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Sustainability assessment test under real time condition (SustainFarm)

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1 Introduction

- ✓ Sustainable food production along the entire value chain is of great importance
- ✓ Consideration of all three pillars of sustainability: economic, ecologic and social
- ✓ Focus on the farm level (primary production)
- ✓ Quantitative indicators as mean of implementation
- ✓ Analysis of the entire process: from data acquisition to visualisation of the results
- ✓ Check feasibility, acceptance and expected benefits





2 Material/Methods

- Sustainability method **SALCASustain** (Roesch et al. 2017) for **21 indicators** (13 environmental impacts, six economic indicators and two social indicators)
- Sample of **typical Swiss farms** (arable, mountain, lowland fattening farms)
- **Two test phases** (2016, 2018)





2 Material/Methods

Environmental dimension

non-renewable energy resources

Phosphorus & Potassium

Land use (occupation)

Water requirement (fresh water)

Greenhouse gas emissions

Eutrophication (aquatic)

Eutrophication (terrestrial)

Acidification (aquatic)

Acidification (terrestrial)

Ecotoxicity

Biodiversity

Soil quality

Economic dimension

Profitability: Earned income per family labour unit

Profitability: Total return on capital

Liquidity: Cashflow-turnover rate

Liquidity: Dynamic gearing ratio

Stability: Fixed assets to total assets

Stability: Equity to fixed assets ratio

Social dimension

Workload in terms of time

Landscape quality: diversity and aesthetics





2 Material/Methods: Pilot farms

Characteristics of 12 pilot farms (test phase I, 2016):

- All numbers are mean values of the farm groups
- The chosen farm types are typical production systems for Switzerland

	Number	UAA	Arable land	Grass land	EFA	Livestock units
	#	ha	ha	ha	%	LU
Arable farms	5	34.2	30.3	5.0	18.8	5.4
Mountain farms	3	35.7	5.2	28.5	23.2	51.5
Lowland fattening farms	4	22.0	5.9	16.0	10.2	83.3

UAA=Utilised agricultural area, EFA=Ecological focus area





2 Material/Methods

- Ecologic: SALCA Swiss Agriculture LCA (Gaillard and Nemecek, 2009); SimaPro
Biodiversity: IP-Suisse credit point system (Jenny et al. 2013)
- Economic: Bookkeeping data (from which financial ratios have been derived)
- Social: ART Work Budget (Schick *et al.* 2007); landscape quality according to Schüpbach *et al.* (2020)





2 Material/Methods - Questionnaire

Main objective:

Determine the farmer's perception on **acceptance**, **feasibility** and **benefits (informative value)**

Questionnaire contains questions on

- (i) General questions on sustainability
- (ii) Information/ feedback during the entire course of the project
- (iii) Data acquisition and data amount
- (iv) Support during the project
- (v) Expected impact of the project (on future farming activities)





3 Results - Correlations



EDha= Energy demand per ha, GWPha= Global warming potential per ha,
 LUha=Land occupation (use) per ha, Acidha=Acidification potential per ha,
 Eutrha= Aquatic eutrophication N per ha, Toxha=Terrestrial ecotoxicity potential per ha;
 BD= Biodiversity score, BQ=soil quality indicator



4 Discussion/ Recommendation

- Provide a **discussion platform** for farmers with similar agricultural activities
- Provide **recommendation** for **actions** and **practical advice** to achieve a more sustainable production
- Provide **user-friendly data entry forms** and easy available help
- Implement **comprehensive plausibility checks**
- Input data: Use **units** the farmkeeper is familiar with
- Analyse option for **reducing the model's complexity**:
 - **drop** some indicators (-> only when correlated)
 - use of **default values** (lowers site-specific statements)





4 Discussion/Conclusions

- Sustainability method *SALCA*sustain is **feasible** under real time condition
- Data collection and quality control is **too time-consuming**
- **Acceptance** by farmers is given, but could be improved by different measures
- Still room for **methodological improvement** (e.g. human well-being, animal welfare)
- **Technical implementation** has to be **improved** -> Project SALCAFuture





Thank you for your attention.

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