

## CV

Maria Bystricky

Current position(s): Senior researcher

Academic age: 8 year(s) 5 month(s)

## Education

Degree	Organisation	Duration
PhD / Dr.: Life cycle assessment of energy crops	Technical University of Munich, DE Chair of Wood Science	07.2007 - 10.2015 8 year(s) 4 month(s)
Agricultural biologist	University of Hohenheim, DE Faculty of Agricultural Sciences	10.2001 - 03.2007 5 year(s) 6 month(s)

## Employment

Role	Organisation	Duration
Senior researcher	Forschungsanstalten Agroscope - AGS, CH Forschungsgruppe Ökobilanzen	06.2012 - Present 12 year(s) 8 month(s)
Research associate / Scientific collaborator	Bavarian State Research Center for Agriculture, DE Arbeitsgruppe Technikfolgenabschätzung	04.2012 - 05.2012 2 month(s)
Research associate / Scientific collaborator	Technical University of Munich, DE Chair of Wood Sciences	07.2007 - 12.2011 4 year(s) 6 month(s)

## Major achievements

### Achievement 1

#### Life cycle assessment of agricultural products, farms, and production systems

Throughout my time at Agroscope and at TU München, I evaluated agricultural production systems via LCA. I started out with the environmental impacts of energy crops compared to fossil energy sources during my PhD, and continued by comparing the impacts of imported food and feed products with those of Swiss products. I also analyzed the environmental impacts of about 50 farms in Austria that belonged to different farm types (dairy, cattle and pig fattening, arable crops, specialty crops) and farming systems (organic, conventional). I led a project that developed a system to reduce the climate change effect of about 10,000 Swiss farms by 10% through implementing greenhouse gas mitigation measures on farms. In the course of this project, we did a detailed LCA on 30 pilot farms and established a system on how their LCA results could be extrapolated to all 10,000 farms; we developed the catalogue of mitigation measures and their climate mitigation potential; and we monitored which GHG mitigation measures the participating farms implemented and how much their climate change effect could actually be reduced.

[1] journal-article. Bystricky, M., Knödseder, T., Weber-Blaschke, G., Faulstich, M. (2010): Comparing environmental impacts of electricity, heat and fuel from energy crops: Evaluating biogas utilization pathways by the basket of benefit methodology. *Engineering in Life Sciences* 10(6):570-576. [DOI](#).

[2] report. Bystricky, M., Alig Ceesay, M., Nemecek, T., Gaillard, G. (2014): Ökobilanz ausgewählter Schweizer Landwirtschaftsprodukte im Vergleich zum Import. *Agroscope Science*, 2, 2014, 1-177. ISBN: 978-3-905667-87-5. [Open Access](#).

[3] report. Furrer C., Stüssi M., Bystricky M. (2021): Umweltbewertung ausgewählter Klimaschutzmassnahmen auf Landwirtschaftsbetrieben. *Agroscope Science*, 121, 2021, 1-67. [DOI](#). [Open Access](#).

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### Achievement 2

#### Method development and data for life cycle assessment of agriculture

I have contributed to develop life cycle inventories for agricultural products. In 2023, I contributed particularly to compiling several hundred datasets that represent crop and animal production in different intensity levels in Switzerland, part of which will be submitted to the ecoinvent database in 2024 and 2025. But also during the whole of my time at Agroscope I have contributed datasets to Agroscope's in-house SALCA database.

In a former project, I was responsible to adapt the SALCA models for direct field and animal emissions to conditions in Austria. I also contributed to the general method development conducted in our research group. In recent years, I had a particular focus on biodiversity methods. In particular, I assessed the impact of domestic production on biodiversity compared to imports, using the SALCA-biodiversity method for detailed analysis of impacts of agricultural management activities for the foreground, combined with more generic methods for the assessment of background processes or imported products.

- [1] report. Bystricky M., Nemecek T., Krause S., Gaillard G. (2020): Potenzielle Umweltfolgen einer Umsetzung der Trinkwasserinitiative. *Agroscope Science*, 99, 2020, 1-221. [DOI](#). [Open Access](#).
- [2] report. Furrer C., Stüssi M., Bystricky M. (2021): Einfluss von Import-Herkunftsändern und Nahrungsmittelverlusten auf die Umweltwirkungen des Schweizer Agrarsektors. *Agroscope Science*, 114, 2021, 1-29. [DOI](#). [Open Access](#).
- [3] journal-article. Nemecek T., Roesch A., Bystricky M., Jeanneret P., Lansche L., Stüssi M., Gaillard G., 2023. Swiss Agricultural Life Cycle Assessment: A method to assess the emissions and environmental impacts of agricultural systems and products. *Int. J LCA* 29:433-455. [DOI](#).
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### Achievement 3

#### Life cycle assessment of the agri-food sector

In recent years, this has become a major focus of my research. I have led several research projects in which I analyzed the environmental impacts of the entire Swiss agri-food sector, taking into account both domestic production and imports of food and feed. A major outcome has been time and again that improvements in domestic biodiversity and other environmental impacts without shifting these impacts abroad can only be achieved if consumption patterns of the Swiss population change towards more plant-based foods.

I analyzed the impact of measures to reduce water pollution with nutrients and pesticides in Switzerland on the environment. Such goals can only be achieved if Swiss agriculture becomes less intensive, which results in lower productivity and therefore a shift of environmental impacts abroad, if consumption patterns remain the same.

For these projects, we combined the agent-based economic model SWISSland, which can simulate the behavior of farmers under different direct payment regimes, with life cycle assessment. That way, we were able to carry out ex-ante analyses of agricultural production scenarios.

- [1] journal-article. Bystricky, M., Bretscher, D., Schori, F., Mack, G. (2023): Reducing feed-food competition with direct payments? An ex-ante assessment of economic and environmental impacts. *Q Open* 3(3):1-25. [DOI](#).
- [2] report. Bystricky, M., Nemecek, T., Gaillard, G. (2017): Gesamt-Umweltwirkungen als Folge von Gewässerschutzmassnahmen im Schweizer Agrarsektor. *Agroscope Science*, 50, 2017, 1-67. ISBN: 978-3-906804-38-5. [Open Access](#).
- [3] journal-article. Bystricky, M., Furrer, C., Ritzel, C., Nemecek, T., Gaillard, G. (2024): Effects of water protection measures in agriculture on the environmental impacts of the Swiss food sector. *Journal of Cleaner Production* 466, 10 August 2024, 142819. [DOI](#).
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