

# Sustainable Journey of Cotton: From Farm to Fabric

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## Abstract

Cotton production has two major sustainability challenges. They require huge usage of pesticide and water. The cotton plants have great susceptibility to pests and diseases. Moreover, excessive use of pesticides and fertilizers can harm the environment and promote soil degradation. Remote monitoring systems can be used to detect and monitor pests in cotton production. These systems typically involve sensors placed throughout the field that can detect the presence of pests or signs of pest damage. By detecting pests early, farmers can take proactive measures to control them, such as applying targeted pesticides or introducing beneficial insects. This can help to reduce the overall use of pesticides and minimize damage to the cotton crop. Biological control is a method of pest management that uses natural enemies like insects, mites, or bacteria to control pest populations. These natural enemies, known as bio control agents, prey on or parasitize the pests, reducing their numbers without the need for chemical pesticides. Another issue is the high water consumption required for cotton cultivation. This is because they are growing quickly and need a lot of energy to produce cotton. This excessive water requirement can be managed by using smart irrigation systems that can accurately measure and control water application. Machine learning algorithms can analyze real-time data on soil moisture to optimize water usage in cotton production. By monitoring soil moisture levels continuously, these algorithms can predict when plants need to be irrigated. This helps prevent over-irrigation and soil degradation.

## Keywords

Bio-control Agent, Cotton Production, Chemicals, Over-irrigation, Pesticide, Soil Degradation, Sustainable, Smart Irrigation