

Maturity and Challenges of Water Sustainability across the Supply Chain

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Abstract

Corporate engagement in water sustainability from a supply chain perspective is limited but growing, as a clear business case is manifesting. Increasingly, water is becoming a serious risk for companies with global operations, since water stress and water access problems are growing. To date, companies have cited water as a sustainability priority but often fall short of reporting sufficient data and progress on goals. However, the food and beverage industry has been active in this space, because water is an integral part of their business and touches most aspects of the supply chain.

This project attempts to map the current landscape where companies are engaging in water sustainability across their supply chains and to identify various types of engagement, in order to draw out leading practices that will help companies better understand ways of advancing their level of engagement. Three companies were chosen for analysis – Nestlé Waters North America, PepsiCo, Inc., and The Coca-Cola Company – as they met the criteria of being engaged for two or more years, were within the food and beverage industry, and were willing to be interviewed.

I created my own Sustainable Value Chain Collaboration Index to map out the companies' maturity levels based on my own research and corporate interviews. The Index encompasses four key indicators (“Corporate,” “Internal Practices & Policies,” “Value Chain Collaboration,” and “External Stakeholder Collaboration”) with five stages of collaboration. The results from the Index indicate that there are some leading practices upstream with suppliers but still no standardization for best practices (i.e., none reached stage 5) and downstream engagement with customers is very limited. In addition, no company has incentives and accountability for desired behavior for their suppliers when looking at

“Value Chain Collaboration.” I then conclude with some recommendations on ways companies can employ the Index and improve their level of collaboration with the value chain.

Introduction

Sustainable supply chain has become a buzzword for forward-thinking companies. In the past, the focus has typically been on greenhouse gas emissions, but water is now emerging as a new focal point by which companies can improve their sustainability efforts. It appears that certain companies and industries, which rely heavily on water, are beginning to realize that water is a finite resource with social, environmental, economic, and political implications. A clear business case is presently manifesting for companies to invest resources in incorporating water sustainability across their supply chains in a genuine way.

Since water sustainability across the supply chain is an emerging issue, there is not a clear consensus on its meaning, objectives, appropriate level of engagement, approach, implementation, measurement, drivers, and challenges. Thus, this project will take a company perspective to map the current landscape and to identify various types of engagement, in order to draw out leading practices that will help companies better understand ways of advancing their level of engagement. Companies within food and beverage industry will be the primary focus of this project, as water is an integral part of their business and many companies within this sector have begun to make honest efforts in the space.

Background

Some forward-thinking companies have taken steps to address water sustainability by signing the United Nations CEO Water Mandate beginning in July 2007, participating in the Water Disclosure Project, joining industry groups, and/or conducting a water footprint; although, a holistic and sincere approach across the supply chain still has been relatively minimal. As indicated by the UN's *Water Disclosure 2.0*, corporate responsibility reports have insufficiently documented efforts relating to water sustainability. More specifically, only 7% of the 110 companies surveyed in the study conducted any sort of measurement of the water use or discharges in their supply chain, and only 10% reported that they encourage their suppliers to manage and assess their water impacts or share sustainable water management practices with their suppliers (Morrison & Schulte, 2009, p. 32, 30).

This attention to water is directly linked to risk. Increasingly, water is becoming a greater risk for companies with global operations, as water stress and water access problems are growing. Risk is typically seen as physical, reputational, regulatory, and financial (Pacific Institute & WWF, 2009, p. 3). JP Morgan Global Equity Research even identified this in March 2008 that “exposure to water scarcity and pollution is not limited to onsite production processes, and may actually be greater in companies’ supply chains than in their own operations (Levinson, Lee, Chung, Huttner, Danely, McKnight, & Langlois, 2008, p. 3).” Therefore, companies are looking for ways to decrease this risk and reduce costs. They can do this by focusing upstream to directly engage suppliers and downstream to engage customers. For purposes of this paper a supplier is considered a group, company, or individual that sources an input to a final product. For the food and beverage industry a supplier may be a farmer who sources raw materials, a company that processes

ingredients for the final product, a company that provides packaging for the product, and so forth. Based on the company structure, a customer can be a retailer, restaurant, and small independent business.

Objective

The purpose of my research is to decipher the landscape where companies are engaging in water sustainability across their supply chains and to develop a narrative of how and why companies are engaging on this subject. I will accomplish this by researching companies that are genuinely working on water sustainability and/or supply chain sustainability; conducting interviews with managers of selected companies; and creating my own Sustainable Value Chain Collaboration Index, as based on my own research and contributions from the Beverage Industry Environmental Roundtable (BIER), to assess where companies are today.

Companies selected for the project will be those that have engaged in the issue for at least two years, are primarily within the food and beverage industry, and are willing to share information publically. The food and beverage industry provides a rich industry to choose companies, as water is an essential element in their products. Water is present along all aspects of the supply chain – from raw materials to manufacturing to transportation to consumption by humans.

Through research and analysis, I hope to shed light on the challenges and successes companies have when trying to implement water sustainability across their supply chains. Since this work is relatively immature, it is critical to understand various corporate

approaches and to identify leading practices so that others may learn by example. It is also important to get a realistic picture of corporate involvement in an age of rampant greenwashing. I also hope to explore reasoning for why water sustainability across the supply chain has not caught on the same way as greenhouse gas emissions have. My work will hopefully help companies across multiple industries identify ways that they can actively and meaningfully engage in water sustainability across their supply chains and contribute to the work of industry groups.

I will consider and hope to address the following questions in my research and analysis:

- What industries and companies are leading the movement to actively embrace water sustainability in their supply chains?
- What are the drivers of sustainable water supply chains? What causes the company to become involved?
 - Do policies matter?
 - What is the impact of community involvement?
- How do companies define water sustainability across their supply chains?
 - What levels are included or excluded?
- How are companies approaching the issue?
- What strategies are being used to engage in water sustainability across the supply chain?
- What efforts and initiatives have been effective in water sustainability?
- What methods and metrics are companies using to measure water sustainability?
- How do you measure the cost estimate of water in segments of your supply chain?

- How do water risks compare to other risks?
 - Do these costs reflect areas where the company focuses their attention?
- What are the associated challenges?
- How are suppliers being engaged?
- How can companies effectively engage in water sustainability with a supply chain approach?
- What level of water sustainability is possible? What factors are most influential in determining the level (i.e., capabilities, priorities, resources, devotion, etc.)?
- What carrots and sticks can be offered to suppliers to promote the adoption water sustainability?
- How can water sustainability across the value chain be expanded?
- What are associated benefits and issues with employing the Sustainable Value Chain Collaboration Index?
- Why has water not achieved the same level of engagement as carbon has across the supply chain?
- Are there any policy tools that can make the adoption and use of such an index tool easier?
- What is the future of this space?

Methods

My first step was to determine what industries and companies are active in water sustainability and supply chain analysis. This background was completed by online

research and informally speaking with people connected to various industries. The results of these initial efforts indicated that water sustainability across the supply chain is relatively undeveloped across most industries, and companies have yet to completely grasp a comprehensive and holistic understanding of the subject. To address this gap in understanding, my project attempts to map out the current level of engagement by focusing on three case studies, to identify leading practices, and to draw out overarching themes and conclusions.

However, after identifying active companies that are engaging in responsible water management, a trend was found among the food and beverage industry. In order to provide a richer analysis, I will focus more on the leaders in the space. Through a contact with the Beverage Industry Environmental Roundtable (BIER), I was able to gain additional contacts within major food and beverage companies – Nestlé Waters North America (NWNA), PepsiCo, Inc., and The Coca-Cola Company (Coca-Cola).

Next, I conducted in-depth online research on each company, various water sustainability and supply chain guidelines, corporate sustainability reports, partnerships, and associated agreements. From this, a standard list of questions was created to ask the corporate managers for the interview portion of the project. These questions were slightly adapted for each company based on its particular programs to ensure that the most relevant and poignant information was gathered. I received an exemption approval by the Duke ORS for an IRB before conducting the formal interviews. Although, the specific names of interviewees will not be disclosed in the paper for confidentiality reasons.

Background information and interview responses were compiled for analysis. I then created my own Sustainable Value Chain Collaboration Index, as based on my own

research and contributions from BIER to assess each company's current engagement level. This mapping also aided in the comparisons and identifications of leading practices, areas of improvement, and challenges. However, it should be noted that the placement of the companies on the Index is based on my best interpretation, so it by no means is exact; and thus, I provide my justifications in the Appendix (Exhibits D, E, and F). Upon analysis, conclusions and leading practices are drawn to help address the research questions posed. Finally, I conclude with some recommendations for improvement in corporate collaboration in water sustainability.

Literature Review: Prior Contributions to Water Sustainability

The associated literature in water sustainability across the supply chain is meager but slowly expanding. Companies are now recognizing the importance of taking a supply chain perspective when assessing their effect, as the greatest impacts are felt upstream during the agriculture phase of producing the raw materials. This phase is also typically under the least control of a food and beverage company, which makes engagement more difficult but also more impactful. To address these supply chain concerns and opportunities, groups like UN Global Compact (CEO Water Mandate), Carbon Disclosure Project (Water Disclosure Project), Ceres, World Business Council on Sustainable Development (WBCSD), Global Environmental Management Initiative (GEMI), Alliance for Water Stewardship (AWS), BIER, and Water Footprint Network have taken leading roles to help companies assess their impacts and to foster better engagement with suppliers and communities.

Since each of these programs has particular goals and methodologies, currently there is no widely accepted standard for measuring water sustainability. Moreover, there is no set definition of water sustainability from a firm and product standpoint, as every company views it with a different lens. Regulatory reporting requirements for companies to report water consumption are limited, unless they opt into a voluntary program. Thus, voluntary regulatory and financial reporting requirements are drivers for companies to measure supply chain water use, as well as reputation management and enhancement. In short, one of the greatest drivers, as mentioned above, is risk mitigation and management.

In the beverage and food industries the most significant water use is embedded in raw materials production (Morrison, Morikawa, Murphy, & Schulte, 2009, p. 46).

Reputational risks stem in part from a company's demand on potable water, which places corporate water use directly in competition with local communities (Morrison, et al., 2009, p. 46). Additionally, the lack of access to clean water may affect market growth in emerging economies, further contributing to water sustainability challenges (Morrison, Morikawa, et al., 2009, p. 46). The 2009 Ceres report also cites regulatory risk resulting from water scarcity, which causes the price of water to rise, a cap on withdrawals, or suspending of license to use water resources (Morrison, Morikawa, et al., 2009, p. 46).

The CEO Water Mandate, a subset of the UN Global Compact, has six areas of commitments: direct operations, supply chain and watershed management, collective action, policy, community engagement, and transparency. Each commitment area has a subset of four to five pledges of action. These vary from raising awareness of water sustainability within corporate culture to building closer ties with civil society organizations at the regional and local level; additionally, from undertaking water resource

education and awareness campaigns to being transparent in dealings and conversations with governments and other public authorities on water issues (CEO Water Mandate, 2007). More specifically for supply chain and watershed management, companies are to encourage suppliers to improve water conservation, quality monitoring, wastewater treatment, and recycling practices; to build capacities to analyze and respond to watershed risk; to encourage and facilitate suppliers in conducting assessments of water use and impacts; to share water sustainability practices with suppliers; and to encourage major suppliers to report progress on a regular basis (CEO Water Mandate, 2007, p. 5).

Although, since the mandate's inception, companies who have signed on still have a ways to go in achieving the pledges. As revealed in *Water Disclosure 2.0*, only two companies out of the 110 companies surveyed (20 were CEO Water Mandate endorsers, 75 were UN Global Compact participants, and 67 were listed in the Dow Jones Sustainability World Index), met the four criteria used for supply chain and watershed management (Morrison & Schulte, 2009, p. 29). Further, only 10% of the companies reported that they either encouraged their suppliers to assess and manage their water impacts or that they shared sustainable water management practices with their suppliers (Morrison & Schulte, 2009, p. 30). Positively speaking, the report did indicate the food and beverage industries to have the highest supply chain and watershed management criteria met (Morrison & Schulte, 2009, p. 29).

In addition to the CEO Water Mandate, the United Nations Environmental Programme developed the Water Footprint, Neutrality, and Efficiency (WaFNE) Umbrella Project, beginning in March 2009. WaFNE Project seeks to map and contribute to water measurement tools and water neutrality concepts; to build capacity and raise awareness in

the public and private sectors; and to demonstrate applicability of harmonized concepts in improving water efficiency and quality (Morrison, Schulte, & Schenck, 2010, p. 3).

The Water Disclosure Project, as part of the Carbon Disclosure Project, attempts to provide water-related data from the world's largest corporations to inform the global market on investment risk and commercial opportunity (Carbon Disclosure Project, 2009). Information on risks and opportunities of companies is compiled via surveys, in order to develop strategies on sustainable water use (Carbon Disclosure Project, 2009). The purpose is to gain transparency among companies' water reporting and to improve markets via data collection and best available information. This is open to all companies and not unique to the food and beverage industry.

Ceres published a report in 2010 to rank 100 of the largest publically traded companies on their water disclosure practices. There were five categories for disclosure: water accounting, risk assessment, direct operations, supply chain, and stakeholder engagement (Barton, 2010, p. 9). The beverage industry scored the second highest, but no company scored above 43 points out of 100 points (Barton, 2010, p. 9). Further, many of the companies did report water risks in their 10-K reports, but the vast majority failed to quantify or monetize these risks and/or to reference it to their supply chains (Barton, 2010, p. 9). This report indicated that companies still have a ways to go on reporting and embedding water risk into their business.

The Global Environmental Management Initiative (GEMI) has expanded its corporate sustainability efforts to include water, as driven by the Water Sustainability Work Group. In 2002, the group created its first tool, *Connecting the Drops*, then produced *Collecting the Drops* tool in 2007 ("GEMI Expands Sustainability," 2011). There is an entire

website devoted to *Connecting the Drops* that allows users to review the business case for pursuing water sustainability, details each tool section, provides an overview of water trends, and examines case studies, among other resources (<http://www.gemi.org/water/index.htm>). Most recently, GEMI has partnered with WBCSD to create a site-specific online *Local Water Tool*, which complements WBCSD's *Global Water Tool* ("GEMI Expands Sustainability," 2011).

The Alliance for Water Stewardship (AWS) seeks to establish a global water stewardship certification program to recognize responsible water managers and users. These water managers and users include both the public and private sector. The initiative is strongly supported by The Nature Conservancy, World Wildlife Fund, Water Stewardship Initiative, the Pacific Institute, and others. AWS will also oversee the certification and provide education and guidance to water managers and users to improve operations and procedures (Alliance for Water Stewardship, 2008).

BIER, founded in 2006, establishes a forum where beverage companies can exchange information, benchmark, share best practices, and communicate with stakeholders. The partnership focuses on water stewardship, energy and climate change, and stakeholder engagement. As part of its water stewardship efforts, BIER supports conservation, watershed protection, community involvement, partnerships, and supply chain engagement ("Beverage Industry Environmental Roundtable," 2010). The group is working to define leading water stewardship actions in the beverage industry, as exemplified by their recent report published in 2010. *World Class Water Stewardship in the Beverage Industry* identifies six leadership principles, one of which is to acknowledge that

water stewardship extends through the value chain (Beverage Industry Environmental Roundtable, 2010, p. 2).

Measuring water in the supply chain goes beyond direct water usage based simply on utility metering. Tools are now being developed to facilitate the measurement of water consumption from a water risk perspective and from a product perspective. WBCSD's *Global Water Tool* is one such tool to help identify water risks. WBCSD also launched the FairWater Initiative to promote responsible water management in the private sector; and is developing a "Fairwater Framework" to map out current initiatives with the hopes of defining best practice in process of stewardship, methodology of measurement, and concepts and principles of water stewardship (WBCSD, 2008, p. 2).

The Water Footprint Network (WFN) constructed the water footprinting methodology to measure the direct and indirect water use of a product. Numerous companies have employed this product perspective tool to understand the associated water consumption amounts of each part of the product's life. Aside from a water footprint, a life cycle assessment (LCA) can also be used to determine a product or service's water impact from cradle to grave.

Corporate Engagement and Initiatives

This section delves into specific companies' work on water sustainability. This includes information on how the company became engaged with water sustainability, water risk accounting, goals, metrics and tools for evaluation, corporate initiatives that

address water and sustainability, related challenges, policies, partnerships, supplier engagement, and transparency.

Nestlé Waters North America

For Nestlé Waters North America (NWWA), the impetus for pursuing environmental sustainability was reducing costs and improving efficiencies. These cost reduction and efficiency measures were first carried out in the early 1990's, and as general momentum in sustainability grew, NWWA made it a core value of their business. Today, NWWA mandates that their spring water is 100% sustainable (Personal communication, December 13, 2010¹). This claim makes it important to note how the company defines sustainability. As explained by a manager, NWWA views water sustainability as only taking out the water that can be recharged from precipitation in their recharge area (Personal communication, December 13, 2010). To achieve this recharge goal, NWWA employs long-term monitoring, scientific monitoring, and Natural Resource Managers ("Managing for Sustainability," 2005).

NWWA is an affiliate of Nestlé Waters Canada and related to Nestlé Waters, which headquartered in Paris, France ("Company Information," 2007). NWWA is not publically traded but is part of Nestlé S.A. (Company), so many of the standards and controls originally stem from the parent company. For instance, Nestlé S.A.'s "Creating Shared Value" concept is also supported by NWWA. Another distinction is that NWWA has not signed on to the CEO Water Mandate, but Nestlé S.A. has. NWWA's bottled water brands include, Acqua Panna, Arrowhead, Calistoga, Contrex, Deer Park, Ice Mountain, Montclair,

¹ All interviews were conducted with a manager for each company and subsequent references of "Personal communication" refer to such person for the respective company.

Nestlé Pure Life, Ozarka, Perrier, Poland Spring, San Pellegrino, and Zephyrhills. Some of these water brands come straight from spring water sources and others may come from municipal water sources but are treated with reverse osmosis (RO).

Since water is the precise business of Nestlé Waters North America, managing for water sustainability is critical. This causes Nwana to have a slightly different business model than the other beverage companies included in this paper. In turn, rather than working directly with farmers who provide the raw material inputs into the drink formulations, Nwana deals directly with the communities in which they source their spring water or have plant operations. Nwana also has the potential to work with bottler manufacturers and packaging suppliers.

Some of Nwana's water-related commitments include, managing water resources for long-term sustainability, reducing supply chain footprint (manufacturing and logistics), and being a good neighbor ("Corporate Citizenship," 2005). In the updated 2010 *Creating Shared Value* report, Nwana's water goals are to be a leader in sustainable water stewardship practices, exceed regulatory requirements for quality and transparency, and advocate for water as being essential to human and environmental health (*Creating Shared Value*, 2011). More specifically, a target is to enhance water stewardship by partnering with local communities and stakeholders to support up to two watershed improvement projects per year (2011-2015) (*Creating Shared Value*, 2011, p. 6). When looking at water use internally, Nwana's target is to optimize water use ratios by product type over 2009 levels (*Creating Shared Value*, 2011, p. 7).

As evidenced by the company's first Corporate Citizenship Report in 2008 (*The Shape of Citizenship*), Nwana also intends to support tighter groundwater legislation,

improve transparency to water management practices, and develop a *Siting and Community Commitment Framework* with key stakeholders (p. 26, 23). The *Siting and Community Commitment Framework* was created with Business for Social Responsibility (BSR) and provides NWNA with a framework on engaging nationally, regionally, and locally, as well as tools for effective communication and outreach (*Creating Shared Value*, 2011, p. 22). NWNA also employs a *Good Neighbor Policy* with the aspirations of open communication, environmental excellence, responsible spring water resource management, water resource relations, sustainable land use, traffic mitigation, exemplary employment practices, water education, emergency relief, and giving back to communities (*Nestlé Waters North America's Environmental Commitment*, 2006). Additionally, the company now requires suppliers to demonstrate compliance with NWNA's internal quality standards before contracts are finalized (*Creating Shared Value*, 2011, p. 24).

In 1996, the *Nestlé Environmental Management System* (NEMS) was created to establish environmental targets and plans, to monitor environmental progress against plans, to check results and define preventive and corrective actions, and to improve NEMS efficiency ("Measuring Our Progress," 2005) (see Exhibit A). In other words, this tool allows direct inputs of data, like water, wastewater, energy, and recycling (Personal communication, December 13, 2010). NEMS is guided by *Nestlé Waters North America Environmental Policy* and *Nestlé Waters North America's Environmental Commitment*.

Nestlé Waters North America's Environmental Commitment includes the following: land and natural resource stewardship, efficient use of water, innovative environmental manufacturing facilitates, reduced plastic and packaging materials, and support for environmental, community, education, and health programs both nationally and locally

(2006). For example, about 14,000 acres of 87% of the land surrounding spring sources are managed as open space (*The Shape of Citizenship*, 2008, p. 22). The *Nestlé Waters North America Environmental Policy* echoes these environmental commitments by ensuring compliance with regulations and protecting and conserving water resources (n.d.). Finally, NWNA is expected to show a cumulative 2-5% water reduction annually, but how each facility contributes to this goal is based on the market (Personal communication, December 13, 2010).

Since NWNA's specific business is bottled water, NWNA has focused internally on improving efficiencies within the plants to decrease the water use ratio (gallons of water to produce one gallon of NWNA spring water) and on watershed management to protect the areas where their bottled water is sourced. These efforts are driven by the need to reduce risk and to secure water supplies. Water is a primary business risk for NWNA and must be managed by source and capacity reviews, as well as treatment, planning for site remediation, and prepping for site exit (Personal communication, December 13, 2010). The spring water operations group is primarily responsible for performing risk assessments on water and for financially accounting the water costs (Personal communication, December 13, 2010). On the other hand, the plant operations group tracks the costs of the public water supply (Personal communication, December 13, 2010).

These primary concerns combined with the fact that non-spring water requires additional treatment, NWNA sees reverse osmosis (RO) as one of the most important factors in achieving water sustainability (Personal communication, December 13, 2010). To be more specific, the Nestlé Pure Life (NPL) brand is more water intensive than spring water products, due to the utilization of RO, so it has been a major focus of the NWNA's

efforts (Personal communication, December 13, 2010). The company also has instituted a water reuse program for cooling towers and irrigation (Personal communication, December 13, 2010).

To contribute back to the communities where water is sourced, NWNA has begun to give back treated wastewater for irrigation purposes. Following this, NWNA has also started working with local farmers to set up spray irrigation systems to improve efficiencies (Personal communication, December 13, 2010). However, another opportunity to influence water sustainability across NWNA's supply chain is through bottles and packaging. Recognizing this NWNA has commenced discussions with their major PET resin supplier to improve water efficiencies in production (Personal communication, December 13, 2010). In the past, the focus has been on improving the shape of the bottle by making them lighter and to improve recycling. These Eco-Shape® half-liter bottles use less plastic than a traditional bottle, in turn reducing energy, water, and greenhouse gases associated with production (*The Shape of Citizenship*, 2008). Then, after conducting a life cycle assessment of the Eco-Shape® bottle, NWNA was able to further reduce the plastic in these bottles by 60 percent (*Creating Shared Value*, 2011, p. 29). Lastly, NWNA continues to expend much effort on increasing U.S. and Canadian recycling rates for PET beverage bottles, in order to reduce the use of virgin resources (*Creating Shared Value*, 2011, p. 14).

When looking at partnerships, NWNA has built relationships with Project WET (Water Education for Teachers), The Nature Conservancy (TNC), Sustainable Agriculture Initiative, American Red Cross, AmeriCares, and various nature preserves and forests. The long-standing program with Project WET promotes education on water conservation to teachers, students, and corporate employees across North America and in more than 50

countries (*Creating Shared Value*, 2011, p. 12). In 2006, it was reported that since its founding in 1984, Project WET and Make a Splash have educated 23 million students and trained 150,000 teachers (*The Shape of Citizenship*, 2008, p. 40). NWNA's ten year partnership with TNC lead to the protection of 426,000 wilderness acres and an innovative water partnership to protect fresh water sources in America (*The Shape of Citizenship*, 2008, p. 41). In addition, NWNA has donated bottled water for disaster relief and has promoted land conservation in Florida, Michigan, and California (*Nestlé Waters North America's Environmental Commitment*, 2006). Further, via the Natural Resource Managers, NWNA works with state and local governments on determining a safe amount of water that can be extracted and can aid in the development of watershed management plans (Personal communication, December 13, 2010).

The company has begun to take a life cycle analysis (LCA) approach when measuring their environmental footprint. More specifically, an internal LCA-based software tool, *Global Environmental Footprint* (GEF), is used to measure the enterprise impact of its operations (*Creating Shared Value*, 2011, p. 7). It was calculated that it takes 1.37 gallons of water to produce one gallon of spring water, which is more efficient than soft drinks or beer ("Water Use Comparisons," 2005). Additionally, by 2011, the company hopes to complete a comprehensive assessment of their materials and packaging footprint, in order to inform on waste reduction opportunities (*Creating Shared Value*, 2011, p. 16).

Water usage in each factory is tracked daily. Between 2002 and 2006, total water consumption was more than halved, measured in liters of water usage per 1,000 liter of bottled water production ("Water Reduction," 2005). As reported in 2011, since 2005, NWNA has reduced the water use ratio 1.6%, while increasing production by over 30%

(*Creating Shared Value*, 2011, p. 7). Contribution to water savings has also stemmed in part from new LEED certified buildings (*The Shape of Citizenship*, 2008, p. 29). To make certain that the water goals and policies are being implemented, NWNA also employs twelve Natural Resource Managers/hydrologists around the country, who carefully monitor and test various operational locations.

When looking at transparency, much of the information appears to be spread throughout the NWNA website and the Nestlé Waters website. However, the first Corporate Citizenship Report, and the most recent one, published in 2010, help to centralize the company's water efforts. NWNA did employ GRI's Sustainability Reporting Guidelines when creating the 2008 Corporate Citizenship Report, but did not adhere to them in the 2010 report (*The Shape of Citizenship*, 2008, p. 4; *Creating Shared Value*, 2011, p. 4). NWNA has also committed to publishing a Corporate Citizenship Report every two years, so the next will be in 2013. The 2010 Corporate Citizenship Report also claimed that the company is in the process of identifying regional stakeholders and third parties to review and provide feedback on NWNA processes; and when this is completed, they will make this publically available (*Creating Shared Value*, 2011, p. 24). Lastly, NWNA advocates for federal standards to improve transparency of bottled water on source, quality, and process (*Creating Shared Value*, 2011, p. 9). Aside from this, it appears that third party verification of the company's claims appear limited.

PepsiCo, Inc.

PepsiCo, Inc. (PepsiCo) owns the brands Pepsi, Frito-Lay, Tropicana, Quaker, Gatorade, and others. PepsiCo's involvement in water sustainability began when Frito-Lay

in Arizona started to look at water in its operations (Personal communication, November 23, 2010). On a corporate level, PepsiCo views water scarcity as relating to physical, regulatory, and reputational risks (*Water Stewardship*, 2010, p. 9). The company has strong internal support for water initiatives, as evidenced by PepsiCo's CEO, Indra Nooyi: "We believe that the world water crisis is one of the most pressing challenges of our age. As a global food and beverage company, our success depends on being responsible stewards of this limited resource" (*Water Stewardship*, 2010, p. 5).

Today, PepsiCo's sustainability goals are part of the umbrella campaign, "Performance with Purpose," which highlights the company's commitment to financial performance, environmental sustainability, human sustainability, and talent sustainability. In regards to environmental stewardship, there are 15 commitments and goals relating to water, land and packaging, climate change, and community (*Performance with Purpose*, 2009, p. 14). Underlying "Performance with Purpose" is "The Promise of PepsiCo" to deliver sustainable growth by investing in a healthier future for their customers, planet, associates, and external partners and communities they serve (2009, p. 1). The *PepsiCo Environmental Policy* outlines the company's commitment to environmental stewardship by promoting ten points ranging from establishing metrics that monitor environmental performance to working with others to develop effective and sustainable solutions (*PepsiCo Environmental Policy*, 2006).

PepsiCo's 2010 water goals and commitments are threefold: to improve water use efficiency by 20% per unit of production by 2015; to strive for positive water balance in operations in water-distressed areas; and to provide access to safe water to three million people in developing countries by the end of 2015 (*Water Stewardship*, 2010, p. 1).

However, it should be noted that the goal of 20% per unit reduction in water consumption by 2015 was first announced in 2007 (*Water Stewardship*, 2010, p. 1). To be clear, the positive water balance means that more water is given back to the earth than what is consumed in PepsiCo facilities.

PepsiCo's declaration of water as a human right in 2009 has served as a backbone to the company's programs by leading them to their goal of respecting the human right to water through world-class efficiency in their operations, preserving water resource, and enabling access to safe water (*Water Stewardship*, 2010, p. 3). This support of the World Health Organization and United Nations joint declaration of the human right to water commits PepsiCo to safety of water quality, sufficiency of water resources, acceptability in communities, physical accessibility to communities, and affordability of water supplies to communities (*Water Stewardship*, 2010, p. 3). In addition to supporting these U.N. efforts, PepsiCo also signed on to the CEO Water Mandate in 2007 and the Water Disclosure Project in 2010 (*Water Stewardship*, 2010, p. 11).

To aid in reaching and being held accountable to the above commitments, PepsiCo has formed multiple partnerships to ensure implementation of its water goals. To begin, PepsiCo was an advisory board member for the development of WBCSD's Water Resource Assessment Tool ("Environmental Sustainability," 2010). In 2009, PepsiCo used this tool to map out current and future water stress risk globally ("Environmental Sustainability," 2010). To facilitate and measure its positive water balance goal, PepsiCo has been working with The Nature Conservancy since 2010 (*Water Stewardship*, 2010, p. 3). The intent is to help identify potential stressors and risks so that the company can better respond to specific issues (Personal communication, November 23, 2010). Further, the PepsiCo

Foundation has partnered with Columbia University Earth Institute's Global Water Center, Water.org, the Safe Water Network, The Energy Resources Institute (TERI), and others to promote access and safe water and sanitation in developing countries (*Water Stewardship*, 2010, p. 5).

Since PepsiCo is not just a beverage company, but also a food company, PepsiCo realizes that supplier engagement must be taken seriously. Much of the focus has primarily been on potatoes, since agriculture has the greatest water consumption impact. For instance, the company has partnered with local farmers in Mongolia to establish crop rotation and pivot irrigation, which initially saved 30% of water (*Water Stewardship*, 2010, p. 9). In the U.K., PepsiCo Walkers facilities are working to capture the natural moisture produced by potatoes to wash the potatoes themselves (*Water Stewardship*, 2010, p. 7). Further, when cleaning Gatorade bottles in the U.S., they have switched from using water to using air as a rinsing agent (*Water Stewardship*, 2010, p. 9).

PepsiCo does not require suppliers to be sustainable with water but encourages it in multiple ways. For example, the company is a member of the *Supplier Ethical Data Exchange* (SEDEX), which promotes suppliers to share ethical and environmental information with their customers (Personal communication, November 23, 2010). The *PepsiCo Global Sustainable Agriculture Policy* cites water management as a broad objective "to optimize the applied water footprint to crops and to reduce water waste during irrigation..." (*PepsiCo Global Sustainable Agriculture Policy*, 2). As such, the company has created the Sustainable Agriculture Council to support the implementation of the *Sustainable Agriculture Policy* ("Policies," 2010). Further, PepsiCo reaches their suppliers through a Resource Conservation and Outreach program (Personal communication,

November 23, 2010). However, much of the focus here is on the operating, plant side rather than the farmer side.

PepsiCo is sharing information with suppliers, bottlers, and farmers by providing best practice tools and particular expertise (*Water Stewardship*, 2010, p. 3). Some of these include, water savings techniques, soil protection, chemical use, and waste reuse (*Performance with Purpose*, 2009, p. 19). For instance, on the farmer side, PepsiCo has demonstrated water conservation techniques in China, like drip irrigation, which reduced water use by about 50% (*Water Sustainability*, 2010, p. 9). In addition, PepsiCo advocates the “direct seeding” method to farmers, which bypasses the nursery phase and saves water by not having to practice flood irrigation (*Water Stewardship*, 2010, p. 9). PepsiCo reported that close to five billion liters of water have been saved as a result of direct seeding in India in 2009 (*Water Stewardship*, 2010, p. 11). PepsiCo offers training workshops to its suppliers at the Global Sustainability Summit, which are primarily focused on energy and greenhouse gases, but now water is becoming a new topic (Personal communication, November 23, 2010). To provide a monitoring and managing tool to its farmers to reduce water use and carbon emissions, PepsiCo has constructed a web-based tool, in conjunction with Cambridge University, called *i-crop* (“PepsiCo Unveils,” 2010). The tool is still being tested on farms in the U.K. but is to be rolled-out in Europe in 2011.

Other tools PepsiCo employs for measuring impact are the Energy Resource Conservation (ReCon) tool, Water Resource Assessment Tool, and water footprinting. ReCon is an internal tool used to audit resource management practices for manufacturing facilities. This tool can be applied to waste, energy, water, and greenhouse gas emissions (*Water Stewardship*, 2010, p. 3). As referred to above, PepsiCo used the WBCSD Water

Resource Assessment Tool in 2009 to map out the risk of water stress in global facilities (“Environmental Sustainability,” 2010). Lastly, the company has utilized the water footprint technique and worked with the Water Footprint Network on water footprinting methodology (*Water Stewardship*, 2010, p. 11).

Another one of PepsiCo’s environmental sustainability commitments that impacts water is to reduce packaging weight by 350 million pounds (*Performance with Purpose*, 2009, p. 14). To meet this goal of reducing the product’s environmental impact, PepsiCo has established the Global Sustainable Packaging Council, comprised of executives from procurement and R&D (*Performance with Purpose*, 2009, p. 15). Water is not explicitly mentioned as part of this work, but it can be implied that more efficient packaging would require less water during the manufacturing phase. Most recently, in March 2011, PepsiCo unveiled the world’s first bio-based PET plastic bottle, which uses switch grass, pine bark, and corn husks and is completely recyclable (“PepsiCo Develops,” 2011).

When looking more specifically at progress, since PepsiCo announced their first water goals in 2007, there has been a 15% improvement in water use efficiency using 2006 as the baseline (*Water Stewardship*, 2010, p. 7). When looking at water consumption, in 2009 PepsiCo global reduced water consumption by 18% based on a 2006 baseline (*Water Stewardship*, 2010, p. 6). By 2011, the company estimates that one million people will have access to safe water, comprising one-third of their safe water access goal (*Water Stewardship*, 2010, p. 5). In regards to the positive water balance goal, in 2009, PepsiCo operations in India achieved a positive water balance, which replenished a net one billion liters of water (*Water Stewardship*, 2010, p. 9). This achievement has lead PepsiCo India to

set the new goal of achieving double replenishment of its fresh water consumption by 2015 (“Environmental Sustainability,” 2010).

When looking at the internal structure of PepsiCo, one notices that the company does not have many, if any, people on the plant level working specifically on water sustainability and conservation. Instead, these efforts stem from corporate. PepsiCo is a lean company, so their approach is to get change by embedding best practices into policies and day-to-day operations. However, this approach certainly has its challenges, as there are limited resources and manpower to implement corporate goals across the entire company (Personal communication, November 23, 2010). These limited resources also make widespread education a critical challenge (Personal communication, November 23, 2010).

PepsiCo employs various transparency mechanisms. First, the company follows GRI guidelines for reporting (*Water Stewardship*, 2010, p. 11). Second, PepsiCo measures progress toward its water goals on a monthly basis and aggregates this to produce a quarterly scorecard (*Water Stewardship*, 2010, p. 11). The company also disclosed information on water risks to Ceres in regards to reputational risks, regulatory risks, and litigation risks (*Water Stewardship*, 2010, p. 11). Fourth, PepsiCo India’s achievement of a positive water balance was audited by Deloitte (*Water Stewardship*, 2010, p. 9). Lastly, in PepsiCo’s recent 10-K, the company cited, “Our reputation could be damaged if we do not act responsibly with respect to water use,” and “climate change, or legal, regulatory or market measures to address climate change, may negatively affect our business and operations” (United States Securities and Exchange Commission [U.S. SEC], 2010, p. 13, 19). The latter risk just mentioned elaborated to include one sentence on being vulnerable to

“decreased availability or less favorable pricing for water,” whereby affecting manufacturing and distribution operations (U.S. SEC, 2010, p. 19).

The Coca-Cola Company

The Coca-Cola Company (Coca-Cola) began to recognize water’s fundamental importance to the business and high risk potential in the early 2000s, and subsequently published their first sustainability report in 2001. The company’s initial work on water was to map water scarcity around the world and then layer it with where Coca-Cola operates. Each plant location was asked to complete a 300-question, 10 hour Water Risk Survey to assess the particular risks (Senge, Smith, Kruschwitz, Laur, Schley, 2008, p. 81, 82). The 92% survey response rate and business unit workshops gave Coca-Cola the information needed to assess the overall risks to the business and the specific risks associated with particular locations (Senge et al., 2008, p. 82, 83). Further, Coca-Cola created a project on the future of freshwater in 2002 (Senge et al., 2008, p. 80).

Coca-Cola was actually one of the first companies to report water as a risk factor under SEC filings, beginning in 2004 (*The Water Stewardship and Replenish Report*, 2011). This early recognition of water’s vital importance to the business and the compiled data on water vulnerabilities spurred Coca-Cola’s dedication to pursuing environmental and social initiatives, in turn contributing to risk reduction. In a recent report, The Coca-Cola Company identified water risks as those relating to physical availability, infrastructure existence/pressure, pricing, drought, competing use, increasing demand, climate change, regulatory limits and social acceptance (*The Water Stewardship and Replenish Report*, 2011, p. 10). More specifically, 2010 SEC 10-K Report publically cites water scarcity and poor

quality as specific, major risk factors: “Water is the main ingredient in substantially all of our products. It is also a limited natural resource in many parts of the world, facing unprecedented challenges from overexploitation, increasing pollution, poor management, and climate change” (U.S. SEC, 2010, p. 12). Additionally, water scarcity and water quality vulnerabilities are included under the “climate change may negatively affect our business” risk heading (U.S. SEC, 2010, p. 19). These water-related uncertainties may cause disruptions in the supply chain, increase the cost of ingredients (agricultural commodities), and/or impact product demand (U.S. SEC, 2010, p. 19). Aside from risk disclosure, the company signed the CEO Water Mandate in 2007, whereby helping to set guidelines for water stewardship and sustainability, and has been actively involved with the World Economic Forum’s Water Resources Group (*The Water Stewardship and Replenish Report*, 2011, p. 6).

Coca-Cola’s water sustainability strategy has since centered around three actions: “reduce” (improve water efficiency by 20% by 2012, compared with 2004 baseline), “recycle” (use wastewater treatment and recycling for manufacturing plants), and “replenish” (safely return the amount of water taken out to produce beverages and used in operations back to the communities and nature). The replenish campaign was declared in 2007 with the goal of offsetting and balancing the water used to create beverages by expanding corporate support of healthy watersheds and sustainable community water programs by 2020. These goals also fit within Coca-Cola’s water stewardship framework of plant performance, watershed protection, sustainable communities, and global awareness and action on water challenges (*Product Water Footprint Assessments*, 2010, p. 6).

Between 2004 and 2008, Coca-Cola's water use ratio improved 9%, meaning it takes 2.43 liters of water to produce one liter of product (*Live Positively*, 31). To date, 42.8 billion liters of water have been replenished to nature and communities, which is equivalent to about 31% of use (*The Water Stewardship and Replenish Report*, 2011). However, it should be noted that these goals refer to Coca-Cola's direct operations and not to the embedded water in agricultural ingredients and packaging materials (*The Water Stewardship and Replenish Report*, 2011). In light of this and to extend beyond their four walls, Coca-Cola has begun to engage suppliers to reduce water use in the supply chain.

After performing a water footprint on a 500mL regular Coca-Cola in a PET bottle, Coca-Cola realized that the greatest water impact was during the agricultural phase in the production of raw ingredients, like sugarcane, corn, oranges, and beets (*Product Water Footprint Assessments*, 2010). Thus, to really have an impact and to achieve their sustainability goals, Coca-Cola recognized that they must engage directly with the farmers from whom they source their ingredients. To help facilitate this and to form local partnerships, Coca-Cola has leveraged its long-standing relationship with World Wildlife Fund (WWF). In addition to WWF, Coca-Cola has also partnered with The Nature Conservancy (TNC), U.S. Agency for International Development (USAID), UN Development Program, European Water Partnership, the Global Environment & Technology Foundation (GETF), the Environmental Law Institute, the Global Reporting Initiative, Water Footprint Network, the Sustainable Agriculture Initiative (SAI), and Bonsucro (Better Sugar Cane Initiative).

Drawing on these partnerships and extending them out to local governments, Coca-Cola developed the Community Water Partnership (CWP) projects. These projects have

become an integral part in the company's water goals and have created widespread impact. Since 2005, there have been over 320 Community Water Partnerships projects in 86 countries with the primary goal of achieving the replenish target (*The Water Stewardship and Replenish Report*, 2011). CWPs are centered around watershed protection, expanding community drinking water and sanitation access, water for productive use (e.g., agriculture water efficiency), and/or education and awareness programs (*The Water Stewardship and Replenish Report*, 2011). Each of these ongoing and completed CWP is detailed in Coca-Cola's 2011 *Water Stewardship and Replenish Report*. For instance, *Project Catalyst* works with sugarcane farmers to improve environmental impacts of growing sugarcane, to educate the farmers, and to improve the quality and quantity of freshwater in the Mackay/Whitsunday catchments, which flow into the Great Barrier Reef (*The Water Stewardship and Replenish Report*, 2011, p. 27). *Project Catalyst* has expanded to include 50 sugarcane growers and over 12,000 hectares of land (*The Water Stewardship and Replenish Report*, 2011, p. 27).

Coca-Cola's work on sustainable agriculture echos the company's approach to water risk management – partnering with NGOs, like WWF, TNC, SAI, and WFN, to understand the supply chain water impacts on local communities; fostering innovation to address challenges and create opportunities; and engaging suppliers and providing them with information on sustainable agriculture, water efficiency, community development, and economic independence (*The Water Stewardship and Replenish Report*, 2011, p. 25). The sustainable agriculture efforts take a holistic approach by looking beyond environmental impacts to include the social and economic aspects, in turn helping Coca-Cola achieve its water sustainability goals, whereby reducing risk.

To address the risk factors, as mentioned above, The Coca-Cola Company began to mandate bottling plants in 2008 to perform a *Source Vulnerability Assessment* and to create a *Source Water Protection Plan* by 2013 via the Water Resource Sustainability Requirement (*The Water Stewardship and Replenish Report*, 2011, p. 6-7). These assessments and plans help drill down to the local level by identifying water vulnerabilities within the supply chain. More specifically, the *Source Water Protection Plan* must include assessments of potential contamination sources, strategies for wellhead protection and aquifer recharge zones, and participation in local watershed management endeavors (GEMI, n.d.). Further, both mandates help to engage water resource managers, local communities, and environmental organizations to understand community needs and associated water issues (*The Water Stewardship and Replenish Report*, 2011, p. 7).

To help alleviate the burden of these supplier mandates, The Coca-Cola Company provides numerous resources, training modules, and technical assistance to its bottlers and suppliers. For instance, *iLearn iManage iProtect* is a web-based tool for plant-level operations, and the Water Efficiency Toolkit allows bottlers to search best management practices and helps them determine efficiency programs to effectuate (*The Water Stewardship and Replenish Report*, 2011, p. 8). In addition to these tools, bottlers also have access to *Water Resource Sustainability Guidance*, *Working Together to Manage Water*, and *Replenish Project Guidelines* (*The Water Stewardship and Replenish Report*, 2011, p. 8). Furthermore, Coca-Cola teamed up with Business for Social Responsibility (BSR) to create The Agricultural Water Initiative to develop supply chain tools for corporations to assess, monitor, and improve water management; to develop sustainable water management tools

for producers; and to create water management indicators and an assessment tool that can be used across multiple industries (“Sustainable Agriculture,” 2011).

Coca-Cola has built relationships and programs to facilitate the engagement with local communities, as well as sugarcane, orange, and corn farmers. For example, the company is working on the ground with TNC, community groups, and local Soil and Water Conservation Districts to encourage corn farmers to practice precision irrigation and conservation tillage, which reduces nutrient runoff and sedimentation of local rivers and recharges groundwater resources (*The Water Stewardship and Replenish Report, 2011, p. 30*). Another project, initiated in 2010, is a four-year, \$11.5 million partnership with The Coca-Cola Company, the Bill & Melinda Gates Foundation, and TechnoServe that empowers small, mango and passion fruit farmers in Uganda and Kenya to participate more directly in Coca-Cola’s supply chain (*The Water Stewardship and Replenish Report, 2011, p. 26*). This program includes training on sustainable farming practices, community organization, and access to financial credit (*The Water Stewardship and Replenish Report, 2011, p. 26*).

Coca-Cola has chosen to focus much on sugarcane, as it is one of the most water-demanding plants. The company has been an active member of Bonsucro (Better Sugar Cane Initiative) and has been launching pilot projects to improve farming practices, production methods, and watershed protection (*The Water Stewardship and Replenish Report, 2011, p. 27*). One case is that Coca-Cola Europe conducted a water footprint on beet sugar to better understand the associated impacts of natural sweeteners (*Product Water Footprint Assessment, 2010, p. 15*). Following a similar model for bottler assessment tools, The Coca-Cola Company has worked with WWF to create an *Agriculture Ingredient Supplier Sustainability Survey*, in order to quantify efficiency and sustainability benchmarks for

agricultural products of key ingredients (*The Water Stewardship and Replenish Report*, 2011, p. 29). Though in its early stages, it looks at land, water, fertilizer, pesticide, and other inputs by focusing on existing policies, better management practices, and general environmental management.

In addition to employing water footprinting, Coca-Cola also attempts to quantify the watershed restoration benefits and water access benefits. To do this work, Coca-Cola has partnered with organizations like, TNC, LimnoTech, and Global Environment & Technology Foundation. When looking at the watershed benefits study, 61 activities were quantified by using various inputs ranging from runoff data to water savings from leak repairs (LimnoTech & The Nature Conservancy, 2010, p. ES1). The water access benefits study generated the estimated benefits by calculating the amount of water in liters replenished based on the identified beneficiaries (Global Environment & Technology Foundation, 2010, p. 4). The results from this report estimated that in 2009, about 638 million liters of water had been replenished; over 160,000 people were reached with full access to water supply; and over 928,000 more people will be reached through projects in progress and those scheduled to be launched in 2009 (Global Environment & Technology Foundation, 2010, p. 4).

When looking from the packaging and bottling supplier perspective, we see that Coca-Cola has been active in pursuing more sustainable packing. The three packaging targets, as announced in 2009 are to improve packaging material efficiency per liter of product sold by 7% by 2015 compared with 2008 baseline, to recover 50% of the equivalent bottles and cans used by 2015, and to source 25% of PET plastic from recycled material by 2015 (*Live Positively*, 2009, p. 26). By improving material efficiency, less water,

energy, and raw materials will be needed to generate the packaging. However, the water benefits of more sustainable packaging have not been formally quantified. In 2009, Coca-Cola also announced its “PlantBottle™,” which is a completely recyclable bottle made with up to 30% plant-based materials (“Introducing Plant Bottle™,” 2009). A life-cycle analysis on the bottle indicated that it reduces carbon emissions by about 25%, as compared to petroleum-based PET (Introducing Plant Bottle™,” 2009).

It is apparent that Coca-Cola exercises multiple avenues of transparency. The company publishes numerous reports specifically on water, follows GRI guidelines, reports water risks in their 10-K, and has published their findings on quantifying watershed restoration and water access benefits with third parties. Coca-Cola’s partnerships also contribute to the company’s transparency by providing a sort of legitimacy to claims.

Sustainable Value Chain Collaboration Index

To determine and map each company’s level of engagement, I created my own Sustainable Value Chain Collaboration Index (Exhibit B). I chose to focus on the value chain rather than the strict supply chain so that value added activities, impacts, and opportunities were not missed. Furthermore, the Index concentrates more on collaboration rather than basic engagement, as collaboration indicates a greater level of transparency, active sharing of information, and the facilitation of innovation.

This Index provides a framework for companies to understand various points where it has an impact across the value chain. It also provides an outline to guide companies on

specific goals or progress points that they can achieve. The Index can also be used to identify lead firms across the value chain that can help drive improvements in water sustainability. These large, key players have the ability to encourage water sustainability efforts by offering various carrots (incentive mechanisms) and sticks (supplier mandates or policies) to others along the value chain.

The Sustainable Value Chain Collaboration Index attempts to take a business perspective by reflecting current industry standards and future expectations. Rather than evaluating companies based on a specific technical tool that only captures portions of the supply chain, like a risk tool that looks at water scarcity on the plant level, my Index allows for a more comprehensive view to be taken when looking at multiple aspects a company touches. After all, a company typically only has a small portion of a product's total life cycle under its direct control.

A few points should be made about the Index before delving down into each company's placement on the Index. First, policies must be in place for suppliers and external engagement ("Internal Practices & Policies" stage 2) before strategies can be defined for each indicator (stage 1 for "Value Chain Collaboration" and "External Stakeholder Collaboration"). This progression makes sense, as you have to be internally aligned before externally being successful. Second, the Index differentiates between different types of partnerships. In "External Stakeholder Collaboration," partnerships at the community level and with government are further along at stage 4, as it takes time to develop these relationships. Relationships and partnerships with larger NGOs are typically easier, so they are at stage 3. These partnerships with well-known NGOs can help to

identify local partners and to enhance engagement with governments, thus making it easier to achieve stage 4.

The Index is a broad-based tool for evaluating value chain collaboration as opposed to being specific to one environmental goal, like water. This allows the Index to be more flexible, and thus more applicable to multiple environmental goals and varying industries. The mapping of companies shows not only the importance of pursuing a value chain perspective in lieu of looking specifically at one phase of the life cycle, but also the numerous opportunities in improving value chain productivity by positively impacting the social and environmental aspects of sustainability.

It should be noted that these corporate maturity placements are based on my own assessments from the best available information I was able to gather in my research. Thus, specific details on value chain engagement may be left out unintentionally and would only be known internally to the company itself. I have also provided the justification for my placements in the Appendix, Exhibits D, E, and F. The reader should also be reminded that the companies studied in this report are thought of as leaders in the industry, so these index levels may not be representative of the food and beverage industry at a whole.

See Exhibit B for the Sustainable Value Chain Collaboration Index and Exhibit C for summary tables of each company's maturity level.

Index Observations

When looking at the Sustainable Value Chain Collaboration Index, we see that no companies are at any stage 5 of "Program Maturation." There was some variation among

the companies studied in this paper, but for the most part, there was concentration of placement between stages 2 and 4. The spread centered more towards the middle reveals that engagement and progress are being achieved, but accountability, full transparency, embedded sustainability, and true collaboration is still lacking or unclear. Further, this illustrates the difficulty and challenges that companies face in ranking high on the Index, because they do not have direct control over all indicators.

The most developed areas were “Internal Practices & Policies” and “Corporate,” as well as “External Stakeholder Collaboration.” This shows us that internally it is obviously easier to advance your level of engagement than it is to work outside of your four walls and engage others. At the same time, this indicates the importance of collaboration and formulating partnerships. These external relationships can help a company engage across their value chain and provide knowledge, resources, and accountability.

Even though the internal indicators were more advanced, we are still limited in knowing what goes on internally. To be more specific, the extent of internal communication is unknown (“Internal Practices & Policies” stage 3), as well as decisions and actions that reflect sustainability (“Internal Practices & Policies” stage 4). Additionally, under “Corporate” stage 1, the company is to “define sustainability,” but we saw that this was not always evident on the website or in other public materials. When the question was asked to each corporate manager, a definition was given, but these were mostly based on individual interpretations rather than a standard corporate definition. This may seem like a menial task to some, but it is an important step in achieving sustainability, as it helps guide a company to determine its programs and initiatives to pursue.

Overall, when looking specifically at “Value Chain Collaboration,” we see that no company was fully at stage 3. This third, “Progress” stage, means that “incentives and accountability for desired behavior” must be present, and currently no companies fully practice this. Following this, to reach stage 4 or higher a company must have supplier assessments and enforcement of standards, and then true collaboration and innovation along the value chain, long-term risk reduction, and defined best practices. The companies studied in this report do not have incentives or strict requirements for suppliers on water sustainability, so there is no true accountability for desired behavior. Although, the closest to this accountability was Coca-Cola’s mandate on their bottlers to produce a *Source Vulnerability Assessment* and *Source Water Protection Plan* by 2013, which caused them to be partly in stage 3. It may be a challenge for companies to reach stages 3, 4, and 5, because it must be willing to leave a supplier if the supplier does not meet the requirements.

The results from the Index also show that some companies may excel in innovation at earlier stages, whereas others will become more innovative at later stages of maturation. To be more specific, innovation is represented in the Index under stage 5 for “Corporate” and stage 5 for “Value Chain Collaboration,” but some companies are pursuing this at earlier stages. For instance, PepsiCo’s new 100% bio-based bottle is very innovative, but the company is not at stage 5 for either indicator. This tells us that innovation can be important at earlier stages in helping a company reach program maturation and building collaboration with others along the value chain. However, we may also see that some disruptive technologies advance a company’s sustainability efforts, but internally, appropriate practices and procedures may still not be in place, or externally, suppliers and

stakeholder groups may not be fully engaged. Therefore, it is difficult to place innovation at a particular stage, as each company will approach this differently.

Nestlé Waters North America's collaboration primarily centers around stage 3 and somewhat into stage 4 for the two internal indicators ("Corporate" and "Internal Practices & Policies") and for "External Stakeholder Collaboration." This exemplifies that the company is well organized and advanced internally with many policies and practices, but externally they still have some room for improvement. For instance, "Value Chain Collaboration" is at stage 2, since there are no incentives and accountability for suppliers. In addition, transparency in financial reporting is unknown. However, Nwana has done well by engaging with governments and lobbying for improved legislation.

PepsiCo is on track with meeting and reporting their goals (i.e., "The Promise of PepsiCo" from "Performance with Purpose"), so the "Corporate" indicator is at stage 4. Although, some of the internal practices and policies are unknown, so they have not reached stage 4 for "Internal Practices & Policies." More specifically, the analytical methods to support sourcing, decisions reflecting sustainability, and rules of thumb are unclear. The company is also sharing best practices and information with suppliers, but there is no accountability or incentives for desired behavior, so "Value Chain Collaboration" is at stage 2. Finally, PepsiCo has established numerous partnerships, but the collective multi-stakeholder actions and collaboration with governments is somewhat limited or unknown.

In the case of Coca-Cola, engagement is concentrated mostly around stage 4. For the "Corporate" indicator, the company is touching into stage 5, since they have formally quantified the benefits of watershed restoration and water access with third party

verifiers. However, they have not publically disclosed risk reduction and innovation in products and processes appears somewhat limited. As mentioned above, the company slightly touches stage 3 of “Value Chain Collaboration,” since they have mandates on their bottlers. Finally, Coca-Cola is at stage 4 for “External Stakeholder Collaboration,” due to their multi-stakeholder CWPs.

Index Recommendations

After employing the Sustainable Value Chain Collaborations Index, some observations and recommendations can be made to improve the tool. As noticed, many times the companies did not meet all characteristic listed under each stage and often fell between two stages. This indicates that the progression of increased maturity may not be logical for all companies or that some action items may be skipped over.

This leapfrogging from one stage to another occurred when companies felt that some characteristics under a stage were not necessarily required to be completed before reaching a higher stage, or when particular information was unknown to the public. For example, on “External Stakeholder Collaboration” I was not able to find how companies defined their stakeholder strategy (or if it even exists) for stage 1, but I was able to find examples of stakeholder collaboration for stages 3 and 4. This shows how the progression of maturation is not always cut and dry, and how significant pieces of corporate information are not publically available. Additionally, the internal codes of conduct and established governance structure for stage 2 of “Corporate” are not fully known externally, but reporting on goals in stages 3 and 4 is typically publically available. This proprietary information may not be publically shared, so it was difficult to determine what internal

policies and codes were in place and how they were monitored. Knowing that some information is not available to the public, I suppose leapfrogging is acceptable in some cases, but transparency then becomes an issue to certify that companies are taking the appropriate steps needed to achieve the highest level of engagement.

At this point, there is little to no engagement or collaboration with customers. The insufficient public information on this made it difficult for me to determine appropriate levels of collaboration, so I chose to exclude it from the Index. This indicates more transparency problems, which causes people outside a company to not be able to accurately draw his or her own conclusions. Therefore, we need better sources at arms length and clear definitions of sustainability and corporate customers.

Since the Sustainable Value Chain Collaboration Index is more generic and not specific to water, certain components or characteristics may be missed when measuring a company's engagement in water sustainability across the value chain. However, this Index can be modified to be more specific to water. As such, I have begun to create a Water Sustainability Value Chain Index DRAFT (Exhibit G). Similarly, this Index DRAFT can still provide a framework for companies on ways of collaborating with their value chain on water sustainability. Although, additional research and case studies need to be completed before making this Index DRAFT complete.

Leading Practices

As exemplified above with the Collaboration Index, no company within the food and beverage industry has achieved stage 5 of "Program Maturation." This illustration, as well

as the recognition that this space is still relatively immature, support the notion that currently there are no widely accepted best practices but only leading practices when it comes to water sustainability across the supply chain. Each company studied in this report can teach us about leading practices, since each brings a unique approach and methodology for engagement. However, one realizes that the most effective approaches are multi-pronged, where engagement can be seen with suppliers, bottlers, NGOs, governments, employees, and customers.

To begin, a company must first have sufficient information about their value chain. Without this background information, a company cannot benchmark, set appropriate goals, or understand its impact and respective opportunities. Therefore, by assessing water risks, accounting for them both internally and externally in reports, compiling data on water resources and availability, gathering specifics relating to plant efficiencies, and collecting other key supplier information, a company can begin to understand the magnitude of its impacts and identify leverage points across the value chain. One way to gain this information is to perform surveys and audits, like *Source Vulnerability Assessments* and *Agricultural Ingredient Supplier Sustainability Surveys*. Moreover, sharing information with suppliers is critical, so outlets like SEDEX and sustainability summits are keys to success.

After possessing the essential knowledge, a company can set high but achievable goals. All companies in this paper have set such goals and have made progress towards these goals, but efforts still must be vigorously pursued. A leading example can be seen with the declaration of water as a human right, as it has helped drive a company's water efforts and holds them accountable. This declaration ties the human element to water and displays water's influence beyond a company's operations. Furthermore, we have seen

PepsiCo India already achieve a positive water balance, which caused them to set a new goal of achieving a double water balance. This redefining of goals and strategy adjustment is an important practice for all companies to follow.

It is also helpful to have an internal system to establish targets, monitor progress, and improve efficiencies, like the NEMS system does. Additionally, internal mandates for bottlers, like Coca-Cola's Water Resource Sustainability Requirements, and corporate policies, like *Nestlé Waters North America Environmental Policy* and PepsiCo's *Global Sustainable Agriculture Policy*, are an important step in embedding water sustainability practices within the company and along its supply chain. Along with the policies and mandates, a company should provide tools and support to the suppliers. For instance, Coca-Cola provides the online tool *iLearn iManage iProtect*, Water Efficiency Toolkit, as well as other guidance documents; and PepsiCo is rolling-out the *i-crop* tool.

Leading the pack on effective partnerships are those that are multi-stakeholder and scalable, like Community Water Partnerships. These programs connect various groups to improve the environment, the human condition, and economic development. Specific partnerships with governments and industry are also important when trying to promote water sustainability. For instance, working with local governments to aid in the creation of watershed protection plans is valuable not only to the local community, but also provides stability and assurance to the company that water resources will be protected for long-term sustainability. This watershed view is critical when taking a holistic view of water sustainability, as water's unique characteristics make it inherently local and part of a larger system that extends beyond a manufacturing facility. This view also feeds back to the

justification of corporate engagement with communities in which they operate and with suppliers who have a significant water impact.

A company should also be innovative when it comes to addressing water sustainability. For example, the PepsiCo Walkers potato washing method and the Gatorade bottle cleaning method are two innovative ways of cutting down potable water used in the production process. NWNA is also working with its PET resin supplier to find ways of improving water efficiency in production. Aside from being technologically innovative, Coca-Cola is pursuing social innovation by working to empower small-scale farmers to participate more directly in the company's supply chain. When taken together, these initiatives and engagement avenues are a good start and provide leading examples, but they still need to be extended and scaled up to become best practices.

In conjunction with all of these leading practices, a company must maintain transparency. Both Coca-Cola and PepsiCo have publically disclosed water risks in their 10-Ks, which is a good starting place. By working with BIER, each company studied in this paper has a forum for exchanging ideas and progress with other key players in the beverage industry. It is also important to have third party verification when publishing reports or measures of impact. For instance, PepsiCo had Deloitte verify claims of India's positive water balance; and Coca-Cola worked with LimnoTech, The Nature Conservancy, and Global Environment & Technology Foundation to measure the benefits of watershed restoration and water access projects. Despite these leading examples in transparency, they are still relatively immature and need to be improved.

Overarching Themes and Conclusions

All companies studied in this report recognize that water is fundamental to their business. These companies also realize that in order to achieve their goals on water and/or sustainability, they must look beyond the four walls of their plant by looking across their supply chain and creating partnerships. This beyond compliance approach is the only way to truly drive impact across the value chain. Obviously, each company has improved internal operational efficiencies, since this is under direct control and a way to cut costs, but collaboration across the value chain is still limited. In other words, corporate focus has not always been on the value chain, which misses opportunities in design, R&D, logistics, marketing, recycling, and any other value-added activity.

From my research, we see that upstream level of engagement with suppliers is more advanced than the downstream engagement with customers. This is most likely due to the scale of impact that the company can have, since agriculture accounts for the greatest consumption of water. There are also some overarching themes when it comes to risk, partnerships, level of collaboration with the value chain, supplier mandates, policies, effective practices, tools, packaging, transparency, differences in carbon and water, and achievable levels of collaboration.

Even though each company has a different impetus, history, and path for engagement, all of them view water as a risk. Whether they see it as physical, reputational, regulatory, or financial, and regardless if they can accurately quantify them, water is still a high-risk area within the food and beverage industry. For example, each company studied in this paper has faced these types of risks when specific communities in the U.S. and abroad (specifically, China and India) spoke out and felt that the company was in

competition of, taking away, or degrading the community water source. However, a great barrier to water risk accounting is that the price of water is too inexpensive, so the payback for capital expenditure on projects that conserve water is not very high. In other words, if there is no associated financial burden from water consumption, companies may not have the full incentive to pursue water sustainability across their value chains. This effect is felt even stronger in small- to mid-cap companies that do not have the same access to capital, as the larger companies studied in this paper do. This lack of suitable pricing also mirrors the carbon situation, as there is little to no consensus on how carbon should be priced, so the incentive to reduce greenhouse gas emissions is low.

To effectively look outside direct operations and engage the value chain, a company must form meaningful partnerships and establish long-term commitments. The partnerships explored in this report have been crucial in helping to bring expertise, legitimacy, transparency, and support to the companies studied. Some partnerships are specific and some are more general, but those proven to be most effective are those that are multi-stakeholder and include government, community groups, industry groups, foundations, academic institutions, non-profits, and even other companies. This partnership model is key to understanding who else along the value chain is contributing to the embedded water and who can have a significant impact by pursuing water sustainability. Moreover, collaborative efforts can help to distribute risks for early adopters. Other industry groups, like the Apparel Coalition, also recognize the fundamental importance of multi-stakeholder partnerships in tackling large sustainability issues, like water use and quality.

External corporate commitments (e.g., CEO Water Mandate, UN Water Disclosure, water as human right declaration, etc.) have also been taken, which help to keep companies accountable and to operationalize goals. However, previous literature contributions indicate that most companies that have joined such commitments still do not practice full disclosure of water accounting and supply chain engagement (Morrison & Schulte, 2009). Moreover, a long-term sustainability focus is required to create meaningful impacts across the value chain. Companies often realize this but are still trying to figure out the best ways of incorporating supplier expectations into their business decisions, goals, and stakeholder commitments.

As we saw with the Sustainable Value Chain Collaboration Index, no company made stage 5 for any indicator and none were fully at stage 3 with the “Value Chain Collaboration” indicator. Even though most companies have some level of engagement with various suppliers to promote water sustainability, like with PET resin suppliers and agricultural farmers, they have still refrained from making an enforced mandate on these suppliers. It appears this is due to the fact that you have to be willing to leave a supplier that does not meet the requirements; and because this is a relatively new space, food and beverage companies are still trying to navigate how they can play a meaningful role in a product’s value chain.

For some companies, risk may be present in being a first mover in the space, as it may be viewed that these strict mandates would limit the number of suppliers, whereby making the supply chain less diversified, and thus more vulnerable. However, there is great potential across the value chain, so companies should exercise serious consideration on the various carrots and sticks that can be offered to suppliers, in order to show the

collective importance of pursuing water sustainability. I have provided some ideas for such incentive mechanisms in the Recommendations section below.

Even though there are no enforced environmental policies on suppliers, all companies do have specific internal policies relating to water, and for some, this extends to its bottlers. Internal policies guide a company's environmental actions and set a standard to keep a company accountable. For instance, NWNA mandates that their spring water must be 100% sustainable and there must be a 2-5% annual water reduction; NWNA also employs the *Good Neighbor Policy*, *Nestlé Waters North America Environmental Policy*, and *Nestlé Waters North America Environmental Commitment*. PepsiCo has a *Global Sustainable Agriculture Policy*, *Environmental Policy*, *Responsible and Sustainable Sourcing Guidelines*, and a corporate protocol to detail how water use should be reported and the proper metrics (*Water Stewardship*, 2010, p. 11). Finally, Coca-Cola has lead by establishing a Water Resource Sustainability Requirement for their bottlers, which requires them to perform a *Source Water Vulnerability Assessment* and a *Source Water Protection Plan*, and by citing "protecting the environment" as one pillar in their Supplier Guiding Principles ("Sustainable Agriculture," 2011).

To help engage across the value chain, companies studied in this report are employing tools internally and offering them externally to their suppliers or partners. All companies utilized the water footprinting method at one point or another to understand a specific product's water impact. Although, the greatest benefit to performing a water footprint is not the actual number generated from the assessment, but rather the ability to identify parts or components along the supply chain with the greatest impact. Further, each company created its own internal tool(s), as based on life cycle assessment, water

footprinting, and water risk. Similarly, many companies, via the Sustainable Apparel Coalition, have worked collaboratively to create the Sustainable Apparel Index, which is used internally for evaluating performance at the company, product, and facility levels (Sustainable Apparel Coalition, n.d.). So far, the food and beverage industry has yet to create such a tool that measures these performance levels, but the opportunity remains for an industry-lead initiative, like BIER, to take the lead on standardizing tools and best practices.

As a precursor to standardization, my research helps to uncover some effective and leading practices in water sustainability across the value chain, as explored in the Leading Practices section above. These leading practices range from collecting supplier and bottler information to technological and social innovation. The results indicate that it is critical for companies to gather and share operational and supplier information, establish meaningful and achievable goals, utilize monitoring processes and tools, set forth specific internal and external policies, and formulate partnerships.

However, contemplation of these leading practices causes one to reflect on the incentives of being a first mover in the space. For example, are there are real risks to being a first mover; what advantages do first movers have; and how can we encourage further engagement and momentum in water sustainability across the supply chain? It appears that there are clear advantages to being a first mover, like reducing risk, increasing brand reputation, enhancing control over the supply chain, and improving internal efficiencies and product quality, but it is still uncertain how long will this advantage last. Clearly, the companies studied in this report recognize the advantages of playing in this space, but the long-term benefits and ability to retain competitive advantages are still unknown.

Aside from this, it is apparent that sharing ideas, collaboration, and transparency are all helpful in educating others about leverage points and effective engagement actions across the value chain, therefore the future is bright as companies as maturity continues to grow. Over time, the increase in customer awareness of product or service inputs and outputs will augment pressure on companies to be more sustainable and transparent, so those who are already leading the pack in value chain efforts will be well positioned. Those companies that have to play catch-up to industry leaders will have to invest greater amounts of capital and resources at a much faster pace than those who are first movers. Moreover, companies that are already engaged in water sustainability would be able to further drive their level of engagement by forming multi-stakeholder industry coalitions. Various ways of promoting the advancement of external and internal collaboration are further explored in the Recommendations section below.

When looking at value-added activities, we see that design and R&D have received the most attention. As such, packaging innovation presents another opportunity for companies to reduce their water impact. However, to date, the focus has been on reducing the amount of virgin natural resources and carbon emissions instead of water. Each company studied in the report had some packaging and bottling goals but did not always quantify the water benefits. When companies think about the end use phase and disposal of the product, opportunities will arise that can help us to understand how we can better design the bottles themselves, so that they can be recycled or biodegrade, thus reducing the embedded water impact.

Currently, a certain level of transparency is required when reporting claims and progress, and this is only expected to grow. All companies shared a baseline of

transparency, like employing GRI guidelines on sustainability reporting, but the number of public reports varied. Public reports specifically on water were most prevalent with Coca-Cola; and both Coca-Cola and PepsiCo disclosed water risk in their 10-K report, but NWNA's disclosure of water risks are unknown, since they are not a publicly-traded company. Each company also used a third-party verifier when reviewing progress of goals at one point or another, but this was sporadic.

Water is fundamentally local and essential to all forms of life. This local characteristic influences a company's approach to sustainability, its ability to have impact, and its ability to measure this impact. Further, this quality explains why water has not achieved the same level of engagement as greenhouse gas emissions have. Some of the tools to measure carbon and water are similar (i.e., carbon footprint and water footprint), but water's fundamentally local characteristic creates numerous problems when conducting a water footprint. It is much easier to make assumptions on emissions, as emission factors are basically the same throughout the world regardless of a particular location. On the other hand, water impacts are unique to a particular geography, region, community, and watershed. Moreover, water is embedded within a socio-political context and its future availability is uncertain. Even with all of these critical factors that display water's essential role in our world, we still have a ways to go on improving water sustainability across the entire value chain.

After comparing water and carbon, and taking the other overarching themes into account, one can begin to consider what level of supply chain engagement companies can even accomplish. Mostly, this depends on the company's commitment and priorities, devoted resources (i.e., foundation money, operational funds, capital investment), and

internal structure and capacity (i.e., enough manpower and internal support for initiatives). It appears that companies support their water sustainability programs by using foundation funds, operational funds, or capital investment. At this point, I am not sure if the origin of funds really matters, so long as companies are devoting sufficient resources. However, it may be inferred that a company that uses funds directly from operations places higher priority on water sustainability, as it is viewed as a part of the core business, rather than an external charitable donation stemming from foundation funds.

For companies with only a few individuals working full time on sustainability, social responsibility, and/or water resource management, internal capacity to drive water sustainability through the company and supply chain may be limited. As seen with NWNA, the company employs a Director of Natural Resources, 12 on-the-ground Natural Resource Managers, Director of Health and Environmental Affairs, and most recently a Director of Sustainability; NWNA may also receive support from Nestlé Waters and Nestlé N.A. PepsiCo has a limited number of people working specifically on sustainability, considering its large size (managers for Water Stewardship, Environmental Stewardship, Supplier Outreach, Packaging Innovation); rather, the company tries to embed sustainability into everyone's daily work. Coca-Cola has numerous employees working full-time on water stewardship, environment and water resources, and sustainable agriculture. Positively speaking, all companies studied in this paper have buy-in from top-level management and their CEO, but lower level employee support and education appears insufficient. When taken together, it seems that companies are well positioned to have a meaningful impact on their value chains. However, they must remain steadfast to their commitments and devote sufficient resources to implement, monitor, and measure these commitments.

As time passes and goals and commitments come due, companies realize the critical functionality of engaging their value chains to meeting these aspirations. Thus, I expect the level of engagement across the supply chain will continue to grow now and in the future, where mandates and accountability will be further defined and collaboration will become reutilized. The future is bright in this space with numerous opportunities, but first hurdles must be overcome, commitments must be sincere and actively pursued, companies need to be held accountable, and efforts should be recognized and rewarded.

Recommendations

In order for water sustainability across the supply chain and value chain to be expanded within the food and beverage industry and other industries, some things need to be improved. Below are some recommendations that focus on areas of improvement and ways companies can enhance their level of collaboration. Some of these recommendations may be more difficult to achieve than others, but they are still worth reflecting on and attempting to address.

- **Continue to promote partnerships (with NGOs, governments, industry, and other stakeholders) and build local relationships**
 - These relationships will help bring legitimacy, improve knowledge, and provide context to initiatives.
 - In line with this, we need to build momentum for the cross-pollination of companies to exchange ideas, challenges, best practices, metrics, and standards, among other things. This will benefit all participating and further promote water sustainability by accelerating development, innovation, and reducing costs. After all, these water challenges are systematic issues that cannot be solved by one company. Hopefully, some best practices can be

drawn out over time, in order to create standards and tools for defining and measuring water sustainability across the value chain.

- **Roadmap for stakeholder engagement:** When companies are just starting to engage in water sustainability across their value chain, it may be helpful to first build relationships with larger, better known groups, as they provide immediate credibility, support, and resources. Such examples are WWF, TNC, Environmental Defense Fund (EDF), Conservation International, WBCSD, and others. After these initial partnerships are created, a company can work with them to identify meaningful on-the-ground partnerships. As evidenced above, these local, community-based partnerships really drive a company's engagement by reducing risk, improving brand reputation, and promoting collective action and innovation. Moreover, many of these organizations now offer the same expertise and capabilities that a consulting firm would but at a much lower cost.
- **Consider the value chain rather than the strict supply chain**
 - There may be opportunities missed by not looking from a value chain perspective, which includes design, R&D, logistics, marketing, recycling, and any other value-added activity. The value chain can help us to identify lead firms, that in turn, could encourage its suppliers, through sticks or carrots, to adopt an index on water sustainability in the value chain. For these reasons, my Index was focused on the value chain.
 - By engaging with the various players in a product's value chain, innovation may result, thus improving firm and product sustainability. Companies can reconsider the design of the product and find ways of reducing the water impact and improving efficiencies through the product's life cycle. For example, what are the main ingredients in the products and how can they be more sustainable? What are more sustainable packaging options? How can the end use phase be more sustainable and how can we improve recycling of the product?
 - The value chain view may also reveal areas that are surprisingly not equitable to others, which would help to clue us into drivers and incentives for various players along the chain.
- **Take a watershed approach by including the surrounding socio-political context and a long-term view**
 - Water's local characteristic makes it unique to particular locations and watersheds. Moreover, water is the essence to life, so the socio-political context surrounding water should not be discounted. To have a more holistic and impactful approach to water sustainability, whereby reducing risk, companies cannot look at water as an isolated issue, nor as a short-term commitment.
- **Vigorously employ third party verification and continually exercise transparency**

- Transparency is increasingly critical to our society, so companies should consistently exercise transparency and third party verification, as often as possible. This should not just be for corporate responsibility reports but also for regular updates, progress achievements, indirect water use, and quantifying risks and benefits. By doing this, a company will be kept on track with achieving its goals and have greater credibility, in turn opening up new opportunities and points of innovation, as inventors and entrepreneurs may seek out a company for being a leader in sustainability and transparency.
- **Promulgate incentive systems to get support and engagement from suppliers**
 - When considering water sustainability from a value chain perspective, many questions arise. Why should a supplier change his or her practices? Why should a plant manager be inconvenienced to conduct a water protection plan? Why should a farmer take time to change his or her management practices? Such questions must be addressed before a company expects a supplier to comply with its requirements.
 - *There is no one-size fits all answer here, but some **incentive ideas** are as follows:*
 - Increase supplier commitments, like purchasing a minimum amount of product per year or buying more than current ordering stocks. This will help to bring certainty to the supplier in the demand, and will give the purchaser more influence in persuading the supplier to pursue water sustainability initiatives.
 - Offer corporate tools, employee support, case studies, and guidance documents on ways suppliers can improve water sustainability and efficiency in operations.
 - Help suppliers secure loans needed for technology improvements. For instance, a rural farmer in a developing country would have a difficult time purchasing a drip irrigation system, so a company can help connect farmers to loan agencies.
 - Design a timeline for suppliers that clearly outlines the increasing expectations that should be met.
 - Rather than cutting the supplier off completely, if they do not meet the timeline, the company could decrease the amount of product purchased by a certain percentage. For each milestone missed, the percentage of purchasing reduction increases. This would help ease the transition, while at the same time sticking firm to the company's commitment to water sustainability.
 - Create an online forum for suppliers to share ideas and information. The company could also recognize these efforts with an awards program to further promote supplier efforts on water sustainability.
- **Learn and share tools with other groups outside the food and beverage industry**

- The Apparel Coalition, Outdoor Industry Association, high tech coalitions, and other industry-lead initiatives are working on similar water sustainability issues. Much can be learned by taking an outside perspective, thinking in new ways, viewing external examples, finding synergies, and promoting cross industry innovation.
 - **The Sustainable Value Chain Collaboration Index** can be utilized as a tool by companies across all industries, not just the food and beverage industry, to identify leverage points where they can have an impact and to understand the progression of collaboration. More specifically, partnerships, best practice sharing, informed decision-making, multi-year reporting, long-term risk reduction, and transparency are actions not specific to one industry or another.
 - Further, companies should employ other tools that are already in existence to help track water usage, identify risk areas, and help set strategy. Companies do not need to reinvent the wheel, but after tools are used, companies can use their own internal creativity to facilitate innovative solutions and to determine what works best for their company. Some of these tools include, GEMI's *Collecting the Drops*, Water Footprint Network's water footprinting, and WBCSD's *Global Water Tool*.
- **Continue to gather and report data**
 - Data is critical to establish baselines, understand challenges, measure progress, and inform decisions. As they say, "you can't know where you are going until you know where you have been."
 - Although difficult, measuring a program's impact is a critical step in increasing a company's level of engagement along the Index. Working with third parties can help a company measure the associated water sustainability benefits and promote transparency.
- **Improve governmental relations and lobby at regional, state, and federal levels of government**
 - Companies can work with governments on building support for regulation that promotes water sustainability. National regulations will also help to bring regulatory certainty to companies, which make operations run smoother.
 - Companies can help governments understand the importance of creating watershed protection plans, with the hope that they will be mandated across all local governments so that water sources can be managed for long-term sustainability.
 - It is also in the best interest for companies to disclose water risks in their financial reports. By lobbying for standardization of disclosure requirements in their 10-K, shareholders will be better informed as to the physical, reputational, regulatory, and financial risks that water poses.

- Another such effort could be to support rises in water rates that more accurately reflect the actual associated costs (i.e., increased scarcity, failing infrastructure, climate changes, etc.).
 - However, the standardization of best practices within industry would make it easier to lobby for regulation of such activities, since they would already be tried and true.
 - Improvements in regulation may also make the adoption and use of tools and indices, like the Sustainable Value Chain Collaboration Index, easier.
- **Increase downstream level of engagement with customers and consumers**
 - Companies can increase their downstream engagement with customers (i.e., retailers, restaurants, and small businesses) by sharing best practices and offering guidance and support on water sustainability.
 - Companies should also provide more detailed information about the products to their customers and consumers (i.e., those who consume the product after purchasing it from the customer). For instance, with today's technology, companies can post particular information on the product's life cycle and sourcing by using barcodes. This product information along the value chain is not only important for marketing, but also for operations to provide assurance.
 - Additionally, educational campaigns for consumers can be established to help them understand water impacts and ways they can be more sustainable with water.
- **Improve employee education and engagement**
 - For a company to be truly sincere about their water sustainability goals, internal support and buy-in should be widely disseminated throughout the company.
- **Follow the commitments as set forth in the CEO Water Mandate and Water Disclosure Project**
 - These are sensible commitments and address various water sustainability issues. Companies may also find technical support from the organization that establishes a mandate.
- **Place greater emphasis on water stewardship and efficiency when working with suppliers on sustainable packaging**
 - The focus in the past has been primarily on carbon and reducing virgin materials, but water should be a primary focal point as well. In addition to the environmental benefits of using less water in new inputs or changes in processing, companies can often save money by having to purchase less potable water.

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Source and Amount of Support

N/A

Faculty and Supporting Members

- Gary Gereffi, Primary Advisor, Duke University, Center on Globalization, Governance & Competitiveness
- Tod Christenson, Beverage Industry Environmental Roundtable (BIER)
- The Coca-Cola Company
- PepsiCo, Inc.
- Nestlé Waters North America

Appendix

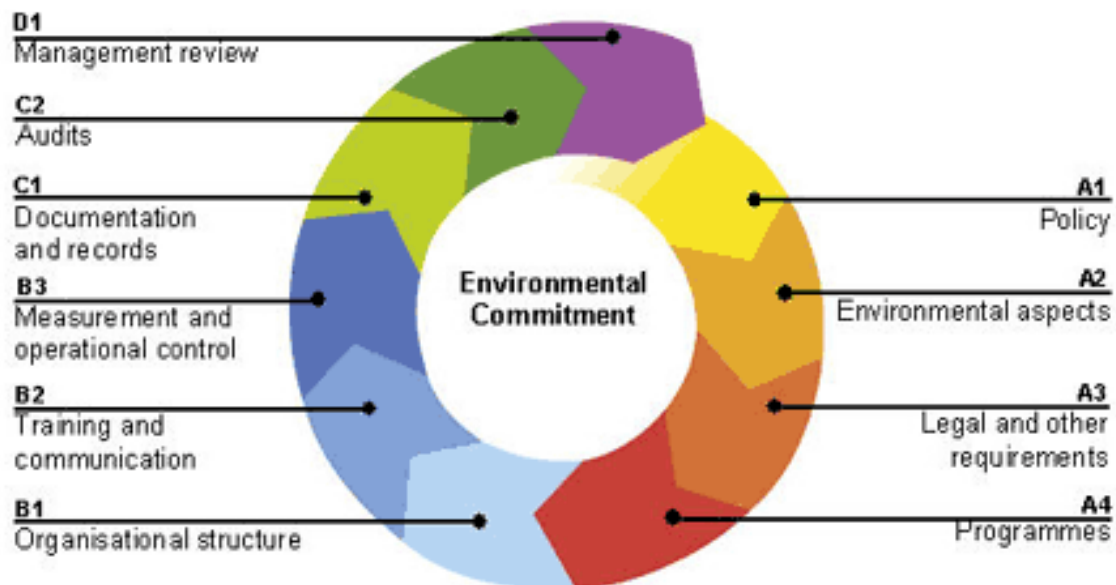
Exhibit A – Nestlé Environmental Management System (NEMS)

Measuring Our Progress

Nestlé Environmental Management System (NEMS)

The frame of NEMS does not form a closed loop, but builds up a virtuous spiral of continuous improvement :

- A. Establish environmental targets and plans,**
based on *The Nestlé Policy on the Environment* (A1), on environmental aspects (A2), on legal and other requirements (A3), and shaped into programmes (A4),
- B. Monitor environmental progress against plans,**
relying on the organisational structure (B1), on training and communication (B2) and on measurement and operational control (B3),
- C. Check results and define preventive and corrective actions,**
with the help of documentation and records (C1) and environmental audits (C2),
- D. Improve NEMS efficiency,**
with a management review (D1).



Available online: <http://www.nestle-watersna.com/Menu/Environmental/Measuring+Our+Progress.htm>

Exhibit B – Sustainable Value Chain Collaboration Index, created by Emily Spear

Sustainable Value Chain Collaboration Index

		STAGE					
		1	2	3	4	5	
		Intent/Vision	Engagement of Key Personnel	Progress	Accountability	Program Maturation	
KEY INDICATORS	Internal	Corporate	<ul style="list-style-type: none"> • Vision & strategy defined • Broad values defined • Define sustainability 	<ul style="list-style-type: none"> • Establish governance structure • Goals defined • Codes of conduct 	<ul style="list-style-type: none"> • Report against goals • Transparency in financial reporting 	<ul style="list-style-type: none"> • Transparent multi-year trend analysis of meeting & reporting goals • Strategy adjustment • GRI guidelines 	<ul style="list-style-type: none"> • Disclosure of risk reduction & benefits of programs • Innovation in products and processes
		Internal Practices & Policies	<ul style="list-style-type: none"> • Risk assessment • Value chain mapping • Procurement practices identified • Compliant with environmental laws 	<ul style="list-style-type: none"> • Policies in place for suppliers and external engagement 	<ul style="list-style-type: none"> • Define metrics • Develop & use tools • Consistent internal communication 	<ul style="list-style-type: none"> • Informed decisions & actions reflect sustainability • Analytical methods refined to support sourcing • Rules of thumb 	<ul style="list-style-type: none"> • Sustainability embedded into processes/practices • Sourcing decisions reflect social, environmental, & economic impacts
	External	Value Chain Collaboration	<ul style="list-style-type: none"> • Initial outreach and communication with suppliers • Strategy defined for supplier engagement 	<ul style="list-style-type: none"> • Define supplier expectations • Provide tools to suppliers • Share best practices 	<ul style="list-style-type: none"> • Incentives & accountability for desired behavior 	<ul style="list-style-type: none"> • Supplier assessments and enforcement of standards 	<ul style="list-style-type: none"> • True collaboration & innovation along value chain • Reduction of long-term risk • Best practices defined
		External Stakeholder Collaboration	<ul style="list-style-type: none"> • Build stakeholder collaboration strategy • Map opportunities & potential partners • Create plan for government relations & lobbying 	<ul style="list-style-type: none"> • Stakeholder invitation • Information sharing • Leverage resources 	<ul style="list-style-type: none"> • Build partnerships with large NGOs • Establish joint goals and objectives • Join industry initiatives 	<ul style="list-style-type: none"> • Collective multi-stakeholder actions • Measurement of goals with third-party verification • Partnerships with communities & governments 	<ul style="list-style-type: none"> • Speaking with collective voice • Continuous improvement • Provable results • Influenced legislation

Exhibit C – Summary tables for each companies’ maturity level, based on Sustainable Value Chain Collaboration Index

Nestlé Waters North America

STAGE

INDICATOR	1	2	3	4	5
<i>Corporate</i>			X	X	
<i>Internal Practices & Policies</i>			X	X	
<i>Value Chain Collaboration</i>		X			
<i>External Stakeholder Collaboration</i>			X	X	

PepsiCo, Inc.

STAGE

INDICATOR	1	2	3	4	5
<i>Corporate</i>				X	
<i>Internal Practices & Policies</i>			X		
<i>Value Chain Collaboration</i>		X			
<i>External Stakeholder Collaboration</i>			X	X	

The Coca-Cola Company

STAGE

INDICATOR	1	2	3	4	5
<i>Corporate</i>				X	X
<i>Internal Practices & Policies</i>			X	X	
<i>Value Chain Collaboration</i>		X	X		
<i>External Stakeholder Collaboration</i>				X	

Exhibit D – NWNA’s Sustainable Value Chain Collaboration Index Placement

Corporate – Stage 3-4

NWNA’s first Corporate Citizenship Report was published in 2008 and outlined the company’s goals and objectives. The subsequent report, published in 2010, outlined progress to 2008 goals, denoted as “achieved,” “making progress,” or “did not achieve.” This means that NWNA is certainly reporting against goals for multiple years but transparency in financial reporting is unknown and consistently meeting goals and strategy adjustments are limited. Further, GRI guidelines were used for the 2008 Corporate Citizenship Report but not in the 2010 report. Thus, they are between stages 3 and 4.

Internal Practices & Policies – Stage 3-4

The company has a number of internal policies in place to help inform decision making, though the “analytical methods refined to support sourcing” in stage 4 are unknown. For instance, NWNS has a *Siting and Community Commitment Framework* to interact with communities, a *Good Neighbor Policy*, a *Nestlé Waters North America Environmental Policy* and *Nestlé Waters North America’s Environmental Commitment*. Additionally, the NEMS system tool helps the company set goals, track, and monitor progress; the company performs regular source and capacity reviews; cumulatively, the plants have to show an annual water reduction; and the GEF tool to help understand life cycle of product. The company mandates that their bottled water is 100% sustainable, which evidences a “rule of thumb,” though I am not sure what decisions and actions support sourcing decisions. It may be that the Natural Resource Managers and/or NEMS help to inform these sourcing decisions, but the specific methods are not specifically known.

Value Chain Collaboration – Stage 2

NWNA appears to be at stage 2 with the Supply Chain Engagement indicator, as they share best practices and provide support to suppliers. For instance, they have conversations with their largest PET resin supplier on water efficiency; work with farmers to set up spray irrigation systems; and require suppliers to adhere to internal quality standards. However, these quality standards are not based on water stewardship, but more focused on water quality, so the company is not in stage 3 yet where incentives and accountability for desired behavior must be in place.

External Stakeholder Collaboration – Stage 3-4

NWNA does have some effective partnerships, but the truly collective, multi-stakeholder initiatives and engagement are not present. For example, the company has a long relationship with Project WET for education and worked with TNC on preservation, so they are certainly at stage 3. In addition, NWNA has engaged with local authorities to help them create watershed management plans, as well as lobbied for recycling, which means they touch in stage 4. Although, the *Siting and Community Commitment Framework* and the *Good Neighbor Policy* provide frameworks for NWNA to engage with stakeholder groups, the diverse, multi-stakeholder actions are limited, thus not fully at stage 4.

Exhibit E – PepsiCo’s Sustainable Value Chain Collaboration Index Placement

Corporate – Stage 4

On the Corporate indicator, I felt PepsiCo was at stage 4, since they have multiple years of reporting goals, adjusted some strategies, and employ GRI guidelines. For example, the company did meet a positive water balance in India so now a higher goal has been set for those Indian operations. The company has been building on their water goals in consistent manner since their first goal announcement in 2007, then subsequent goals in 2010. However, strategy adjustment and multi-trend analysis still appears limited in certain areas.

Internal Practices & Policies – Stage 3

Internally, PepsiCo has policies in place (i.e., PepsiCo’s *Environmental Policy* and *Sustainable Agriculture Policy*), tools (e.g., ReCon), metrics, and internal communication to inform decision making, so they meet stage 3; but the incentives and analytical methods refined to support sourcing decisions are still unknown or unclear, so they are not at stage 4. The declaration of water as human right and commitment to CEO Water Mandate have been helpful in setting strategy and making decisions, but rules of thumb and analytical methods to support sourcing are not widely known to the public. It also appears that PepsiCo has limited internal staff working on sustainability, as they are trying to make it a part of everyone’s job, but overall informed decisions that reflect sustainability are not fully understood.

Value Chain Collaboration – Stage 2

PepsiCo certainly has communication and engagement with suppliers: working with bottlers to develop innovative techniques that use less water, SEDEX involvement, farmers in China and Mongolia for better irrigation practices, promoting of direct seeding method, Global Sustainability Summit (info on GHGs, energy, and now water), and Resource Conservation and Outreach program. However, they are not quite at stage 3, because there are no true incentives or accountability for desired behaviors.

External Stakeholder Collaboration – Stage 3-4

PepsiCo’s support of the United Nations programs, involvement with the WBCSD’s Water Resource Assessment Tool, TNC partnership, and other collaborative efforts place the company fully at stage 3 and partly at stage 4, as the full multi-stakeholder and collective action initiatives are limited. Most of the partnerships and collaborations that PepsiCo has are either with one main partner or with a few stakeholders, but none are very diverse, multi-stakeholder with government, NGOs, local groups, and industry, so I would not necessarily consider them to be fully at stage 4 yet. Further, collaboration with governments is somewhat limited or unknown.

Exhibit F – Coca-Cola’s Sustainable Value Chain Collaboration Index Placement

Corporate – Stage 4-5

Coca-Cola has been engaging in water sustainability initiatives since the 2000s, so they have multiple years of reporting and meeting targets. Though, they are not fully at stage 5 yet, because the reporting on risk reduction is still limited in how they have quantified and publically reported this. However, the “Quantifying Water Access Benefits in Community Water Partnership Projects” and “Quantifying Watershed Restoration Benefits in Community Water Partnership Projects” are public reports that do measure the benefits of their CWPs, but are not specific to risk reduction. Additionally, innovation in products and processes appears to be limited.

Internal Practices & Policies – Stage 3-4

Coca-Cola certainly has informed decision-making to reflect sustainability, but the “rules of thumb” are not known. The risk surveys, water footprinting, and *Agriculture Ingredient Supplier Sustainability Survey* to help with sourcing decisions, so they are partly in stage 4, but all the analytical methods and rules of thumb are not publically well understood.

Value Chain Collaboration – Stage 2-3

Coca-Cola shares best practices with various suppliers, tools are given to bottlers and key suppliers (e.g., *iLearn iManage iProtect*, Water Efficiency Toolkit, *Water Resource Sustainability Guidance*, *Working Together to Manage Water*, and *Replenish Project Guidelines*), and small-scale farmers are being empowered to participate more directly in the company’s supply chain, so they are definitely at stage 2. The company has requirements and accountability for their bottlers via *Source Vulnerability Assessments* and *Source Water Protection Plans* (Water Resource Sustainability Requirement), so they are partly in stage 3. However, when looking further upstream in their supply chain, there are no incentives and accountability for desired behavior on external suppliers, like agricultural or packaging suppliers.

External Stakeholder Collaboration – Stage 4

The Community Water Partnerships mix local governments, communities, foundations, and NGOs to create multi-stakeholder initiatives. Coca-Cola is also involved with industry engagements, like the CEO Water Mandate, BIER, and World Economic Forum’s Water Resources Group. The company has also employed third-party verification with measuring program impact (“Quantifying Water Access Benefits in Community Water Partnership Projects” and “Quantifying Watershed Restoration Benefits in Community Water Partnership Projects”).

Exhibit G – Water Sustainability Value Chain Index DRAFT

Water Sustainability Value Chain Index

		STAGE					
		1	2	3	4	5	
		Intent/Vision	Engagement of Key Personnel	Progress	Accountability	Program Maturation	
KEY INDICATORS	Internal	Corporate	<ul style="list-style-type: none"> • Vision & strategy defined • Broad values defined • Defined water sustainability 	<ul style="list-style-type: none"> • Establish governance structure • Goals defined • Codes of conduct 	<ul style="list-style-type: none"> • Report against goals • Transparency in financial reporting • Water operational efficiencies 	<ul style="list-style-type: none"> • Transparent multi-year trend analysis of meeting & reporting goals • Strategy adjustments • GRI guidelines 	<ul style="list-style-type: none"> • Disclosure of risk reduction & benefits of programs • Innovation in products and processes
		Internal Practices & Policies	<ul style="list-style-type: none"> • Risk assessment • Value chain mapping • Procurement practices identified • Compliant with environmental laws 	<ul style="list-style-type: none"> • Policies in place for suppliers and external engagement 	<ul style="list-style-type: none"> • Define metrics • Develop & use tools • Consistent internal communication • Benchmark measurement standards 	<ul style="list-style-type: none"> • Actions reflect water sustainability • Analytical methods refined to support sourcing • Rules of thumb 	<ul style="list-style-type: none"> • Sustainability embedded into processes/practices • Water sustainability reflected in sourcing decisions
	External	Value Chain Collaboration	<ul style="list-style-type: none"> • Initial outreach and communication with suppliers • Strategy defined for supplier engagement 	<ul style="list-style-type: none"> • Define supplier expectations • Provide tools to suppliers • Share best practices 	<ul style="list-style-type: none"> • Incentives & accountability for desired behavior 	<ul style="list-style-type: none"> • Supplier assessments and enforcement of standards 	<ul style="list-style-type: none"> • True collaboration & innovation along value chain • Reduction of long-term risk • Best practices defined
		External Stakeholder Collaboration	<ul style="list-style-type: none"> • Build stakeholder collaboration strategy • Map opportunities & potential partners • Create plan for government relations & lobbying 	<ul style="list-style-type: none"> • Stakeholder invitation • Information sharing • Leverage resources • Sign on to water disclosure initiatives 	<ul style="list-style-type: none"> • Build partnerships with large NGOs • Establish joint goals and objectives • Join industry initiatives 	<ul style="list-style-type: none"> • Collective multi-stakeholder actions • Measurement of goals with third-party verification • Partnerships with communities & governments 	<ul style="list-style-type: none"> • Speaking with collective voice • Continuous improvement • Provable results • Improved legislation