


## Tools – The SUPREMA model family

### CAPRI

CAPRI is a multi-commodity static spatial global partial equilibrium model for ex-ante impact assessment of agricultural, environmental and trade policies with a focus on the EU. The model provides with estimates of a wide range of agricultural activities and commodities. It simulates values for the major EU agri-food markets, markets of citrus fruits, permanent crops, vegetables, apples and tobacco, for such activities as palm oil, tea and coffee trade, for a range of GHG emissions, for variables related to CAP policy such as direct payments, as well as for areas of intensive and extensive grassland, fallow land and set aside, numbers of high and low intensity livestock and young animals. All of the CAPRI commodity markets and activities, following the general economic theory of demand, supply and trade, interact at the supply and demand sides, as well as trade. A great number of activities and commodities covered in CAPRI lead to a great number of inter-dependencies in the model, and thus, high level of model complexity.

Due to its static partial equilibrium nature, CAPRI is solved for the market clearing prices at the targeted simulation year. This solution depends, among else, on the two types of values: i) values of parameters of the behavioural equations representing various agricultural activities and markets that are calibrated to the base year values of the CAPRI database, and ii) the so-called “support” points which, depending on the activity/commodity, represent expert knowledge or values of the external baseline. Calibration of parameters of the behavioural functions follows a CAPRI-specific approach, which implies the interaction of two modules: supply and market. The supply module consists of nonlinear programming models representing farmers’ decisions. The market module is a deterministic partial equilibrium model. The supply module operates at NUTS2 level, and the market module at country and regional aggregates levels. The interaction of the supply and market modules results in optimized values of farming activities and market values at the clearing prices. The “support” points act as references in the calibration and baseline generation processes, directing the simulation outcome towards these values.

The CAPRI database is generated from two major sources: EUROSTAT and FAOSTAT. Due to the level of details required by CAPRI, the original EUROSTAT and FAOSTAT values are subject to the balancing process and are used for calculation of additional required coefficients. This results in some differences between the original statistical values and the values of the CAPRI database. CAP and environmental policies are included in CAPRI model as exogenous variables. CAPRI is an Armington bilateral trade model. It simulates global trade flows among countries and regional blocks. As a result, the EU domestic market prices are functions of the EU farm gate and import prices (the source for this section is Britz and Witzke 2014).



CAPRI model version used for generation of the current 2030 and 2050 baselines is of April 2020.

Among else, it includes:

- only for 2030 baseline: calibration to the MTO2019,
- only for 2050 baseline: using of the 2050 GLOBIOM baseline for the land use projections,
- endogenous manure trade module,
- update of regional and national database until 2016/2017 and some other series,
- update of exogenous input file for biomass production and
- update of the farm practices and environmental constraints.

References:

Britz, W., P. Witzke (2014). CAPRI model documentation 2014. Online: <https://www.capri-model.org>.

Blanco, M., P. Martinez, P. Witzke, M. van Leeuwen, R. Jongeneel, P. Salamon, S. Frank, P. Havlík, J. Barreiro-Hurlé, M. L. Rau, H. van Meijl, A. Tabeau, J. P. Lesschen (2019). Deliverable 1.5: Documentation of the SUPREMA model tools. Project Support for Policy Relevant Modelling of Agriculture (SUPREMA). Online: <https://www.suprema-project.eu>.