERAL LECTURE - **US EMBASSY MANILA**

LECTURE ON LAND USE CHANGE, THE LIVESTOCK REVOLUTION, AND CORONAVIRUSES

**2019** GENERAL LECTURE - **AGU CENTENNIAL CELEBRATION, BEIJING, CHINA.**

LECTURE ON THE GLOBAL FOOD-ENERGY-WATER NEXUS: HOW WATER CONTROLS SUSTAINABLE FOOD SECURITY

**2016** GENERAL LECTURE - **ITALIAN REPUBLIC SENATE**

LECTURE ON GENDER AND WATER SECURITY

**2015** DISTINGUISHED LECTURE - **ISTITUTO LOMBARDO ACCADEMIA DI SCIENZE E LETTERE**

LECTURE ON WATER RESOURCES TO FEED THE PLANET

**2015 SCIENCE (SECURITY AND GLOBAL ENVIRONMENTAL CHANGES) STUDIES AWARD, POMI FOUNDATION.**

**2003 YUNG RESEARCHER AWARD, INSTITUTE FOR MOUNTAIN RESEARCH**

**2002 PRIZE INNOVATIONS FOR THE ENVIRONMENT, LEGAMBIENTE FOUNDATION**

**1996 MAGNA CUM LAUDE DISTINCTION, UNIVERSITY OF PERUGIA**

## **PROFESSORAL SERVICE**

### **EDITORIAL SERVICE:**

**EDITORIAL BOARD MEMBER**, SCIENTIFIC DATA (2023-PRESENT); HYDROLOGICAL SCIENCES JOURNAL (2022-PRESENT); ADVANCES IN WATER RESOURCES (2021-PRESENT); FRONTIERS IN ENVIRONMENTAL SCIENCES (2018-PRESENT).

**GUEST EDITOR**, ADVANCES IN WATER RESOURCES (2017-2019)

**REVIEWER AND PANELIST:** 200+ MANUSCRIPTS FOR PEER-REVIEWED JOURNALS INCLUDING NATURE, NATURE FOOD, NATURE GEOSCIENCE, NATURE WATER, PNAS, SCIENCE ADVANCES, BIOSCIENCE, WATER RESOURCES RESEARCH, GRL, EARTH'S FUTURE, ADVANCES IN WATER RESOURCES, ERL AND 50+ GRANTS FOR MULTIPLE FUNDING AGENCIES. COORDINATOR OF EXPERTS EVALUATION PANELS FOR THE EUROPEAN UNION.

### **COMMITMENT TO THE DISSEMINATION OF SCIENTIFIC RESULTS TO THE GENERAL PUBLIC:**

40+ SEMINARS TO ELEMENTARY, MIDDLE AND HIGH SCHOOL STUDENTS, 20+SEMINARS TO HUMANITARIAN SERVICE ORGANIZATION, 30+SEMINARS TO PRIVATE AND PUBLIC COMPANIES AND ENTERPRISES ON THE RELATIONSHIP EXISTING BETWEEN WATER AND FOOD PRODUCTION, THE COMPLEX ISSUES RELATED TO RESOURCE SCARCITY AND THE SOCIETAL IMPACTS OF GLOBAL ENVIRONMENTAL CHANGE.

## **ADVISING AND MENTORING ACTIVITY**

6 POSTDOC

20 PH.D. STUDENTS. Three of these received the cum magna laude distinction for their PhD thesis.

70+ M S STUDENTS IN ENVIRONMENTAL ENGINEERING. Three of these theses received the CIRITA award as the best Master's thesis of the year; another thesis was awarded in 2007 with the "City and Security" award as best master thesis of the year and in 2016 another thesis received the prestigious SPE (Society of Petroleum Engineers) mention as the best master thesis of the year in analysing the impact of energy production on water resources.

MENTORING-Women in Science; Talented girls in STEM (SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS)

### **POLICY IMPACT OF THE RESEARCH AND MEDIA COVERAGE:**

20+ POLICY DOCUMENTS (FAO, IUCN, WB, WHO, UNEP, EU, PBL) REFERENCE TO RESEARCH OUTPUT REPORTED ON PAPERS\*\*

1000+ NEWS STORIES REFERENCE TO THE PAPERS REPORTED IN "SELECTED PUBLICATION"

## **PROFESSIONAL ORGANIZATIONS**

**THE AMERICAN GEOPHYSICAL UNION (AGU)**, MEMBER (2000-PRESENT)

**THE EUROPEAN GEOSCIENCES UNION (EGU)**, MEMBER (1997-PRESENT)

**THE JAPAN GEOSCIENCE UNION (JPGU)**, MEMBER (2018-PRESENT)

**ITALIAN SOCIETY OF WATER ENGINEERING (GII)**, MEMBER (2017-PRESENT), ELECTED MEMBER OF THE SCIENTIFIC BOARD (2021-PRESENT); VICE-PRESIDENT (2021-PRESENT)

**THE ITALIAN SOCIETY OF HYDROLOGY (SII)**, MEMBER (2017-PRESENT), ELECTED MEMBER OF THE SCIENTIFIC BOARD (2016-2020)

**INTERDISCIPLINARY RESEARCH CENTRE ON SUSTAINABILITY AND HUMAN SECURITY (SHUS)**, ELECTED MEMBER OF THE ADVISORY BOARD (2016-PRESENT)

## BIBLIOGRAPHY

MARIA CRISTINA RULLI IS THE AUTHOR OF 150 PUBLICATIONS, 124 OF THEM IN PEER-REVIEWED SCIENTIFIC JOURNALS.

NUMBER OF CITATIONS RECORDED BY GOOGLE SCHOLAR

TOTAL CITATIONS: 7070 (AS OF APRIL 3, 2023), H-INDEX: 48, I10-INDEX: 79

NUMBER OF CITATIONS RECORDED BY SCOPUS

TOTAL CITATIONS: 4685 (AS OF APRIL 3, 2023), H-INDEX: 40

NUMBER OF CITATIONS RECORDED BY WEB OF SCIENCE

TOTAL CITATIONS: 4169 (AS OF APRIL 3, 2023), H-INDEX: 38; HIGHLY CITED PAPERS: 5

## SELECTED PUBLICATIONS

Dell'Angelo J., Rulli M.C., D'Odorico P. (2023) Will war in Ukraine escalate the global land rush?, *Science*, 379 (6634), 752-755. <https://www.science.org/doi/10.1126/science.adf9351>.

Sardo M., Epifani I., D'Odorico P., Galli N., Rulli M.C. (2023) Exploring the water–food nexus reveals the interlinkages with urban human conflicts in Central America, *Nature Water*, 22-0477 <https://doi.org/10.1038/s44221-023-00053-0>

Wang, L., Jiao, W., MacBean, N., Rulli M.C., Manzoni S., Vico G., D'Odorico P. (2022) Dryland productivity under a changing climate. *Nature Climate Change* 12, 981–994 (2022). <https://doi.org/10.1038/s41558-022-01499-y>

Galli, N., Dell'Angelo, J., Epifani, I., Rulli M.C. (2022) Socio-hydrological features of armed conflicts in the Lake Chad Basin. *Nature Sustainability* 5, 843–852 (2022). <https://doi.org/10.1038/s41893-022-00936-2>

Chiarelli D.D., D'Odorico P., Müller M.F., Mueller N.D., Davis K.F., Dell'Angelo J., Penny G., Rulli M.C. (2022) Competition for water induced by transnational land acquisitions for agriculture, *Nature Communications*, 13, 505 (2022). <http://dx.doi.org/10.1038/s41467-022-28077-2>.

Ricciardi L., D'Odorico P., Galli N., Chiarelli D.D., Rulli M.C. (2022) Hydrological implications of large-scale afforestation in tropical biomes for climate change mitigation, *Philosophical Transactions of the Royal Society B* 377 20210391. <http://doi.org/10.1098/rstb.2021.0391>

Muylaert R. L., Kingston T., Luo J., Vancine M.H., Galli N., Carlson C.J., John R.S., Rulli M.C., Hayman D.T. S. (2022) Present and future distribution of bat hosts of sarbecoviruses: implications for conservation and public health, *Proceedings of the Royal Society B*.2892022039720220397. <http://doi.org/10.1098/rspb.2022.0397>

\*\*Rulli M.C., D'Odorico P., Galli N., Hayman D.T.S. (2021), Land-use change and the livestock revolution increase the risk of zoonotic coronavirus transmission from rhinolophid bats, *Nature Food*, 2(6), 409-416. <https://doi.org/10.1038/s43016-021-00285-x>.

Jenkins W., Rosa L., Schmidt J., Band L., Beltran-Peña A., Clarens A., Doney S., Emanuel R.E., Glassie A., Quinn J., Rulli M.C., Shobe W.I., Szeptycki, L., D'Odorico P. (2021) Values-Based Scenarios of Water Security: Rights to Water, Rights of Waters, and Commercial Water Rights, *BioScience*, 71, 11, 1157–1170. <https://doi.org/10.1093/biosci/biab088>

Müller M.F., Penny G., Niles M.T., Ricciardi V., Chiarelli D.D., Davis K.F., Dell'Angelo J., D'Odorico P., Rosa L., Rulli M.C., Mueller N.D. (2021). Impact of transnational land acquisitions on local food security and dietary diversity. *Proceedings of the National Academy of Sciences of the United States of America*, 118(4), e2020535118. <https://doi.org/10.1073/pnas.2020535118>.

Rosa L., Rulli M.C., Ali S., Chiarelli D.D., Dell'Angelo J., Mueller N.D., Scheidel A., Siciliano G., D'Odorico P. (2021), Energy implications of the 21st century agrarian transition, *Nature Communications*, 12(1), 2319. <https://doi.org/10.1038/s41467-021-22581-7>.

Rosa L., Chiarelli D. D., Rulli M. C., Dell'Angelo J., D'Odorico P. (2020). Global agricultural economic water scarcity. *Science Advances*, 6, eaaz6031. <http://dx.doi.org/10.1126/sciadv.aaz6031>.

D'Odorico P., Chiarelli D.D., Rosa L., Bini A., Zilberman D., Rulli M.C. (2020). The global value of water in agriculture. *Proceedings of the National Academy of Sciences of the United States of America*, 117, 21985-21993. <http://dx.doi.org/10.1073/pnas.2005835117>

Rosa L., Chiarelli D.D., Sangiorgio M., Beltran-Peña A.A., Rulli M.C., D'Odorico P., Fung I. (2020). Potential for sustainable irrigation expansion in a 3 °C warmer climate. *Proceedings of the National Academy of Sciences of the United States of America*, 117. <http://dx.doi.org/29526-29534>, 10.1073/pnas.2017796117.

- Davis K. F., Koo H. I., Dell'Angelo J., D'Odorico P., Estes L., Kehoe L. J., Kharratzadeh M., Kuemmerle T., Machava D., Pais A. J. R., Ribeiro N., Rulli M.C., Tatlhego M. (2020). Tropical forest loss enhanced by large-scale land acquisitions. *Nature Geoscience*, 13, 482-488, <http://dx.doi.org/10.1038/s41561-020-0592-3>
- Rulli M.C., Casirati S., Dell'Angelo J., Davis K.F., Passera C., D'Odorico P. (2019), Interdependencies and telecoupling of oil palm expansion at the expense of Indonesian rainforest, *Renewable and Sustainable Energy Reviews*, 105, 499, 512, 21. <http://dx.doi.org/10.1016/j.rser.2018.12.050>.
- Rosa L., Chiarelli D.D., Tu C., Rulli M.C., D'Odorico P. (2019) Global unsustainable virtual water flows in agricultural trade, *Environmental Research Letters*, 14, 11, 114001. <https://doi.org/10.1088/1748-9326/ab4bfc>.
- D'Odorico P., Davis K.F., Rosa L., Carr J.A., Chiarelli D., Dell'Angelo J., Gephart J., MacDonald G.K., Seekell D.A., Suweis S., Rulli M.C. (2018) The Global Food-Energy-Water Nexus, *Review of Geophysics*, 56, 3, 456-531. <http://dx.doi.org/10.1029/2017RG000591>
- Davis K.F., Chiarelli D.D., Rulli M.C., Chhatre A., Richter B., Singh D., Defries R. (2018) Alternative cereals can improve water use and nutrient supply in India, *Science advances* 4 (7), eaao1108. <http://dx.doi.org/10.1126/sciadv.aao1108>
- Rosa L., Rulli M.C., Davis K.F., Chiarelli D.D., Passera C., D'Odorico P. (2018) Closing the yield gap while ensuring water sustainability, *Environmental Research Letters* 13 104002. <http://dx.doi.org/10.1088/1748-9326/aadeef>
- Rosa, L., Rulli, M.C., Davis, K. F., D'Odorico, P. (2018). The water-energy nexus of hydraulic fracturing: A global hydrologic analysis for shale oil and gas extraction. *Earth's Future*, 6, 745–756. <https://doi.org/10.1002/2018EF000809>.
- Davis K.F., Rulli M.C., Seveso A., D'Odorico P. (2017) Increased food production and reduced water use through optimized crop distribution, *Nature Geoscience* 10 (12), 919-924. <https://doi.org/10.1038/s41561-017-0004-5>
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- Rosa L., Davis K.F., Rulli M.C., D'Odorico P. (2017) Environmental consequences of oil production from oil sands, *Earth's Future*, 5, 158–170. <http://dx.doi.org/10.1002/2016EF000484>.
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- Dell'Angelo J., D'Odorico P., Rulli M.C., Marchand P. (2016) The Tragedy of the Grabbed Commons: Coercion and Dispossession in the Global Land Rush. *World Development*, 92, 1-12, <http://dx.doi.org/10.1016/j.worlddev.2016.11.005>.
- Rulli M.C., Bellomi D., Cazzoli A., De Carolis G., D'Odorico P. (2016) The water-land-food nexus of first-generation biofuels. *Scientific Reports*, 6, 22521, <http://dx.doi.org/10.1038/srep22521>
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- Davis K. F., P. D'Odorico, Rulli M.C. (2014). Moderating diets to feed the future. *Earth's Future*, 2, 559-565, <http://dx.doi.org/10.1002/2014EF000254>
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- Rulli M.C., P. D'Odorico (2013). The water footprint of land grabbing. *Geophysical Research Letters*, 40, 1-6. <http://dx.doi.org/10.1002/2013GL058281>.