

HFFA Research GmbH

**Methodological Paper  
Modelling agricultural markets  
with the HFFA-Model**

Sophia Lüttringhaus and Matti Carlsburg





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## List of abbreviations

- EU – European Union
- FAO – Food and Agriculture Organization of the United Nations
- FASOMGHG – Forest and Agricultural Sector Optimization Model with Greenhouse Gases
- HFFA-Model – Name of the multi-market model developed by the HFFA Research GmbH
- KTBL – Association for Technology and Structures in Agriculture (German: Kuratorium für Technik und Bauwesen in der Landwirtschaft e.V.)
- MMM – Multi-market model
- SWOPSIM – Static World Policy Simulation modeling framework
- USDA – United States Department of Agriculture



### 3 Conclusion

Market models, even if they are comprehensive, display with the help of mathematical tools a simplified version of the actual processes in markets and overall economies. Nevertheless, such models are extremely helpful to analyze the impacts of political or societal decisions within the restrictions of today's computing capacities. Per definition, models only simulate certain processes of the "real world" and thus, focus on one specific aspect or work with certain assumptions to be able to yield results with large data sets and restrictions. Therefore, they are not a tool for economic forecasting, but they give an indication of how certain decisions might affect a market and give hints what decision makers should bear in mind. Especially partial equilibrium models such as the HFFA-Model, are only valid under the presumption that they focus on one sector, in our case the agricultural sector. Hence, other economic sectors are ignored and the model cannot provide insights for these.

Furthermore, there are methodological restrictions. Using Cobb Douglas functions implies that the model's own-price and cross-price elasticities are constant. This might not fully reflect observable realities on markets, as elasticities tend to change when other market conditions shift. Therefore, it is important to point out that the explanatory power of models is limited to a certain degree (Piermartini and Teh, 2005).

Nevertheless, market models such as the HFFA-Model provide a very good opportunity to study the market effects of certain decisions. But these effects go further than shifts in supply, demand, trade flows and prices of agricultural commodities. For our purposes we will additionally analyze the direct or indirect changes in global land use, water consumption, greenhouse gas emissions and biodiversity.

To model these socio-ecologic changes, HFFA Research GmbH developed several *satellite or add-on models*, which can be combined to the general HFFA-Model explained here. These satellite models are used to explore research questions which go beyond pure market economics. Such a sustainability assessment is more and more important in the actual scientific and societal debates on sustainable nutrition and production. A detailed explanation of these extra models will be published.



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