

Water Utilisation in African Beverage Industries: *Current Practices and Prospects*



*Summary of the outcomes from the
African Brewery Sector Water Saving Initiative (ABREW)
and a concept note for the
African Beverage Industries water Saving Initiative (ABIWSI)*

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INTRODUCTION

Africa is endowed with abundant water resources although its distribution and availability for use varies widely, with quite a number of countries facing water shortage and water stress. Regional and national water figures often conceal the dramatic effects of local water scarcity, limited or polluted supplies and inadequate distribution systems. Access to fresh water has been identified repeatedly as a key condition for development. National water policies and conservation efforts often tend to focus on the supply-side for domestic and agricultural use, and less commonly on industrial needs. Under these circumstances the uncontrolled use of a limited resource by water intensive industries takes on a special significance.



Brewing is intrinsically a water intensive industry. Commonly available best practice technologies still require in excess of four litres of raw water for every litre of beer produced. Older technologies that are inefficiently operated can easily double or triple this consumption, to the detriment of neighbouring communities and additional cost to the company itself. High water consumption also means higher energy use, as much of the excess water has to be heated in the brewing and cleaning processes.

This brochure covers the key findings of the African BREwery sector Water saving initiative (ABREW). This project was aimed at assessing the current status and opportunities for reducing water use and wastewater generation of the African brewery sector through a cleaner production approach. The study focused on breweries in Ethiopia, Ghana, Morocco and Uganda, but it is assumed that the findings are relevant to the rest of the continent.

THE AFRICAN BREWERY SECTOR

Breweries are a widespread industry in Africa. The majority are profitable businesses, making them significant contributors to national economies. In the four study countries, 15 breweries provide employment to over 6 000 workers and have an annual beer production of 5.2 million hectolitres (hl). Most African breweries are privately owned – often by multinational parent companies, which are expected to uphold the principles of corporate social responsibility in their operations.



WATER USE AND ASSOCIATED PROBLEMS IN BREWERIES

All four study countries have reasonable water resources at the national level, however, its availability and distribution varies greatly in time and in place. In common with other African countries, most water is used for agricultural purposes such as irrigation, with industrial and domestic use being the other major consumers.

Water consumption and specific use (hl water / hl beer) varies greatly between individual breweries in the study countries and ranges from 7.2 hl/hl in Uganda to 22 hl/hl in Ethiopia. Most breweries are still far from the accepted international best practice benchmark of 6.5 hl/hl, let alone the best technology level of 4 hl/hl.

Country	Total annual production (hl/year)	Total water consumption (hl/year)	Specific water use (hl water/hl beer)
Ethiopia (5 companies)	1.5 million	20 million	9.0 – 22.0
Ghana (4 companies)	1.3 million	12 million	7.4 – 9.5
Morocco (1 company)	0.9 million	Not available	Not available
Uganda (2 companies)	1.5 million	12 million	7.2 – 9.0
Total	5.2 million	> 44 million	

Breweries in Ghana, Morocco and Uganda already compete for water with other industrial and domestic users, while Ethiopian breweries compete with irrigation for crop farming. In addition, brewery wastewater treatment is often minimal, affecting receiving water bodies and threatening water supplies of other users and neighbouring communities. The acute shortage of fresh water in urban centres and the dependence of nearby rural communities on rivers that are used by breweries are already source of conflict and dispute in some countries.

While water conservation is such an important issue for everyone, it is sometimes difficult to get the message across. The utility manager of an Ugandan brewery commented: *"How can we convince people that there is a need for saving water when they can take a look out of the window and see Lake Victoria."*

AWARENESS ON WATER USE

Overall, awareness of water issues – its availability, supply, quality and pollution – is not commensurate with the importance of water as an essential resource for society and for the functioning of industry. In particular, the notion of water management in a systematic way still needs to be further developed. Water awareness varies greatly among decision-makers, government officials and brewery staff, depending on their training and exposure to these issues.

PUBLIC INSTRUMENTS USED TO INFLUENCE WATER USE

Policies, legislation and financial instruments have been applied in varying degree in all study countries in an effort to affect water use, however:

- instruments are rather few in number, and not conceived in a systematic fashion;
- there is only limited enforcement of legislation;
- there is a lack of capacity in government to monitor trends; and
- current water and effluent charges are not sufficient to encourage water conservation and pollution prevention.

As a result, national legislative and regulatory frameworks are not yet key drivers for the brewing industry to reduce water consumption or the release of pollutants into the environment.

ECONOMICS OF WATER SAVING

The current abstraction fees and effluent release charges are not a major cost factor in the African brewery sector and thus do not have significant influence on the extraction of water and its subsequent discharge. Indirect costs associated with water use are often much higher, but are rarely separately accounted for.



CORPORATE MANAGEMENT ASPECTS

African countries have been slow to incorporate the requirements of environmental management systems (EMS) into their regulatory approach, with the result that internal corporate EMS and external compliance with regulatory standards have become separate, parallel exercises, often with separate reporting requirements. Several breweries in Africa have adopted ISO 14 000 standards largely as a result of market interests rather than consciousness of management efficiency. Hence, this is often an exercise undertaken for public relations purposes only rather than a tool for improving environmental performance and sustainability.



DRIVERS FOR BREWERIES TO PURSUE IMPROVED WATER MANAGEMENT

A range of drivers have been identified in this study as factors that would, if they were implemented, encourage breweries to pursue improved water management in their operations. This includes:

- Environmental regulation and enforcement of effective legislation;
- Introduction of pricing for water extraction and discharge, which reflects its full economic value;
- Awareness raising and compliance assistance to companies by National Cleaner Production Centres and water management authorities; and
- Stronger application of corporate environmental policies of multinational parent companies and internal environmental management and reporting requirements.



POSSIBILITIES FOR CLEANER PRODUCTION (CP)

The specific water consumption of African breweries is higher than the industry average benchmark, which clearly indicates that there are some good opportunities for cleaner production measures to reduce water consumption. A combination of government, corporate and public pressure is now encouraging some breweries to build treatment plants. As the cleaner production approach leads to both a decrease in wastewater volumes and an improved wastewater quality, smaller (and cheaper) treatment plants could be built.



Detailed CP assessments focussing on water and wastewater were undertaken in two breweries in Uganda. The following are some of the options identified.

CP Category	CP Option
Housekeeping	<ul style="list-style-type: none"> • Training employees on water saving • Implement a leak detection programme • Install nozzles on hoses • Use high pressure washing equipment for cleaning
Better process control	<ul style="list-style-type: none"> • Monitor and control tank cleaning water • Use level controllers for filling tanks • Measure and monitor cleaning water volume • Eliminate need for overflow rinsing in bottle washing • Install automatic stop water devices on pasteurisation units
Equipment modification	<ul style="list-style-type: none"> • Cool waste water from pasteurisation for reuse • Store vacuum pump water in bottle filling area for reuse
Technology change	<ul style="list-style-type: none"> • Introduce CIP for tank cleaning • Investigate the use of dry milling instead of wet milling
Product change	<ul style="list-style-type: none"> • Use machine wash water from main product to manufacture a new product
Reuse / recycling	<ul style="list-style-type: none"> • Store and reuse cellar defrost water • Reuse bottle washing water • Recover condensate • Recover and reuse caustic water • Recover and reuse cooling water • Use spent grain for animal feed stock for farmers

Implementing these CP options would achieve significant water savings and waste reduction in the breweries' operations. The assessments showed that CP improvements are not limited to replacement of costly equipment, but that simple, low-costs options can also contribute to improved water management.



CURRENT BARRIERS TO BETTER WATER MANAGEMENT IN BREWERY SECTOR:

Besides the general constraints associated with attitudes and institutional practices, the sectoral study and framework analysis in the four study countries identified the following barriers to better water management in the brewery sector.

Government/ Policy:

- Existing water policies focus on water supply side for domestic and agricultural use and effluent discharge while policy instruments, e.g. water abstraction permits and licences, are not applied effectively.
- Limited information on national water use comparing industrial use with agricultural/domestic use.
- Existing water and effluent charges are not sufficient to encourage water conservation and pollution prevention.
- There is only limited enforcement of existing legislation.

Brewery industry:

- Insufficient monitoring of water use at brewery plants: often not related to the operational process or the location of the water meters limits value of data obtained.
- Environmental control still seen as issue of wastewater treatment rather than improving production efficiency.
- Limited understanding of cleaner production approach:
reduced resource use = financial savings = increased productivity
- Management focuses on expanding output, rather than reducing production costs.
- Management unaware of concomitant costs associated with high water use, eg. energy costs, higher chemicals use, costs of pumping and treatment.

CONCLUSIONS/ RECOMMENDATIONS:

- Major effort needs to be made in all stakeholder groups: company, government and public to raise awareness of the national importance of improved water management in breweries, and its relevance to corporate goals.
- The collection of better information on water allocation, use and discharge, and a more precise knowledge of water use at the process level in brewery plants would enable an improved and effective application of government policy.
- Promote CP as process efficiency enhancement tool: systematic diagnostics of plant efficiencies, which leads to a more precise study of cost-effective options.
- Government to make better use of financial instruments, such as water abstraction and discharge fees in order to encourage breweries to pursue water saving goals under these regulations.
- Include water management targets more explicitly into ISO 14 000 and other environmental management tools, such as EIA, audits, and in public outreach and communications.
- Develop a comprehensive follow-up programme that includes the provision of a more focussed and prolonged cleaner production outreach to the brewery sector and promotes an active public-private partnership on water utilisation in African breweries.

AFRICAN BEVERAGE INDUSTRIES WATER SAVING INITIATIVE (ABIWSI)

A PUBLIC-PRIVATE PARTNERSHIP TOWARDS EFFICIENT WATER USAGE AND SUSTAINABLE WATER SUPPLY IN AFRICA

WATER IN AFRICA

Although Africa is endowed with abundant water resource, distribution and availability for use varies widely. A number of African countries are already facing water shortage owing to natural and human factors. This shortage is further exacerbated by high population growth. Examples of such factors include industrial and agricultural pollution; disposal of sewage and municipal solid waste into storm drains; and uncontrolled leaching of toxic materials from dumpsites into water bodies. Often, industrial waste is being discharged into rivers and lakes without treatment. The consequence is that the load of waste exceeds the ability of water bodies to assimilate it resulting in lack of access to clean water and widespread water-borne and water-based diseases.

WATER AND BEVERAGE INDUSTRIES IN AFRICA

Water is the principal raw material for beverage industries. As such, the availability of water in adequate quantity and quality determines the viability of these industries and especially breweries. However, the converse is also true: the impact of these industries on water resources and prices for communities is significant. This is especially of concern in Africa, where there is growing scarcity of water and where communities are dependent on flowing streams and open water bodies for day-to-day consumption.

UNEP, with a financial support from DANIDA and in collaboration with regional partners, has been implementing a project entitled the *African BREwery sector Water saving Initiative (ABREW)*. The project activities included conducting two studies. The following are some of the findings:

- Average specific water use in the assessed breweries in Africa ranges from 7.2 to 22 hectolitre of water per hectolitre of beer; with 6.5 hectolitre being the average global industry benchmark.
- Generally, there is lack of regulatory and institutional mechanisms: (i) to ensure judicious withdrawal and use of water, and (ii) to control discharge of effluents to nearby water bodies. These are two factors which aggravate the impacts of breweries on the environment.
- The scarcity of fresh water coupled with the dependence of communities on rivers which are also used by breweries have already become a source of conflict and dispute in some African countries.

These and other findings provided the basis for the development of the *African Beverage Industry Water Saving Initiative (ABIWSI)* as a follow-on from ABREW.

OBJECTIVES OF ABIWSI

The broad objective of this initiative is to promote efficient utilization of water and to reduce water discharge from African beverage industries and thereby contribute to the fulfilment of the African Water Vision. Some of its specific objectives include:

- Build technical capacities of African beverage industries, industry support centres and water management institutions on integrating cleaner production approaches;
- Promote public-private partnerships which facilitate the proactive engagement of African industries in improving their water utilization and in reducing their waste discharges;
- Contribute to dialogue on required policy and strategy reorientation at regional and national level.

KEY ACTIVITIES OF ABIWSI

The following are some of the key activities that are envisaged to be undertaken under ABIWSI.

1. Conduct regional Training of Trainers (TOTs) programmes on the basis of existing and updated training manual and in active participation of the National Cleaner Production Centres (NCPC) and other industrial training institutions.
2. Conduct a benchmarking study on the performance of African Beverage industries which can be used as reference point for subsequent monitoring and evaluation.
3. Develop a Regional award system that recognises the most efficient industries, on the basis of their consumption per production unit, and the best performing industries, on the basis of their yearly improvement per unit production.
4. Facilitate dialogue between industries and the relevant government agencies to promote the required public-private partnership at the national level.

WHY SHOULD YOU PARTICIPATE?

The Global Compact CEO Water Mandate¹ is a pledge by leading companies to set water-use targets, assist suppliers and users with water efficiency practices, and partner with governments and community groups to address water shortages and sanitation. Its structure is designed to assist companies in developing a comprehensive approach to water management covering areas such as: improvement in direct operations, promotion of supply chain and watershed management and public policy engagement and partnership with communities.

UNEP and the GTZ are inviting leading companies to engage in jointly developing best practices in one or more of these spheres of responsibility and to set new benchmarks both for the industry and policy level in Africa. Such partnerships will be built on shared responsibilities, and will combine the competences of the private sector with the expertise of the GTZ in sustainable development and the normative and technical capacities of a UN organization.

By being a partner to this initiative, companies will have the platform to demonstrate the fulfilment of their commitment to efficient water utilization in general and the UN Global Compact CEO Water Mandate, in particular. If you are interested in learning more about the opportunities and benefits for engaging in this initiative, please contact

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¹The Global Compact CEO Water Mandate was launched in June 2007 and represents both a call to action and a strategic framework for companies seeking to address the issue of water sustainability in their operations and supply chains. For more information, please access http://www.unglobalcompact.org/Issues/Environment/Water_sustainability/index.html