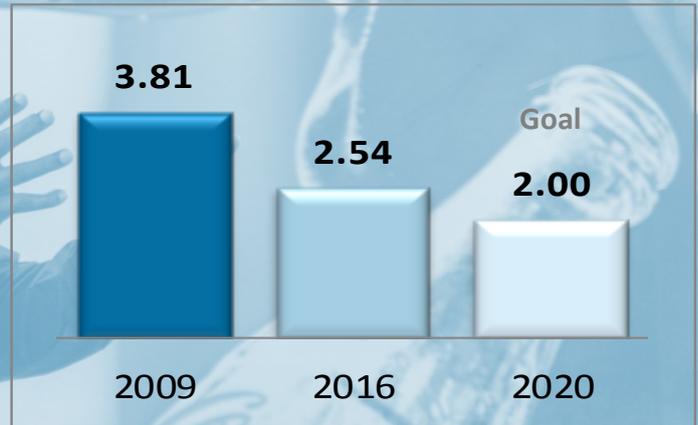




### Nairobi Bottlers Ltd.

#### WATER SAVINGS

Per liter of beverage produced



*“Nairobi’s water challenges not only impact our businesses, but the community at large. Since 2009, we have been on a journey to reduce our water footprint by exploring and initiating best practices in industrial water management. We are happy to take a leadership role in sharing our experiences given water itself is a shared resource.”*

-Duncan Kimani  
Manufacturing Director,  
Nairobi Bottlers Limited

#### WATER AND NAIROBI BOTTLERS LTD.

With over 1300 employees, Nairobi Bottlers Ltd.—a subsidiary of Coca-Cola Beverages Africa—sits on just 12.4 acres in the Kenyan capital’s Embakasi Division. The second largest Coca-Cola bottling plant in Sub-Saharan Africa, it is the region’s most productive site per square foot. In addition to the well known Coca-Cola soft drink, the state of the art facility also produces the popular Fanta and Dasani water beverages, among others. In 2016, the bottler produced 40 million cases of bottled beverages.

It comes as no surprise to many that water is the lifeblood of the business. Not only is it the main ingredient in the company’s beverages, but it is also required throughout the cleaning and production processes.

There are two main sources of water for Nairobi’s in-

dustries: municipal water received from Nairobi City Water and Sewerage Company and groundwater from boreholes. The city’s municipal supply has been unreliable in recent years due to an increase in the number of those depending upon it, unpredictable weather patterns, and its aging infrastructure. These combined stresses have taxed the system leading to water rationing and increased tariffs. At the same time, Nairobi’s water tables are being rapidly depleted due to an increased reliance on groundwater accessed through boreholes, not all of which have been legally dug, nor are regularly monitored.

#### ROLE OF KENYA INDUSTRIAL WATER ALLIANCE

For both small and large industries, water insecurity hampers the ability to operate efficiently and therefore negatively affects profitability. Awareness by key

industry players that water is a shared resource and must be jointly managed has led them to look inward into how they can sustainably manage water resources within and outside their walls. The Kenya Industrial Water Alliance—known as KIWA—brings industry players together to discuss ways in which they can jointly address Nairobi’s water security challenges.

One example of KIWA’s efforts was organizing a site visit by key industry stakeholders to Nairobi Bottlers premises to share best practices on water use efficiency, waste water management and water sources protection.

## RESPONDING TO WATER CHALLENGES

Since 2009, Nairobi Bottlers has found new ways to enhance water use efficiency, reduce wastage and reuse some of the water discharged to decrease the amount of water used to create its product.

Today, Nairobi Bottlers relies upon a mixture of both municipal and borehole water to run its operations. But it is doing so smartly. In recent years, Nairobi Bottlers has made enhancements to its facility and processes in an effort to lower its water usage ratio by focusing on reducing and reusing in all its operations. Between 2009 and 2016, it lowered its water use ratio from 3.81 to 2.54 per liter of beverage, respectively. Its goal is to produce at 2 liters of water per liter of beverage by 2020 to achieve Coca-Cola’s “best in class” benchmark.

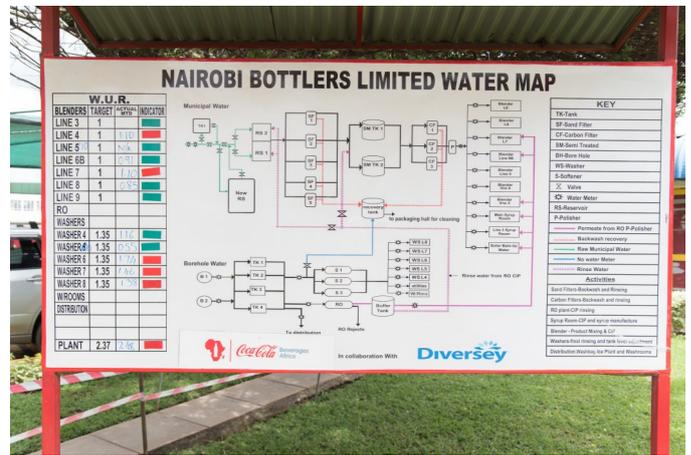
## ROAD TO IMPROVED WATER USE EFFICIENCY

**Establishing a water team, mapping and daily metering.** The first step Nairobi Bottlers took to improve its



water resource management was to create a “water team” to review the company’s water usage. The team examined the areas in which

the plant used large volumes of water such as during the cleaning, rinsing and washing processes to determine ways in which it could better manage its water



resources. It then devised and executed a plan to complete an overall mapping exercise through the creation of a water map and initiated daily water meter reading and monitoring. The water map illustrates water distribution from point of entry (municipal or borehole) to the final packaging, marking all metered points throughout. It also displays the monthly water usage ratio for the previous month per production line and washer against set targets. It then flags the water usage ratio according to the line’s ability to meet its monthly targets. Posted prominently outside the factory, the water map is easily viewable by those entering the facility from the front as a constant reminder of its importance to sustainable operations.

By establishing the basic framework upon which future water savings and monitoring could take place, the bottling company was in a better position to determine which additional water efficiency technologies, including capital intensive options, would be most beneficial in the long run.

**Initiating a dry floor policy, launching a leak reduction program and optimizing its conveyor lubrication system.** Nairobi Bottlers next looked at some of the obvious signs of water wastage, such as the water that was accumulating on the factory floors common to most bottling factories. More than an inconvenience, wet floors are a safety hazard and also a sign of water wastage. Stopping drips and leaks can reduce water use by as much as 10 percent. Since the beginning of its leak reduction program, a member of Nairobi Bottlers’ water team walks through the production facility once per month, looking closely for wet areas that are caused by leaks at pipe joints and connections. Any leaks are measured by volume with a drip gauge. The location, date and flowrate of the leak is then recorded before it is tagged for follow-up.

the plant used large volumes of water such as during the cleaning, rinsing and washing processes to determine ways in which it could better manage its water



## TOP TEN INITIATIVES

### TO IMPROVING INDUSTRIAL WATER MANAGEMENT

1. Establishment of a water team
2. Creation of a water map
3. Perform daily water metering and monitoring
4. Instituted a dry floor policy
5. Launched a leak reduction program
6. Fitted water hoses with spray guns
7. Optimized conveyor lubrication system
8. Recovering backwash water
9. Installing a cleaning-in-place and rinse water recovery system
10. Recover vacuum pump cooling water

At the end of the year, maintenance adds up the numbers on the tags to calculate the volume of water saved by fixing the leaks. In April 2016, one process line recorded leaks amounting to 1,370 liters of water daily. Plugging the leak ended up saving 300,000 liters of water that year alone.

To ensure its conveyor system was more water efficient, Nairobi Bottlers made two improvements to optimize its lubrication system. First, it replaced its wide nozzles which were previously spraying a considerable amount of water with smaller nozzles which spray a thin but powerful jet of lubricant to generate smooth movement of the bottles on the conveyor system. Secondly, by replacing the current wet lubricant which required more water for its dilution with a semi-dry lubricant, the company was able to reduce the amount of water used for dilution of the lubricant and therefore reduced the amount of water spilled on the floor from the conveyor belt system.

***Instituting smart cleaning techniques and installing spray nozzles.*** One of the next steps which took minimal investment, but provided substantial returns in water savings was training employees about which areas could be swept dry with a broom and when water should be used for cleaning. By reducing the amount of water used for cleaning the floors and fitting all water hoses with spray nozzles to ensure they release water only when in use, Nairobi Bottlers was further able to increase its annual water savings.

***Recovering vacuum pump cooling water.*** Meanwhile, Nairobi Bottlers also reviewed its vacuum pump cooling system. Its current vacuum pumps used for deaeration of process water during blending, require large volumes of water to cool them. First, the company invested in a process to retrofit the vacuum pumps on two process lines to allow for the recirculation of the cooling water. Next it introduced a new vacuum pump technology on its three new blending lines that will ensure no water is wasted during this process. This enabled the company to save 13 million liters of water in 2015 alone.

***Upgrading CIP and rinse water recovery system.*** Nairobi Bottlers has also recently invested in a new cleaning-in-place (CIP) and rinse water recovery system. At present, the water used to rinse the sixteen syrup vessels

is not collected. Since this water contains fewer contaminants than effluent, it makes good sense to recycle it for use elsewhere where possible. This initiative will allow Nairobi Bottlers to recover an additional 250,000 liters of water per day from the CIP and entire plant cleaning processes. The bottler plans to reuse 50 percent of this water, with a goal to reuse 70 percent of it by 2020. At the end of the first phase, the company's water usage ratio will drop to 2.3 liters per liter of beverage produced.

**Backwash recovery.** The site's six sand filters treat water originating from the municipal source in order for it to meet Coca-Cola's strict water standards. This process is also water-intensive. Once this water has been drained it can be treated and used for cleaning purposes.

Nairobi Bottlers is currently able to recover 50 percent of backwash water from the sand and carbon filters.

## MOVING FORWARD

Water is a shared resource, and its security, a shared challenge, particularly in Kenya's urban centers. Efficient management of this scarce resource must therefore become a shared responsibility. Increasing awareness and promoting water-use efficiency at the firm level underpins Nairobi Bottlers' sustainability goals. Through its partnership with the Kenya Industrial Water Alliance it has pledged to continue to work with industry stakeholders to share industrial best practices as a path to creating a water-smart future.

## PARTNERING TO ADDRESS INDUSTRIAL WATER SECURITY RISKS

### The Challenge

Water supply for Kenya's major urban and industrial centers is insufficient to meet current demand. Today in Nairobi for example, supply is 20 percent lower than required; and by 2035, it is expected to be more than 60 percent lower than projected demand. With industrial water demand predicted to increase by 125 percent between 2014 and 2030, addressing the challenges of unreliable and decreasing water supply, in addition to flooding, pollution, and catchment degradation, will be vital to ensure the continued and sustainable industrial growth in Nairobi and other industrial centers.

- SSEE Water Programme Briefing Note. October 2014.

### About Kenya Industrial Water Alliance

Launched in September 2016, the Kenya Industrial Water Alliance—known as KIWA—is a partnership of public, private and civil society organizations collectively addressing major water-related risks to industrial growth. Spearheaded by the Kenya Association of Manufacturers and the Water Resources Management Authority, and supported by the International Water Stewardship Programme and the 2030 Water Resources Group, KIWA provides an action-oriented forum for stakeholders to discuss, plan, design and implement activities to increase water security, initially in the Nairobi sub-catchment. The partnership is developing initiatives aimed at closing the water demand and supply gap and reducing water wastage.

