

The Impact of Cotton Farming in Goiânia on Global Warming and How GLOBE Program Can Help

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Abstract: Cotton farming, as a significant agricultural activity, can contribute to global warming through changes in land use and the emission of greenhouse gases. In Goiânia, the conversion of land for cotton cultivation can lead to deforestation, soil degradation, and increased greenhouse gas emissions, exacerbating the effects of climate change. The GLOBE program offers an opportunity to monitor these environmental impacts by collecting data on local temperature, land cover, and water quality. This paper discusses the relationship between cotton farming and global warming and how the GLOBE program can be utilized to mitigate these effects through education, data collection, and sustainable practices.

Methods:

1. **Data Collection:** The GLOBE program allows students and researchers to collect data on various environmental factors such as local temperature, humidity, land cover, and water quality. Participants will use GLOBE protocols to record these measurements in cotton farming areas around Goiânia.
2. **Observation of Land Use:** By monitoring changes in land cover using GLOBE's land cover observations, participants will be able to assess the conversion of natural areas into cotton farms and its impact on the local climate.
3. **Water Quality and Irrigation Monitoring:** The GLOBE program provides tools to measure water quality and irrigation practices. Observing these factors will help determine how cotton farming influences local water resources and contributes to climate change.
4. **Educational Outreach:** Engaging local communities and students in the GLOBE program to understand the environmental impact of cotton farming and advocate for sustainable agricultural practices.

What Can Be Done to Prevent Extensive Commercial Cotton Farming and Its Impact on Rising Temperatures

To prevent the extensive and commercial cultivation of cotton and mitigate its impact on rising temperatures, it is essential to adopt an integrated approach that involves sustainable agricultural practices, public policies, and environmental education. Some effective measures include:

1. Promoting Sustainable Agricultural Practices:

- **Low-impact farming:** Encourage the use of farming techniques that minimize soil degradation and the need for deforestation. This includes practices such as **conservation agriculture**, focusing on crop rotation, no-till farming, and the use of cover crops.

- **Efficient water use:** Implement more efficient irrigation systems, such as drip irrigation, to reduce water wastage and lessen the impact of farming on the water cycle.
- **Reduced use of pesticides and chemical fertilizers:** Promote the use of organic fertilizers and biological pest control practices, reducing the release of greenhouse gases such as methane and nitrous oxide.

2. Encouraging Agroecology:

- **Diversified cropping policies:** Encourage crop diversification in agricultural areas, which helps prevent monoculture, making the land less vulnerable to pests and diseases while reducing environmental degradation.
- **Integrated crop-livestock-forest systems:** This system promotes the integration of agriculture, livestock, and forest preservation, helping to reduce deforestation and increase biodiversity.

3. Agroforestry Systems and Regenerative Agriculture:

- **Agroforests:** Implementing agroforestry systems can be a viable alternative to large-scale cotton farming, as it combines agricultural production with the preservation of native vegetation, helping in carbon sequestration and biodiversity conservation.
- **Regenerative agriculture:** Encourage techniques that restore soil health, such as composting and planting nitrogen-fixing plants, which can increase environmental resilience and reduce climate impacts.

4. Environmental Education and Awareness:

- **Education on environmental impacts:** Educational programs on the consequences of excessive cotton farming can raise awareness among farmers, consumers, and policymakers about the harm caused by intensive agriculture.
- **Promoting conscious consumption:** Through educational campaigns, it is possible to reduce demand for products made from cotton grown with unsustainable practices and promote more ecological alternatives, such as organic cotton or more sustainable synthetic fibers.

5. Public Policies and Environmental Legislation:

- **Regulating agricultural expansion:** Implement public policies that limit the expansion of large commercial plantations, especially in ecologically sensitive areas. This could include creating protected zones and incentivizing the preservation of native vegetation.
- **Incentives for sustainable practices:** Provide subsidies and tax incentives for farmers who adopt sustainable agricultural practices, such as organic farming and low-impact technologies.

6. Technology and Innovation:

- **Research and development of climate-resistant cotton:** Invest in the development of cotton varieties that require fewer natural resources, such as water and fertilizers, and that are more resilient to extreme weather conditions.
- **Environmental impact monitoring:** Use technologies, such as remote sensing and the GLOBE program, to monitor and analyze environmental changes caused by cotton farming, enabling corrective actions based on data.

7. Economic Alternatives for Farmers:

- **Alternative income sources:** Create programs that encourage farmers to diversify their sources of income, such as offering training in the cultivation of more sustainable crops or eco-tourism alternatives.
- **Certification and sustainable markets:** Develop and promote markets for organic cotton and fair trade certifications, which provide a premium to farmers who adopt sustainable practices.

Conclusion:

Combating the impact of extensive cotton farming on rising temperatures requires a multifaceted approach that combines sustainable agricultural practices, environmental education, effective public policies, and technological innovation. Raising awareness among all stakeholders, from farmers to consumers, is crucial to ensuring that cotton farming does not overload the planet and that its impact on the climate is mitigated.

Cotton farming in Goiânia can contribute to global warming through deforestation, greenhouse gas emissions, and altered water cycles. By utilizing the GLOBE program, we can collect critical environmental data, which will help raise awareness of the effects of cotton farming on the local and global climate. This data can drive educational programs that encourage sustainable farming practices and contribute to mitigating climate change. The GLOBE program plays a vital role in fostering a deeper understanding of how agricultural activities impact our planet and how we can work together to create a more sustainable future.