

An improved biodiversity index for FAO's Tool for Agroecology Performance Evaluation (TAPE)

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Introduction

The 'Tool for Agroecology Performance Evaluation' (TAPE) has been developed by the FAO to assess the **impact of agroecology** with a globally applicable and comparable method (based on a 2-3 hours farm interview; Mottet et al., 2019). The environmental dimension has so far been represented by a soil index (visual analysis) and an **agrobiodiversity index**, which is based on the crops grown and animals kept. While the TAPE biodiversity index is crucial, it does **not** take into account **"unplanned" biodiversity** (i.e. farm management practices).

Aim

- Extend biodiversity index to **include unplanned biodiversity**
- **Compare** improved biodiversity index with the comprehensive, well established **Swiss biodiversity indicator** (Jeanneret et al., 2014) on Swiss farms

Methods

- Improved biodiversity index based on BioBio-method (Herzog et al., 2012)
- Test on 21 farms of the SAEDN network (Gilgen et al., 2023)

Agrobiodiversity
Biodiversity of crops and livestock (Gini-Simpson Index)

Field size
Mean field size of the Farm

Semi natural habitats (SNH)
1) Share of SNH on utilised agriculture area (UAA)
2) Diversity of SNH

Nitrogen application
1) Area with **no** mineral fertilizers (in %)
2) Total N input (mineral & organic)

Field operations
Number of mechanised operations per field



Pesticide application
1) Total number of pesticide application
2) Area with **no** pesticide application (in %)
3) Ecotoxicology

Tree habitat
Share of trees on agricultural land (in %)

Stocking rate
Livestock units per hectare

Grazing intensity
Grazing livestock units per hectare

Land use change
Area of natural/semi-natural habitat not undergone land use change in the last year (in %)

Results

- The improved biodiversity index of TAPE shows a **good correlation** with the well established Swiss biodiversity indicator (Fig. 1)
- **Regional differences** are visible, with largest range for pesticide application (Fig. 2)

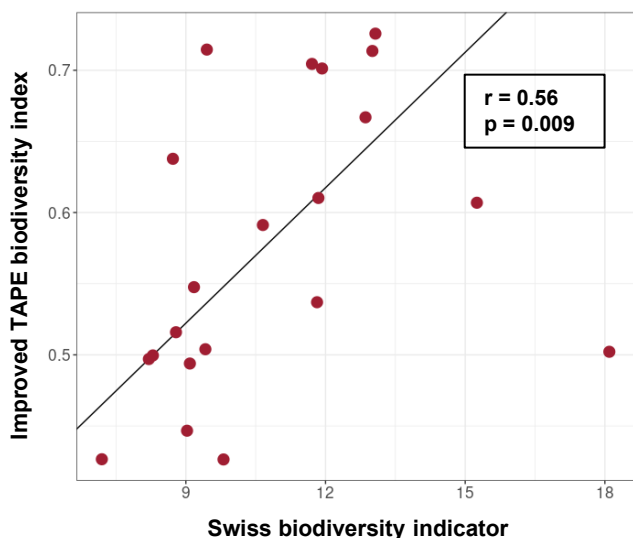


Fig. 1: Theil-Sen regression of the Swiss biodiversity indicator and the improved TAPE biodiversity index

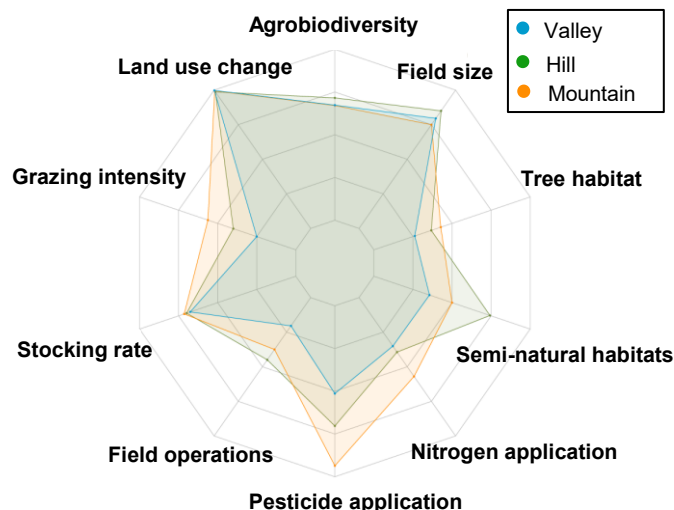


Fig. 2: New biodiversity index categorised by region (mean values)

Summary

With the improved biodiversity index, considerably more biodiversity aspects are taken into account in TAPE. Users are now able to choose between the old and the new biodiversity index.

Gilgen A. et al. (2023). How to assess the agroecological status of Swiss farming systems? *Agroscope Science* (172).
 Herzog F. et al. (2012). Biodiversity indicators for European farming systems: a guidebook. *ART-Schriftenreihe* (17).
 Jeanneret P. et al. (2014). An expert system for integrating biodiversity into agricultural life-cycle assessment. *Ecological Indicators*, 46, 224-231.
 Mottet A. et al. (2020). Assessing Transitions to Sustainable Agricultural and Food Systems: A Tool for Agroecology Performance Evaluation (TAPE) [Methods]. *Frontiers in Sustainable Food Systems*, 4.

