Curriculum Vitae **Christian Folberth**

Personal information

Name: Christian Folberth
Date of birth: 10. 1.1980
Nationality: German
ORCID: 0000-0002-6738-5238
Web: http://www.iiasa.ac.at/staff/staff.php?type=auto&visibility=visible&search=true&login=folberth

Position

2016 – **Research Scholar**
Agriculture, Forestry, and Ecosystem Services Research Group (AFE), Biodiversity and Natural Resources Program (BNR), International Institute for Applied Systems Analysis, Austria

Professional experience

2015 – 2016 **Research Fellow and Co-Group Leader**
Research and Teaching Unit Human-Environment Relations, Department of Geography, Ludwig Maximilian University of Munich, Germany

2015 – 2016 **Guest Research Scholar**
Agro-Environmental Systems Group, Ecosystem Services and Management Program, International Institute for Applied Systems Analysis, Austria

2013 – 2015 **Research Scholar**
Agro-Environmental Systems Group, Ecosystem Services and Management Program, International Institute for Applied Systems Analysis, Austria

2009 – 2013 **Research Assistant**
Swiss Federal Institute of Aquatic Science and Technology (Eawag), Switzerland

Education

2014 PhD (Doctor of Sciences ETH Zurich)
Modeling crop yield and water use in the context of global change with a focus on maize in sub-Saharan Africa
Department of Environmental Systems Science, ETH Zurich, Switzerland

2008 M.Sc. (with distinction) Environmental Planning and Ecological Engineering
Technical University of Munich, Germany

2005 B. Sc. (with distinction) Horticultural Sciences
Technical University of Munich, Germany

Research interests

climate impacts, adaptation, and mitigation in agriculture; potentials and limitations for sustainable land management; agro-ecosystem processes across scales; sustainable soil management; substance flows in the agro-food system; anthropogenic drivers of land use systems and change; emerging technologies in agricultural research and practice

Fellowships

2015 – 2016 LMUexcellent Research Fellowship of the Center for Advanced Studies, Ludwig Maximilian University of Munich, Germany

Organization of scientific meetings

2019 – Session "Modeling agricultural systems under global change", EGU General Assembly. Co-convener with C. Müller, F. Lutz, S. Minoli.
2018 Session "Agricultural management in ecosystem models for biogeochemical and agricultural assessments", EGU General Assembly. Co-convener with C. Müller, F. Lutz, S. Minoli.
2016 Workshop "Sustainable Phosphorus Management for Future Food Security", Center for Advanced Studies, LMU Munich. Co-convener with Prof. Caroline Gutjahr
2015 Dialogue session "Soil and land information: How to support decision making?", Global Soil Week 2015. Co-planner with partners from IIASA, JRC, ICRAF, and ISRIC among others

Professional societies

2018 – European Geoscience Union

Editorial board services

2019 – Editorial Board member, Agronomy
2019 – Editorial Board member, Geoscientific Model Development

Peer-review and refereeing

Reviewer for journals: Agricultural and Forest Meteorology; Agriculture, Ecosystems and Environment; Agricultural Systems; Agronomy; Archives of Agronomy and Soil Science; Climatic Change; Earth System Dynamics; Ecological Modelling; Environmental Research Letters; Frontiers in Nutrition; Global Food Security; Nature Sustainability; Resources, Conservation and Recycling; Science of the Total Environment

Reviewer for research grants: Agence Nationale de la Recherche (France)

Other professional activities (selected)

2019 Invited workshop participant, Sustainable Agricultural Matrix pursuit project, SESYNC, MD, USA
2019 Invited workshop participant, Footprint methodologies and their role in policy development and communication, German Development Institute, Bonn, Germany
2018 Invited workshop participant, Sustainable Agricultural Matrix pursuit project, SESYNC, MD, USA
2015 Invited speaker, Land use workshop of Heinrich-Böll-Foundation stipends, Munich, Germany
2012 – Member of the Inter-Sectoral Impact Model Intercomparison Project (ISI-MIP) and Global Gridded Crop Model Intercomparison (GGCMI) initiative
2011 – Invited guest lectures and seminars on crop modelling, tropical agriculture, and agricultural climate change impacts at University of Kassel (Germany, 2010), University of Bonn (Germany, 2011), University of Basel (Switzerland, 2012, 2014), Technical University of Munich (Germany, 2015, 2015), and University of Natural Resources and Life Sciences Vienna (Austria, 2016, 2018)

Teaching experience

Resources and sustainability; Land use systems and land use conflicts; Transition paths towards sustainability; Introduction to anthropogeography; Crop modelling across scales; Data handling and visualization in R

Supervision and capacity building

2021 Co-Supervision of Young Scientists Summer Program (YSSP) participants Henrique Moreno Dumont Goulart (VU Amsterdam, NL) and Jincheng Li (Beijing University, CHN) at International Institute for Applied Systems Analysis
2020 Supervision of Young Scientists Summer Program (YSSP) participant Xiaobo Wang (Chinese Academy of Sciences, CHN) at International Institute for Applied Systems Analysis
2018 Co-Supervision of Young Scientists Summer Program (YSSP) participant Tony Carr (University College London, UK) at International Institute for Applied Systems Analysis
2015 Co-Supervision of B.Sc. student Leonie Keil at Ludwig Maximilian University of Munich, Germany
2014 External technical advisor to PhD student Liu Wenfeng (ETH Zurich and Eawag, Switzerland)

Technical expertise

Software

ArcGIS, QGIS, STAN, Vensim, Adobe CS, MS Office

Programming environments

R, Linux shell scripting, C, VBA, Fortran, Python

Data processing

handling of large datasets, visualization, machine learning applications, parallel computing

Languages

German	native
English	fluent
French	good written, moderate communication
Spanish	good written, moderate communication
Romanian	basic understanding

Peer-reviewed journal articles

Wang, X.; Müller, C.; Elliot, J.; Mueller, N. D.; Ciais, P.; Jägermeyr, J.; Gerber, J.; Dumas, P.; Wang, C.; Yang, H.; Li, L.; Deryng, D.; Folberth, C.; Liu, W.; Makowski, D.; Olin, S.; Pugh, T. A. M.; Reddy, A.; Schmid, E.; Jeong, S.; Zhou, F.; Piao, S. Global Irrigation Contribution to Wheat and Maize Yield. *Nature Communications* **2021**, *12* (1), 1235. https://doi.org/10.1038/s41467-021-21498-5.

Müller, C.; Franke, J.; Jägermeyr, J.; Ruane, A. C.; Elliott, J.; Moyer, E.; Heinke, J.; Falloon, P. D.; Folberth, C.; Francois, L.; Hank, T.; Izaurralde, R. C.; Jacquemin, I.; Liu, W.; Olin, S.; Pugh, T. A. M.; Williams, K.; Zabel, F. Exploring Uncertainties in Global Crop Yield Projections in a Large Ensemble of Crop Models and CMIP5 and CMIP6 Climate Scenarios. *Environ. Res. Lett.* **2021**, *16* (3), 034040. https://doi.org/10.1088/1748-9326/abd8fc.

Lange, S.; Volkholz, J.; Geiger, T.; Zhao, F.; Vega, I.; Veldkamp, T.; Reyer, C. P. O.; Warszawski, L.; Huber, V.; Jägermeyr, J.; Schewe, J.; Bresch, D. N.; Büchner, M.; Chang, J.; Ciais, P.; Dury, M.; Emanuel, K.; Folberth, C.; Gerten, D.; Gosling, S. N.; Grillakis, M.; Hanasaki, N.; Henrot, A.; Hickler, T.; Honda, Y.; Ito, A.; Khabarov, N.; Koutroulis, A.; Liu, W.; Müller, C.; Nishina, K.; Ostberg, S.; Müller Schmied, H.; Seneviratne, S. I.; Stacke, T.; Steinkamp, J.; Thiery, W.; Wada, Y.; Willner, S.; Yang, H.; Yoshikawa, M.; Yue, C.; Frieler, K. Projecting Exposure to Extreme Climate Impact Events Across Six Event Categories and Three Spatial Scales. *Earth's Future* **2020**, *8* (12). https://doi.org/10.1029/2020EF001616.

Ringeval, B.; Müller, C.; Pugh, T. A. M.; Mueller, N. D.; Ciais, P.; Folberth, C.; Liu, W.; Debaeke, P.; Pellerin, S. Potential Yield Simulated by Global Gridded Crop Models: Using a Process-Based Emulator to Explain Their Differences. *Geosci. Model Dev.* **2021**, *14* (3), 1639–1656. https://doi.org/10.5194/gmd-14-1639-2021.

Ruane, A. C.; Phillips, M.; Müller, C.; Elliott, J.; Jägermeyr, J.; Arneth, A.; Balkovic, J.; Deryng, D.; Folberth, C.; Iizumi, T.; Izaurralde, R. C.; Khabarov, N.; Lawrence, P.; Liu, W.; Olin, S.; Pugh, T. A. M.; Rosenzweig, C.; Sakurai, G.; Schmid, E.; Sultan, B.; Wang, X.; de Wit, A.; Yang, H. Strong Regional Influence of Climatic Forcing Datasets on Global Crop Model Ensembles. *Agricultural and Forest Meteorology* **2021**, *300*, 108313. https://doi.org/10.1016/j.agrformet.2020.108313.

Balkovič, J.; Madaras, M.; Skalský, R.; Folberth, C.; Smatanová, M.; Schmid, E.; van der Velde, M.; Kraxner, F.; Obersteiner, M. Verifiable Soil Organic Carbon Modelling to Facilitate Regional Reporting of Cropland Carbon Change: A Test Case in the Czech Republic. *Journal of Environmental Management* **2020**, *274*, 111206. https://doi.org/10.1016/j.jenvman.2020.111206.

Carr, T. W.; Balkovič, J.; Dodds, P. E.; Folberth, C.; Fulajtar, E.; Skalsky, R. Uncertainties, Sensitivities and Robustness of Simulated Water Erosion in an EPIC-Based Global Gridded Crop Model. *Biogeosciences* **2020**, *17* (21), 5263–5283. https://doi.org/10.5194/bg-17-5263-2020.

Flach, R.; Fader, M.; Folberth, C.; Skalský, R.; Jantke, K. The Effects of Cropping Intensity and Cropland Expansion of Brazilian Soybean Production on Green Water Flows. *Environ. Res. Commun.* **2020**, *2* (7), 071001. https://doi.org/10.1088/2515-7620/ab9d04.

Folberth, C.; Khabarov, N.; Balkovič, J.; Skalský, R.; Visconti, P.; Ciais, P.; Janssens, I. A.; Peñuelas, J.; Obersteiner, M. The Global Cropland-Sparing Potential of High-Yield Farming. *Nature Sustainability* **2020**, *3* (4), 281–289. https://doi.org/10.1038/s41893-020-0505-x.
**Covered in Future Earth's Anthropocene magazine among others*

Jägermeyr, J.; Robock, A.; Elliott, J.; Müller, C.; Xia, L.; Khabarov, N.; Folberth, C.; Schmid, E.; Liu, W.; Zabel, F.; Rabin, S. S.; Puma, M. J.; Heslin, A.; Franke, J.; Foster, I.; Asseng, S.; Bardeen, C. G.; Toon, O. B.; Rosenzweig, C. A Regional Nuclear Conflict Would Compromise Global Food Security. *PNAS* **2020**, *117* (13), 7071–7081. https://doi.org/10.1073/pnas.1919049117.
** Covered in Newsweek among others*

Flach, R.; Skalský, R.; Folberth, C.; Balkovič, J.; Jantke, K.; Schneider, U. A. Water Productivity and Footprint of Major Brazilian Rainfed Crops – A Spatially Explicit Analysis of Crop Management Scenarios. *Agricultural Water Management* **2020**, *233*, 105996. https://doi.org/10.1016/j.agwat.2019.105996.

Minoli, S.; Müller, C.; Elliott, J.; Ruane, A. C.; Jägermeyr, J.; Zabel, F.; Dury, M.; Folberth, C.; François, L.; Hank, T.; et al. Global Response Patterns of Major Rainfed Crops to Adaptation by Maintaining Current Growing Periods and Irrigation. *Earth's Future* **2019**, *7*, 1464-1480. https://doi.org/10.1029/2018EF001130.

Folberth, C.; Elliott, J.; Müller, C.; Balkovič, J.; Chryssanthacopoulos, J.; Izaurralde, R. C.; Jones, C. D.; Khabarov, N.; Liu, W.; Reddy, A.; et al. Parameterization-Induced Uncertainties and Impacts of Crop Management Harmonization in a Global Gridded Crop Model Ensemble. *PLoS ONE* **2019**, *14* (9), e0221862. https://doi.org/10.1371/journal.pone.0221862.

Schewe, J.; Gosling, S. N.; Reyer, C.; Zhao, F.; Ciais, P.; Elliott, J.; Francois, L.; Huber, V.; Lotze, H. K.; Seneviratne, S. I.; et al. State-of-the-Art Global Models Underestimate Impacts from Climate Extremes. *Nature Communications* **2019**, *10* (1). https://doi.org/10.1038/s41467-019-08745-6.

Müller, C.; Elliott, J.; Kelly, D.; Arneth, A.; Balkovic, J.; Ciais, P.; Deryng, D.; Folberth, C.; Hoek, S.; Izaurralde, R. C.; et al. The Global Gridded Crop Model Intercomparison Phase 1 Simulation Dataset. *Scientific Data* **2019**, *6* (1), 50. https://doi.org/10.1038/s41597-019-0023-8.

Folberth, C.; Baklanov, A.; Balkovič, J.; Skalský, R.; Khabarov, N.; Obersteiner, M. Spatio-Temporal Downscaling of Gridded Crop Model Yield Estimates Based on Machine Learning. *Agricultural and Forest Meteorology* **2019**, *264*, 1–15. https://doi.org/10.1016/j.agrformet.2018.09.021.
**Among journal's most downloaded articles*

Wartenburger, R.; Seneviratne, S. I.; Hirschi, M.; Chang, J.; Ciais, P.; Deryng, D.; Elliott, J.; Folberth, C.; Gosling, S. N.; Gudmundsson, L.; et al. Evapotranspiration Simulations in ISIMIP2a-Evaluation of Spatio-Temporal Characteristics with a Comprehensive Ensemble of Independent Datasets. *Environmental Research Letters* **2018**, *13* (7). https://doi.org/10.1088/1748-9326/aac4bb.

Schleussner, C.-F.; Deryng, D.; Müller, C.; Elliott, J.; Saeed, F.; Folberth, C.; Liu, W.; Wang, X.; Pugh, T. A. M.; Thiery, W.; et al. Crop Productivity Changes in 1.5°C and 2°C Worlds under Climate Sensitivity Uncertainty. *Environmental Research Letters* **2018**, *13* (6). https://doi.org/10.1088/1748-9326/aab63b.

Ruane, A. C.; Antle, J.; Elliott, J.; Folberth, C.; Hoogenboom, G.; Mason-D'Croz, D.; Müller, C.; Porter, C.; Phillips, M. M.; Raymundo, R. M.; et al. Biophysical and Economic Implications for Agriculture of +1.5° and +2.0°C Global Warming Using AgMIP Coordinated Global and Regional Assessments. *Climate Research* **2018**, *76* (1), 17–39. https://doi.org/10.3354/cr01520.

Rosenzweig, C.; Ruane, A. C.; Antle, J.; Elliott, J.; Ashfaq, M.; Chatta, A. A.; Ewert, F.; Folberth, C.; Hathie, I.; Havlik, P.; et al. Coordinating AgMIP Data and Models across Global and Regional Scales for 1.5°C and 2.0°C Assessments. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* **2018**, *376* (2119). https://doi.org/10.1098/rsta.2016.0455.

Müller, C.; Elliott, J.; Pugh, T. A. M.; Ruane, A. C.; Ciais, P.; Balkovic, J.; Deryng, D.; Folberth, C.; Cesar Izaurralde, R.; Jones, C. D.; et al. Global Patterns of Crop Yield Stability under Additional Nutrient and Water Inputs. *PLoS ONE* **2018**, *13* (6). https://doi.org/10.1371/journal.pone.0198748.

Liu, W.; Yang, H.; Folberth, C.; Müller, C.; Ciais, P.; Abbaspour, K. C.; Schulin, R. Achieving High Crop Yields with Low Nitrogen Emissions in Global Agricultural Input Intensification. *Environmental Science and Technology* **2018**, *52* (23), 13782–13791. https://doi.org/10.1021/acs.est.8b03610.

Lim, C.-H.; Choi, Y.; Kim, M.; Lee, S. J.; Folberth, C.; Lee, W.-K. Spatially Explicit Assessment of Agricultural Water Equilibrium in the Korean Peninsula. *Sustainability* **2018**, *10* (1). https://doi.org/10.3390/su10010201.

Keil, L.; Folberth, C.; Jedelhauser, M.; Binder, C. R. Time-Continuous Phosphorus Flows in the Indian Agri-Food Sector: Long-Term Drivers and Management Options. *Journal of Industrial Ecology* **2018**, *22* (2), 406–421. https://doi.org/10.1111/jiec.12560.
** C. Folberth corresponding author and co-supervisor of lead author*

Balkovič, J.; Skalský, R.; Folberth, C.; Khabarov, N.; Schmid, E.; Madaras, M.; Obersteiner, M.; van der Velde, M. Impacts and Uncertainties of +2°C of Climate Change and Soil Degradation on European Crop Calorie Supply. *Earth's Future* **2018**, *6* (3), 373–395. https://doi.org/10.1002/2017EF000629.

Schauberger, B.; Archontoulis, S.; Arneth, A.; Balkovic, J.; Ciais, P.; Deryng, D.; Elliott, J.; Folberth, C.; Khabarov, N.; Müller, C.; et al. Consistent Negative Response of US Crops to High Temperatures in Observations and Crop Models. *Nature Communications* **2017**, *8*. https://doi.org/10.1038/ncomms13931.
**Covered in The Independent among others*

Porwollik, V.; Müller, C.; Elliott, J.; Chryssanthacopoulos, J.; Iizumi, T.; Ray, D. K.; Ruane, A. C.; Arneth, A.; Balkovič, J.; Ciais, P.; et al. Spatial and Temporal Uncertainty of Crop Yield Aggregations. *European Journal of Agronomy* **2017**, *88*, 10–21. https://doi.org/10.1016/j.eja.2016.08.006.

Müller, C.; Elliott, J.; Chryssanthacopoulos, J.; Arneth, A.; Balkovic, J.; Ciais, P.; Deryng, D.; Folberth, C.; Glotter, M.; Hoek, S.; et al. Global Gridded Crop Model Evaluation: Benchmarking, Skills, Deficiencies and Implications. *Geoscientific Model Development* **2017**, *10* (4), 1403–1422. https://doi.org/10.5194/gmd-10-1403-2017.

Frieler, K.; Schauberger, B.; Arneth, A.; Balkovič, J.; Chryssanthacopoulos, J.; Deryng, D.; Elliott, J.; Folberth, C.; Khabarov, N.; Müller, C.; et al. Understanding the Weather Signal in National Crop-Yield Variability. *Earth's Future* **2017**, *5* (6), 605–616. https://doi.org/10.1002/2016EF000525.

Pugh, T. A. M.; Müller, C.; Elliott, J.; Deryng, D.; Folberth, C.; Olin, S.; Schmid, E.; Arneth, A. Climate Analogues Suggest Limited Potential for Intensification of Production on Current Croplands under Climate Change. *Nature Communications* **2016**, *7*. https://doi.org/10.1038/ncomms12608.

Liu, W.; Yang, H.; Folberth, C.; Wang, X.; Luo, Q.; Schulin, R. Global Investigation of Impacts of PET Methods on Simulating Crop-Water Relations for Maize. *Agricultural and Forest Meteorology* **2016**, *221*, 164–175. https://doi.org/10.1016/j.agrformet.2016.02.017.

Liu, B.; Asseng, S.; Müller, C.; Ewert, F.; Elliott, J.; Lobell, D. B.; Martre, P.; Ruane, A. C.; Wallach, D.; Jones, J. W.; et al. Similar Estimates of Temperature Impacts on Global Wheat Yield by Three Independent Methods. *Nature Climate Change* **2016**, *6* (12), 1130–1136. https://doi.org/10.1038/nclimate3115.

Folberth, C.; Skalský, R.; Moltchanova, E.; Balkovič, J.; Azevedo, L. B.; Obersteiner, M.; Van Der Velde, M. Uncertainty in Soil Data Can Outweigh Climate Impact Signals in Global Crop Yield Simulations. *Nature Communications* **2016**, *7*. https://doi.org/10.1038/ncomms11872.

Deryng, D.; Elliott, J.; Folberth, C.; Müller, C.; Pugh, T. A. M.; Boote, K. J.; Conway, D.; Ruane, A. C.; Gerten, D.; Jones, J. W.; et al. Regional Disparities in the Beneficial Effects of Rising CO2 Concentrations on Crop Water Productivity. *Nature Climate Change* **2016**, *6* (8), 786–790. https://doi.org/10.1038/nclimate2995.

Müller, C.; Elliott, J.; Chryssanthacopoulos, J.; Deryng, D.; Folberth, C.; Pugh, T. A. M.; Schmid, E. Implications of Climate Mitigation for Future Agricultural Production. *Environmental Research Letters* **2015**, *10* (12). https://doi.org/10.1088/1748-9326/10/12/125004.

Frieler, K.; Levermann, A.; Elliott, J.; Heinke, J.; Arneth, A.; Bierkens, M. F. P.; Ciais, P.; Clark, D. B.; Deryng, D.; Döll, P.; et al. A Framework for the Cross-Sectoral Integration of Multi-Model Impact Projections: Land Use Decisions under Climate Impacts Uncertainties. *Earth System Dynamics* **2015**, *6* (2), 447–460. https://doi.org/10.5194/esd-6-447-2015.

Van der Velde, M.; Folberth, C.; Balkovič, J.; Ciais, P.; Fritz, S.; Janssens, I. A.; Obersteiner, M.; See, L.; Skalský, R.; Xiong, W.; et al. African Crop Yield Reductions Due to Increasingly Unbalanced Nitrogen and Phosphorus Consumption. *Global Change Biology* **2014**, *20* (4), 1278–1288. https://doi.org/10.1111/gcb.12481.

Rosenzweig, C.; Elliott, J.; Deryng, D.; Ruane, A. C.; Müller, C.; Arneth, A.; Boote, K. J.; Folberth, C.; Glotter, M.; Khabarov, N.; et al. Assessing Agricultural Risks of Climate Change in the 21st Century in a Global Gridded Crop Model Intercomparison. *Proceedings of the National Academy of Sciences of the United States of America* **2014**, *111* (9), 3268–3273. https://doi.org/10.1073/pnas.1222463110.
**Covered in Nature | News, January 2014.*

Piontek, F.; Müller, C.; Pugh, T. A. M.; Clark, D. B.; Deryng, D.; Elliott, J.; De Jesus Colón González, F.; Flörke, M.; Folberth, C.; Franssen, W.; et al. Multisectoral Climate Impact Hotspots in a Warming World. *Proceedings of the National Academy of Sciences of the United States of America* **2014**, *111* (9), 3233–3238. https://doi.org/10.1073/pnas.1222471110.
**Covered in The Guardian among others*

Folberth, C.; Yang, H.; Gaiser, T.; Liu, J.; Wang, X.; Williams, J.; Schulin, R. Effects of Ecological and Conventional Agricultural Intensification Practices on Maize Yields in Sub-Saharan Africa under Potential Climate Change. *Environmental Research Letters* **2014**, *9* (4). https://doi.org/10.1088/1748-9326/9/4/044004.
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Elliott, J.; Deryng, D.; Müller, C.; Frieler, K.; Konzmann, M.; Gerten, D.; Glotter, M.; Flörke, M.; Wada, Y.; Best, N.; et al. Constraints and Potentials of Future Irrigation Water Availability on Agricultural Production under Climate Change. *Proceedings of the National Academy of Sciences of the United States of America* **2014**, *111* (9), 3239–3244. https://doi.org/10.1073/pnas.1222474110.

Balkovič, J.; van der Velde, M.; Skalský, R.; Xiong, W.; Folberth, C.; Khabarov, N.; Smirnov, A.; Mueller, N. D.; Obersteiner, M. Global Wheat Production Potentials and Management Flexibility under the Representative Concentration Pathways. *Global and Planetary Change* **2014**, *122*, 107–121. https://doi.org/10.1016/j.gloplacha.2014.08.010.

Liu, J.; Folberth, C.; Yang, H.; Röckström, J.; Abbaspour, K.; Zehnder, A. J. B. A Global and Spatially Explicit Assessment of Climate Change Impacts on Crop Production and Consumptive Water Use. *PLoS ONE* **2013**, *8* (2). https://doi.org/10.1371/journal.pone.0057750.

Folberth, C.; Yang, H.; Gaiser, T.; Abbaspour, K. C.; Schulin, R. Modeling Maize Yield Responses to Improvement in Nutrient, Water and Cultivar Inputs in Sub-Saharan Africa. *Agricultural Systems* **2013**, *119*, 22–34. https://doi.org/10.1016/j.agsy.2013.04.002.

Dominguez-Faus, R.; Folberth, C.; Liu, J.; Jaffe, A. M.; Alvarez, P. J. J. Climate Change Would Increase the Water Intensity of Irrigated Corn Ethanol. *Environmental Science and Technology* **2013**, *47* (11), 6030–6037. https://doi.org/10.1021/es400435n.

Folberth, C.; Yang, H.; Wang, X.; Abbaspour, K. C. Impact of Input Data Resolution and Extent of Harvested Areas on Crop Yield Estimates in Large-Scale Agricultural Modeling for Maize in the USA. *Ecological Modelling* **2012**, *235–236*, 8–18. https://doi.org/10.1016/j.ecolmodel.2012.03.035.

Folberth, C.; Gaiser, T.; Abbaspour, K. C.; Schulin, R.; Yang, H. Regionalization of a Large-Scale Crop Growth Model for Sub-Saharan Africa: Model Setup, Evaluation, and Estimation of Maize Yields. *Agriculture, Ecosystems and Environment* **2012**, *151*, 21–33. https://doi.org/10.1016/j.agee.2012.01.026.

Folberth, C.; Suhadolc, M.; Scherb, H.; Munch, J. C.; Schroll, R. Batch Experiments versus Soil Pore Water Extraction - What Makes the Difference in Isoproturon (Bio-)Availability? *Chemosphere* **2009**, *77* (6), 756–763. https://doi.org/10.1016/j.chemosphere.2009.08.029.

Folberth, C.; Scherb, H.; Suhadolc, M.; Munch, J. C.; Schroll, R. In Situ Mass Distribution Quotient (IMDQ) - A New Factor to Compare Bioavailability of Chemicals in Soils? *Chemosphere* **2009**, *75* (6), 707–713. https://doi.org/10.1016/j.chemosphere.2009.01.077.

Conference presentations and posters (selected)

Folberth, C. et al., 2020. Combining crop modelling and machine learning for rapid provision of crop yield estimates and externalities. iCROPM2020, Montpellier, France

Zhang, X. et al., 2019. A Sustainable Agriculture Matrix of environmental and socioeconomic indicators for protecting Earth's climate. AGU Fall Meeting 2019, San Francisco, USA

Laso Bayas, J.C. Gardeazabal, A., Karner, M., Vargas, L., Folberth, C. et al., 2019. AgroTutor - Promoting sustainable agricultural intensification and crowdsourcing plot information. ESA Living Planet Symposium 2019, Milan, Italy

Folberth, C., Skalský, R., Moltchanova, E., Balkovič, J., Azevedo, L.B., Obersteiner, M., van der Velde, M., 2016. Uncertainty in soil data and implications for global gridded crop modelling. Wageningen Soil Conference 2017. Wageningen, Netherlands

Folberth, C., Binder, C., 2016. Global flows of nitrogen and phosphorus embedded in agricultural products and recycling potential. 8th International Phosphorus Workshop, Rostock, Germany.

Azevedo, L., Vadas, P.A., Balkovič, J., Skalsky, R., Folberth, C., van der Velde, M., Obersteiner, M., 2016. Potential substitution of mineral P fertilizer by manure: EPIC development and implementation. EGU General Assembly 2016, Vienna, Austria.

van der Velde, M., Folberth, C., Balkovič, J., Ciais, P., Fritz, S., Janssens, I.A., Obersteiner, M., See, L., et al., 2014. African crop yield reductions due to increasingly unbalanced Nitrogen and Phosphorus consumption. EGU General Assembly 2014, Vienna, Austria.

Folberth, C., Abbaspour, K.C., Schulin, R., Yang, H., 2012. Filling maize yield gaps in sub-Saharan Africa - a spatially explicit modelling approach. EcoSummit 2012, Columbus, Ohio.

Koch, J., Wimmer, F., Schaldach, R., Onigkeit, J., Folberth, C., 2012. Modelling the impact of climate change on irrigation area demand in the Jordan River. Proceedings of the 6th International Congress on Environmental Modelling and Software (iEMSs), 1-5 July 2012, Leipzig, Germany

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