

PERSONAL INFORMATION

Juraj Balkovič

 (Slovakia)

 balkovic@iiasa.ac.at

Sex Male | Nationality Slovak

WORK EXPERIENCE

2012–Present

Research Scholar

International Institute for Applied Systems Analysis (IIASA)
Schlossplatz 1, A-2361 Laxenburg (Austria)
<https://iiasa.ac.at/>

- Leader of the Agro-Environmental Systems (AES) team in the Center for Landscape Resilience & Management (CLR).
- Biophysical modelling of agro-ecosystems at large scale (crop production, soil organic carbon, environmental externalities, crop management interventions, climate change impacts)

Business or sector Research

2003–Present

Assistant Professor

Faculty of Natural Sciences, Comenius University in Bratislava
Mlynská dolina, Ilkovičova 6, 842 15 Bratislava (Slovakia)
www.fns.uniba.sk

- Teacher
- Research in soil and plant science

Business or sector Education

2004–2011

Research Scholar

Soil Science and Conservation Research Institute
Gagarinova 10, 827 13 Bratislava (Slovakia)
www.vupop.sk

- Soil and landscape information system
- Policy support/consultancy

Business or sector Research

EDUCATION AND TRAINING

1999–2002

PhD

Faculty of Natural Sciences, Comenius University in Bratislava, Bratislava (Slovakia)

- Soil science
- Thesis: “Soils with andic properties in Slovakia”

2001

RNDr.

Faculty of Natural Sciences, Comenius University in Bratislava, Bratislava (Slovakia)

- Plant sociology
- Thesis: “Primary assessment of forest vegetation in the Štiavnické vrchy Mts”

1994–1999

M.Sc.

Faculty of Natural Sciences, Comenius University in Bratislava, Bratislava (Slovakia)

- Environmental science
- Soil science
- Plant sociology and ecology

PERSONAL SKILLS

Mother tongue(s) Slovak

Foreign language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C2	C1	C1	C2

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
 Common European Framework of Reference for Languages - Self-assessment grid

Communication skills

- Teamwork: I have worked in various types of research and education teams.
- Intercultural skills: I am experienced at working in an international dimension, collaborating with people of various nations.

Organisational / managerial skills

- I am experienced in leading and managing small and dynamic research teams.

Job-related skills

- Competent with most of Microsoft Office programs, ArcGIS, MS SQL server, R software, Visual Basic, FORTRAN
- mathematical modelling of the soil-plant-atmosphere systems
- Environmental Policy Integrated Climate (EPIC) model
- basic and applied soil science
- statistics

Digital skills

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem-solving
Proficient user	Proficient user	Proficient user	Independent user	Proficient user

Digital skills - Self-assessment grid

Driving licence AM, B

ADDITIONAL INFORMATION

Most relevant publications

- Flach, R., Skalský, R., Folberth, Ch., Balkovič, J. et al. (2020). Water productivity and footprint of major Brazilian rainfed crops – A spatially explicit analysis of crop management scenarios. *Agricultural Water Management* 233 (2020) 105996, DOI: 10.1016/j.agwat.2019.105996
- Folberth, C., Khabarov, N., Balkovič, J. et al. (2020) The global cropland-sparing potential of high-yield farming. *Nat Sustain* 3, 281–289. DOI: <https://doi.org/10.1038/s41893-020-0505-x>
- Franke, J.A, Müller, Ch., Elliott, J., Ruane, A.C., Jägermeyr, J., Balkovič, J. et al. (2020) The GGCM Phase 2 experiment: global gridded crop model simulations under uniform changes in CO₂, temperature, water, and nitrogen levels (protocol version 1.0). *Geosci. Model Dev.*, 13, 2315–2336, DOI: <https://doi.org/10.5194/gmd-13-2315-2020>
- Asseng, S., Martre, P., Maiorano, A., Rötter, R., O'Leary, G., Fitzgerald, G., Girousse, C., Motzo, R.,

- Giunta, F., Babar, M., Reynolds, M., Kheir, A., Thorburn, P., Waha, K., Ruane, A., Aggarwal, P., Ahmed, M., Balkovič, J. et al. (2019). Climate change impact and adaptation for wheat protein. *Global Change Biology* 25 (1): 155-173. DOI:10.1111/gcb.14481.
- Müller, C., Elliott, J., Kelly, D., Ameth, A., Balkovič, J. et al. (2019). The Global Gridded Crop Model Intercomparison phase 1 simulation dataset. *Sci Data* 6, 50). DOI: <https://doi.org/10.1038/s41597-019-0023-8>
 - Folberth, C., Elliott, J., Müller, C., Balkovič, J., et al (2019). Parameterization-induced uncertainties and impacts of crop management harmonization in a global gridded crop model ensemble. *PLoS ONE*, 14 (9), art. no. e0221862
 - Thomson, M.J., Balkovič, J., Krisztin, T., MacDonald, G.M. (2019). Simulated impact of paleoclimate change on Fremont Native American maize farming in Utah, 850–1449 CE, using crop and climate models. *Quaternary International*, 507, pp. 95-107.
 - Chen, J., Gong, Y., Wang, S., Guan, B., Balkovič, J. & Kraxner, F. (2019). To burn or retain crop residues on croplands? An integrated analysis of crop residue management in China. *Science of the Total Environment*, 662, pp. 141-150.
 - Folberth, C., Baklanov, A., Balkovič, J. et al. (2019). Spatio-temporal downscaling of gridded crop model yield estimates based on machine learning. *Agricultural and Forest Meteorology* 264: 1-15. DOI: 10.1016/j.agrformet.2018.09.021.
 - Liu, B., Martre, P., Ewert, F., Porter, J.R., Challinor, A.J., Müller, C., Ruane, A.C., Waha, K., Thorburn, P.J., Aggarwal, P.K., Ahmed, M., Balkovič, J. et al. (2019). Global wheat production with 1.5 and 2.0°C above pre-industrial warming. *Global Change Biology*, 25 (4), pp. 1428-1444.
 - Choruma, D., Balkovič, J., Odume, O.N. (2019). Calibration and validation of the EPIC model for maize production in the Eastern Cape, South Africa (2019) *Agronomy*, 9 (9), art. no. 494.
 - Hochrainer-Stigler, S., Balkovič, J., Silm, K. et al. (2019). Large scale extreme risk assessment using copulas: an application to drought events under climate change for Austria. *Comput Manag Sci* 16, 651–669. <https://doi.org/10.1007/s10287-018-0339-4>
 - Zhang, J., Balkovič, J., Azevedo, L.B. et al. (2018). Analyzing and modelling the effect of long-term fertilizer management on crop yield and soil organic carbon in China. *Science of the Total Environment*, 627, pp. 361-372. DOI: 10.1016/j.scitotenv.2018.01.090
 - Müller, C., Elliott, J., Pugh, T.A.M., Ruane, A.C., Ciais, P., Balkovič, J. et al. (2018). Global patterns of crop yield stability under additional nutrient and water inputs. *PLoS ONE*, 13(6), e0198748
 - Byers, E., Gidden, M., Leclere, D., Balkovič, J. et al. (2018). Global exposure and vulnerability to multi-sector development and climate change hotspots. *Environmental Research Letters* 13(5): e055012
 - Deppermann A., Balkovič J., Bundle S.C. et al. (2018). Increasing crop production in Russia and Ukraine—regional and global impacts from intensification and recultivation. *Environmental Research Letters* 13 (2): e025008. DOI:10.1088/1748-9326/aaa4a4.
 - Balkovič, J., Skalský, R., Folberth, C. et al. Impacts and Uncertainties of +2°C of Climate Change and Soil Degradation on European Crop Calorie Supply (2018) *Earth's Future*, 6, pp. 373-395. DOI: 10.1002/2017EF000629
 - Van Zelm, R., van der Velde, M., Balkovič, J. et al. (2018). Spatially explicit life cycle impact assessment for soil erosion from global crop production. *Ecosystem Services* 30, Part B, pp. 220-227. DOI: 10.1016/j.ecoser.2017.08.015
 - Williges, K., Mechler, R., Bowyer, P., Balkovič, J. (2017) Towards an assessment of adaptive capacity of the European agricultural sector to droughts. *Climate Services*, 7, pp. 47-63. DOI: 10.1016/j.cliser.2016.10.003
 - Porwollik, V., Müller, C., Elliott, J., Chryssanthacopoulos, J., Iizumi, T., Ray, D.K., Ruane, A.C., Ameth, A., Balkovič, J., et al. (2017). Spatial and temporal uncertainty of crop yield aggregations. *European Journal of Agronomy*, 88, pp. 10-21. DOI: 10.1016/j.eja.2016.08.006
 - Frieler, K., Schauburger, B., Ameth, A., Balkovič, J. et al. (2017). Understanding the weather signal in national crop-yield variability. *Earth's Future*, 5 (6), pp. 605-616. DOI: 10.1002/2016EF000525
 - Müller, C., Elliott, J., Chryssanthacopoulos, J., Ameth, A., Balkovič, J., et al. (2017). Global gridded crop model evaluation: Benchmarking, skills, deficiencies and implications. *Geoscientific Model Development*, 10 (4), pp. 1403-1422. DOI: 10.5194/gmd-10-1403-2017
 - Schauburger, B., Archontoulis, S., Ameth, A., Balkovič, J. et al. (2017). Consistent negative response of US crops to high temperatures in observations and crop models. *Nature Communications*, 8, art. no. 13931 .

- Xiong, W., Skalský, R., Porter, C.H., Balkovič, J., Jones, J.W., Yang, D. (2016). Calibration-induced uncertainty of the EPIC model to estimate climate change impact on global maize yield. *Journal of Advances in Modeling Earth Systems*, 8 (3), pp. 1358-1375.
- Folberth, C., Skalský, R., Moltchanova, E., Balkovič, J. et al. (2016). Uncertainty in soil data can outweigh climate impact signals in global crop yield simulations. *Nature Communications*, 7, art. no. 11872
- Ma, K., Liu, J., Balkovič, J., Skalský, R., Azevedo, L.B., Kraxner, F. (2016). Changes in soil organic carbon stocks of wetlands on China's Zoige plateau from 1980 to 2010. *Ecological Modelling*, 327, pp. 18-28.
- Frank, S., Schmid, E., Havlík, P., Schneider, U.A., Böttcher, H., Balkovič, J., Obersteiner, M. (2015). The dynamic soil organic carbon mitigation potential of European cropland. *Global Environmental Change*, 35, pp. 269-278.
- Zhang, X., Ermolieva, T., Balkovič, J., Mosnier, A., Kraxner, F., Liu, J. (2015). Recursive cross-entropy downscaling model for spatially explicit future land uses: A case study of the Heihe River Basin. *Physics and Chemistry of the Earth*, 89-90, pp. 56-64.
- Elshout, P.M.F., Van Zelm, R., Balkovič, J. et al. (2015). Greenhouse-gas payback times for crop-based biofuels. *Nature Climate Change*, 5 (6), pp. 604-610.
- Van Oijen, M., Balkovič, J., Beer, C. et al. (2014). Impact of droughts on the carbon cycle in European vegetation: A probabilistic risk analysis using six vegetation models. *Biogeosciences*, 11 (22), pp. 6357-6375.
- Xiong, W., van der Velde, M., Holman, I.P., Balkovič, J. et al. (2014). Can climate-smart agriculture reverse the recent slowing of rice yield growth in China? *Agriculture, Ecosystems and Environment*, 196, pp. 125-136.
- Van der Velde, M., Folberth, C., Balkovič, J. et al. (2014). African crop yield reductions due to increasingly unbalanced Nitrogen and Phosphorus consumption. *Global Change Biology*, 20 (4), pp. 1278-1288.
- Xiong, W., Balkovič, J., van der Velde, M. et al. (2014). A calibration procedure to improve global rice yield simulations with EPIC. *Ecological Modelling*, 273, pp. 128-139.
- Balkovič, J., van der Velde, M., Skalský, R. et al. (2014). Global wheat production potentials and management flexibility under the representative concentration pathways. *Global and Planetary Change*, 122, pp. 107-121.
- Balkovič, J., van der Velde, M., Schmid, E. et al. (2013). Pan-European crop modelling with EPIC: Implementation, up-scaling and regional crop yield validation. *Agricultural Systems*, 120, pp. 61-75.
- Van der Velde, M., See, L., You, L., Balkovič, J. et al. (2013). Affordable Nutrient Solutions for Improved Food Security as Evidenced by Crop Trials. *PLoS ONE*, 8 (4), art. no. e60075
- Schneider, U.A., Havlík, P., Schmid, E., Valin, H., Mosnier, A., Obersteiner, M., Böttcher, H., Skalský, R., Balkovič, J. et al. (2011). Impacts of population growth, economic development, and technical change on global food production and consumption. *Agricultural Systems*, 104 (2), pp. 204-215.

Memberships

- Societas pedologica slovacica
- The International Union of Soil Sciences (IUSS)