

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, she is vice president of the Italian Society of Water Engineering since 2021 and she is Fellow of the Istituto Veneto di Scienze, Lettere ed Arti since 2024. In 2024 she has been awarded the Creativity Prize-Prince Sultan Bin Abdulaziz International Prize for Water. Her research focuses 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 and migration. Her most recent research concentrates on the nexus between Health and Dry Environment focusing on the potential nexus between the unsustainable food system and the insurgence of diseases (e.g., zoonotic, food and nutrition related, uncommunicable).

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EDUCATION

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

M.S. IN ENVIRONMENTAL ENGINEERING, 1994, 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

2024 CREATIVITY PRIZE – PRINCE SULTAN BIN ABDULAZIZ INTERNATIONAL PRIZE FOR WATER

2024 FELLOW - ISTITUTO VENETO DI SCIENZE, LETTERE AD ARTI

2015 SCIENCE (SECURITY IN GLOBAL ENVIRONMENTAL CHANGES) STUDIES AWARD, POMI FOUNDATION

2002 PRIZE INNOVATIONS FOR THE ENVIRONMENT, LEGAMBIENTE FOUNDATION

1996 MAGNA CUM LAUDE DISTINCTION, UNIVERSITY OF PERUGIA

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

EDITORIAL SERVICE:

EDITORIAL BOARD MEMBER, EARTH'S FUTURE (2024-PRESENT); SCIENTIFIC DATA (2023-PRESENT); HYDROLOGICAL SCIENCE 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+MANUSCRIPT FOR PEER REVIEW 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+ GRANT'S PROPOSAL FOR MULTIPLE FUNDING AGENCIES. COORDINATOR OF EXPERTS EVALUATION PANEL 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.

SCIENTIFIC ADVISING

SCIENTIFIC ADVISOR, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO); ENI ENRICO MATTEI FOUNDATION (FEEM); WORLD WIDE FUND FOR NATURE (WWF).

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)

MEMBERSHIP OF PROFESSIONAL ORGANIZATIONS

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

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

THE JAPAN GEOSCIENCE UNION (JPGU), MEMBER (2019-PRESENT)

THE ITALIAN SOCIETY OF WATER ENGINEERING (GII), MEMBER (1996-PRESENT), ELECTED MEMBER OF THE SCIENTIFIC BOARD (2021-PRESENT); VICE PRESIDENT (2021-PPRESENT)

THE ITALIAN SOCIETY OF HYDROLOGY (SII), MEMBER (2015-PRESENT), ELECTED MEMBER OF THE SCIENTIFIC BOARD (2016-2020)

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

BIBLIOGRAPHY

MARIA CRISTINA RULLI IS AUTHOR OF 150 PUBLICATIONS, 140 OF THEM PUBLISHED IN PEER REVIEWED SCIENTIFIC JOURNALS

GOOGLE SCHOLAR

TOTAL CITATIONS: 9635 (AS OF SEPTEMBER 11TH, 2024),
H-INDEX: 54, I10-INDEX: 89

SCOPUS

TOTAL CITATIONS: 6479 (AS OF SEPTEMBER 11TH, 2024),
H-INDEX: 45

WEB OF SCIENCE

TOTAL CITATIONS: 5736 (AS OF SEPTEMBER 11TH, 2024),
H-INDEX: 42
HIGHLY CITED PAPERS : 5; HOT CITED PAPER: 1

SELECTED PUBLICATIONS

Rulli, M.C., Sardo, M., Ricciardi, L., Govoni, C., Chiarelli, D., Galli, N., Komarek, A., D'Odorico, P. (2024) Meeting the EAT-Lancet 'healthy' diet target while protecting land and water resources. *Nature Sustainability*, accepted for publication.

Posada-Marín, J., Salazar, J., **Rulli, M.C.**, Wang-Erlandsson, L., Jaramillo, F. (2024) Upwind moisture supply increases risk to water security. *Nature Water*. <https://doi.org/10.1038/s44221-024-00291-w>

Yang, Y., Tilman, D., Jin, Z., Smith, P., Barrett, C.B., Zhu, Y-G., Burney, J., D'Odorico, P., Fantke, P., Fargione, J., Finlay, J., **Rulli, M.C.**, Sloat, L., van Groenigen, K.J., West, P.C., Ziska, L., Michalak, A.M., the Clim-Ag Team, Lobell, D.B. (2024) Climate change exacerbates the environmental impacts of agriculture. *Science*, 385, eadn3747.

D'Odorico, P., Dell'Angelo, J., **Rulli, M.C.** (2024) Water commons grabbing and (in)justice. *Nature Water* 2, 300–302.

Ricciardi, L., D'Odorico, P., **Rulli, M.C.** (2024) To what extent can agriculture be reshaped to address healthy and sustainable diets by boosting pulse production locally?. *Global Food Security*, 40, 100734.

Govoni, C. P. D'Odorico, L. Pinotti, **Rulli, M.C.** (2023), Preserving global land and water resources through the replacement of livestock feeds with agricultural by-products. *Nature Food*, 4, 1047–1057.

Dell'Angelo, J., **Rulli, M.C.**, D'Odorico, P. (2023) Will war in Ukraine escalate the global land rush? *Science*, 379 (6634), 752-755.

Wolde, S., D'Odorico, P., **Rulli, M.C.** (2023). Environmental drivers of human migration in Sub-Saharan Africa. *Global Sustainability*, 6, E9.

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.

Galli, N., Chiarelli, D. D., Ricciardi, L., Rulli, **M. C.** (2023). A blue water scarcity-based method for hydrologically sustainable agricultural expansion design. *Water Resources Research*, 59, e2023WR034473.

Muylaert, R.L., Wilkinson, D.A., Kingston, D'Odorico, P., **Rulli, M.C.**, Galli, N., John, R.S., Alviola, P., Hayman D.T.S. (2023) Using drivers and transmission pathways to identify SARS-like coronavirus spillover risk hotspots. *Nature Communications* 14, 6854.

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).

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.

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.

Tatlhego, M., Chiarelli D.D., **Rulli, M.C.**, D'Odorico, P. (2022). The value generated by irrigation in the command areas of new agricultural dams in Africa, *Agric. Water. Management.*, 264, 107517.

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 migration, *Philosophical Transactions of the Royal Society B* 377 20210391.

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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.

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.

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 implication of the 21st century agrarian transition, *Nature Communications*, 12(1), 2319.

Rosa, L., Chiarelli, D. D., **Rulli, M.C.**, Dell'Angelo, J., D'Odorico, P. (2020). Global agricultural economic water scarcity. *Science Advances*, 6, eaaz6031.

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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.

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.

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.**, Tathego, M. (2020). Tropical forest loss enhanced by large-scale land acquisition. *Nature Geoscience*, 13, 482-488.

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.

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.

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.

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.

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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.

Dell'Angelo, J., P. D'Odorico, **Rulli, M.C.** (2018). The Global Water Grab Syndrome, *Ecological Economics*, 143, 276-285.

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).

D'Odorico, P., **Rulli, M.C.**, Dell'Angelo, J., Davis, K.F., (2017): New frontiers of land and water commodification: socioenvironmental controversies of large-scale land acquisition, *Land Degradation and Development*, 28,7,2234-2244.

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.

Rulli, M.C., Santini, M., Hayman, D.T.S., D'Odorico, P. (2017) The nexus between forest fragmentation in Africa and Ebola virus disease outbreaks. *Scientific Reports* 7: 41613.

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..

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.

Davis, K. F., Yu K., **Rulli, M.C.**, Pichdara, L., D'Odorico, P. (2015). Accelerated deforestation driven by large-scale land acquisitions in Cambodia. *Nature Geoscience*, 8, 772-775.

Davis, K. F., **Rulli, M.C.**, D'Odorico, P. (2015), The global land rush and climate change, *Earth's Future*, 3, 298–311.

Rulli, M.C., D'Odorico P. (2014). Food appropriation through large scale land acquisition. *Environmental Research Letters*, 9, 1-8.

Davis, K.F., D'Odorico, P. , **Rulli, M.C.** (2014). Moderating diets to feed the future. *Earth's Future*, 2, 559-565

D'Odorico, P., **Rulli, M.C.** (2014). The land and its people. *Nature Geoscience*, 7,324-325.

Rulli, M.C., Saviori, A., D'Odorico, P. (2013). Global land and water grabbing. *Proceedings of the National Academy of Sciences of the United States of America*, 110, 892-897.

D'Odorico, P., **Rulli, M.C.** (2013). The fourth food revolution. *Nature Geoscience*, vol. 6, p. 417-418, ISSN: 1752-0894.

Rulli, M.C., P. D'Odorico (2013). The water footprint of land grabbing. *Geophysical Research Letters*, 40, 1-6.

POLICY IMPACT OF THE RESEARCH AND MEDIA COVERAGE:

20+ POLICY DOCUMENTS (FAO, IUCN, WB, WHO, UNEP, EU, PBL) REFER TO RESEARCH OUTPUT REPORTED ON "SELECTED PUBLICATIONS"

1000+ NEWS STORIES REFERENCE TO PAPERS REPORTED IN "SELECTED PUBLICATIONS"