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A Comparison of Water Conservation Methods within the Supply Chain

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Honors Project

Submitted to the University Honors Program at Bowling Green State University in partial fulfillment of the requirements for graduation with UNIVERSITY HONORS

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## Introduction

In the business world of today, companies are putting sustainability of natural resources as one of their top priorities. With resources that people take for granted becoming more and more scarce, it is becoming necessary for companies to use tools, such as supply chain management, to come up with a solution to sustain the environment. One such resource that is being looked at is water. Water is involved in every business from water being a key ingredient in its product, such as a soda producer, to its being used to cool down metals in a steel mill. Each company has its own methods of conserving water, which led me to my question of: if the type of business sector a company is working in affects how it looks at and reacts to water sustainability?

## Hypothesis

Through the implementation of water sustainability methodologies within the supply chain, companies will be able to benefit from cost savings and public trust.

## Defining the Problem

Natural resource scarcity (NRS) is a real fear that is occurring in today's world. Companies have to have plans in place for various issues that may occur with both renewable and nonrenewable resources on both a local and global level. For example, Fortification is used when a global renewable resource is scarce and this means to reduce the use of that resource in order to give itself time to replenish. Conservation strategies are put into place when there is local depletion of nonrenewable resources, and so, the local companies make sure to only use these resources when it is unavoidable, and begin to find alternatives to use until more of the resource is discovered. These are just a few of the strategies that need to be put into place

when NRS occurs (Bell, Autry, Mollenkopf, Thornton 160). One of the most important renewable resources that society has is water, but even that will reach a point of scarcity soon. Two and a half percent of the world's water could be considered fresh water, and by the year 2025 approximately two-thirds of the world will be facing water shortages due to increasing population and the depletion of freshwater sources (Penfield 22). In addition, it is speculated that in ten years' time, water will cost as much as oil to purchase (Penfield 22). This is leading companies to look to their supply chain to find new methods to reduce, reuse, and replenish water.

### Methodology

The method taken in this paper is a comparative analysis of three different business sectors and using one company for each sector to represent that sector as a whole. The way that I went about completing this comparative analysis is to use online articles of the industries in order to gain a thorough understanding of how various industries are currently implementing their water systems, and how they are planning to adapt in the future. In addition, I looked at the companies' sustainability reports, financial reports, and shareholder reports from their websites to find out more information about their efforts. The information gained from these reports was then put into a matrix of questions that were generated before the analysis. This enabled the ease of comparing the companies after the information was obtained. The information obtained was then looked at in terms of the finished product, the internal method to create that product, how supplies were obtained and managed, and what the company did after the product was sent out. In this paper, each of these traits will be from here on by called

the product, the process, the supply chain, and the post-production, in that order for ease of comparison.

### Analysis of Companies

Within the scope of this paper, there were three companies that I used that are used as a base for my conclusions. These companies being: Coca-Cola to represent the beverage sector, Levi Strauss for the clothing sector, and Kellogg's for the food sector. As each company is in a different business sector it would help to show that each different industry in business has a different way of looking at water sustainability as a whole. The information obtained for this analysis can be found through the company's financial reports, sustainability reports, and annual shareholder reports.

### Coca-Cola Analysis

Based on the information gathered from the company's sustainability report, Coca-Cola's main areas of focus for water sustainability is in the reduction of water within its products and the replenishment of water within the environment. In terms of reducing water within its products, Coca-Cola is currently using 2.03 liters of water per liter of actual product. While currently the company has achieved a 10% improvement in efficiency since 2010, with a total amount of water used in the company being 304.8 billion liters, the company has the goal by 2020 to reduce that by 25% using a 2010 baseline. This would put the company using 1.7 liters of water per liter of actual product. The method that the company uses to look at this is a footprint analysis of its ingredients, and discovered that a major use of water was one of its major ingredients, sugar beets. As the company is a founding member of the Water Footprint Network, Coca-Cola divides water into three categories: green water, blue water, and grey

water. Green water is water that is obtained from the moisture found in the soil through rain. Blue water is water from surface and ground water, lakes and rivers for example, that are consumed. Grey water is water that is used to load pollutants from the water treatment process. Currently, the process of turning sugar beets into product is about 50% green water, 25% blue water, and 25% grey water. (*Product Water Footprint Assessments Practical Application in Corporate Water Stewardship*) As such, in order to create the strived for higher levels of efficiency, Coca-Cola is looking to use more green water in the process of creating their signature product. Using more green water within a product enables the water to be more easily replenished as by its definition, it is water found in soil through the rain, so long as there is rain, there will be green water. This makes it a much more renewable form of water as compared to the other two types.

As the second major areas of focus, the replenishment of water within the environment, Coca-Cola looks to achieve this through multitudes of community water partnerships across the globe, in addition to returning the wastewater back to the environment after treating it. Currently, Coca-Cola is working with 209 different community based water partnerships in 61 different countries around the world in an effort to reach the company's goal. This goal is that by 2020 to return to the community and nature an amount of water equivalent to what they use in their finished products and their production. As of right now, the company is replenishing 94% of the water they use back to various communities and nature. This amount is equal to approximately 153.6 billion liters of water. Some of the initiatives and groups that Coca-Cola is working with to obtain these results are the CEO Water Mandate, GETF, Global Water Challenge, Millennium Water Alliance, The Nature Conservatory, UNDP, Un-Habitat, UNICEF,

USAID, USWP, Water for People, 2030 Water Resources Group, WaterAid, World Resources Institute, World Vision, and the World Wildlife Fund. In order for the company to be able to meet its goal, the company worked ahead of local governments and made sure that each one of its plants and facilities could adopt the processes and technology needed to treat the grey water back into usable freshwater for the environment. To do this, Coca-Cola had to lay down a large investment of \$1 billion in order to make all of the facilities up to the necessary standard.

#### Levi Strauss Analysis

While Coca-Cola's areas of focus were in replenishment and reduction, the two main areas for Levi Strauss are reuse and reduction. In terms of the reuse of water within the process, the company is currently aiming to use a plan for products called Water<less. In the clothing making process, water must be used to rinse of the clothes, and to aid in the dyeing process. Normally after this, the water is taken to a water treatment center before being able to be used once again. In the Water<less process, the water used is kept in a constant cycle. After the water is used for rinsing or dyeing, the used water is captured and treated within the clothing facility itself. This led to the creation of 100% recycled water products. The issue with this method, is the price and the difficulty of set-up. In order to be able to use the Water<less process, the clothing facility has to have been specifically designed with this method in mind. This means that either new facilities would have to be created for this process, or old facilities would have to undergo a complete overhaul. Because of the efficiency of this new process though, Levi Strauss wants to move 80% of its product lines to use this Water<less process by 2020, instead of the current 20% of its product lines as of 2015.

Similar to how Coca-Cola looked to agricultural development to reduce water usage, but instead of looking at what kind of water is being used, Levi Strauss is looking at the agricultural techniques themselves in order to reduce water usage. One of the key components that Levi Strauss use in order to maintain their business is cotton. It is also at this point, growing the cotton itself, where the greatest water consumption resides. Currently, 68% of water consumption when creating clothes occurs when growing cotton. In order to reduce water consumption within its supply chain, Levi Strauss developed a series of farming techniques called the Better Cotton Initiative (BCI). With these farming techniques, producers of cotton consumer 23% less water when compare to farmers who do not operate under these techniques. As such, it is Levi Strauss's goal by 2020 to have 75% of its cotton suppliers using BCI techniques as compared to the current 6% of suppliers as of 2015.

One other area that Levi Strauss is working with to reduce water consumption is post-purchase of the clothing. Levi Strauss is working with the consumer in order to reduce water usage. After growing cotton, the next highest usage of water in the life cycle of clothing occurs under consumer care. The average amount of water used per article of clothing accounts for 23% of total water consumption through that clothing's life cycle. According to a study done by Levi Strauss on the life cycle of a pair of jeans, the average consumer only needs to wash that article of clothing after wearing it ten times. Though currently people wash their jeans after wearing them only two to four times. One method the company is currently implementing to reach out to the public is sewing Care Tag for the Planet, which have the information on the inside of the jeans, to try to spread this information around, and has been met with middling results. The CEO has also gone on interviews and done awareness campaigns on days such as



Earth Day, in an effort to make people see that they do not need to wash their jeans as often as they currently think.

### Kellogg's Analysis

The areas of focus for Kellogg's as a food manufacturer are improvement, reduction, and reuse. In order to improve water quality overall, Kellogg's looks to work with the water obtained from the watershed in an effort to improve water quality for the farmers that obtain water from the area. As a test, the company is working at the Saginaw Bay watershed in order to work on this project. To improve water quality, Kellogg's is working directly with the farmers to develop techniques in order to stem off runoff into the basin. By stopping runoff from the farms, excess nutrients and chemicals would not be introduced into the water and soil. By this merit, water quality and soil quality for the area would be improved, which would increase the quality of the wheat and sugar beets being produced in that area. This would mean an increase in quality for products produced by Kellogg's in this area.

In terms of reduction, the company is using a form of metrics calculator called Fieldprint. Developed by Field to Market, an alliance of which Kellogg's is a long standing member, Fieldprint is an outgoing metrics calculator that enables suppliers and farmers to track the improvement of data across several environmental measures such as irrigated water use efficiency, water quality, GHG emissions, soil carbon, energy use efficiency, soil conservation yields and land conservation use efficiency. This technology enables suppliers to benchmark themselves against the competition. As such, Kellogg's is using this technology to award more business to those who score well with Fieldprint. This encourages suppliers of Kellogg's to work on becoming more environmentally friendly, or they would lose one of their most important

customers. Using this method, the company is hoping to achieve a 15% reduction in water use per metric tonne of food produced by 2020. In addition, the company is using its employees to create water saving measures. At a facility in South Korea, solely by making employee behavioral changes in how they used water within the facility, the company was able to reduce water usage there by 9.06%.

Kellogg's currently only uses reused water for non-contact food purposes. These could be for use in cooling systems, or irrigation. One of the goals of the company is to implement water reuse projects within 25% of the company's plants by 2020. At a test facility in Zanesville, Ohio, water was able to be cycled through the cooking systems by turning the water into steam. This enabled the water to be recirculated upwards of 50 times before having to be discharged for water treatment due to quality standards.

#### Findings from Analysis

Based on the analysis given, the data appears to support my given hypothesis. From the analysis of these three companies, there are several traits the companies have in common with one another. Looking at all three of the companies, as shown below in Table 1, they each were in at least two of the three attributes mainly looked at in this research: reuse, reduce, and replenish. None of the companies looked researched were in all three categories. Each company are attempting to reduce the amount of water usage within its company, but how they achieve these reductions is different for each company. Coca-Cola looked to use more renewable water sources, i.e. green water, within its efforts to reduce water usage. From this, one can surmise that since Coca-Cola is a beverage company that they would want to use water that can be used repeatedly. As green water, is the most renewable water source as it comes

from rain, it would be the one that Coca-Cola would want to use the most in its products. When Levi Strauss look at water reduction, they looked at two places within their own company and at their consumers. Since Levi Strauss is a clothing based company that is vertically integrated, they already own the assets to make the cotton. So in order to create a reduction on water, they looked to the agricultural techniques themselves in order to create the wanted reduction. In addition, in order to gain public trust in their products, they are attempting to persuade people to wash their jeans less often. By washing jeans more often, the fabric would become worn out more quickly, which means that consumers would have to buy more of their product. Levi Strauss is instead persuading them to do the opposite, by attempting to persuade people to wait longer to wash their jeans, they are losing out on profit. From this, one could assume that from the clothing sector, companies are looking to not gain profit, but actually are looking to reduce water usage overall. Kellogg's uses its suppliers and competition to reduce the amount of water within its system. By encouraging competition, the food industry is able to influence water reduction through volume. Because of the large amount of product that food based companies purchase, any reduction in water is amplified just because of how much is actually created.

In terms of differences in business sectors, the way the companies choose not to go into certain water sustainability methods shows how these sectors differ in general. Coca-Cola is a beverage based company, as such replenishing the amount of water on the world is critical for their business because without water, they cannot create their product. As such, they cannot reuse water because water they use goes to the product and then the consumer, there is at no point where the company could reuse water as the water cannot be taken out of their product.

In contrast, there is Levi Strauss. A company whose main product is not water based, water is just used within the process. For these kinds of companies, reusing of water is possible, and it makes sense because if the company can reuse water, which is water they do not have to purchase. Kellogg's, while it reuses water as well, looks to improve the quality of the water source. As a food based company, Kellogg's constantly looks to improve the taste of their product, and one way they can do that is through the water. If the taste and quality of the water improves, so does the taste of their food. Working with farmers to reduce runoff of chemicals enables the company to control the taste to what they want it to taste like, but also improves the health of their consumers. Because there are so many dangerous chemicals that go into food production, if food based companies can improve the quality of water, they can help to alleviate some of those dangerous chemicals from entering their products.

	Reuse	Replenish	Reduce
<b>Supply Chain</b>	Kellogg's		Kellogg's
<b>Product</b>			Coca-Cola
<b>Process</b>	Levi Strauss		
<b>Post-Production</b>		Coca-Cola	Levi Strauss

#### Limitations of Research

The conclusions generated from this research were made using a very small sample of companies. As such, larger sample sizes would be needed to create the evidence to truly support them. The companies used were also placeholder companies. They were used to represent entire industries, and so, looking at different companies within the same industry could generate different results depending on which companies were observed. Within the

reports analyzed, companies did not give out specific numbers or methods on some of their goals. This could have created false results given the state of the research.

#### Future Work

If I or someone else were to continue the research started in this paper, there would be several steps that would need to be completed. In order to gain credence to the conclusions drawn in each business sector, more companies from the already explored sectors would have to be included into the framework. Examples of these would be Pepsi for beverages, Gap for the clothing sector, and Nestle for the food sector. Another step that needs to be taken is diving much farther into the companies themselves. This would involve contacting the companies and speaking with their sustainability officer(s). One other step that would need to be taken is to expand the number of business sectors explored. Such examples could be, metal-working, cattle raising, or construction.

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