Healthy Nutrition and Sustainable Food Production
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Trade-offs and synergies between human health and sustainability of Swiss dietary scenarios

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FiBL

Universität Zürich[UZH]

Flury&Giuliani GmbH
Agrar- und regionalwirtschaftliche Beratung

rütter soceco
sozioökonomische forschung + beratung

treeze
fair life cycle thinking

Zürcher Hochschule für Angewandte Wissenschaften
zhaw

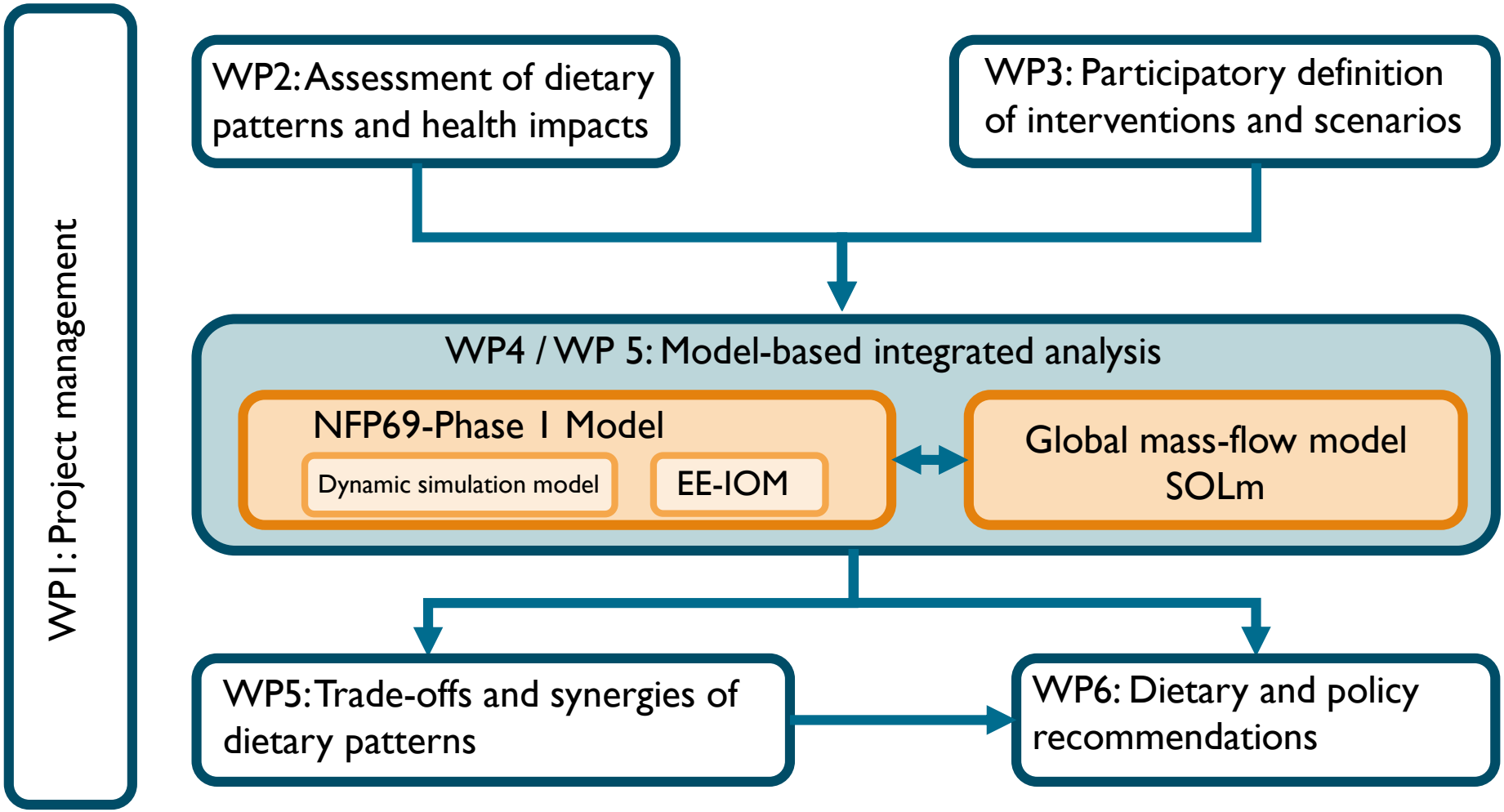
Aims of the project

1. Define and analyse scenarios for future healthy and sustainable dietary patterns in Switzerland

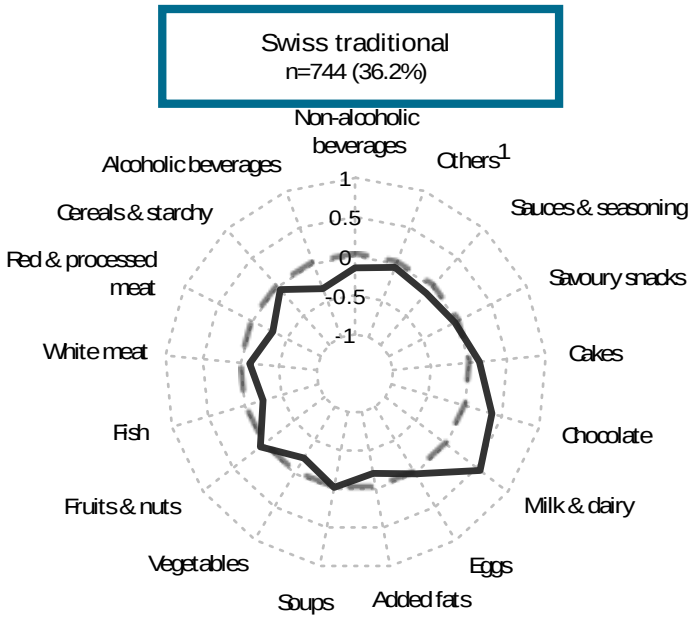
2. Analyse how healthy dietary patterns support and/or contradict sustainability in the Swiss food system

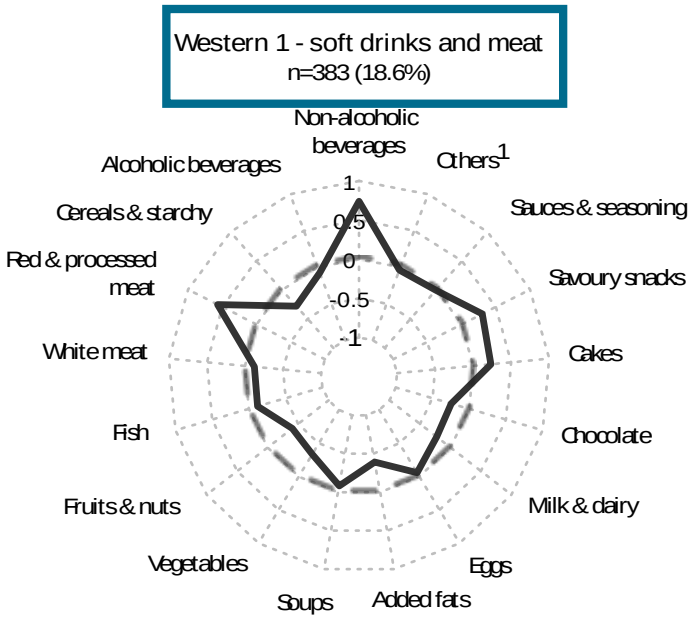
3. Derive target-group-specific recommendations for the realisation of sustainable and healthy dietary patterns

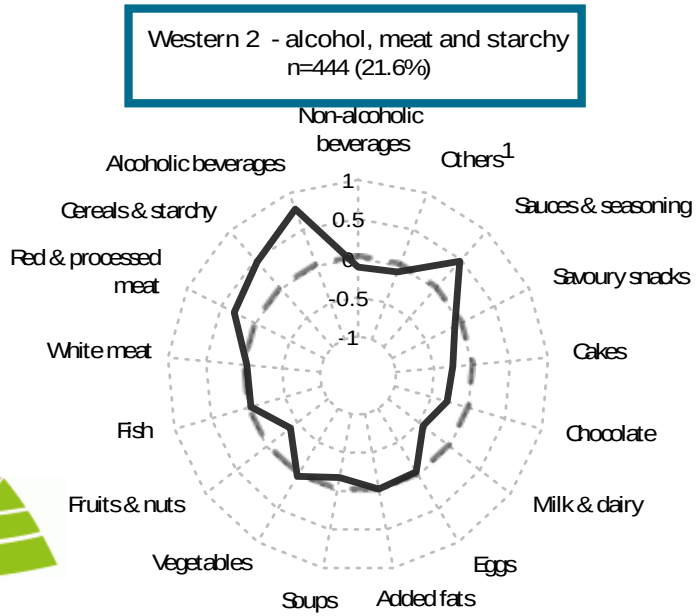
Project approach

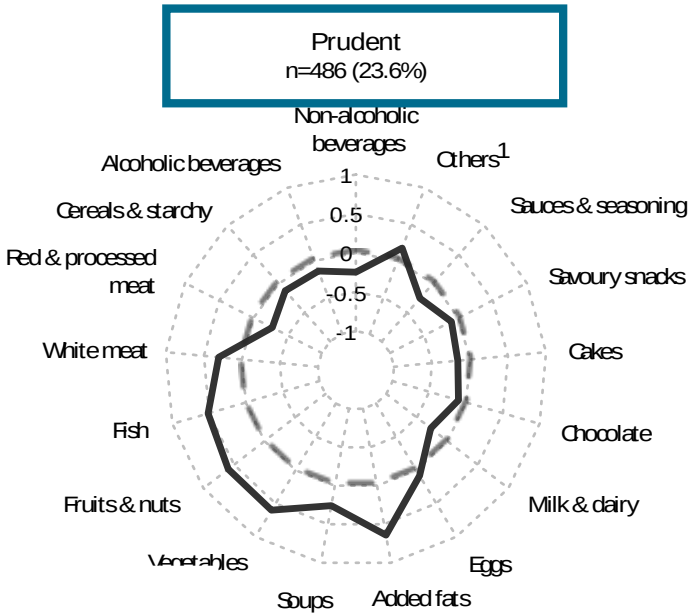


Identification of four dietary patterns in the Swiss population on the basis of the menuCH study









Krieger et al. 2019, Nutrients

Impacts of different food groups on health drivers and disease promotors

	Health Driver			Disease Promoter		
	Decreases the risk to develop Chronic Diseases			*Increases the risk to develop Chronic Diseases*		
	Food group	*CD*	*Effect**	*Food group*	*CD*	*Effect**
Strong	**Nuts & Seeds**	T2DM CVD CHD Cancer	+ + + +	**Processed Meat**	T2DM CVD CHD Stroke Cancer	- - - - -
	Legumes & Beans	T2DM CVD CHD Cancer	+ + + +	**Alcohol** **→ heavy use**	all 6 diseases	-
	Whole grains	T2DM CVD CHD Obesity Cancer	+ + + + +	**Physical Inactivity**	all 6 diseases	-
	Physical activity	all 6 diseases	+			
Medium	**Fruits & Vegetables**	CVD Obesity	+ +	**Starches Refined Grains**	T2DM CVD CHD Cancer Stroke	-/0 -/0 - -/0 -
	Vegetable Oils (depending on processing method; quality)	CVD CHD Stroke Obesity	+ + + +	**SSB**	T2DM CVD CHD Cancer Stroke Cancer	-/0 -/0 - -/0 - -
	Fish (effects depending on contamination)	CVD CHD Stroke	+ + +	**High-trans-fat Food**	T2DM CVD CHD Cancer Obesity	- -/0 - -/0 -
				High-Sodium Food	CVD CHD Cancer Stroke	-/0 -/0 - -/0
Weak	**Dairy Products**	5 diseases → controversial findings (except for CHD)	+/0/-			

Scenarios

Predefined consumption scenarios

- Reference scenario 2050
- Swiss Food Pyramid (SFP) 2050
- Sustainability / Feed No Food 2050
- ~~Consumer preferences~~

Optimised consumption scenarios

- Aiming for the ideal: Minimise different environmental impacts
- Accounting for acceptability: Minimise the difference to the reference scenario 2050 and to the SFP scenario 2050 while fulfilling different environmental targets

Integrated Modelling Approach: Linking the three models

Predefined scenarios

SDM

- *Input:* explicit specifications for consumption patterns
- *Output:* economically motivated behaviour (according to decision structure in SDM) of the agents leads to production structure of the agricultural sector

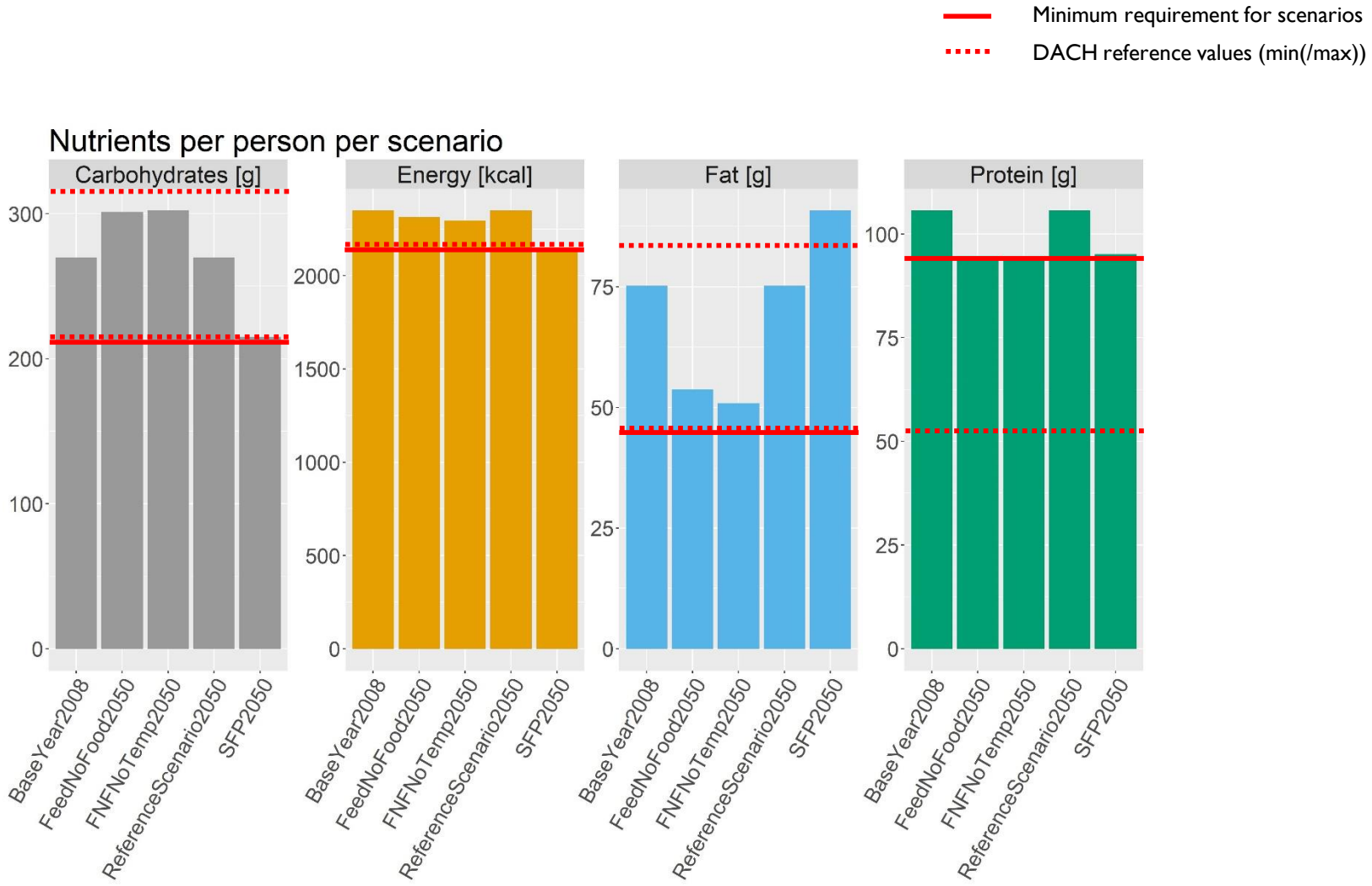
SOLm

- *Input:* production structure of the agricultural sector (areas, animal numbers, feeding rations, ...), explicit specifications for consumption patterns
- *Output:* environmental impacts from agricultural production in Switzerland and in countries of origin of imported goods

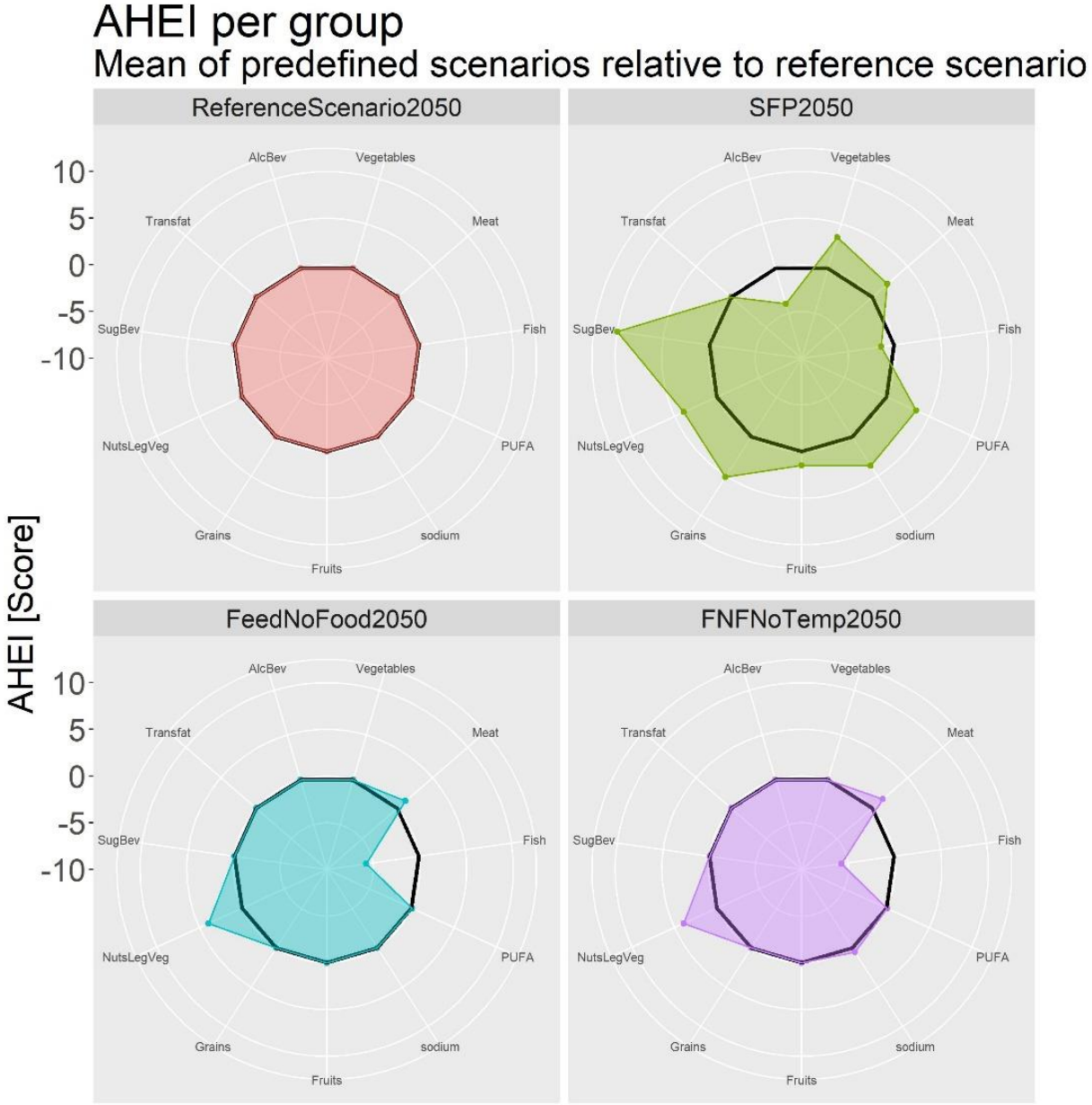
EE-IOM

- *Input:* production structure of the agricultural sector, detailed nutrient- and mass-flows (to be aligned in detail), explicit specifications for consumption patterns
- *Output:* production structures of the other sectors, further environmental impacts from agricultural production and the other sectors

Predefined consumption scenarios: nutrients

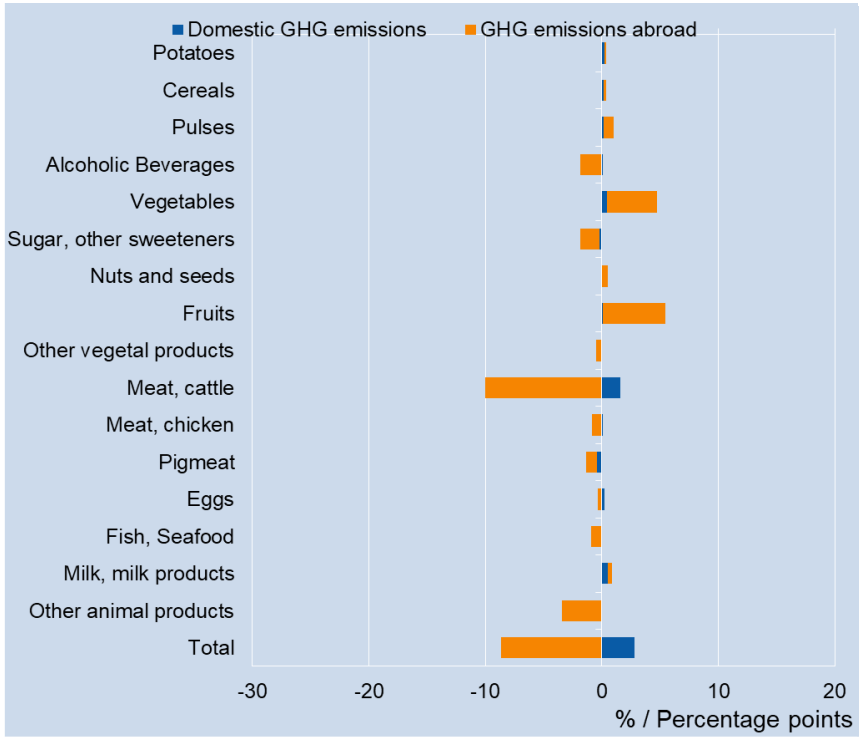


Health impacts (AHEI) of the predefined scenarios



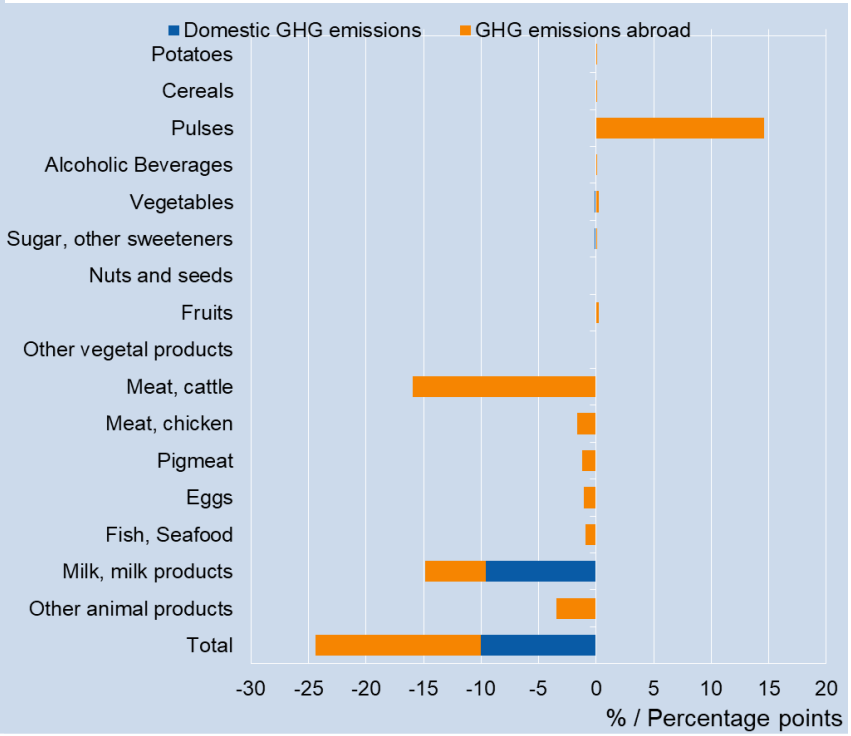
GHG emissions compared to reference scenario

Swiss Food Pyramid (SFP) 2050



Source: Calculations FiBL

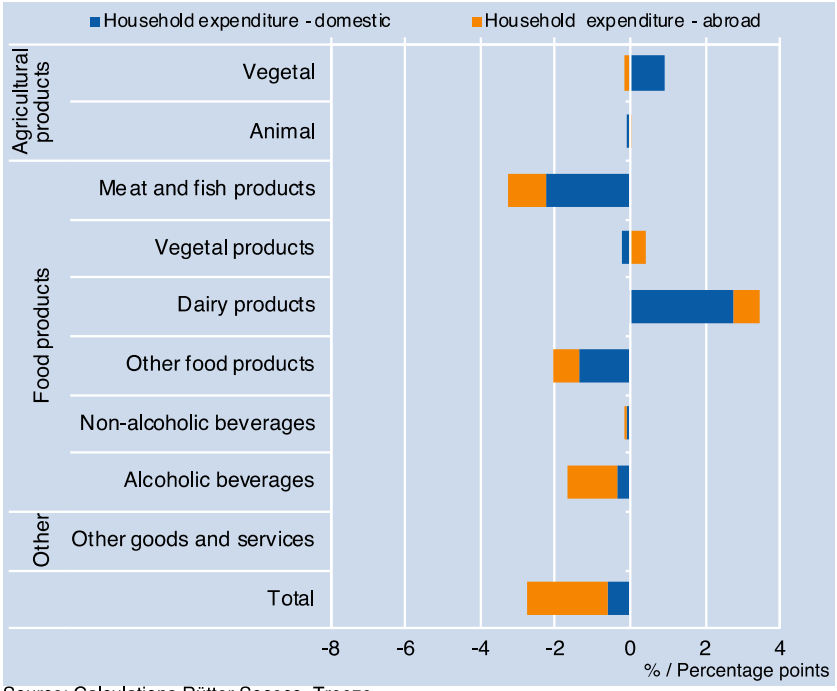
Sustainability / Feed No Food 2050



Source: Calculations FiBL

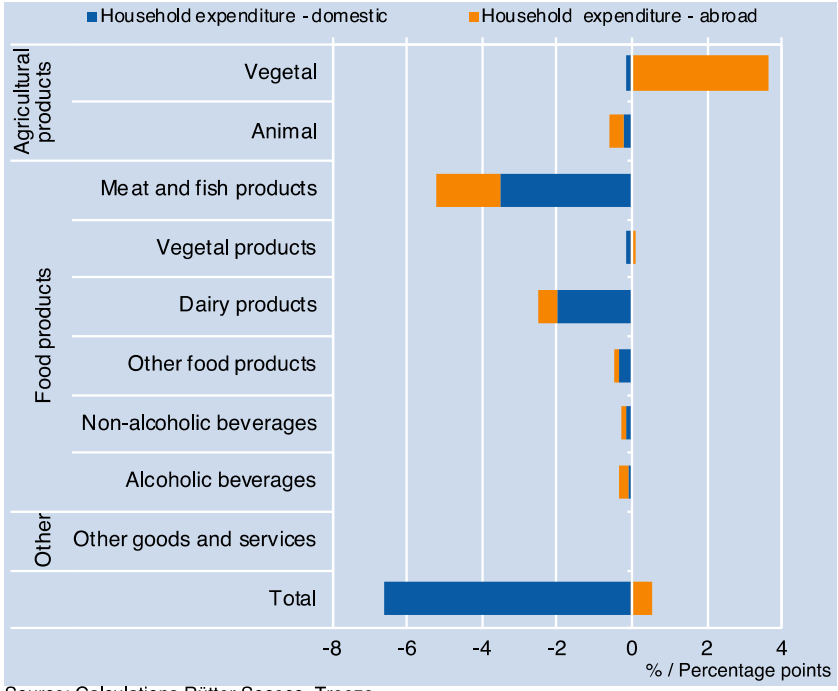
Household expenditure compared to reference scenario

Swiss Food Pyramid (SFP) 2050



Source: Calculations Rütter Soceco, Treeze

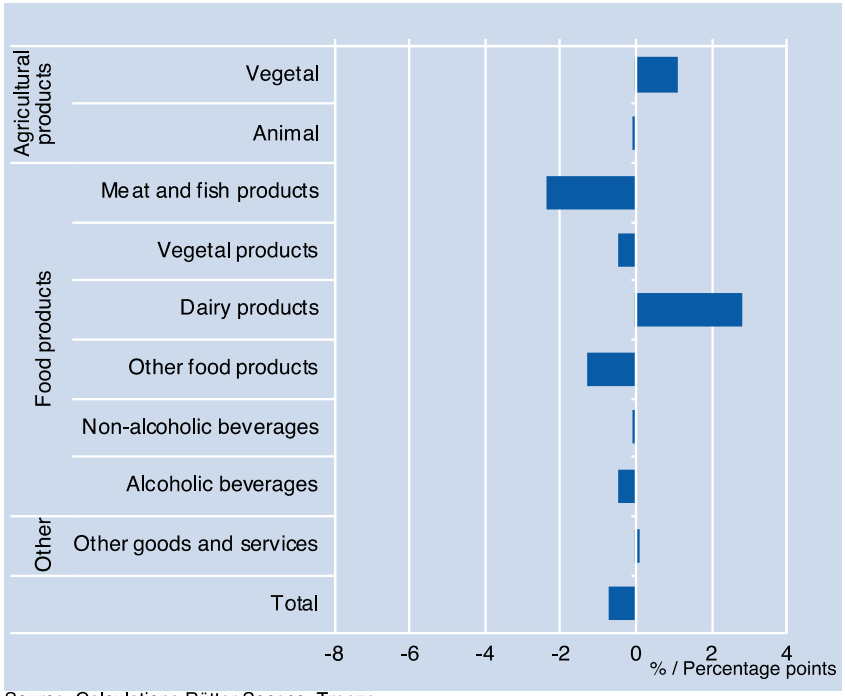
Sustainability / Feed No Food 2050



Source: Calculations Rütter Soceco, Treeze

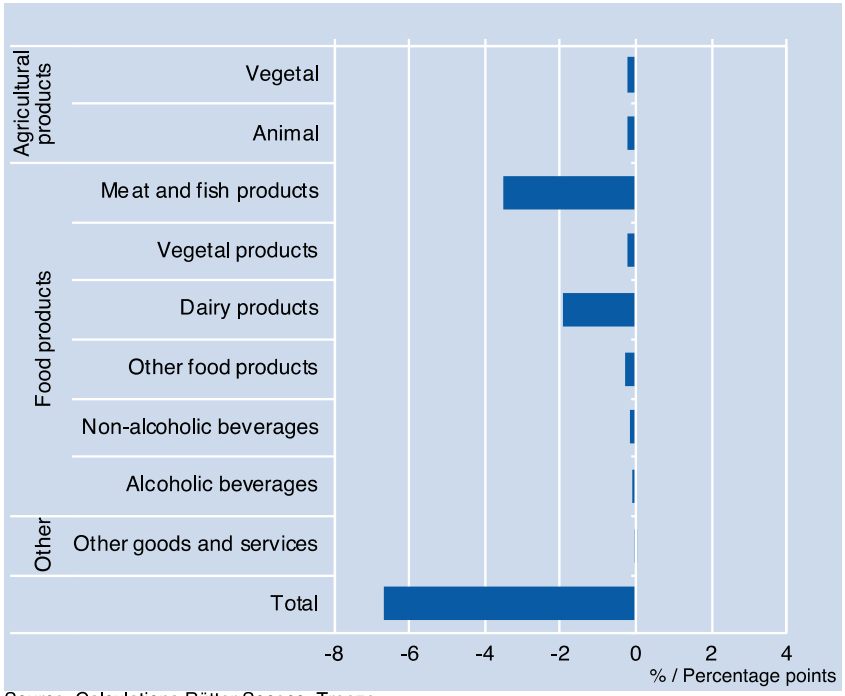
Gross value added compared to reference scenario

Swiss Food Pyramid (SFP) 2050



Source: Calculations Rütter Soceco, Treeze

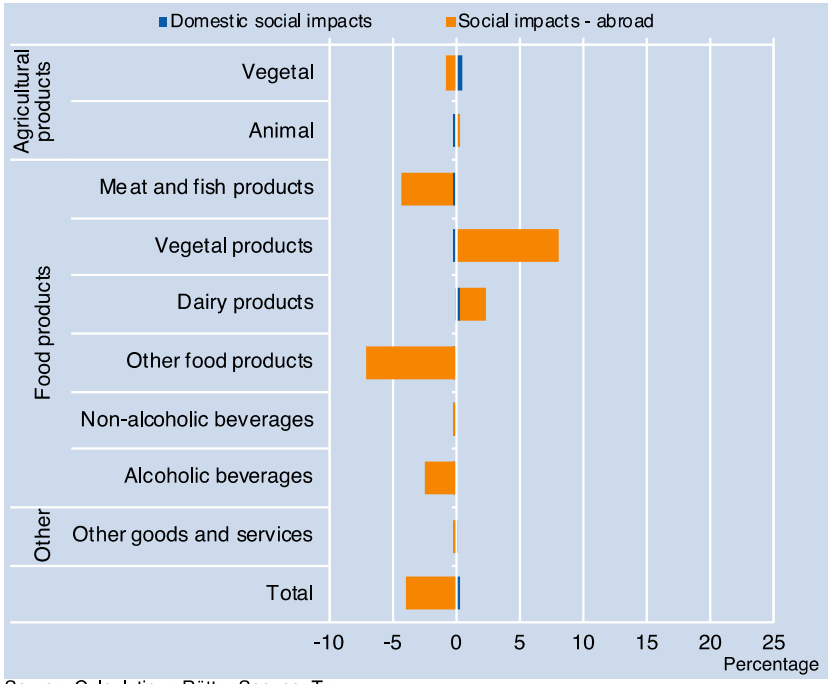
Sustainability / Feed No Food 2050



Source: Calculations Rütter Soceco, Treeze

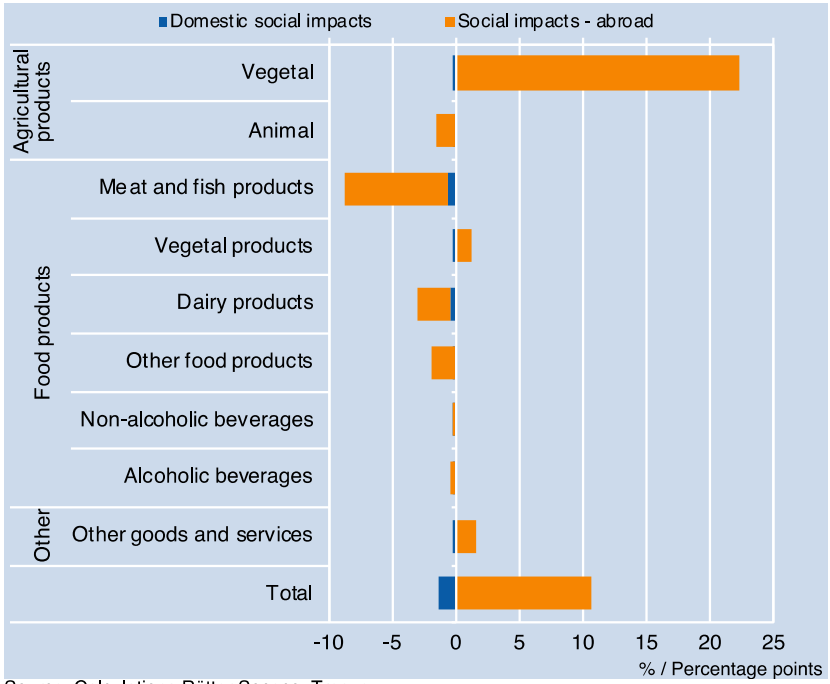
Social hotspot index compared to reference scenario

Swiss Food Pyramid (SFP) 2050



Source: Calculations Rütter Soceco, Treeze

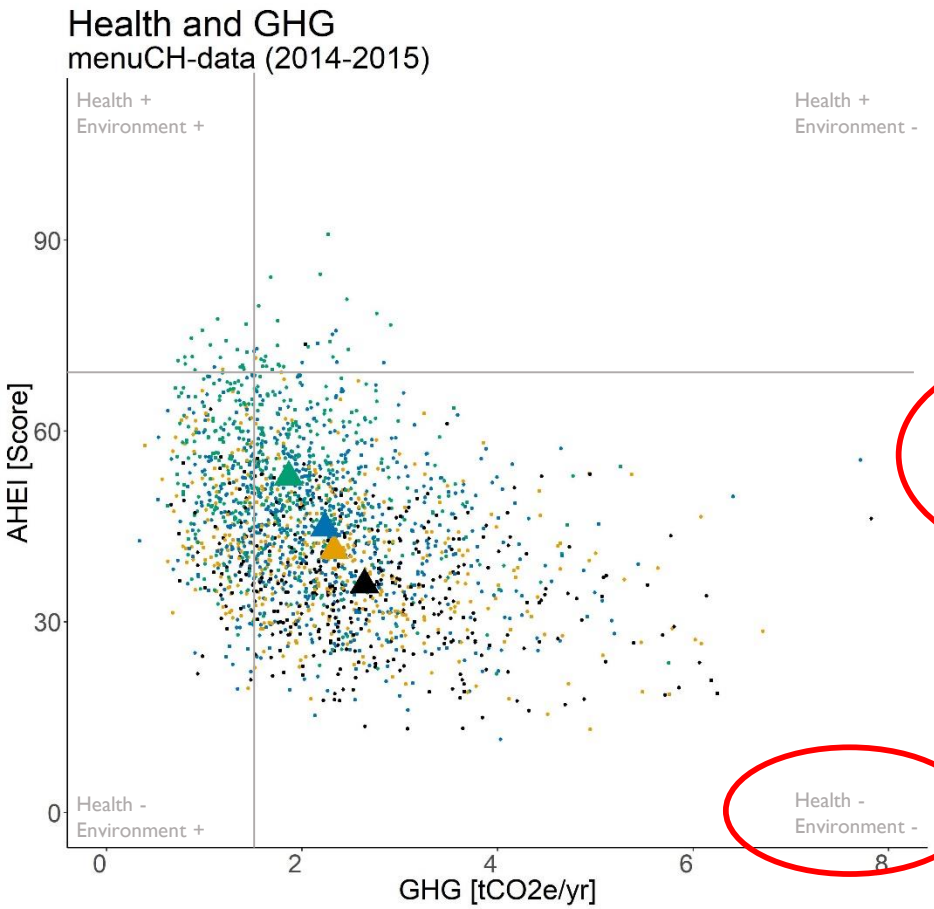
Sustainability / Feed No Food 2050



Source: Calculations Rütter Soceco, Treeze

Health and environmental impacts of current consumption (menuCH)

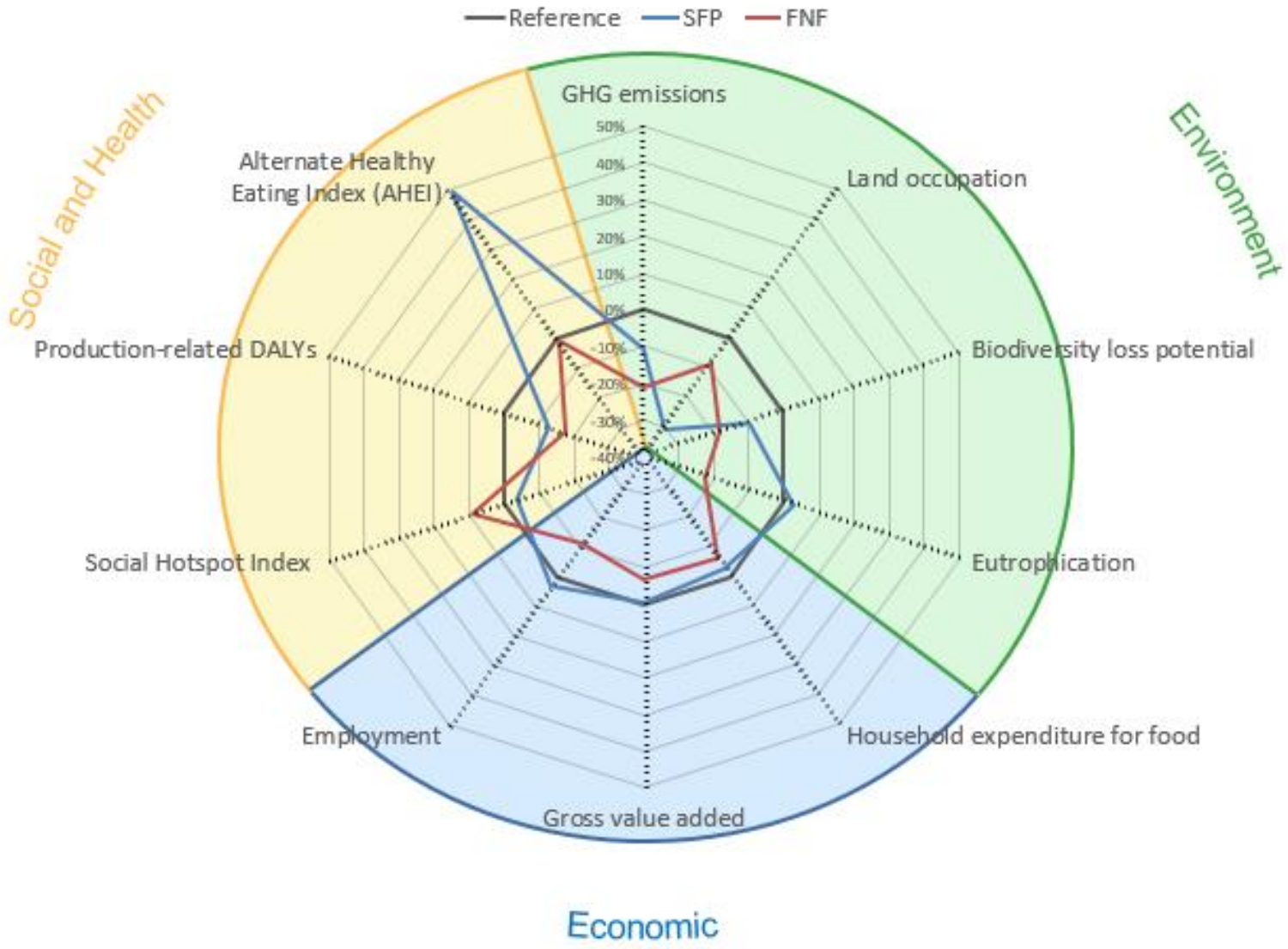
Health impacts (AHEI-2010) and greenhouse gas emissions per observation of the menuCH-dataset (points)



Means of the four clusters (Krieger et al. 2018)

Interpretation:
- → poor performance
+ → good performance

Overview of trade-offs and synergies of the SwissFoodPyramid and the FeedNoFood Scenario



Conclusions – Public Policy

- **Potential to use synergies between health and sustainability compared to the average Swiss diet**
- **At a certain point of optimisation, trade-offs become increasingly relevant**
- **Harmonize health policy and agricultural policy => Food policy**:
  - Reduce the incentives for sugar production
  - Reduce incentives for meat production (especially for meat which is not a co-product to dairy production)
  - Adjust the level of recommended dairy products (i.e. reduce this level)
- Provide **incentives for retailers to promote healthy/sustainable products**
- Consider **taxation of specific foods** of which the consumption induces negative externalities with respect to health. (e.g. high sugar contents). Also positive financial incentives could be effective (e.g. adapted VAT levels).
- Consider **taxation of specific inputs/practices** to increase sustainability in production (e.g. a tax on external nitrogen sources).
- Targeting at a Feed No Food Scenario would require a sophisticated **policy mix** (e.g. to avoid expansion of temporary meadows, promote suitable breeds for changed feeding rations, …).