

Name:

Phosphorus Balance.

Definition:

Based on the IRENA 18 indicator, it is assessed the impact of phosphorus used in agriculture. The phosphorus balance is an indicator calculated as soil total P inputs minus total P outputs . Phosphorus is an element retained by soil and it can be transported in runoff after rainfall, in other words it can be lost through erosion and leaching.

Method of calculation:

This indicator is calculated by estimating the average balance in each plot/crop.

$$\text{Indicator} = \frac{\sum_i (PB_i \times A_i)}{A_T}$$

Where:

Indicator: Total phosphorus balance (kg of P/ha per year)

PB_i: Crop *i* phosphorus balance (P (kg)/ha)

A_i: Area for the crop *i* (ha)

A_T: Total area considered (ha)

The balance of each crop/plot is calculated as the difference between phosphorus intake and phosphorus outputs in the system:

Inputs: phosphorus fixed by the organic and inorganic fertilizers.

Outputs: phosphorus contained in harvested agricultural products

Interpretation:

A positive phosphorus balance implies a higher amount of released than consumed phosphorus by the crop. The risk of contamination caused by runoff depends on the fertilization type and on soil management. Otherwise, this implies a higher P loss from the soil than the P intake. And if this condition continues for a long time, the crops might show symptoms of phosphorus deficiency.

Using this indicator, two other indicators, that provide information about fertilization management, can be calculated:

- Phosphorus use efficiency: is the ratio between the amount of fertilizer P uptaken from the field by the crop and the amount of fertilizer P applied through fertilization.
- Productivity of the phosphorus:, which means the kg of crop per kg of applied P

Information source:

Crop area, applied inputs and yields of the different crops: data obtained in a farmers survey.
The values of crop phosphorus uptakes: data obtained in bibliography.

Bibliography and references:

European Environment Agency. Indicator Fact Sheet IRENA 18.1 – Gross nitrogen balance

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OECD / Eurostat. Gross nitrogen balance handbook (2007)