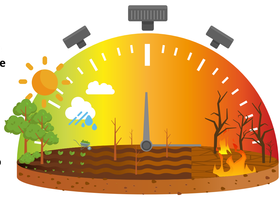
HOW TO ADAPT BRAZILIAN AGRICULTURE TO INCREASINGLY FREQUENT DROUGHTS AND HIGH TEMPERATURES

Agriculture in the country has struggled with the impacts of extreme climate events.

In the last decade, drought episodes have become more frequent and severe compared to previous decades.



That is the reality unveiled by two forecast and monitoring tools created under the research project titled "Monitoring and Forecast of Climate Impacts on Agriculture," led by Brazilian researcher Marcelo Galdos (University of Leeds), with the participation of Marcelo Zeri and Ana Cunha (Cemaden), Fabio Marin (ESALQ-USP) and Murilo Vianna (University of Leeds), among several British researchers.

The researchers created two important tools to monitor droughts and climate impacts on Brazilian agriculture:

A platform combining several indicators to monitor the incidence of droughts in agriculture both presently and in the recent past.

An agricultural modeling that simulates the effects of climate change across the main Brazilian crops, such as corn, soybean, sugarcane and sorghum.

HOW TO HANDLE THIS SITUATION?

Recurring droughts makes it harder to plan plantation strategies and lowers crop yields. And forecasts indicate that they tend to become even more frequent over the next few years.

A temperature increase of 2 and 4 degrees Celsius could reduce corn yield in the Brazilian northeast by 30% and 60%, respectively.

In this scenario of rising temperatures, 54% of the region would suffer from **water shortage in 2100**, while semi-desert and arid conditions would replace the current caatinga subtropical vegetation.

How can farmers prepare for the future? What can be done beyond public initiatives, such as better resource management, irrigation systems and other water infrastructure projects?

*The key word here is **ADAPTATION** to adverse conditions. There are a few ways to go about it.*

Here are some of them with examples:

1

Practices to preserve soil moisture: these have countless benefits for soil fertility, biodiversity and structure, while also preserving surface moisture and reducing water evaporation rates. A range of techniques can be used in this sense:

- **Letting crop residues cover the soil after harvesting:** this creates a layer of organic material that helps preserve moisture and potentially boost carbon stocks in the soil.
- **Planting species adapted for cover crops**, such as legumes, grasses, oleaginous seeds and cruciferous vegetables.
- **Planting directly in chaff**, with minimal inversion tillage.

2

Use of crops that are more tolerant to drought: there are varieties of corn and beans that are better adapted for drought conditions. Techniques that expose young plants to moderate water stress in nurseries also help increase sugarcane tolerance to droughts. The ideal here is to develop crops with deeper roots that use water more efficiently.

- **Alternative species, such as prickly pears, castor beans, sorghum, agave and pineapple, are well adapted to dry conditions.** Sorghum is among the most versatile and tolerant. Originally from Sub-Saharan Africa, it produces grains for human consumption and animal feed, and biomass for fodder, and can grow again after harvesting, minimizing replanting costs and operations.

- **Genetic enhancements of seeds have also yielded good results**, especially for cashew and cotton in the Northeast. Nonetheless, the climate change scenario should be addressed by faster enhancement programs, especially with the use of artificial intelligence for cross-species.

3

Diversifying crops and adjusting the crop calendar: this includes, for example, changing plantation dates to avoid droughts during critical crop development stages. Farmers must closely monitor the Agricultural Climate Risk Zoning (ZARC) of EMBRAPA (Brazilian Agricultural Research Corporation). The tool generates information such as the crop calendar, best municipalities to grow a certain product, ideal sewing dates with lower climate risk, crops adapted to the region and most appropriate type of soil.

4

Greater investment in specialized technical support: in order to train family farmers in proper agricultural practices, Public policies are also required to ensure access to water, disseminate technologies and production systems that are more resistant and adequate for droughts.

5

Diversification and integration of agricultural systems: to expand growing options beyond single crops, including integration between crops, livestock and forestry, and greater crop diversity.

WOULD YOU LIKE TO LEARN MORE ABOUT HOW TO PREPARE FOR DROUGHTS IN YOUR REGION?

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Authors:

Drafting and editing: