

Cotton & Water: Demystifying Agricultural Water Management

PART ONE



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# Webinar Support



## Overview

- Water challenges
- Cotton's resiliency in a variety of climates
- Continual improvement: enhancing cotton's water productivity



## Challenges



#### **Global Water Stress**



Based on data from: Gassert, F., M. Landis, M. Luck, P. Reig, and T. Shiao. 2013. "Aqueduct Global Maps 2.0." Working Paper. Washington, DC: World Resources Institute. http://www.wri.org/publication/aqueduct-metadata-global. 20 pp.

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#### **Cotton Critical Crop in Water-Limited Areas**

"Significant reduction in water withdrawals from the Ogallala Aquifer for irrigation is probable if producers were to convert 50% of their land under corn to cotton production."





## Aral Sea

## Poor water policy drained the Aral Sea, **not cotton**.





#### 5% of World's Cotton in Aral Sea Region

Irrigation Region	Irrigated Area (1000 ha)	Irrigated Area Cotton
1	876	49%
2	1,822	28%
3	806	37%
4	505	0%
5	1,011	62%
6	1,227	30%
7	866	2%
Total	7113	32%



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#### Cotton's Global Water Use

## Cotton production uses 3% of the world's agricultural water



## Cotton's Resiliency in a Variety of Climates

#### Heat Tolerance

#### Arizona Cotton Field - July 26



#### **Drought Tolerance**



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#### Seasonal Water Use - Arizona



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#### U.S. Cotton Crop Largely Rain-Fed

- 60% of U.S. cotton land requires no irrigation
- Only **4%** of land is fully irrigated



#### Maximize Rainfall Capture

#### **Optimize Irrigation Water Use**



#### **Increase Plant Water Productivity**

#### **Evaluate with Credible Metrics**

### Water Capture





#### **Optimizing Irrigation: Water Delivery Systems**





#### **Optimizing Irrigation: Precision Timing**





### Plant Water Productivity



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#### U.S.: Water & Yield Trends





#### **Global Average Cotton Yield Trend**





#### **Cotton's Agricultural Water Summary**

- Relative to other crops, cotton is not an excessive water user.
- It is heat and drought tolerant, so it can be grown in water limited regions.
- Modern technologies have greatly increased cotton productivity and decreased cotton's irrigation water use.
- Based on current research progress, the trend towards increased water productivity will continue.



#### **Cotton's Water Footprint**

It takes about **0.4 mm of rainfall on a hectare of land** to produce **one kilogram** of cotton fiber.

That is equal to:

4400 liters per kg [520 gallon per lb.]

1800 liter per kg of **seed** and fibre [217 gallons per lb.]



Less than 50% of world's cotton relies on irrigation



## Intro to Part 2 Dr. Jesse Daystar

#### Water and Life Cycle Assessment





### Interactions with Water

#### Water Use/Water Withdraw

Water that has been withdrawn or required for a process/product regardless of whether it is returned or removed from the watershed

#### Water Consumption

Withdrawn and removed from a water basin through evaporation, imbedded in a product or through other means





#### **Global Water Scarcity**



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### SAC Higg Index

	Impact area	MSI Score	Midpoint
à	Global Warming	2.2	2.1711 kg CO <sub>2</sub> eq
	Eutrophication	9.1	0.0091 kg PO <sub>4</sub> eq
4	Water Scarcity	47.6	1.4409 m <sup>3</sup>
6	Abiotic Resource Depletion, Fossil Fuels	17	22.6769 MJ eq



#### LCA: Inventory -> Endpoint



#### **Consumer Relevance**





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## Cotton Sustainability

Topics > Sustainability > Cotton Sustainability



**Recycled** Cotton

The use of recycled materials is a growing topic of interest and recycled cotton can find new life in many different products.



Biodegradability of Cotton

What happens when your favorite cotton shirt finally reaches the end of its functional life? Explore this natural fiber's afterlife.



Life Cycle Assessment of Cotton

This presentation will identify key impact areas and elaborate on environmental benchmarking for cotton.



**Consumer Perceptions** 

Explore consumer perceptions relating to cotton and cotton sustainability using ongoing research from Cotton Incorporated.



Cotton LEADS™

The Cotton LEADS<sup>®</sup> program strives to make sure cotton is produced responsibly now and for years to come.



U.S. Cotton Traceability Learn about what makes U.S. cotton stand out from the rest with 100% traceability

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#### Webinars

Events > Webinars

Cotton & Water: Understanding Metrics & Use in Industry Tools May 28, 2020 2:00 pm EDT

#### Cotton & Water Webinar Series - Part 2

Building on part one of our webinar series, Dr. Jesse Daystar, Cotton Incorporated's Chief Sustainability Officer, will focus on how we measure, communicate, and benchmark water impacts and improvements. We'll take a deeper look at the metrics used in life cycle assessment and examine industry tools like the Sustainable Apparel Coalition's Higg Index.

Learn more about cotton sustainability.

Register for Cotton & Water Part 2 Register for second part of our Cotton & Water webinar series at cottonworks.com/webinars.

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