

# International collaboration

Some thoughts and experiences

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## AgMIP6 GLOBAL WORKSHOP REPORT

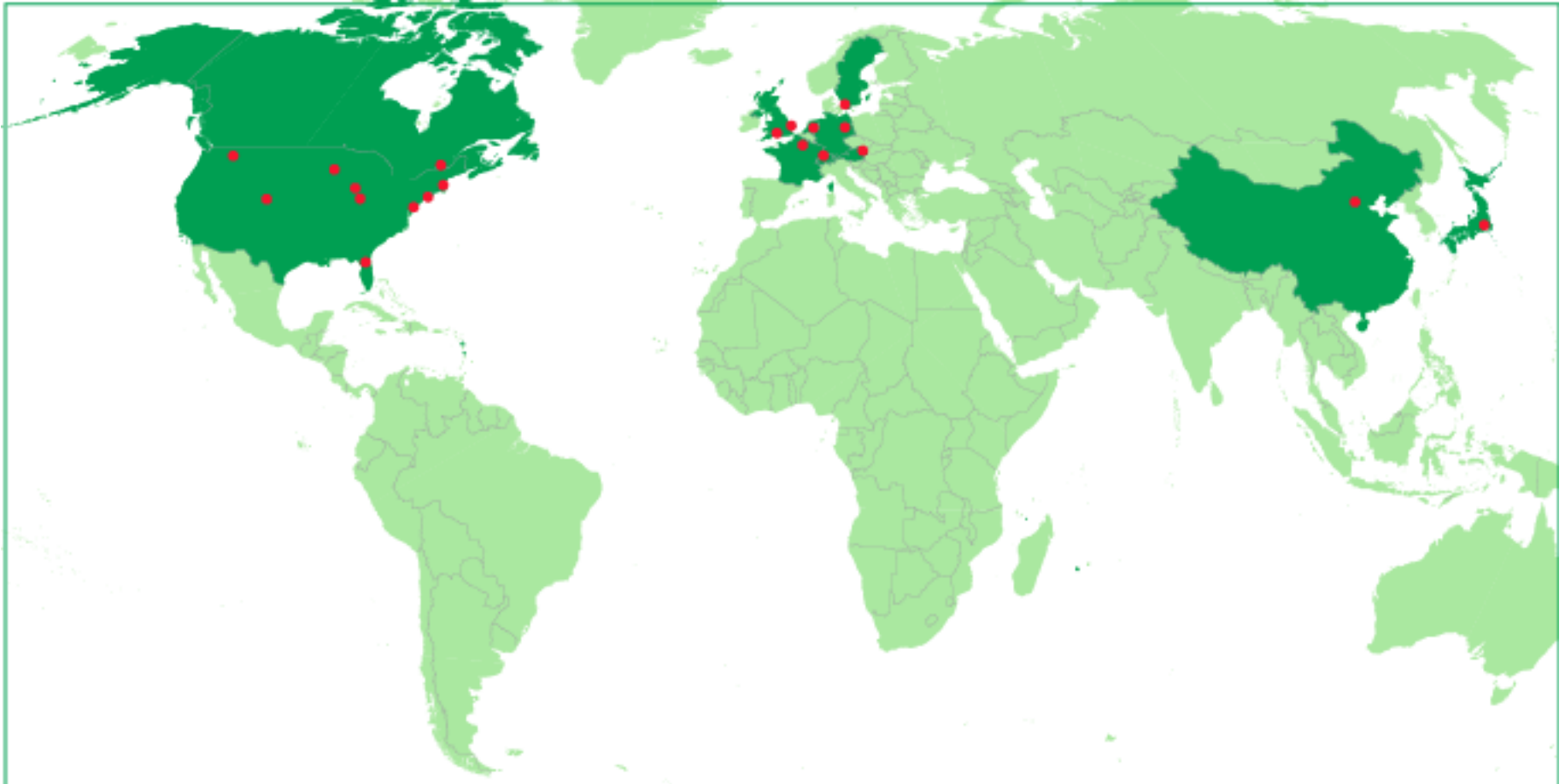


- SUMMARY
- PROGRAM
- PRESENTATIONS
- ABSTRACTS
- SPONSORS
- PARTICIPANT LIST



AgMIP6 Group Photo

# AgMIP-AgGrid groups



# AgMIP engagement

- Ag-Grid
  - Phase I (finished)
  - Phase II, model comparison and improvement
  - FACE, part III(?)
- Ozone
- Crop rotations
- Regional assessments

# Publications

[Deryng et al., 2016] 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., Khabarov, N., Olin, S., Schaphoff, S., Schmid, E., Yang, H., and Rosenzweig, C. (2016). Regional disparities in the beneficial effects of rising CO<sub>2</sub> concentrations on crop water productivity. *Nature Clim. Change*, 6(8):786–790.

[Elliott et al., 2014] Elliott, J., Deryng, D., Müller, C., Frieler, K., Konzmann, M., Gerten, D., Glotter, M., Flöke, M., Wada, Y., Best, N., Eisner, S., Fekete, B. M., Folberth, C., Foster, I., Gosling, S. N., Haddeland, I., Khabarov, N., Ludwig, F., Masaki, Y., Olin, S., Rosenzweig, C., Ruane, A. C., Satoh, Y., Schmid, E., Stacko, T., Tang, Q., and Wisser, D. (2014). Constraints and potentials of future irrigation water availability on agricultural production under climate change. *Proceedings of the National Academy of Sciences*, 111(9):3239–3244.

[Engström et al., 2016a] Engström, K., Lindeskog, M., Olin, S., Hasler, J., and Smith, B. (2016a). Impacts of climate mitigation strategies in the energy sector on global land use and carbon balance. *Earth System Dynamics Discussions*, 2016:1–43.

[Engström et al., 2016b] Engström, K., Olin, S., Rounsevell, M. D. A., Brogaard, S., van Vuuren, D. P., Alexander, P., Murray-Rust, D., and Arneth, A. (2016b). Assessing uncertainties in global cropland futures using a conditional probabilistic modelling framework. *Earth System Dynamics Discussions*, 2016:1–33.

[Lindeskog et al., 2013] Lindeskog, M., Arneth, A., Bondeau, A., Waha, K., Seaquist, J., Olin, S., and Smith, B. (2013). Implications of accounting for land use in simulations of ecosystem carbon cycling in Africa. *Earth System Dynamics*, 4(2):385–407.

[Müller et al., 2016] Müller, C., Elliott, J., Chryssanthacopoulos, J., Arneth, A., Balkovic, J., Ciais, P., Deryng, D., Folberth, C., Glotter, M., Hoek, S., Iizumi, T., Izaurralde, R. C., Jones, C., Khabarov, N., Lawrence, P., Liu, W., Olin, S., Pugh, T. A. M., Ray, D., Roddy, A., Rosenzweig, C., Ruane, A. C., Sakurai, G., Schmid, E., Skalsky, R., Song, C. X., Wang, X., de Wit, A., and Yang, H. (2016). Global gridded crop model evaluation: benchmarking, skills, deficiencies and implications. *Geoscientific Model Development Discussions*, 2016:1–39.

[Olin et al., 2015a] Olin, S., Schurgers, G., Lindeskog, M., Wärlind, D., Smith, B., Bodin, P., Holmér, J., and Arneth, A. (2015a). The impact of atmospheric CO<sub>2</sub> and N management on simulated yields and tissue C : N in the main wheat regions of western Europe. *Biogeosciences Discussions*, 12(2):1047–1111.

[Olin et al., 2015b] Olin, S., Schurgers, G., Lindeskog, M., Wärlind, D., Smith, B., Bodin, P., Holmér, J., and Arneth, A. (2015b). Modelling the response of yields and tissue C:N to changes in atmospheric CO<sub>2</sub> and N management in the main wheat regions of western Europe. *Biogeosciences*, 12(8):2489–2515.

[Pugh et al., 2016] Pugh, T., Müller, C., Elliott, J., Deryng, D., Folberth, C., Olin, S., Schmid, E., and Arneth, A. (2016). Climate analogues suggest limited potential for intensification of production of current croplands under climate change. *Nature Communications*, 7:12608.

[Pugh et al., 2015] Pugh, T. A. M., Arneth, A., Olin, S., Ahlström, A., Bayer, A. D., Goldewijk, K. K., Lindeskog, M., and Schurgers, G. (2015). Simulated carbon emissions from land-use change are substantially enhanced by accounting for agricultural management. *Environmental Research Letters*, 10(12):124008.



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- Home
- Cross-Cutting
- Crops
- Livestock
- Economy
- Regional
- Global
- Output
- About
- Events
- Jobs

Home



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- NEWS 2016-10-14
- 2016-10-05
- 2016-09-27
- 2016-09-16
- 2016-08-30
- 2016-08-24
- 2016-07-26
- Archive
- Flagship initiative

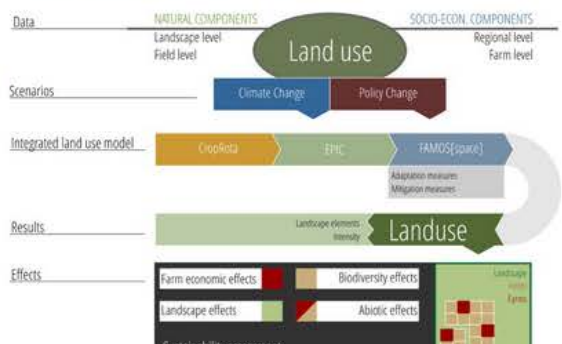
Support a new EU Flagship topic 'CC impacts along the agro-food chain' by rating it on a scale of one to five stars

Cross-Cutting	Crops	Livestock systems	Economy

## MACSUR *science pick of the month*: Climate change impacts on farm production, landscape appearance, and the environment: Policy scenario results from an integrated field-farm-landscape model in Austria

Schönhart M., Schauppenlehner T., Kuttner M., Kirchner M., Schmid E. 2016. Climate change impacts on farm production, landscape appearance, and the environment: Policy scenario results from an integrated field-farm-landscape model in Austria. *Agricultural Systems* 145, 39-50. doi: 10.1016/j.jagsy.2016.02.008

Climate change is among the major drivers of agricultural land use change and demands autonomous farm adaptation as well as public mitigation and adaptation policies. The authors used an integrated land use model (ILM) mainly combining a bio-physical model and a bio-economic farm model at field, farm and landscape levels to study adaptation and mitigation options in an Austrian landscape. They analyzed impacts of climate change and mitigation and adaptation policies on farm production as well as on the abiotic environment and biotic environment. Changes in total farm gross margins, i.e. a measure for economic performance, from three climate change scenarios for 2040 range between + 1% and + 5%. This is the case with autonomous adaptation by farmers but no policy intervention and compared to a reference situation under the current climate. Changes in aggregated gross margins are even higher if adaptation policies are in place. However, increasing productivity from climate change leads to deteriorating environmental conditions such as declining plant species richness and landscape appearance. It has to be balanced by mitigation and



# Other initiatives

- ISIMIP, Inter-Sectoral Impact Model Intercomparison Project
  - AgGrid
- CMIP, Coupled Model Intercomparison Project
  - LUMIP, Land-Use
  - Fire-MIP
- Ecology?