

RIO GRANDE DO SUL

SOUTH BRAZILIAN STATE PRESENTS ITSELF TO THE WORLD
AS A MODEL OF SUSTAINABLE DIVERSIFIED AGRICULTURE



ABC+RS

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carbon emissions*

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GOVERNO DO ESTADO
RIO GRANDE DO SUL
SECRETARIA DA AGRICULTURA,
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AGRICULTURE WITH SUSTAINABILITY

Rio Grande do Sul is a Brazilian state whose economy built itself upon agriculture and agribusiness. Currently, agribusiness accounts for approximately 40% of the state's Gross Domestic Product (GDP), while agricultural activities per se correspond to about 23% of its GDP.

The presence of a multiplicity of ethnicities characterizes the state's population. It constitutes itself of descendants of Germans, Italians, Portuguese, Poles, African populations, indigenous peoples, Russians, Arabs, Jews, Japanese, Uruguayans, and Argentines. The population assortment, combined with its climate and soil conditions, defines the state's considerable rural productive diversity: Rio Grande do Sul produces more than 40 livestock and agricultural products, of which soybeans, rice, corn, tobacco, and wheat stand out as the major crops.

Rio Grande do Sul also presents an outstanding production of cattle, dairy cattle, sheep, pork, poultry, and fish. In 2021, the state exported around USD 15 billion in agricultural products, mainly soybean and soybean-derived products, forestry products, meat, tobacco, and other cereals such as corn and wheat¹.

1) For more information see: The Summary of Agriculture and Livestock Data in Rio Grande do Sul – Brazil, 2022. Available at: <https://www.agricultura.rs.gov.br/upload/arquivos/202209/01082325-rag-2022.pdf>

ABC+RS: a path to mitigate carbon emissions



Rio Grande do Sul works to conjugate rural production and food security with sustainability.

The state put into action the State Plan for Mitigation of Climate Change (ABC+RS Program), which seeks to consolidate low-carbon agriculture. The ABC+RS Program aims to ensure the continuous and sustained improvement of management practices that can mitigate the emission of greenhouse gases and increase the fixation of CO₂ in the soil and vegetation of the agricultural systems in the state.

Presently, Rio Grande do Sul has 2.2 million hectares of crops managed under the integrated crop-livestock-forest system (ICLFS) and is the third state in Brazil that most uses ICLFS². That contributes to Pampa and Atlantic Forest Biomes preservation and demonstrates Rio Grande do Sul's accountability to environmental sustainability. Pampa and Atlantic Forest are the two biomes present in the state. In addition to the ICLFS, the ABC+RS Program includes other practices that advance carbon sequestration, such as direct seeding with no-tillage, crop rotation, and the adjustment of animal load on the fields.

The integrated crop-livestock-forest and crop-livestock systems are known for their considerable potential to retain carbon and reduce greenhouse gas emissions. Research indicates that emission mitigation can reach up to 44% compared to the same amount of meat produced with conventional methods³.

In a similar direction, the no-tillage system reduces soil erosion and, hence, the loss of organic matter and nutrients. It, therefore, lowers production costs, the use of fossil fuels, and the emission of greenhouse gases. It also increases seeding productivity and the planting window, which is the ideal planting period.

In 2020, Rio Grande do Sul reduced its greenhouse gas emissions by approximately 4.0%, compared to 2019, and 7.5%, compared to 2010. The emissions in Rio Grande do Sul's agriculture in 2020 were 4.6% lower than in the previous year, which was decisive for the total reduction observed in the state's emissions⁴.

2) Source: Secretary of Agriculture, Livestock, and Rural Development of the state of Rio Grande do Sul (Secretaria da Agricultura, Pecuária e Desenvolvimento Rural, SEAPDR)

3) Source: Brazilian Agricultural Research Corporation (Embrapa Agrobiologia/RJ)

4) Source: FEIX, R., LEUSIN JÚNIOR, S., BORGES, B. K. & PESSOA, M. L. (2022). PAINEL DO AGRONEGÓCIO DO RIO GRANDE DO SUL 2022. Porto Alegre: SPGG.





The Pampa Biome

The Pampa Biome encompasses two-thirds of Rio Grande do Sul's territory. It characterizes itself by a temperate climate (temperatures between 13° and 17° C or, yet, between 55.4° F and 62.6° F) and the presence of extensive grasslands. Pampa is a term that has Quechua origin and means Flat Region. Quechua is an indigenous population from South America.

The Pampa Biome has been housing livestock (cattle, sheep, and horses) since the Jesuit colonization in the 17th century. Indeed, those animals' presence benefits the maintenance of the biome's grass and leguminous species. In the same geographic space within the Pampa's territory, multiple species of legumes and high forage value

grasses coexist, during winter and summer, and compose natural pastures, sometimes intercropped with exotic forage, with satisfactory productive stability. That provides sustenance to the herds of domestic ruminants as well as to wild herbivores.

Natural pastures have composed the Pampa Biome since prehistoric times. Those pastures used to feed herbivores, such as giant sloths and others. Therefore, the cattle and other herbivores brought by the European colonizers developed well in the Pampa because they found an adequate climate and nutritious pastures.

Studies show that animals raised in the Pampa in well-managed natural pastures emit less methane and are part of a system that accumulates carbon

fixed by plant roots. Another direct benefit of raising cattle in the Pampa is that the manure they produce is rich in nutrients and organic matter, which are essential for healthy soils. In other words, cattle, in addition to the meat, dairy, and other products they produce, also contribute to the conservation of the biome, which has a rich and extensive flora and fauna. Furthermore, animals raised in natural pastures produce food with more vitamins and minerals and higher levels of omega-3.





Environmental legislation and biome preservation

Environmental care and accountability are at the core of the scope of the Brazilian Forest Code, instituted by the Federal Law Nº. 12,651 of 2012. The Forest Code determines the preservation of areas protected by legislation. It determines the conservation of 20% of the natural landscape of the Pampa and Atlantic Forest Biome area. Data from the Brazilian Agricultural Research Corporation (EMBRAPA) show that native vegetation still occupies a large part of the national territory⁵.

The Forest Code also aims to reduce water, soil, and air pollution. The goal is to turn Brazil into a model for agricultural production and environmental preservation conciliation.

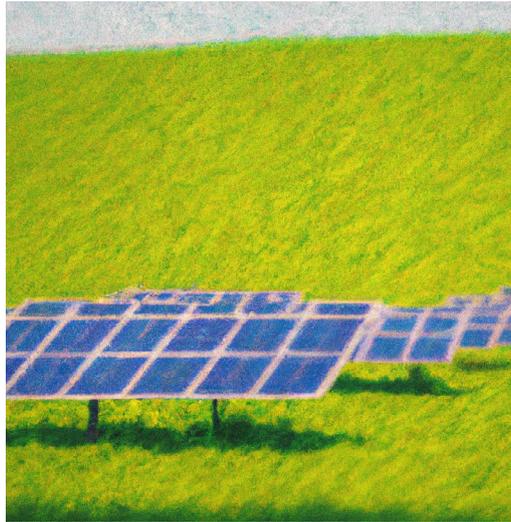
The Forest Code has, furthermore, established the Rural Environmental Register (Cadastro Ambiental Rural - CAR), which today is the country's most extensive environmental register. CAR is a national public electronic register. It is compulsory for all rural properties and integrates environmental information from rural properties and possessions regarding the Permanent Preservation Areas, restricted use areas, Legal Reserves, remaining forests and other forms of native vegetation, and other consolidated areas. CAR is the database for the control and monitoring of native landscapes, for environmental and economic planning, and for combating deforestation⁷.

Rio Grande do Sul, in particular, instituted the State Environmental Code through State Law No. 15,434/2020. That Code conformed the federal environmental legislation to Rio Grande do Sul's context, provided Bioma Pampa with a formal definition, and defined new modalities and expiration dates for environmental licenses. Additionally, it consolidated mechanisms to promote credit for environmental protection and sustainable practices, among other measures.

5) Source: Brazilian Agricultural Research Corporation (Embrapa Pecuária Sul)

6) Source: <https://www.embrapa.br/en/car/sintese>

7) Source: <https://www.car.gov.br/#/sobre>



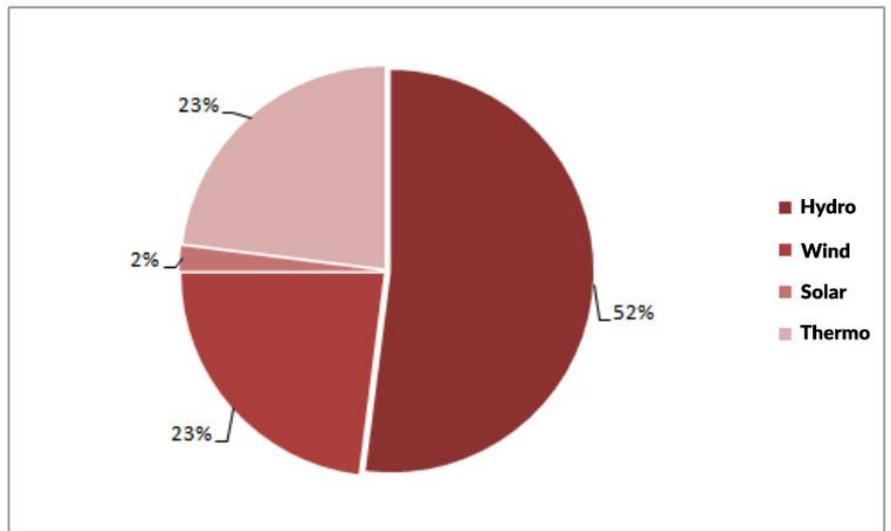
A renewable energy matrix



In Rio Grande do Sul, renewable energy sources are 77% of the energy matrix. Twenty-four hydroelectric plants are responsible for providing more than 50% of the energy consumed in the state. Furthermore, the investment in wind energy in the state between 2009 and 2017 reached BRL 11 billion. Thus, as the chart shows, 23% of the energy consumed in Rio Grande do Sul come from wind power⁸.

The state also fosters, through the State Law 14,864/2016, the generation and use of Biomethane and the production of other biomass energy. In addition, Rio Grande do Sul is now the third state in Brazil that most use photovoltaic energy, whose installed power capacity increased by about 74% between 2020 and 2021.

Percentage of electricity generation by type of source in Rio Grande do Sul in 2021 (%)



Source: Brazilian Energy Research Company (Empresa de Pesquisa Energética)

8) Source: <https://atlassocioeconomico.rs.gov.br/geracao-e-transmissao-de-energia>





Instruments for reducing environmental impact



Rio Grande do Sul has adopted a series of measures to reduce the state's environmental impact, especially concerning the carbon emissions from agricultural activities in its territory. The state is a signatory to the Alliance for Climate Action Brazil. That is a national coalition led by the World Wide Fund for Nature Brasil (WWF Brasil), the ICLEI South America, the Institute for Climate and Society, the Disclosure Insight Action Latin America, and the Brazilian Climate Center. The Alliance aims to support Brazil in reaching its goals and fulfilling the commitments made in the Paris Agreement. Rio Grande do Sul is, moreover, aligned with the discussions of the Koronívia Group, which seeks to discuss topics related to agriculture under the Paris agreement general guidelines.

The state ratified its commitment to building paths to sustainability. One measure in that direction is the series of regulations (Normativas SEAPDR No. 12/2022, No. 13/2022, No. 05/2019, No. 08/2019) issued by its Secretary of Agriculture, Livestock, and Rural Development. Those legal norms institute rules regarding the regulation, management, control, and use of hormonal agricultural herbicides. Those regulations aim, through technical courses, to instruct rural workers to use such products safely and adequately, mainly regarding sensitive crops. They require the training and registration of workers responsible for such pesticides' direct management. Today, Rio Grande do Sul has reached the number of 10,000 workers able to directly and appropriately manage hormonal herbicides and registered with the Secretary of Agriculture, Livestock, and Rural Development.

Rio Grande do Sul also carries out Rural Extension efforts to promote the use of bio inputs and

sustainable agricultural practices. The state invests, through the action of the Department of Agricultural Diagnosis and Research (*Departamento de Diagnóstico e Pesquisa Agropecuária - DDPA/SEAPDR*), in research in the following areas: agrometeorology; agroecology and sustainable agriculture; pollination and native bees; Pampa Biome and livestock; soil and water; among other themes. Such research aims to promote the use of sustainable techniques in agricultural and livestock production, as to allow for the sustainable management of the agroecosystem, and the conservation of biodiversity and natural resources. The goal is to enable a pattern of economic development concomitant with natural resource preservation.

The studies put forward by DDPA/SEAPDR orient themselves towards sustainable production technologies development and validation. They congregate economically relevant agricultural and forestry products, integrated management of agricultural systems, organic vegetable production systems, and aquaculture, among other topics⁹.

The agrometeorology research line has the Simagro-RS – Agroclimatic Monitoring and Alerts System, which works to monitor the climate in Rio Grande do Sul for agricultural purposes. Simagro-RS elaborates products and information to enable planning and act as support for short, medium, and long-term efforts in the state's agricultural sector. There are 20 new automatic weather stations installed to consolidate the existing sensor network in the state. Such a sensor network monitors climate and ensures the correct use of phytosanitary products. Simagro-RS likewise builds weather and climate models. It generates agrometeorological products for all the 497 municipalities in Rio Grande do Sul.

9) Information available at: <https://www.agricultura.rs.gov.br/agroecologia-e-agricultura-sustentavel/>; <https://www.agricultura.rs.gov.br/polinizacao-e-abelhas-nativas>



Furthermore, the SEAPDR, through the action of the Department of Agricultural Policies and Rural Development (DPADR), encourages the production of winter cereal, like wheat. Such cereals cultivation improves rural property profitability because it partitions the direct fixed costs, such as skilled labor and machinery. It also increases soybean crop productivity in succession and generates indirect benefits in terms of soil fertility and natural suppression of pests and invasive plants. Wheat production, in particular, promotes soil conservation and no-till due to the crop cover during the winter and the excellent straw for planting summer crops. The state program to boost corn production, Pró-Milho, plays a similar role. Corn is a highly demanded grain for feeding cattle, swine, and poultry. Its cultivation benefits the production systems as a result of carbon retention both in the aerial and in the crop's root system. In addition, corn cultivation enables the fixing of nutrients in the soil and prevents erosion.

In a similar direction, private entities linked to agricultural and livestock production in Rio Grande do Sul created the Duas Safras Program, which aims to increase rural production systems' efficiency by promoting the rational use of the state's traditional human and productive resources. In Rio Grande do Sul, the temperate/subtropical climate allows for two or even three crops per year in the same area.

Ultimately, it is imperative to recognize the state's efforts to promote public policies aimed at solving problems related to drought and irrigation. Irrigation is a technology of fundamental importance. It avoids crop losses and

maintains agricultural productivity at high levels in the short, medium, and long run, which prevents production fluctuations. It genuinely functions as rural insurance for the producer and guarantees rural property sustainability. Currently, the state has three irrigation projects: the *Avançar na Agropecuária e no Desenvolvimento Rural* Project (Advance in Agriculture, Livestock, and Rural Development Project), which allocates resources to the construction of water storage structures in Rio Grande do Sul's municipalities; SOS Estiagem, which provides a one-time aid to producers affected by the drought that afflicted the state during the 2021-2022 crop; and the Programa Estadual de Expansão da Agropecuária Irrigada - Mais Água Mais Renda (State Program for the Expansion of Irrigated Agriculture - More Water, More Income), which, irrespective of being formally finished, continues to provide resources to its participants to foster and facilitate the expansion of irrigation.

Therefore, the information compiled in this document shows the willingness and potential of Rio Grande do Sul State to integrate the global food markets and to contribute not only to mitigating food insecurity in the world but mainly to doing so with a commitment to the environmental and climate balance. The state, therefore, presents itself as an outstanding source of agrosilvopastoral products for the world, based on a highly diversified and sustainable source of food production, without ever losing focus on food and energy security.



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GOVERNMENT OF THE STATE OF RIO GRANDE DO SUL

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