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ÖSTERREICHISCHES INSTITUT FÜR WIRTSCHAFTSFORSCHUNG
AUSTRIAN INSTITUTE OF ECONOMIC RESEARCH

BOKU
Universität für Bodenkultur Wien
University of Natural Resources
and Applied Life Sciences, Vienna

Adaptation and mitigation in Austrian cattle and milk production - scenarios for 2050

preliminary results

klima+ energie fonds

Franz Sinabell (co-ordination)
Karin Heinschink, Mathias Kirchner
Eric Audsley, Andreas Schaumberger, Vojko Danieu, Erwin Schmid, Barbara Amon, Martin Schönhart, Norbert Röder, Petra Salamon, Adrian Williams

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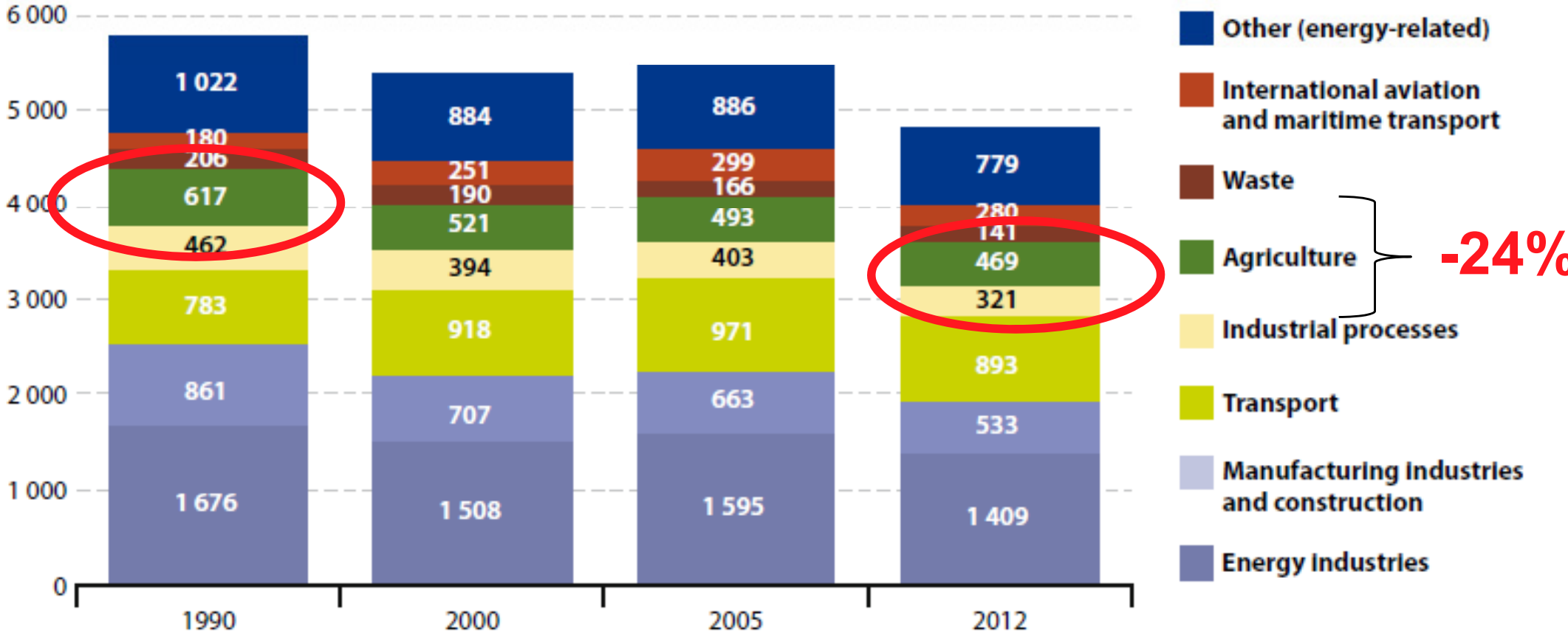
overview

- context and resarch questions
- methodological structure
- selected results
- interaction with scientifc community / stakeholders
- main challenges to tackle
- outlook

context and research questions

sector specific development

Figure 3.4: Greenhouse gas emissions by sector, EU-28, 1990, 2000, 2005 and 2012
(Million tonnes of CO_2 equivalent)



Source: European Environment Agency, Eurostat (online data code: tsdcc210)

EU climate policy comittment

For the EU, the Paris agreement needs to include a clear long-term emissions reductions goal, robust transparency and accountability rules to lend credibility to countries' targets, and a dynamic review mechanism to improve countries' targets over time

Environment Council 18 Sept 2015:

... the global average temperature needs to be kept below 2°C above the pre-industrial level ...

... global GHG emissions need to ... be reduced by at least by 50% by 2050 compared to 1990 ...

EU „Intended Nationally Determined Contribution" 6 March 2015:

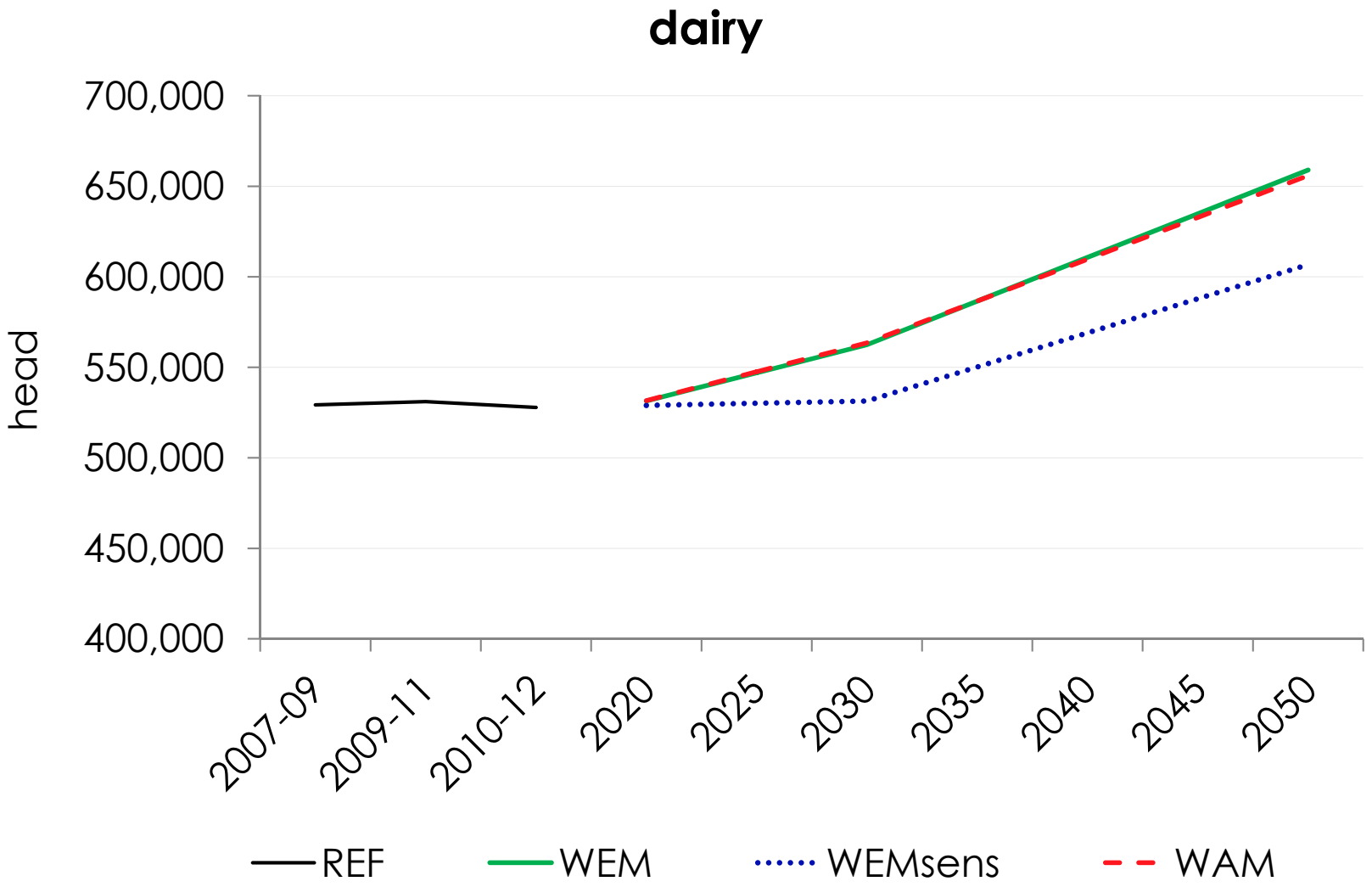
„ ... BINDING target of at least 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990 ..."

observation and forecast
GHG emission – total and agriculture

	1990	2000	2005	2010	*2020*	*2030*	2005/30
			Mt CO_2 eq				%
total GHG emissions	**5,680**	**5,177**	**5,224**	**4,786**	***4,159***	***3,875***	**-26**
agriculture	**569**	**481**	**455**	**442**	***446***	***453***	**0**
land use, land-use change and forestry	-260	-311	-321	-314	*-245*	*-249*	-22
share of agriculture in %	10	9	9	9	*11*	***12***	

Source: 2020 and 2030: EEA, 2015 Table A.21; 1990 to 2010: EEA green house gas viewer (11 Dec. 2015)

forecast for Austria: dairy herd



Source: Sinabell, Schönhart and Schmid, 2015

mitigation options

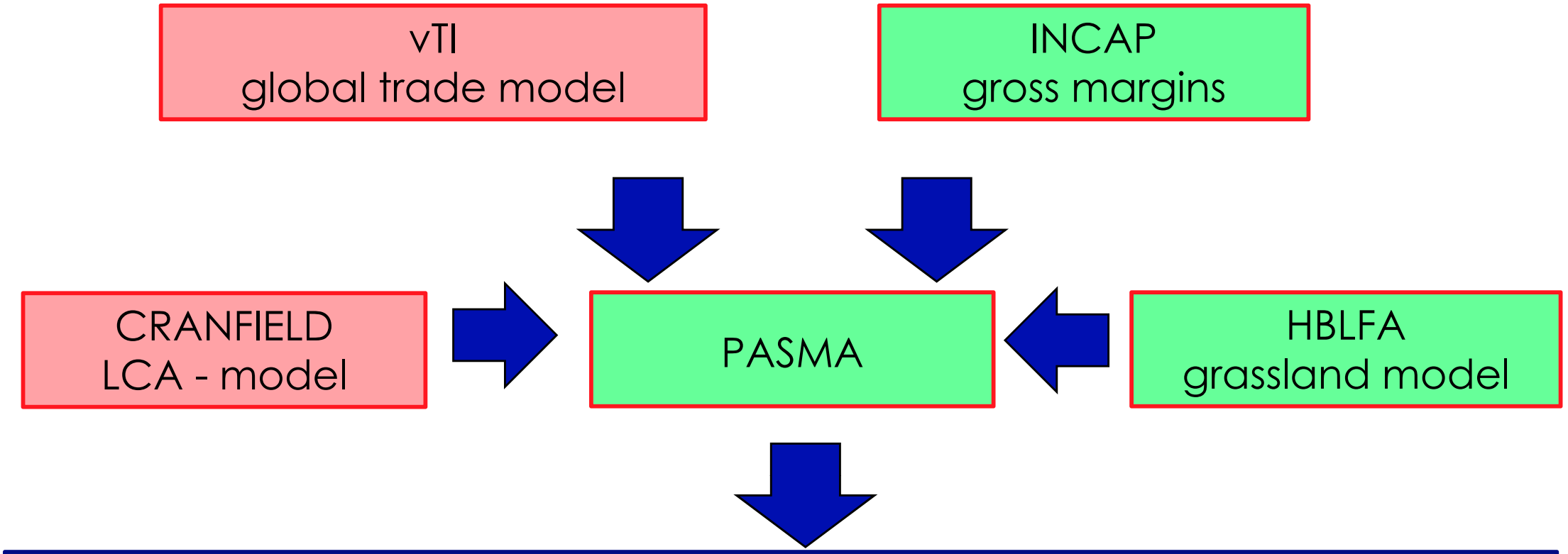
measures	description
Increase in lactation dairy cows	Increases number of lactations per cow; as a consequence reduced demand of heifers for replacement
Increase in efficiency of livestock	Increases yields of all livestock products except for dairy; assumed to be result of breeding and better (herd) management; no additional feed demand and costs assumed; milk increases are covered by index milk yield per cow
Increase in quality grassland/silage	Increases protein and energy content of all forage products, i.e. forage from permanent and temporary grasslands and silage maize; assumed to be the result of improved crops, better management; no additional costs assumed
Feeding efficiency increase	Reduced protein and energy demand of pig production; no changes in costs and manure production assumed
Reduction of losses manure nutrients	Reduced loss of nitrogen from all livestock manure; assumed to be the result of better management free of additional costs
Reduction of losses of fertilizer	Reduced loss of nitrogen from all mineral fertilizer; assumed to be the result of better management and spreading equipment free of additional costs
Additional energy crops	Model is forced to increase area of short rotation forestry
Tax on mineral fertilizer	Costs of mineral fertilizers are increased

what we know and what might happen

- GHG burden of milk production is relatively low in Austria
- various measures available to reduce it further
  - more efficient cows and more feed concentrates
  - reduction of numbers of cows / cattle
- however, consider
  - incomes will be negatively affected (comparative advantage)
  - consumers not affected → no change of consumption
  - reduction of domestic production might be substituted by less GHG efficient products → leakage
- effect on global GHG emission due to national action

methodological approach

quantitative modeling framwork



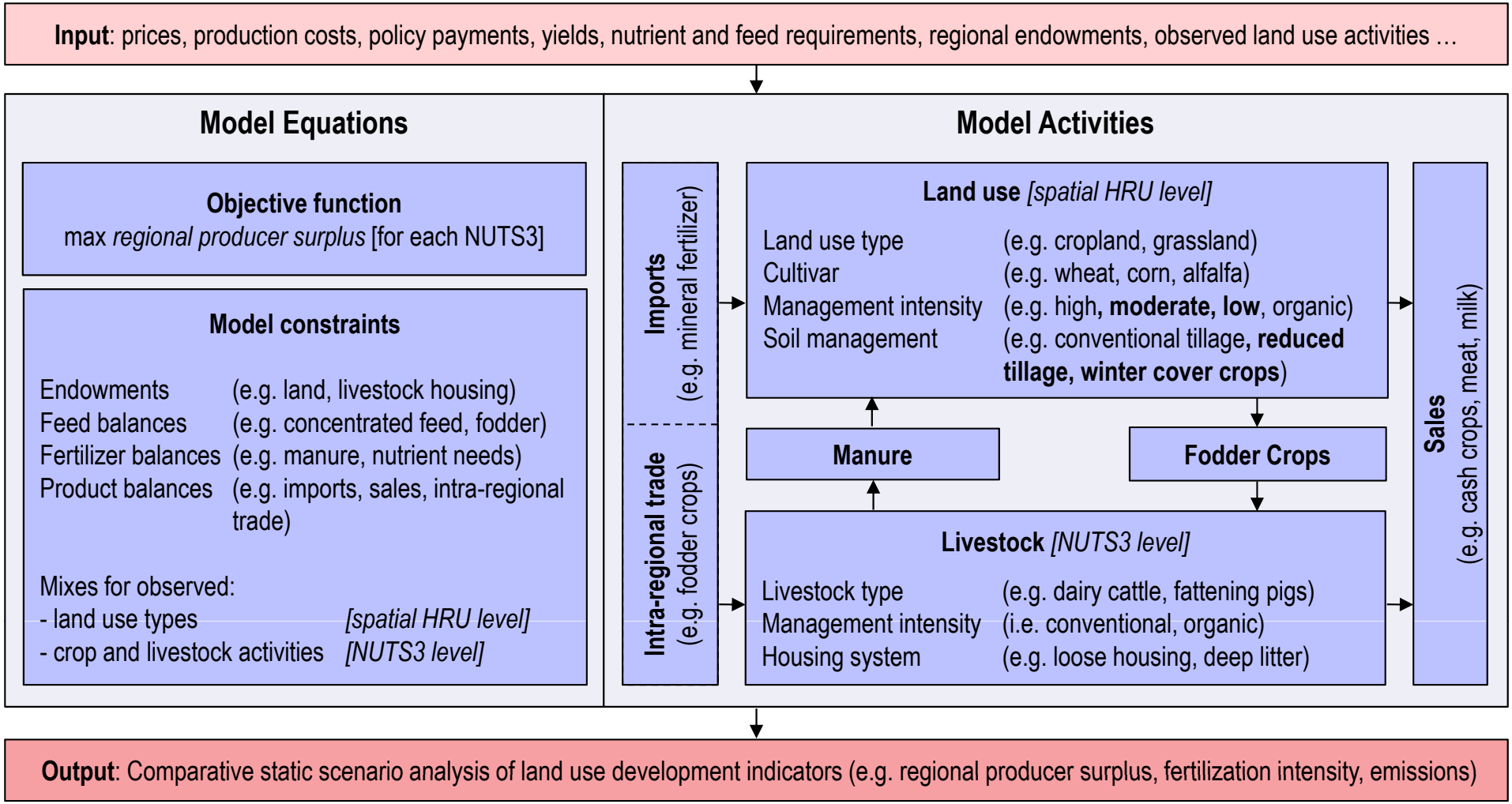
impact Indicators assuming no change in consumption patterns

gross value added, employment, CO_2equ-emission, nutrient balances

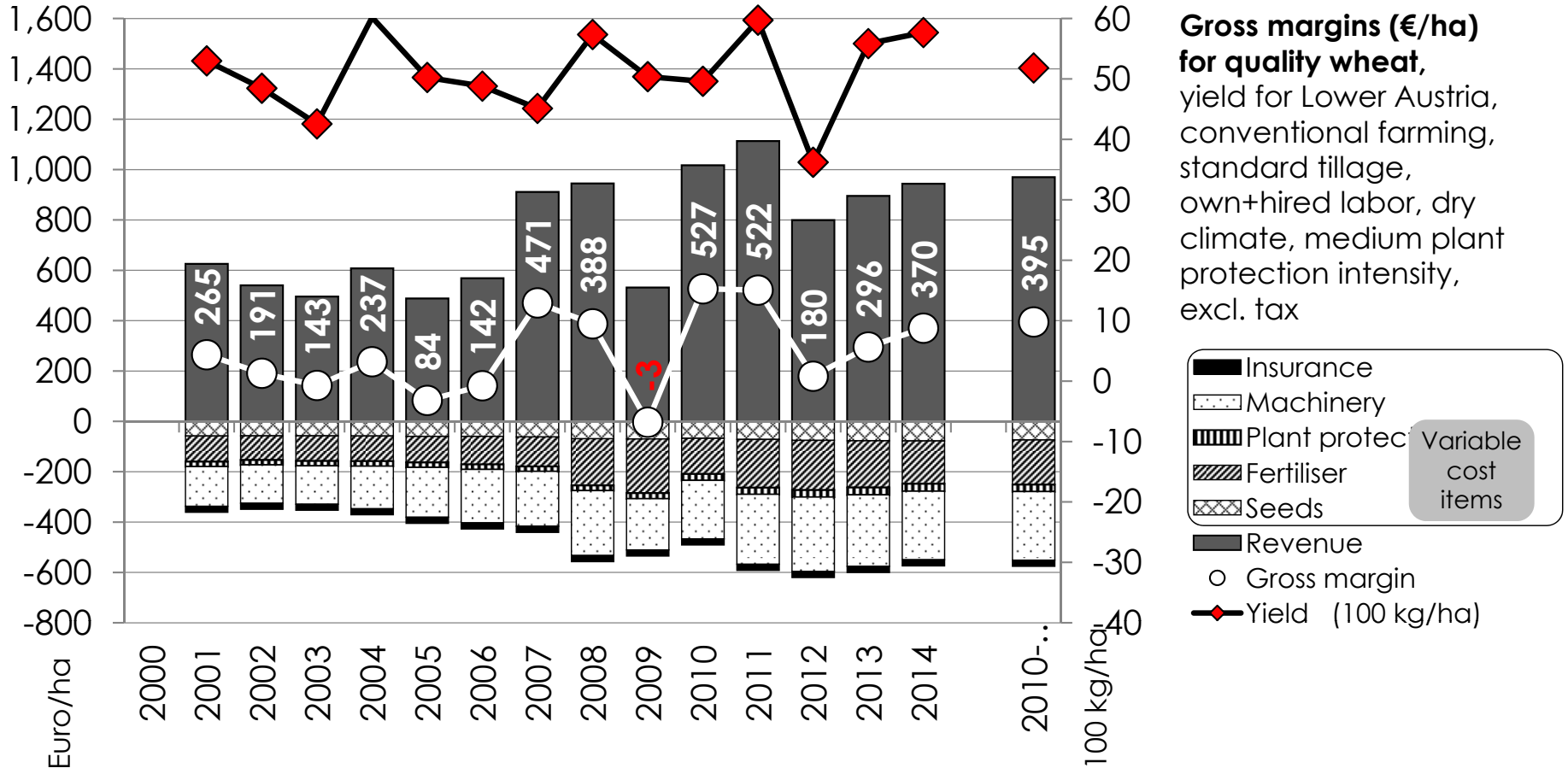
methods, models, preliminary results

PASMA

Ex-Post-Evaluierung PASMAgrid



input parameters: cost data (example wheat in Gänserndorf)

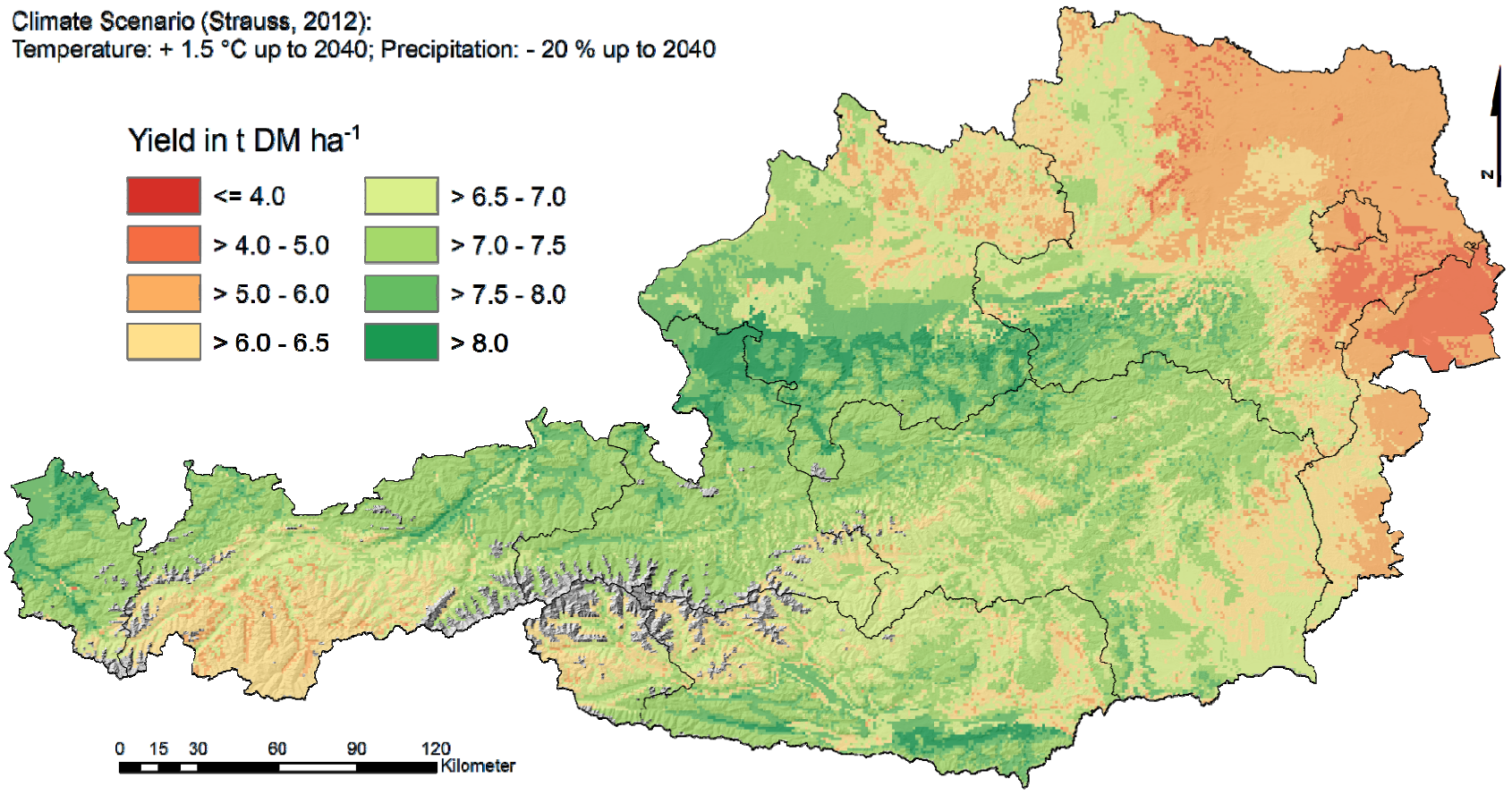


input parameters: yield of grassland

Grassland Yield of 2-, 3- and 4-Cut Management (Ø 2031 - 2040)

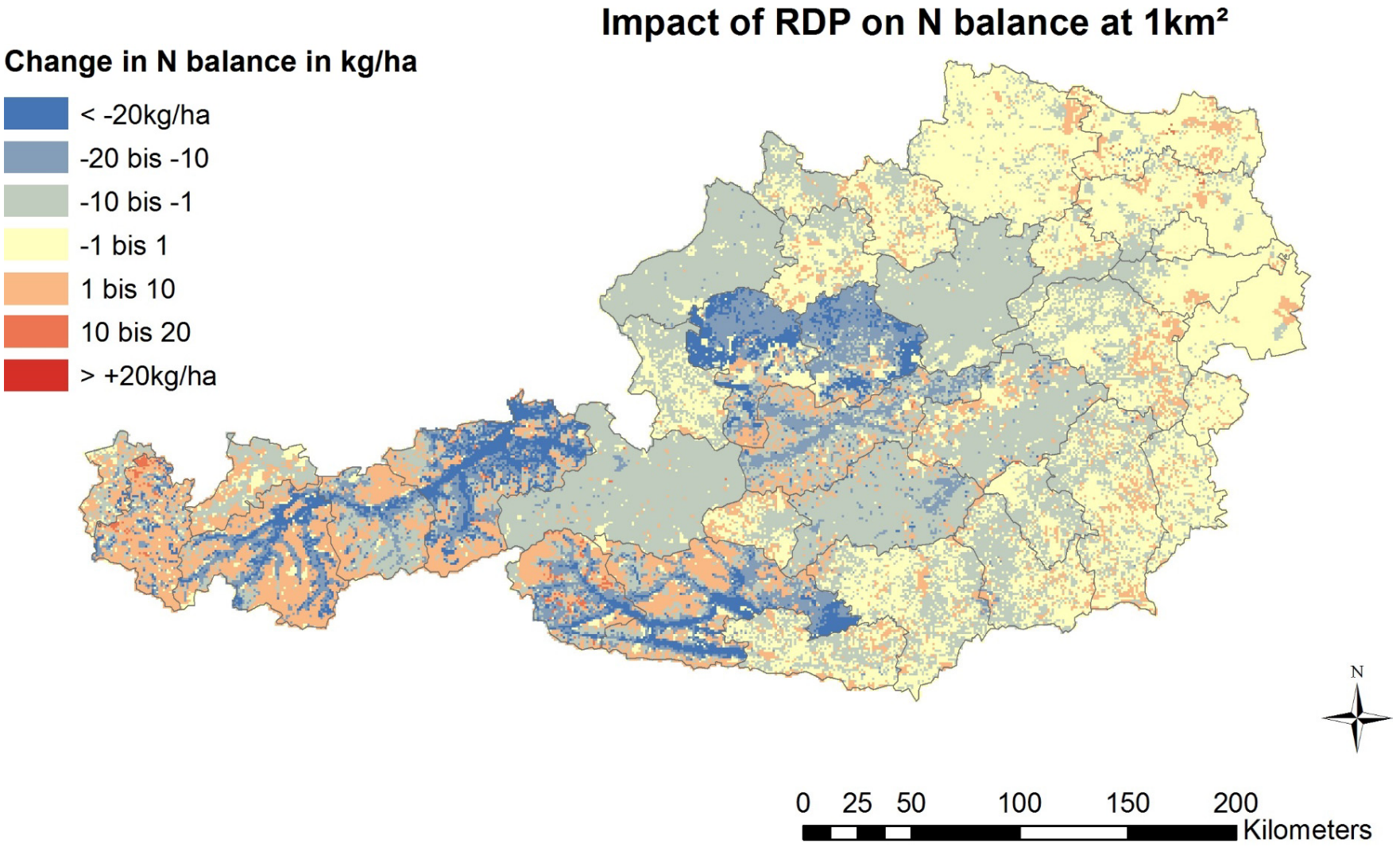
*Based on drought sensitive model **Spatial GRAM**, applied on total area (Schaumberger, 2011)*

Climate Scenario (Strauss, 2012):
Temperature: + 1.5 °C up to 2040; Precipitation: - 20 % up to 2040



Data: BOKU, BMLFUW - ETRS 1989 LAEA
Layout: Andreas Schaumberger / Oktober 2015

policy experiment with PASMAgrid effect agri-environmental measures



14.12.2016

interaction with scientific community and stakeholders

ways and methods of interaction

- presentation of preliminary results and interaction with stakeholders
- course on LCA in Vienna for scientific community (participants from 5 countries)
- strenghtening of co-operation within Austrian research teams (ÖGA) and extension services (chamber of agriculture)
- integration in international networks (MACSUR)

main challenges

still to tackle

challenges still to tackle

- expectation – stakeholders
  - projections into longer future – how to communicate
  - how costly is mitigation – still information needs
  - what are really useful recommandations
  - how to disseminate the data and results
  - it is necessary to overcome sectoral views (e.g. land use change and agricultural production)
- scientific output
  - most impact likely with a methodological detail

selected research output so far …

- Larcher, M., M. Schönhart, E. Schmid und St. Vogel, 2015,Intensivierungspläne österreichischer MilchproduzentInnenangesichts der auslaufenden Milchquotenregelung 2015 – ein empirisches Modell zur Erklärung von Verhaltensintentionen. German Journal of Agricultural Economics, (3) 148-162.
- Mitter, H., E. Schmid, F. Sinabell, 2015, Integrated modeling of protein crop production responses to climate change and agricultural policy scenarios in Austria. Climate Research, Vol. 65: 205–220, 2015, doi: 10.3354/cr01335
- Schönhart1, M. and I. Nadeem , 2015, Direct climate change impacts on cattle indicated by THI models. Advances in Animal Biosciences (2015), 6:1, pp 17–20 © The Animal Consortium 2015. doi:10.1017/S2040470014000430
- Heinschink, K., F. Sinabell, Ch. Tribl, 2016, Decomposition of variable costs in the Austrian agricultural production. Jahrbuch der ÖGA - Band 26.
- Schönhart, M., F. Sinabell, 2016, Scenarios for the Austrian agricultural sector until 2025 considering greenhouse gas mitigation. Jahrbuch der ÖGA - Band 26 (Annals of the Austrian Association of Agricultural Economists Vol. 26).
- Heinschink, K. Ch. Tribl and F. Sinabell, 216, Decomposition of production costs of crop, forage and livestock production in Austria, International Scientific Conference Agrarian Perspectives XXIV. and 25th Annual Conference of the Austrian Society of Agricultural Economics. Global Agribusiness and the Rural Economy, 16th - 18th September 2015, Czech University of Life Sciences Prague, Czech Republic (together with K. Heinschink and Ch. Tribl; presented by K. Heinschink).
- Sinabell, F., K. Heinschink, K. Mechtler, H. Mitter, E. Schmid, A. Zimmermann, 2016, Yield potentials and yield gaps of soybeans in Austria – a biophysical and economic assessment. Poster presented at International Crop Modeling Sympsoium ICropM 2016, Berlin, 16 March 2016, Berlin.

- Sinabell, F., K. Heinschink, K. Mechtler, H. Mitter, E. Schmid, A. Zimmermann, 2016, Yield potentials and yield gaps of soybeans in Austria – a biophysical and economic assessment. Poster presented at International Crop Modeling Sympsoium ICropM 2016, Berlin, 16 March 2016, Berlin.

- Heinschink, K., F. Sinabell, Ch. Tribl, 2016, Index-based Costs of Agricultural Production' (INCAP) – a new risk analysis tool for Austria. Paper prestented at the Agricultural Economics Society Annual Conference 2016, 4 April 2016, University of Warwick, England.
- Sinabell, F., Herausforderungen für die Österreichische Landwirtschaft. In: 5. Umweltökologischen Symposium "Landwirtschaft 2030 – Auswirkungen auf Boden, Wasser und Luft", Bericht HBLFA Raumberg-Gumpenstein, 2016, 11-14.

expected research outputs for the coming months …

- Sinabell, F, Schönhart, M., K. Heinschink. Ch. Tribl, E. Schmid 2016, Workshop on Dairy and Cattle Production in Austria 2050. Annual Meeting of the AustrianAgricultural Association, Sept. 15-16, Vienna.
- Sinabell, F. B. Amon, E. Audsley, K. Heinschink, N. Röder, P. Salamon, Schönhart, M., E. Schmid , A. Williams, 2016, Life Cycle Assesment Implications of Cattle and Restricting Dairy and Cattle Production in Austria. Annual Meeting of the AustrianAgricultural Association, Sept. Sept. 15-16, Vienna.
- Heinschink, K., F. Lembacher, F. Sinabell, Validation of index based gross margins for crop production in Austria. Annual Meeting of the AustrianAgricultural Association, Sept. Sept. 15-16, Vienna.
- Heinschink, K., F. Sinabell, and Ch. Tribl, 2016, Index based gross margins for crop and livestock production in Austria. Annual Meeting of the German Association of Agricultural Economics, Bonn, 28th to 30the Sept. 2016 .
- Heinschink, K., and F. Sinabell, 2017, The economic cost of eco-system provision by agriculture. Paper submitted to Environmental Modeling and Software.
- Sinabell, F. B. Amon, E. Audsley, M. Kirchner, K. Heinschink, N. Röder, P. Salamon, Schönhart, M., E. Schmid , A. Williams, 2017, Implications of Cattle and Restricting Dairy and Cattle Production in Austria – implications from a live cycle assesment point of view. To be submitted to the Journal of Environmental Management