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ABR Program Handbook

Climate change



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Introduction



The **Responsible Brazilian Cotton program (Programa Algodão Brasileiro Responsável – ABR)** is publishing a series of handbooks on how its new material topics relate to sustainability.

This first edition focuses on the **climate change debate** to foster engagement on the topic and stress its importance for cotton farming in Brazil.

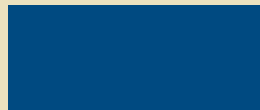
Enjoy your reading!



Climate Change

Over the last few decades, the temperature and climate standards in our planet have been changing increasingly faster due to human influence.

This process relates directly to greenhouse gas (GHG) emissions, such as carbon dioxide and methane. The combustion of fossil fuels such as coal, oil, and gas is among the primary drivers of global warming, but land clearing, deforestation, and sanitary landfills also contribute significantly.





Historical global emissions by sector

Source: Climate Watch

CO₂e

2022

60Gt

45Gt

30Gt

15Gt

0

1992 1995 1998 2001 2004 2007 2010 2013 2016 2019 2022

50.1Gt

- Energy
- Agriculture
- Industrial processes
- Waste
- Land use change and forestry



What is Climate Mitigation and Adaptation?



Climate mitigation and climate adaptation are complementary strategies to address the challenges brought on by climate change, such as extreme events: heatwaves and **cold spells, prolonged droughts, severe storms**, etc.



These events cause impacts to agriculture, including cotton farming, which shows how important it is that we deal with this topic responsibly and work together to find solutions for sustainable development.

Climate Mitigation



It consists of actions to fight the issue at its root, with the main goal of **reducing GHG emissions** in order to slow down global warming.

It is crucial to invest in mitigation initiatives as a way to ensure that the consequences of climate change aren't irreversible.



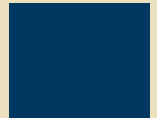
How can cotton farming contribute to mitigation?

Using fertilizers more efficiently and responsibly, following soil analysis reports, thereby reducing nitrogen oxide emissions.

Implementing agroforestry or no-till farming systems, which ensure greater soil carbon sequestration.

Using bio-inputs and biological pest management, which reduce dependency on chemicals with a higher carbon footprint.

Investing in technology and precision agriculture to reduce fossil fuel consumption.



Climate Adaptation



The purpose of climate adaptation is to **promote initiatives that address climate change impacts**, with the understanding that it is necessary to reduce the exposure and vulnerability of natural and human systems in this context.

This strategy is crucial for agricultural production, for example, which is heavily reliant on rainwater.



How can cotton farming contribute to adaptation?

Developing and using cotton varieties that are more resistant to drought or extreme heat.

Investing in high-quality no-till farming, incorporating crop rotation, and enhancing the soil's organic matter.

Managing water resources adequately, with efficient irrigation and soil conservation.

Planning the agricultural calendar around more appropriate planting and harvesting periods.

Strengthening early warning systems and climate monitoring, which help farmers make informed decisions.





What are Brazil's plans to manage the issue?



In line with the Paris Agreement, an international treaty adopted in 2015 that focuses on fighting climate change, our country has developed a national plan to address this topic.

The Nationally Determined Contribution (NDC) is the official representation of our country's commitment. It comprises targets that are revised every five years, which are based on Brazil's **economic, social, and environmental reality.**

[Learn more about the NDC.](#)

Check out the [National Plan for Climate Change Adaptation \(PNA\)](#), Brazil's primary public policy for climate adaptation and a critical initiative to meet our Paris Agreement commitments.

Main Targets

Reducing polluting gas emissions by **53%** by 2030, compared to 2005 levels.

Reaching climate neutrality by 2050, which means bringing net emissions to **zero**.



Why does that matter for cotton?



It reduces climate risks for farming.



It empowers green markets and certifications.



It prepares the country for extreme events.



It helps Brazilian agriculture's competitiveness in the global context.



**Climate
change does
not affect
everyone
equally!**



Socially vulnerable groups are more sensitive to those issues, as they live in areas with more limited infrastructure and access to public services, and they rely on natural resources for food and income generation.

For instance, heavy rain tends to affect areas with precarious housing and sanitation more critically, compared to higher-income areas. Can you see the difference?

In Brazil's cotton farming reality, rural communities, farmworkers, family farmers, and indigenous peoples might be living in vulnerable conditions, as they face challenges related to prolonged droughts, temperature increase, and water scarcity.

Promoting climate justice also ensures that these groups can be protected and empowered to face climate issues!





High alert!

2024

was the warmest year in Brazil since 1961, with every month's temperature surpassing the historical average.

Source: National Institute of Meteorology (INMET)



95%

of the country's municipalities suffered climate-related disasters between 2013 and 2024.

Source: S2ID/MIDR

Cotton farming productivity loss could reach

15%

by 2040 in some regions of the country.

Source: Agroicone





97%

of Brazilians feel the impact of climate change on their day-to-day activities.

Source: Datafolha

There was a

25%

increase in the number of consecutive days without rain in Brazil over the last 60 years due to climate change.

Source: Inpe





How can cotton production be affected?



Climate change can also bring significant risks to agricultural production's predictability and stability, thus impacting exports and operational costs as well as the access to national and international markets, which are increasingly demanding in terms of sustainability requirements.



Temperature increase

It intensifies pest pressure, influencing cotton's physiological efficiency and compromising production if adaptation measures are not taken.



Infrequent rainfall

It promotes droughts and drives the demand for irrigation systems (due to increased water stress) in order to prevent fiber quality loss.



Extreme climate events

They can damage crops, disrupt mechanized harvesting, and significantly increase cotton production costs.



Ecosystem degradation

The conversion of native vegetation reduces nature's capacity for climate regulation, thus affecting the water cycle and rainfall formation.



What is ABR's stance regarding climate change?

93% of rainfed
production*



*Based on the 2023/2024 crop season.

The water footprint to produce cotton in Brazil is 3,436 liters per kilogram of lint, of which 3,372 liters are sourced from rainfall and only 64 liters come from irrigation.

[Source: International Cotton Advisory Committee \(ICAC\)](#)

Conservation of native vegetation

Certified farms must preserve key areas of native vegetation, which promotes carbon stocks and favors the reduction in the concentration of GHG such as CO₂ in the atmosphere.



Use of renewable energy sources

ABR encourages investment in renewable energy sources, which is a key strategy to help cotton farming reduce impacts caused by emissions and ensure greater production efficiency.

Use of bio inputs

By encouraging the adoption of biological products, we reduce the need for synthetic chemical inputs, which have a high carbon footprint and can impact biodiversity.



Soil stewardship

ABR encourages soil stewardship and the promotion of no-till farming using crop residues, with crop rotation and using cover crops.



Climate change on ABR's checklist

The Responsible Brazilian Cotton certification also incorporates climate change into its checklist, which comprises a series of requirements to be fulfilled by producers.

[Check out the full checklist here.](#)



Climate mitigation



7.20 – Does the farm abstain from burning crop residues or remains, with the exception of authorized burning or that intended for energy production?

8.1 – On the farm, are nutrients used according to the soil's requirements and crop type (based on regular soil sampling*), while also considering the time between applications and dosage, as well as keeping application records?

8.11 – Does the farm monitor pests and diseases, especially the boll weevil, and are chemical applications supported by monitoring results? Does the farm participate in and contribute to state-level monitoring actions to reduce the incidence of boll weevils?

Climate adaptation



7.10 – Is it possible to demonstrate that the farm employs management practices that optimize soil water use and minimize soil water evaporation?

8.3 – Does the farm plan and implement best soil management practices to maintain and improve soil structure and fertility and enhance nutrient cycles?

8.5 – Does the farm monitor and/or control rainfall and use rainwater efficiently (i.e. erosion and runoff controls, rainwater harvesting, etc.)?

8.6 – Does the farm implement conservation techniques to preserve the physical, chemical, and biological quality of the soil?



Would you like to learn more...

About the ABR Program?

Go to ABRAPA's website for information about Responsible Brazilian Cotton's work in the country to empower cotton farming and ensure greater farming sustainability.

<https://abrapa.com.br/>

About climate change?

Searching for quality information from trusted sources is crucial to learning more about climate change.



Check out the list below for key organizations to keep an eye on!

Embrapa

<https://www.embrapa.br/>

Brazilian Ministry of Environment and Climate Change

<https://www.gov.br/mma/pt-br>

National Institute for Space Research

<https://www.inpe.br/>

Brazilian Institute of Environment and Renewable Natural Resources

<https://www.ibama.gov.br/>

Brazilian Institute of Geography and Statistics

<https://www.ibge.gov.br/>

IMAmt – Mato Grosso Cotton Institute

<https://imamt.org.br/>



ALGODÃO BRASILEIRO RESPONSÁVEL
RESPONSIBLE BRAZILIAN COTTON

