

The Institute of Agrophysics, Polish Academy of Sciences, Department of Metrology and Modelling of Agrophysical Processes announces recruitment for **PhD student** at the Doctoral School of Quantitative and Natural Sciences. PhD student will receive a scholarship (48 months) in the amount of PLN 5,000 / month (gross).

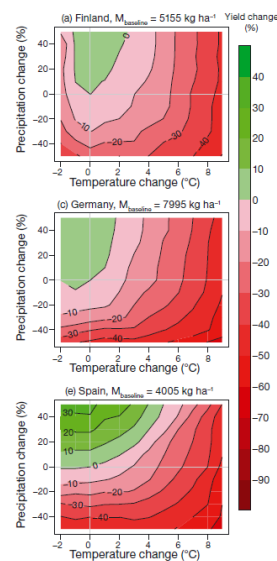
Proposed topic of PhD thesis:

Biophysical modelling of wheat and maize production in Europe in the context of agent based approach.

- The PhD thesis at the Department of Metrology and Modelling of Agrophysical Processes, Institute of Agrophysics, Polish Academy of Sciences in Lublin under supervision of dr hab. Jaromir Krzyszcak (j.krzyszcak@ipan.lublin.pl) is planned for 48 months (from 01.10.2020).
- The PhD thesis will be financed under the H2020 "AGRICORE" project. The scholarship is guaranteed for 48 months.
- Language of PhD course and thesis: English or Polish.
- The PhD candidate should meet the minimum skill standard in physics, mathematics and informatics. Obtaining Master Degree before the contract starting date is required.
- For application details (documents, procedures, deadlines) please go to website of [the Doctoral School of Quantitative and Natural Sciences](#).

Keywords: *climate change, modelling of plant production, adaptation, wheat, corn, greenhouse gases, agent modelling*

Individual climate projections are not fully consistent between each other, they provide a range of climatic responses, from which it can be concluded that future climate will have rather adverse effects on crop production in many regions of the world, with the risk of severe impacts increasing after 2050. To prevent or reduce such negative impact field-level adaptation measures will be crucial to implement. To evaluate the impact of various adaptation options on crop production levels process-based biophysical crop models are often used. The topics of research proposed as part of the doctoral dissertation will include examining of behaviour of a chosen model (or multiple models) under current and future climate in order to characterise the type of responses to environmental conditions and to assess climate change impacts on wheat and maize production across a large range of foreseeable changes in climate, adaptation measures and regions in Europe. Additional emphasis will be placed on modelling of GHG emissions from these crops. This will allow not only to provide recommendations useful for farmers to maintain levels of their yield, but also to allow them sustainable use and retain of nutrients to reduce agricultural greenhouse gas emissions and water pollution. Focus will also be put on including factors not yet explored in such research, namely on including or improving the description of the interactions between crops and other flora and fauna species to assess crop yield losses caused by diseases and on using agent-based modelling to allow interactions between farms.



References

1. Ruiz-Ramos M., Ferrise R., Rodríguez A., Lorite I.J., Bindi M., Carter T.R., Fronzek S., Palosuo T., Pirttioja N., Baranowski P., Buis S., Cammarano D., Chen Y., Dumont B., Ewert F., Gaiser T., Havlinka P., Hoffmann H., Höhn J.G., Jurecka F., Kersebaum K.C., Krzyszcak J., Lana M., Mechiche-Alami A., Minet J., Montesino M., Nendel C., Porter J., Ruget F., Semenov M.A., Steinmetz Z., Stratonovitch P., Supit I., Tao F., Trnka M., de Wit A., Rötter R.P. (2018): Adaptation response surfaces for managing wheat under perturbed climate and CO₂ in a Mediterranean environment. *Agricultural Systems*, 159, 260-274. <https://doi.org/10.1016/j.agsy.2017.01.009>

Do not hesitate to contact with dr hab. Jaromir Krzyszcak (j.krzyszcak@ipan.lublin.pl) with any questions related to the proposed PhD.