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Why India fell behind in the cotton race – an aversion to science and technology

The Boom Years: A Cotton Revolution

- Between 2002-03 and 2013-14, India saw a huge rise in cotton production, tripling from 13.6 million bales to 39.8 million bales.
- The rise was driven by the adoption of genetically modified (GM) Bt cotton hybrids, which improved yields and reduced pesticide use.
- India became a major cotton exporter, surpassing the United States by 2015-16, marking a cotton revolution in the country.

About Cotton

- Cotton is one of India's most important commercial crops, contributing to 25% of global cotton production.
- Around 67% of India's cotton is grown in rain-fed areas, and 33% is grown in irrigated areas.
- Cotton grows best in hot, sunny climates and well-drained soils, though it is sensitive to waterlogging.

Decline in Cotton Production: A Self-Inflicted Crisis

- By 2024-25, India's cotton production dropped to 29.5 million bales, the lowest since 2008-09.
- India became a net importer of cotton, relying on supplies from countries like the US, Australia, Egypt, and Brazil.
- This decline is mainly due to domestic policy failures and regulatory hurdles, not external factors.
- National lint yields have dropped from 566 kg per hectare in 2013-14 to below 450 kg per hectare.

Technological Advancements and the Role of GM Cotton

- India's cotton rise was fueled by innovations like H-4 and Varalaxmi hybrid cotton varieties, followed by the introduction of Bt cotton in 2002-03 and Bollgard-II in 2006.
- However, reluctance to approve new GM technologies has led to stagnation in recent years.



Policy Paralysis and the GM Crop Ban

- Policy decisions, especially during the UPA and NDA governments, hindered agricultural innovation, including a moratorium on GM Bt brinjal and restrictions on GM crop trials.
- GM crops were classified as "hazardous substances" under the Environment Protection Act, discouraging scientific progress.

Regulatory Hurdles and Their Consequences

- Several indigenous GM crop innovations, like pest-resistant cotton, faced regulatory delays.
- The regulatory system, driven by fear and activism, blocked progress, leaving farmers without access to advanced crop varieties.
- Courts intervened in issues that should have been handled by experts, complicating the approval process.

The Economic Fallout: India's Growing Cotton Imports

- India's cotton imports have doubled in value, rising from \$518.4 million in 2023-24 to \$1,040.4 million in 2024-25.
- Cotton exports have also fallen, from \$729.4 million to \$660.5 million.
- The resurgence of pink bollworm infestations worsened the crisis, and the refusal to adopt newer pest-resistant GM cotton varieties left farmers vulnerable.

Who Benefits? The Global Cotton Giants

- India's shift to becoming a net importer of cotton benefits countries like the US and Brazil, who may lobby to remove India's import duties.
- This situation mirrors India's decision to allow imports of GM soyameal, setting a precedent for future GM crop imports.

The Farmer's Plight and the Activist Influence

- Indian farmers have been denied access to modern agricultural technology due to activist opposition and bureaucratic delays.
- While activists blocked GM field trials, they remained silent about GM imports like soyameal and corn, putting farmers at a disadvantage and making them reliant on expensive imported cotton.

Conclusion

- India's cotton crisis is a result of poor policy decisions, reluctance to adopt new technologies, and bureaucratic inefficiencies.



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- To regain its position as a global cotton leader, India needs to embrace scientific advancements, streamline regulatory approvals, and focus on the needs of its farmers.
- Bold policy decisions are needed to foster innovation and ensure a sustainable future for Indian cotton production.

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