

Crop Diversity Index [DiverIMPACTS Indicator # 7.1]

Dimension: Environment

Indicator type: Causal

SAFA Theme and Sub-Theme: Biodiversity- species diversity, ecosystem/landscape Diversity

DiverIMPACTS WP4 internal reference: Ecosystem/landscape (7.1); Crop diversification (8.1)

Short description:

Assessment of crop diversity combining species diversity and proportion of each crop

Object:

Crop species diversity improve important ecosystem services and improve agricultural productivity and stability. The Crop diversity indicator (CDI) is based on the reciprocal Simpson indicator and it assesses diversity by means of a diversity index addressing both crop species richness and the “abundance” of each as for biodiversity indices. This is given by the proportion of each crop in the total cropped area. Furthermore, the indicator can be used to assess both spatial and temporal diversification of a farm.

- **Spatial (spatio-temporal) diversification for the Ecosystem/landscape criterion**

Spatial scale: farm

Temporal scale: one year or duration (years) of the rotation with the most length

Formula

$$CDI = \sum_n (1/\sum_i p_i^2) / n$$

p_i^2 : proportion of the crop i in the total cropped area (expressed on a scale between 0 and 1) within a single year

$n = 1$ or number of the years of the longest rotation

- **Temporal diversification for the Crop diversification criterion**

Spatial scale: cropping system

Temporal scale: length of the rotation

Formula

$$CDI = 1/\sum_i p_i^2$$

p_i^2 : proportion of the crop in the rotation (expressed on a scale between 0 and 1)

Reference value:

4 (see Boller *et al.*, 1997)

Recommendations :

It can be calculated for the duration of rotation or for a cropped/farm surface

Alternative indicators

No suggestion

Literature reference:

Bockstaller, C., Lassere-Joulin, F., Slezack-Deschaumes, S., Piutti, S., Villerd, J., Amiaud, B., & Plantureux, S., 2011. Assessing biodiversity in arable farmland by means of indicators: an overview. *Oléagineux Corps Gras Lipides*, 18(3), 137-144. <https://doi.org/10.1684/ocl.2011.0381>

Boller, E. F., Malavolta, C., & Jörg, E., 1997. Guidelines for integrated production of arable crops in Europe. *Technical guidelines III. IOBC/WPRS Bulletin*, 20(5), 5-19.