



# Using DMDU methods to explore the lifestyle change uncertainty in integrated assessment models

Sibel Eker

Climate Interactive and IIASA

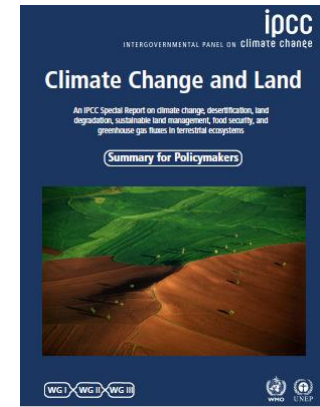
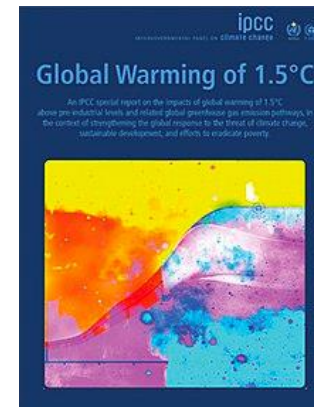
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*12 November 2020*

*Annual Meeting of the Society for Decision Making under Deep Uncertainty*



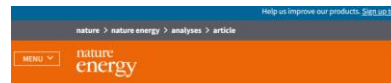
# Lifestyle change



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## Lifestyles Need to Change Radically, WRF Conference Concludes

February 28, 2019 | In [Headline Event, WRF Events](#)



Analysis | Published: 04 June 2018  
**A low energy demand scenario for meeting the 1.5°C target and sustainable development goals without negative emission technologies**

Amal Ghosh, Charlie Wilson, Nuno Bento, Benigna Boza-Kos, Volker Frey, David L. McCollum, Naveenita D. Rao, Keyvan Riahi, Joon Roggi, Simon De Sterck, Jonathan Collins, Stefan Frank, Oliver Fricko, Fei Guo, Matt Golden, Peter Havik, Daniel Huggemann, Gregg Kiewit, Peter Rafaj, Wolfgang Schoepf & Hugo Vallin

Nature Energy **3**, 515–527 (2018) | [Download Citation](#)  
**3945** Accesses | **62** Citations | **501** Altmetric | [Metrics](#)



Article | Published: 10 October 2018  
**Options for keeping the food system within environmental limits**

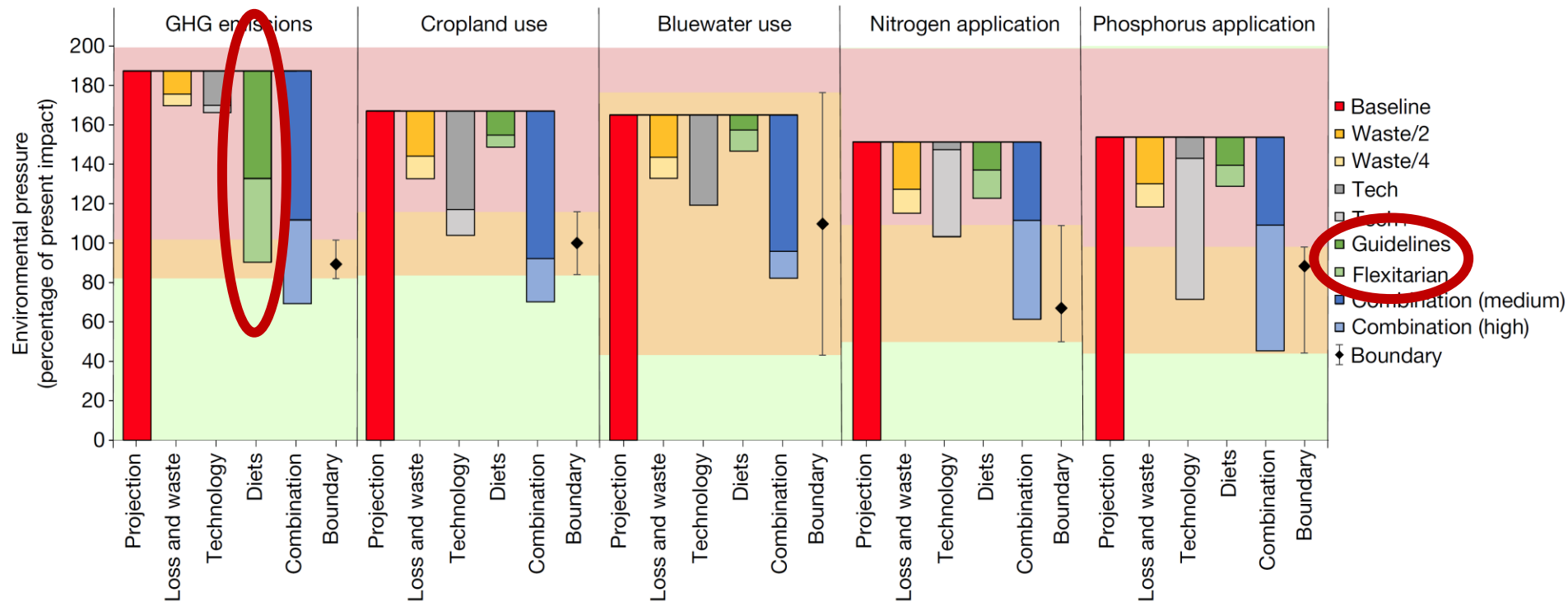
Marco Springmann, Michael Clark, Daniel Mason-D'Cruz, Keith Wiebe, Benjamin Leon Bodirsky, Luis Lassalle, Wim de Vries, Sonja J. Vermeulen, Mario Herrero, Kimberly M. Carlson, Malin Jonell, Max Troell, Fabrice DeClerck, Line J. Gordon, Rami Zurayk, Peter Scarborough, Mike Rayner, Brent Loken, Jess Fanzo, H. Charles J. Godfray, David Tilman, Johan Rockström & Walter Willett

Nature **562**, 519–525 (2018) | [Download Citation](#)  
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# Sustainable diets

Impacts of reductions in food loss and waste, technological change, and dietary changes on global environmental pressures in 2050

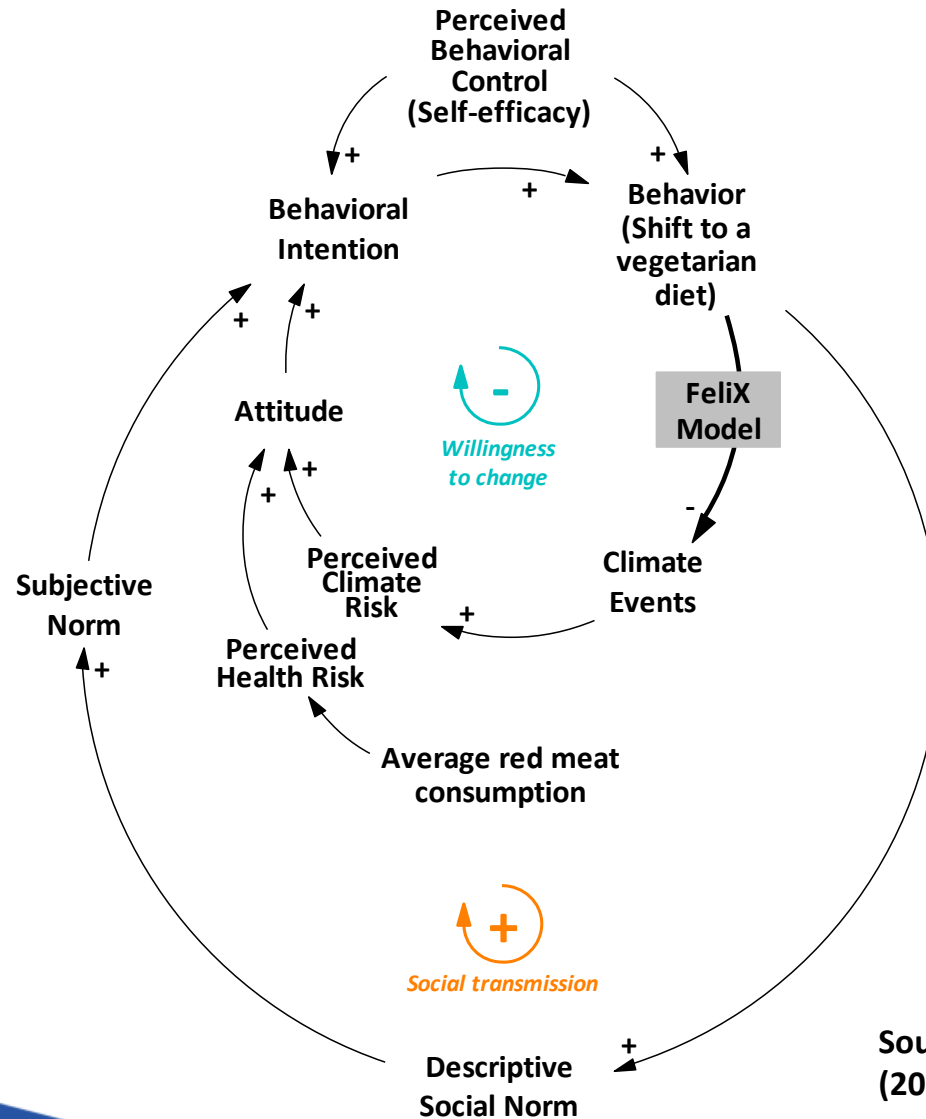


# How many people does it take...?



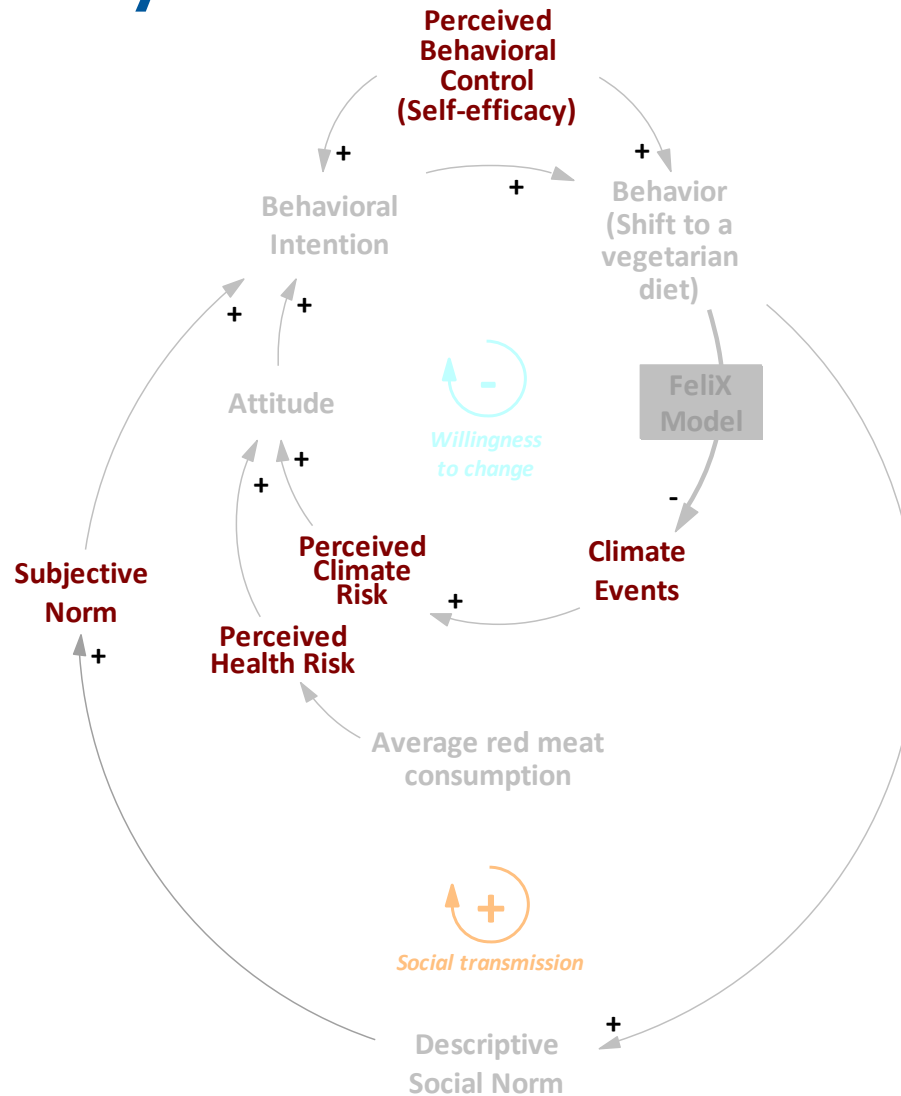
*...integrated assessment models should include social and behavioral uncertainty for feasible scenarios!*

# Modelling behavioral drivers



Source: Eker S, Reese G, Obersteiner M. (2019) *Nature Sustainability*.

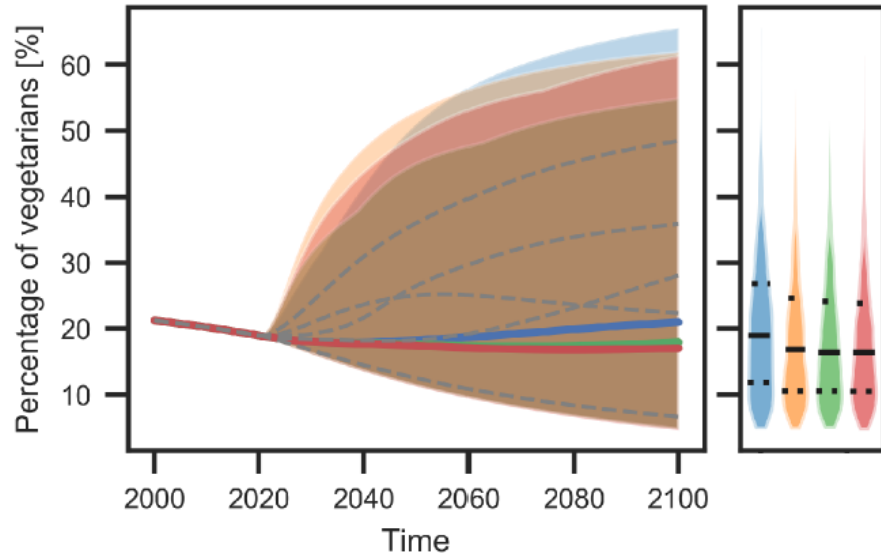
# Uncertainty



# Scenario exploration



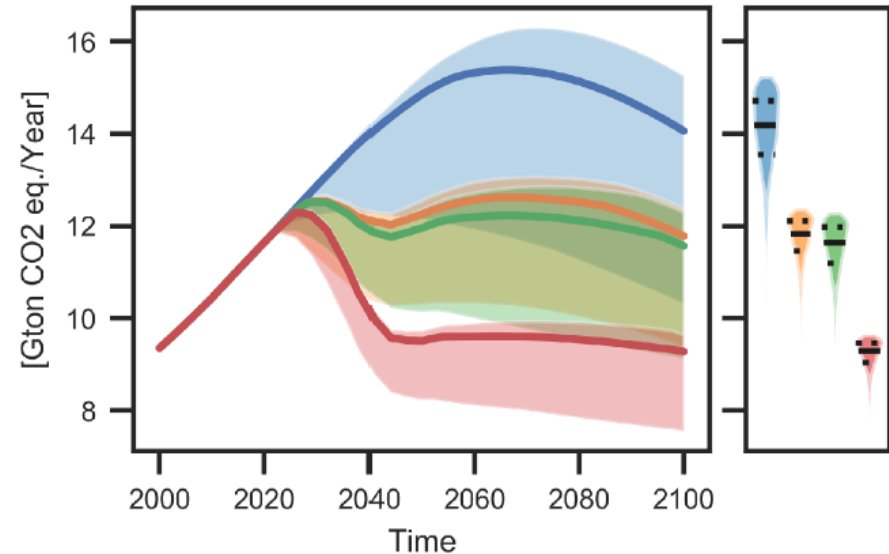
Percentage of vegetarian diet followers



(a)



Total Agr. and Land Use Emissions

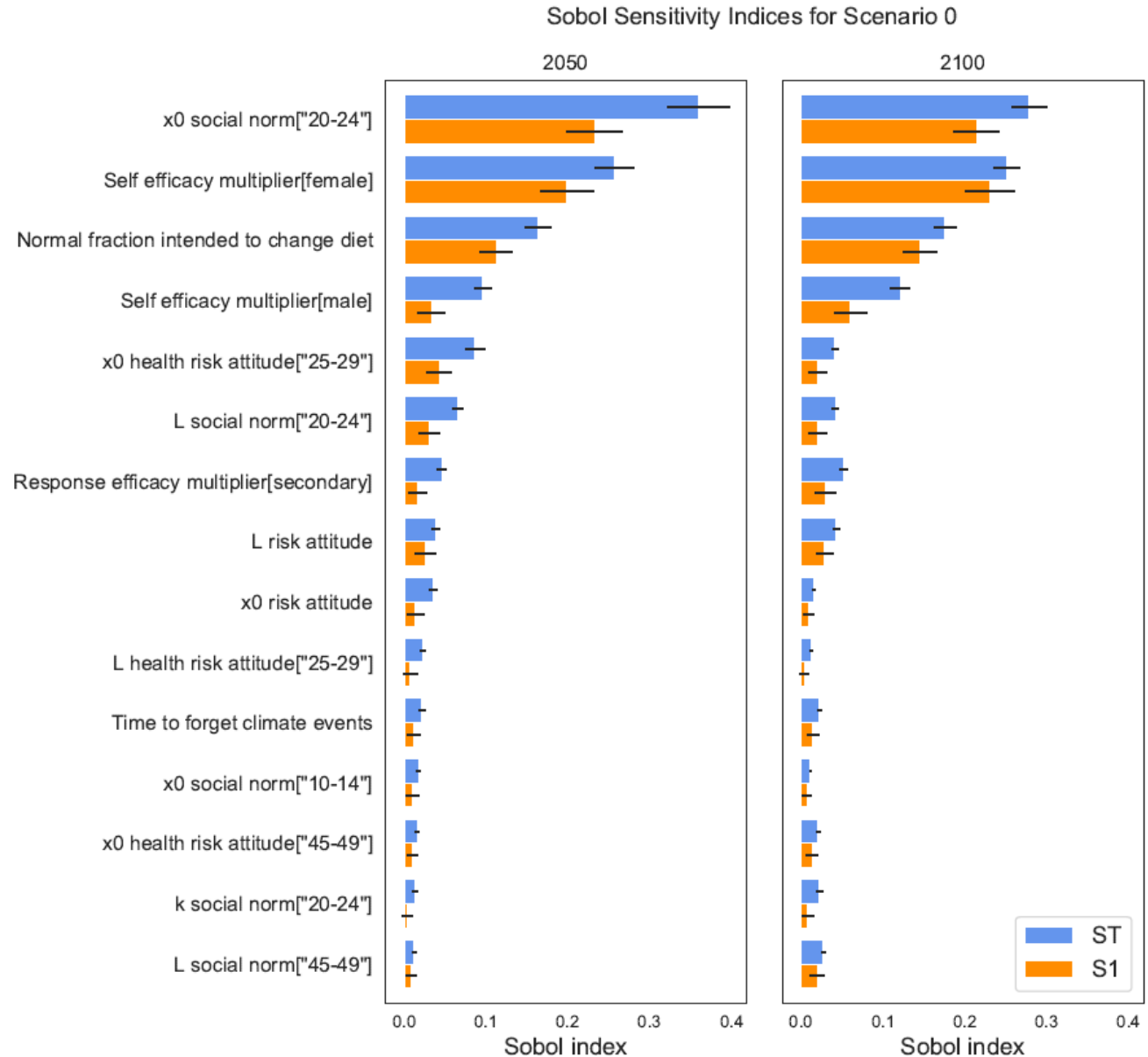


(b)



# Global Sensitivity Analysis and Sobol Indices

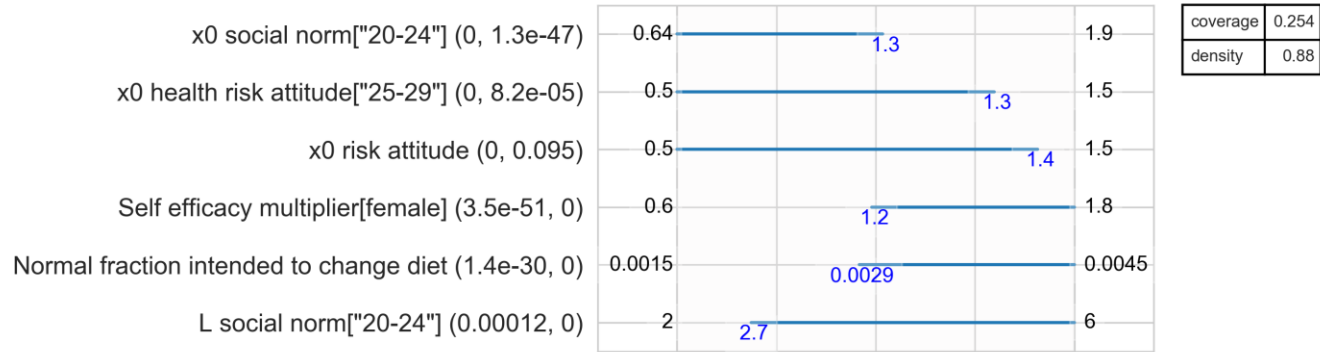
Which behavioural factors cause the highest sensitivity?



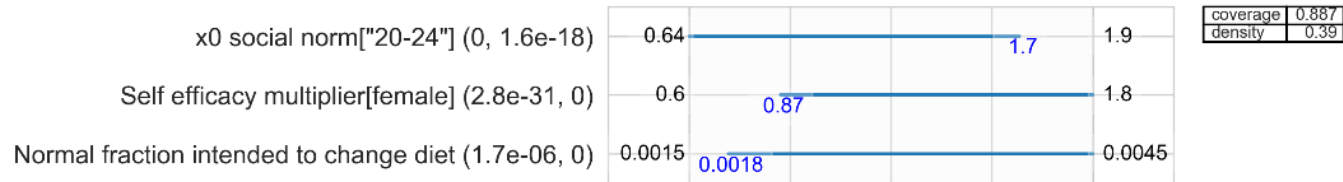
# Scenario discovery using PRIM

Which factors are associated with a wide spread of vegetarians in the global population?

Scenario discovery results for scenario 0 and time 2050



Scenario discovery results for scenario 0 and time 2050

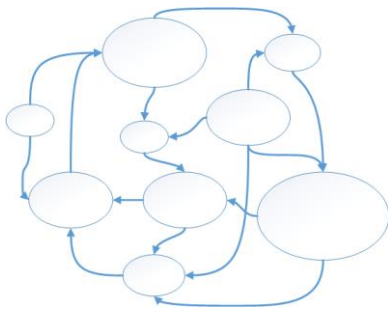


# Conclusions



Social norms and self-efficacy (identity) are the most prominent drivers, not the climate or health risk.

The groups who already have a high tendency, e.g. young and female, are the low-hanging fruits.



The modelling framework is generalizable and transferrable.

**DMDU methods help to enhance the feasibility of mitigation scenarios, and set research priorities for uncertainties!**

