INVESTOR BRIEF

Understanding Supply Chain Water Risk:

By Laura Gosset, Engagement Analyst
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Global freshwater resources under increasing strain

Water scarcity is an urgent global issue being exacerbated by climate change and a growing population. By 2030, the world will face a 40% deficit in water supply under business-as-usual scenario predictions.[1] The 2015 Global Risk Report of the World Economic Forum, based on a survey of over 900 stakeholders, concluded that global water crises are the number one high-impact threat facing the planet over the next decade.[2]

Experts predict an increase in climate change-led precipitation extremes that include a higher frequency of droughts and floods in some regions.[3] Combined with rising water demands from growing populations and competing users, secure access to water is an escalating large-scale challenge.

Although it is widely acknowledged as a concern, few businesses have made significant progress in tackling the issue of supply chain water risk. A recent global study found that climate change-related risks within global supply chains are a major blind spot for companies.[4] This is of particular concern because, as firms move towards increasingly globalized and disaggregated value chains of production, risks are more difficult to locate along increasingly complex supply chains.

Water scarcity issues are particularly relevant within the agricultural sector, which accounts for an average of 70% of global water withdrawals.[5] A closer look at the water-related issues associated with raw materials such as cotton can be helpful in understanding supply chain risks.

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Cotton impact on water resources: water depletion and pollution

Cotton is a crop that is receiving increasing attention as a supply chain input due to its potential negative environmental and social impacts. The biggest water-related risks of cotton growing stem from overconsumption of water causing the depletion of water resource availability, and the pollution of water through agricultural run-off causing water quality degradation.

Negative impacts on water availability are felt particularly deeply in water-stressed areas where multiple users are competing for water use. In recent years cotton cultivation has increased in water-stressed regions of China and Australia[6] and in fact, the majority of cotton production in the world takes place in areas already suffering from high water stress. Table 1 shows the world's primary cotton producing countries along with their water stress ranking, their share of global cotton production and the portion of cotton growing area that is irrigated. These top six cotton producers account for approximately 81% of global cotton production.[7]

Table 1. Water use for cotton production, by country

Country	Water stress ranking[8]	% of global cotton production (2014/15)[9]	% of cotton area irrigated[10]
Brazil	Low	6	<1
China	High	25	75-100
India	High	25	100
Pakistan	Extremely high	9	100
United States	Extremely high	14	36
Uzbekistan	High	3	100

Water use for cotton has already been linked to severe degradation of major water systems around the world such as the Aral Sea in Central Asia and the Murray Darling River in Australia.[11] The disappearance of the Aral Sea has been designated one of the "worlds' worst human-induced ecological disasters"[12] and has occurred largely through the diversion of water for irrigation of cotton crops in the region.

Water risk and changing cotton prices

Companies that rely on a stable supply of cotton for their products, whether it is directly for their own manufacturing or indirectly through their supply chain, are vulnerable to intensifying water scarcity issues.

There has been substantial volatility in the price of cotton over the last decade.[13] While there are many factors that influence cotton prices, climate change-related phenomena and increasing global water scarcity can be expected to contribute to uncertainty in the future of cotton pricing. Changes in the global cotton supply impact the price and availability of cotton at each stage of the supply chain, which can in turn affect the business bottom line for the retail sector. When cotton fiber prices rose dramatically in 2010/2011, in part attributed to crop shortages due to flooding in Pakistan, an increase in garment import prices was observed. In the months following the peak in fiber prices, average U.S. garment import prices for cotton-dominant apparel imports increased up to 25%.[14]

In Canada, an illustrative example of impact on the apparel sector is the case of manufacturer Gildan Activewear. In both 2012 and 2013 Gildan attributed higher cotton costs to lower profit margins, reporting a 57% decrease in profit in the second quarter of 2012 compared to the previous year.[15]

Depending on the location of production, fabric costs can account for 50% or more of the net buyer cost of a t-shirt,[16] making product pricing vulnerable to shifts in raw material inputs.

Gildan Activewear and two of their U.S. competitors are listed in Table 2 showing decreased profits and increased costs in early 2012 compared to the previous year.[17]

Table 2. Profits and costs for three-month period ending in March or April (2011 and 2012)[18]

	Net earnings per share (USD)[19]		Cost of sales (millions USD)	
Company	Q1 2012	Change from 2011 Q1 (%)	Q1 2012	Change from 2011 Q1 (%)
Gildan Activewear Inc.	0.22	-57%	396.5	+44%
Hanesbrand Inc.	-0.27	-155%	754.0	+11%
Delta Apparel Inc.	0.23	-66%	100.4	+7%

Although cotton prices have declined since 2012 and remain relatively low, the 2010/11 surge demonstrates the vulnerability of cotton supplies to climate- and water-related events (e.g. droughts, flooding) that can in part be mitigated by developing more sustainable, less water-intensive farming practices. Moreover, it highlights the difficulty for apparel firms to pass through those costs to the consumer, which suggests that any cotton price increases will have a direct impact on profitability and shareholder returns.

Improving the sustainability of cotton in the retail supply chain

Many retail companies have limited visibility into their supply chains, especially at the commodity level, and do not have a full grasp of the water risks they face. In order to secure a sustainable cotton supply, companies need to work to better understand water usage and impact in their supply chain. Some key areas to begin include:

1. Mapping water risks across all stages of the supply chain;
2. Establishing traceability mechanisms to identify the sources of cotton inputs;
3. Identifying sources of sustainable cotton inputs;
4. Committing to increasing the volume of cotton sourced sustainably;
5. Participating in a multi-stakeholder initiative related to sustainable cotton sourcing.

Although sourcing more sustainable cotton inputs may carry higher short-term costs, market uncertainty and changing consumer expectations point to the potential financial and reputational benefits. Sustainable cotton sourcing allows companies to secure a more reliable long-term supply of cotton inputs through building better linkages along their supply chain. A company's commitment to sustainable sourcing will also benefit its brand reputation and earn it recognition as a contributor to environmental and social sustainability, as consumers are increasingly looking to information on responsible sourcing practices to inform their purchasing decisions.

Brands such as H&M, Levi Strauss & Co., Adidas, Nike and IKEA have joined the Better Cotton Initiative, a multi-stakeholder organization working towards improving the sustainability of cotton production. All of these companies have announced targets for sourcing sustainable cotton and in late 2015 IKEA announced that 100% of the cotton used for their products now comes from more sustainable sources,[20] providing evidence that sourcing sustainable cotton can be an economically viable and forward-thinking corporate strategy.

Endnotes

[1] 2030 Water Resources Group (2009). *Charting our Water Future: Economic frameworks to inform decision-making*. 2030 WRG, Washington, DC.

[2] World Economic Forum (2015). Global Risks 2015. WEF, Geneva, Switzerland. http://wef.ch/WSjABx

[3] IPCC (2014). *Climate Change 2014: Synthesis Report.* Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland.

[4] CDP (2016). *From Agreement to Action: Mobilizing suppliers toward a climate resilient world*. CDP Supply Chain Report 2015-2016, CDP, London, UK.

[5] WWF (2007). *Cleaner, greener cotton: Impacts and better management practices*.

[6] UNFAO and ICAC (2015). *Measuring Sustainability in Cotton Farming Systems: Towards a Guidance Framework*.

[7] ICAC (December 2015). *Cotton this month*.

[8] Based on Aqueduct projected water stress country rankings using 2020 BAU scenario for agricultural sector from the World Resource Institute (2016). http://www.wri.org/resources/data-sets/aqueduct-projected-water-stress-country-rankings

[9] Estimated 2014/15 production from ICAC (December 2015). *Cotton this month*.

[10] See Table 4 in UNFAO and ICAC (2015). *Measuring Sustainability in Cotton Farming Systems: Towards a Guidance Framework*.

[11] WWF (2015). *Sustainable agriculture: cotton overview*. http://www.worldwildlife.org/industries/cotton

[12] EJF (2005). *White Gold: the true cost of cotton*. Environmental Justice Foundation, London, UK: p.5.

[13] OECD/FAO (2015). OECD-FAO Agricultural Outlook 2015, OECD Publishing, Paris. http://dx.doi.org/10.1787/agr_outlook-2015-en

[14] Cotton Incorporated (2013). '"Observed Changes", Cotton Market Podcasts pass-through series. http://www.cottoninc.com/corporate/Market-Data/Cotton-Market-Podcasts/Pass-Through/

[15] Financial Post (November 21, 2013). "Gildan Activewear's forecast misses as cotton costs stay high" http://business.financialpost.com/news/gildan-activewear-grows-q4-profit-on-higher-sales-lower-costs and
Financial Post (May 3, 2012). "Gildan profit hit by cotton costs" http://business.financialpost.com/investing/gildan-profit-hit-by-cotton-costs?__lsa=0b6a-0242

[16] O'Rourke Group Partners, LLC (April 2011). *Benchmarking the Competitiveness of Nicaragua's Apparel Industry*, p.18.

[17] Early 2012 is when the spike in cotton fiber prices would be expected to impact retail companies given a lag time for the impact from changes in cotton fiber prices to pass through from one stage of the supply chain to the next.

[18] The three-month period used for this table includes Q1 for Hanesbrand Inc. and Delta Apparel Inc. (January to March) and Q2 for Gildan Activewear Inc. (February to April).

[19] Showing the value reported for basic earnings per share.

[20] IKEA (October 30, 2015). "IKEA becomes the first major retailer to use 100% cotton from more sustainable sources". http://www.ikea.com/gb/en/about_ikea/newsitem/IKEA-first-major-reatailer-to-use-100-percent-cotton

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Understanding Supply Chain Water Risk: **The Case of Cotton**

CONTACT: **Laura Gosset**, Shareholder Engagement Analyst, SHARE
lgosset@share.ca

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SHAREHOLDER ASSOCIATION *for* RESEARCH & EDUCATION

1055 West Georgia Street
Suite 2600, PO Box 11171,
Royal Centre
Vancouver, BC V6E 3R5

T: 604.408.2456 | F: 604.408.2525

www.share.ca