



INSTITUTO BRASILEIRO  
**DE AGRICULTURA  
SUSTENTÁVEL**



# Brazilian Institute of Sustainable Agriculture

## Mission

Together with professionals in the agricultural sector, we aim to expand the adoption of sustainable production models in Brazil



INSTITUTO BRASILEIRO  
**DE AGRICULTURA  
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CONTABILIDADE AMBIENTAL DO SOLO



# Soil Environmental Accounting



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2024

# Soil Environmental Accounting

What is SEA

**Soil Environmental Accounting (SEA)** is the annual measurement and recording of **physical**, **chemical**, and **biological** parameters integrated into a single index. This index unequivocally indicates the impact of the production system on soil quality.



2024

# Soil Environmental Accounting

SEA Index

The SEA Index ranges from 0 to 7 and is calculated based on objective measurements of biological, physical, and chemical parameters that reflect soil quality.

With the plot's SEA index, the values obtained are compared annually to determine **Soil Environmental Accounting**, which can be either **positive or negative**.

The Index is the sum of the values attributed to groups of parameters plus the holistic balance that indicates harmony between the parameters. **A higher index reflects better soil quality.**



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## SEA Areas of Activity

Currently, SEA is being developed in six Brazilian states: **Minas Gerais, São Paulo, Goiás, Mato Grosso do Sul, Mato Grosso e Bahia**

**Crops: Corn, Coffee, Soybeans, Cotton, Cocoa, Oranges and Grasses**



# Direct and Indirect Benefits

- Annual monitoring of the plot's evolution
- Improves management decisions
- Promotes the **sustainability of the agricultural system**
- Encourages the reduction of the use of synthetic inputs
- Seeks to increase organic matter levels in the soil by indicating sustainable practices
- Strengthens practices that will lead to **carbon sequestration**
- We recognize agricultural producers with the **Positive Soil Environmental Accounting Seal**
- The Seal is a competitive differentiator for the farmer
- The Seal increases the transparency of agricultural production



2024

# Parameters analyzed

## Soil Chemistry

- Phosphorus content
- Calcium content
- Magnesium content
- Potassium content
- Ca/Mg ratio
- Ca/K ratio
- Mg/K ratio
- Aluminum saturation
- Micronutrient content: B, Zn, Fe, Cu e Mn
- Base saturation (V%)
- Soil cation exchange capacity (T)
- pH

## Soil Physics

- Rapid Diagnosis of Soil Structure
- Soil penetration resistance
- Stability of soil aggregates in water\*

## Soil Biology

- $\beta$ -glucosidase enzyme activity
- Acid phosphatase enzyme activity
- Aryl sulfatase enzyme activity
- Mycorrhizal colonization
- Soil organic matter
- Soil organic carbon





# SEA Dashboard

# CONTABILIDADE AMBIENTAL DO SOLO (CAS)

**CAS**



**5,14**  
+ 1,9%

**Equil. Holístico**



**0,50**  
0,0%

**Físicos**



**2,00**  
0,0%

**Químicos**



**1,46**  
+ 12,7%

**Biológicos**



**1,18**  
- 5,6%

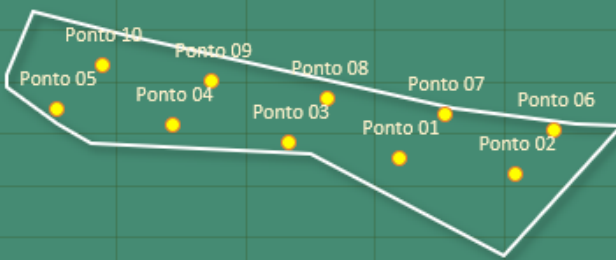
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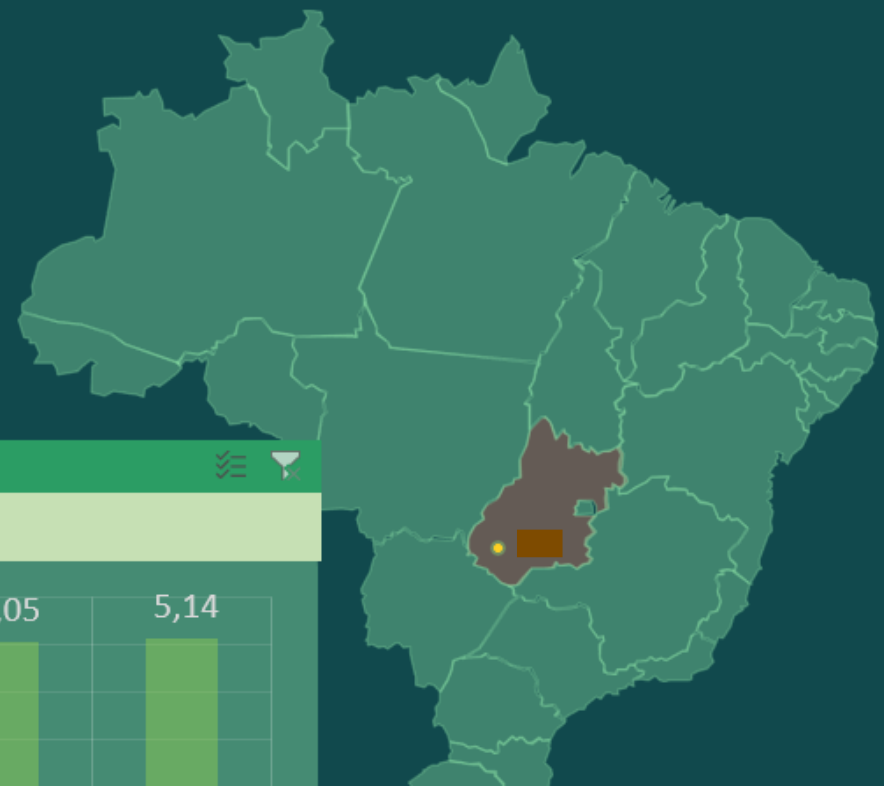
Cultura:

Município:

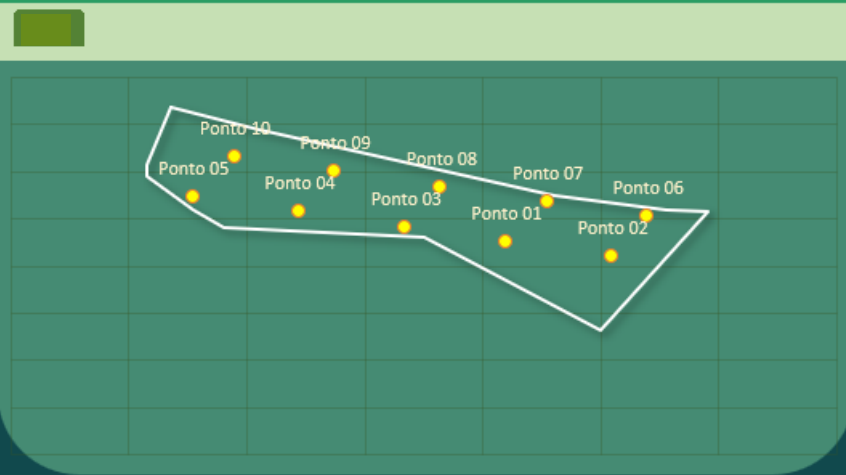
**Código IBA**



**Grupo de Parâmetros**



## Código IBA



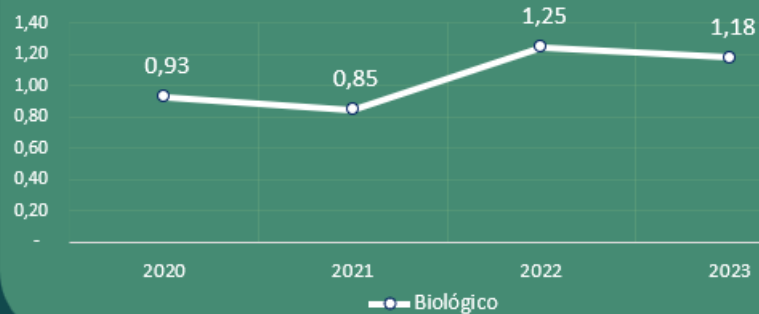
## Grupo de Parâmetros

Biológico

Equilíbrio Holís...

Físico

Químico



## Filtro Ano

2020

2021

2022

2023



## Questinário

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### 1) O que é a Contabilidade Ambiental do Solo (CAS)?

É a mensuração e o registro anual de parâmetros físicos, químicos e biológicos que apontem, de forma inequívoca, as consequências do sistema de produção utilizado, na degradação/intoxicação ou na recuperação/desintoxicação daquele agroecossistema, bem como do meio ambiente como um todo, incluindo as pessoas.

## Parâmetros



- Aril-sulfatase
- Colonização micorrízica nas raízes da cultura
- COS
- EH (Bio)
- Fosfatase ácida do solo
- MOS
- $\beta$ -Glicosidase do solo

## Grupo de Parâmetros



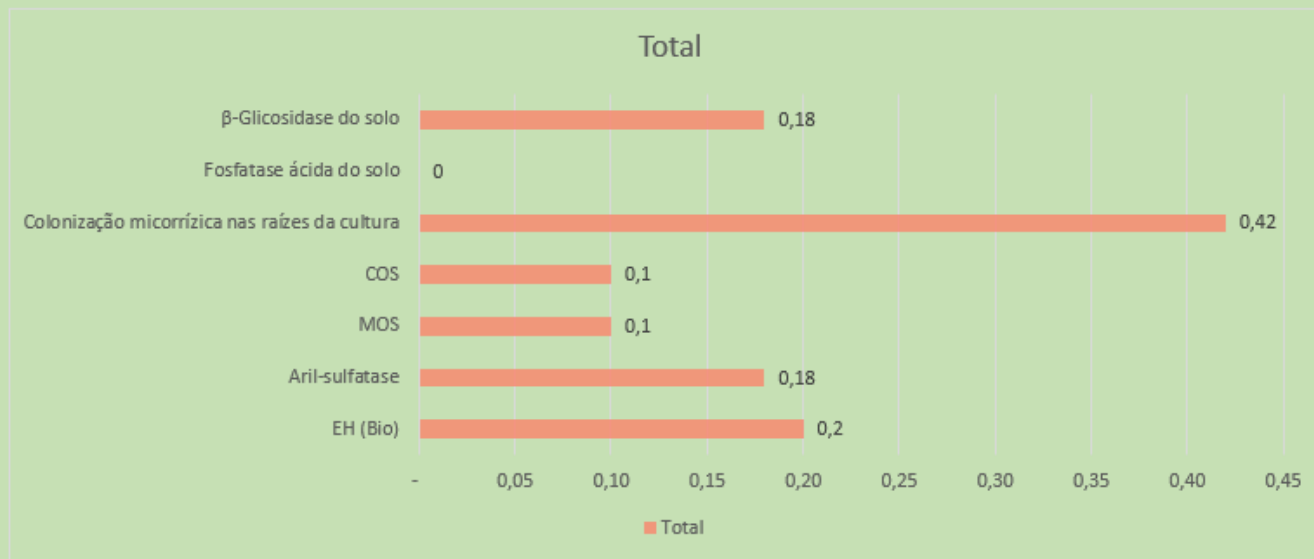
- Biológico
- Equilíbrio Holístico
- Físico
- Químico

A atividade enzimática no solo pode contribuir com informações de mudanças qualitativas na matéria orgânica do solo. Enzimas do grupo das glicosidases são amplamente encontradas na natureza, desempenhando importante papel no ciclo do carbono, isso porque os produtos obtidos pela ação destas enzimas são importantes fontes de energia para os microrganismos do solo. Logo, a microbiota do solo pode ser avaliada pela atividade da enzima  $\beta$ -Glicosidase. Esta enzima é utilizada como um indicador da qualidade do solo, pois é influenciada diretamente pelo seu teor de carbono. Essa enzima atua na etapa final do processo de

## filtroAno



- 2023
- 2022
- 2021
- 2020





**SEA Seal**

2024

## SEA Seal

Criteria for obtaining the seal

From the **second year of Environmental Soil Accounting**, the producer will be eligible to receive the annual SEA seal if the **SEA Index for the current year is at least 3% higher than the one of the previous year**. Once the producer receives the first seal, they will not receive a new one under the following circumstances:

If the management system of the other plots in the property (not measured) differs from the ones monitored by Environmental Soil Accounting.

If the SEA Index is negative for more than 3% for three consecutive Years.







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