

ENHANCING BIODIVERSITY THROUGH COTTON SUPPLY CHAINS



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August 2026

Main messages

- Biodiversity loss is becoming a material business risk for cotton-dependent industries, driven by ecosystem degradation, growing regulatory requirements, and increasing expectations for sustainable value chains.
- BAMBOO's geographically differentiated assessment methods enable industries to identify and quantify biodiversity impacts across cotton supply chains, highlighting land and water use during cotton cultivation as the most significant drivers. The results demonstrate that sourcing decisions and sustainable farming practices can substantially influence biodiversity outcomes.
- Improving biodiversity performance requires a combination of robust supply chain data, greater transparency, and the adoption of sustainable production practices. At the same time, industry-wide progress will depend on balancing sustainability ambitions with economic competitiveness and fostering stronger consumer demand for biodiversity-friendly products.

Context

The global decline in biodiversity is an urgent challenge linked to industrial activity and supply chains. It endangers ecosystem services and therefore human well-being, economies and

industrial operations. As biodiversity loss interacts with other planetary boundaries (e.g. climate change, land-system change, freshwater use), cascade effects and additional pressures on ecosystems are revealed that mean fierce risks for industries.

Moreover, biodiversity loss and interlinked environmental, social and economic challenges pose a crisis to which governments are responding to through **regulations, directives and frameworks**, some directly implicating industry.

A few examples are the [Kunming-Montreal Global Biodiversity Framework \(GBF\)](#) and the two transformative EU directives: the [Corporate Sustainability Reporting Directive \(CSRD\)](#) and the [Corporate Sustainability Due Diligence Directive \(CSDD\)](#).

On top of these, there is another framework underway by the EU that may determine sustainability practices in industry; the Ecodesign for Sustainable Products Regulation (ESPR). A key pillar of ESPR is the need for digital product passport, to ensure traceability along the value chain after the product has been placed on the market, notably with textiles being identified among one the first product group to be prioritized.

Besides regulatory and legal compliance, industries, notably cotton-dependent industries,



face other compelling drivers towards sustainable practices: the ambition to distinguish oneself, particularly through marketing and biodiversity high dependency, although within the textile industry, biodiversity remains rather an invisible asset. For many industries, sustainability, including biodiversity, is ultimately a priority to abide by one's core values.

It is therefore paramount to understand the interlinkages between industrial activity and biodiversity to unlock solutions that support mitigation of biodiversity loss while addressing broader sustainability demands, including economic and social ones. To address this challenge, the industry, researchers and policymakers identify as priority to comprehend the effects of industry, supply chains and global trade on biodiversity and ecosystem services, which in turn, requires reliable methods for their assessment and measurement.

Recognizing this need, BAMBOO provides knowledge of the effects of non-food biomass, such as cotton, trade on biodiversity and ecosystem services and delivers tools that allow to quantify the impact of global trade on biodiversity.

BAMBOO's tools could therefore pose as a solution for industries, as these tools allow to: 1) quantify the impacts of non-food biomass trade flows on species diversity, functional diversity, and ecosystem services, specifically from impacts from greenhouse gas emissions, nutrient pollution and land and water use - by quantifying such impacts, one can identify which pose higher risk to biodiversity and ecosystems, and based on this information, implement adequate mitigation efforts; 2) identify and assess the leverage points for biodiversity conservation in non-food biomass economy that can inform mitigation efforts by industry, in order to steer actions leading to concrete mitigation of impacts on ecosystems.

Industry value chain, including suppliers, retailers, producers, and consumers, dealing with and using non-food biomass raw materials and products, such is the case of cotton, will be able to use the knowledge on the impact of the trade of cotton on

biodiversity to inform decisions.

Key results

A "real-world" case study was conducted using BAMBOO's methods to assess the main causes of biodiversity loss along the supply chain of cotton products, and to identify key leverage points for biodiversity conservation, ultimately also testing the methods. This case study was performed in close collaboration a **Retail Partner** to take into consideration its **large and complex supply chains**. The Retail partner provided data from a supply chain located in several Indian States. Moreover, several relevant stakeholders linked to the textile industry across the value chain were consulted and their feedback was collected.

The data analysis shows that land use and water use, within the impact categories considered, are the most relevant ones, being mainly linked to the cultivation of cotton lint. In the case study it was observed that the origin of the supplied cotton is directly connected with the magnitude of the impacts on biodiversity associated to cotton cultivation. Indeed, Indian States are characterized by different climatic regimes (specially for precipitations and temperature), which influences the production yield, and consequently, the consumption of resources such as land and water.

A scenario analysis showed that yield improvements and water consumption reduction are achievable adopting better techniques for irrigation, following advances in cotton cultivation applied in other Countries. However, yield improvements are already registered among farmers which follow indications of the Better Cotton Initiative (BCI), a governance program fostering more ecofriendly solutions tailored for the local specificities. BCI solutions include, for instance, crop rotation, land cover, and biological pest control. Based on an analysis performed under this case study, the latter indicates that BAMBOO methods can capture the beneficial effect of BCI farming on the mitigation of impacts on biodiversity.



Regarding main challenges and drivers towards biodiversity loss mitigation identified by relevant stakeholders of the textile industry, retailers included, **regulation is perceived both as an obstacle and an opportunity, balance with economic competitiveness** remains hard to achieve, which in turn, is linked to an urgent need which is **consumer behavioural change**. Moreover, a clear need identified is **reliable primary data**, namely from suppliers.

Recommendations

- Geographically differentiated impact assessment methods, such as those of BAMBOO, are suitable to correctly assess the impacts in cotton production, which is highly dependent on the regional climate conditions.

- Strengthen supply chain transparency by: prioritizing suppliers with verified sustainability data, i.e., that already provide reliable, auditable sustainability data, and increasing disclosure requirements across the supplier base, using purchasing power to encourage greater disclosure from suppliers that do not currently provide sufficient data.
- Foster market demand for sustainable and biodiversity-friendly products throughout the supply chain by encouraging consumer investment, supporting targeted marketing and educational initiatives that increase awareness, build trust, and reinforce the value proposition of sustainable consumption and through political lobbying.



Co-funded by
the European Union

Co-funded by the European Union and the Swiss Confederation. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Swiss Confederation. Neither the European Union nor the granting authority or the Swiss Confederation can be held responsible for them.

Project funded by



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