Food and Agriculture Organization of the United Nations

10 June 2022

Status of Black Soils and Sustainable Management Practices in Brazil

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Types of Black Soils in Brazil

Midlatitude grasslands Black Soils:

- Represents the main continuous area in Brazil.
- Located in the Pampa Biome, southern of Brazil.
- The landscape is characterized by plain to slightly undulated relief;
- Parent material is derived, mainly, from basalt, gabbro and sedimentary rocks rich in bases.
- The native vegetation is dominated by grasses, sparse bushes and occasional small trees within the grass matrix.
- The soils are classified, according to WRB, as Chernozems, Kastanozems, Phaeozems, Leptsols and Cambisols.

Anthropic Black Soils:

- Represented by the Amazonian Dark Earths (ADEs), and locally named "**Terra Preta de Indio**".
- Located in old pre-Columbian Amerindian settlements throughout the Amazon, especially in Brazil, Colombia, Guyana, Ecuador, Peru, and Venezuela.
- The ADE sites are located near water courses and in floodplains.
- The ADEs are characterized by presence of ceramic and/or lithic fragments and indigenous artifacts in the anthropic horizons and have high level of nutrients, compared to adjoining non-ADE soils.
- The soils classes, according to WRB, are **Anthrosols**, but Ferralsols, Acrisols, Lixisols and Alisols, all with **Pretic horizon** may also occur.

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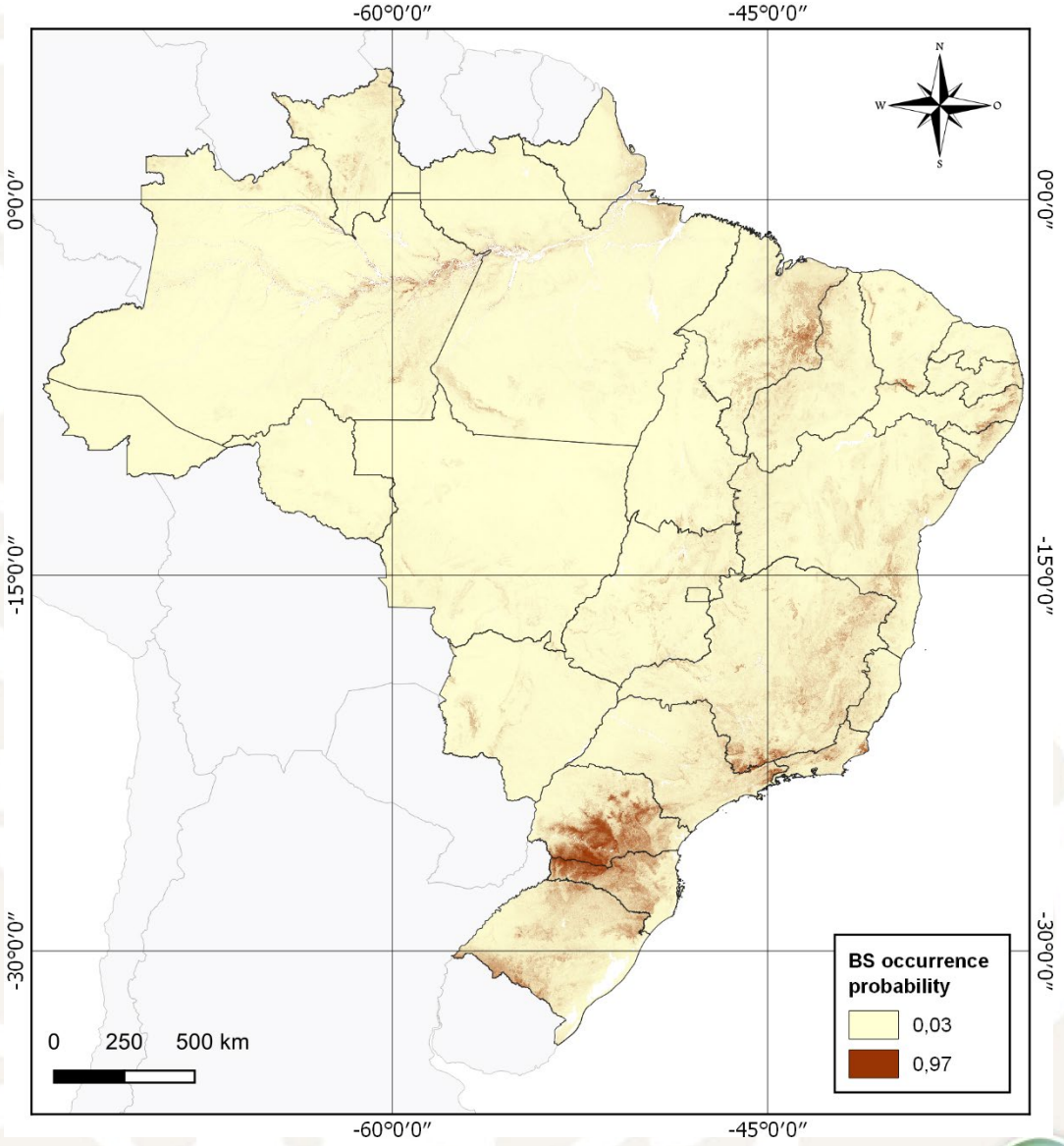
Tropical Black Soils:

- They occur in different regions of Brazil.
- The parent material is mainly derived from basalt, gabbro and diabase, or calcareous rocks and base rich sediments.
- The landscape is mainly undulated relief, the climate is usually dry, sub-humid or semi-arid.
- In the Brazilian country scale, they represent **hotspots** and, in many sites, the vegetation is “dry forest” (Tropical Deciduous Forest).
- Soils are classified, according to WRB, as Chernozems, Kantanozems, Phaeozems, Leptsols, Cambisols and some Gleysols.



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Sustainable management practices

Adopt the basic pillars of **No-Tillage System (Conservation Agriculture)**:

i) crop diversification and rotation;

ii) no-tillage;

iii) permanent soil covering.

To minimize soil disturbance and diversifying cropping system to achieve a sustainable grain production.

Cropping systems:

- Annual sequence with **wheat in the winter and soybean in the summer - crop succession (CS)**, and crop rotation with the following species in winter–summer, respectively: *white lupine–maize; black oat–soybean; wheat–soybean.*

- **Wheat – soybean – crop rotation (CR) and No-Tillage** allowed high and stable crop yields, especially under water-stress conditions.

Sustainable management practices

Water management

- Due to high water consumption, irrigation technologies such as intermittent irrigation, sprinkler irrigation, use of poly tubes or plastic hoses, among others, to reduce water requirements for crop production.

➢ The usage of intermittent irrigation reduced volume of water consumed by irrigated rice fields.

➢ **Paddy rice system** with no tillage with monocropping succession of irrigated rice (*Oryza sativa* L.) in the summer and spontaneous Italian ryegrass (*Lolium multiflorum* Lam.).

Grassland management

Recommended practices:

- Adjustment of animal load - based on pasture biomass growth (dry matter).
- Planning of fallow and mowing seasons.
- Mowing height between 20 - 30 cm above ground.
- Control of invasive plants and risks to endemic species in the Pampa biome.

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