

Collaborative actions for sustainable water management



The role business can play as an active stakeholder in collaborative processes for water management

A discussion paper prepared by the WBCSD program on
Water and Sustainable Development
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Introduction

Global water use for human purposes can be split into three major categories: around 70 percent is used for agriculture, 20 percent for industry and the remaining 10 percent for domestic activities. Demand for water will increase in all three of these areas as populations grow and as countries become more industrialized. It is estimated that by 2020 around two-thirds of the world's population will be living in water-stressed countries.

Companies interact with water in all of these areas. World Business Council for Sustainable Development (WBCSD) member companies provide numerous products and services to industry, agriculture, communities and households. The WBCSD promotes sustainable water management and raises awareness in the business community of the consequences faced by society when water is mismanaged. The organization's views have been published in three previous reports.¹

Business can only thrive in healthy economies where social and environmental needs are satisfied as well as economic ones. It needs reliable water supplies to manufacture products and deliver services to its customers. It also needs safe sanitation systems to protect the health of its employees and to treat and recycle used water. It needs healthy and vibrant communities and attractive environments in which it can do business. These cannot exist if water management is neglected.

Industrial and agricultural demand for water must be considered against the backdrop of inadequate water supply and sanitation in many areas of the world. Each year 1.8 million people die from diarrhoeal diseases, 88% of which are attributed to unsafe drinking water and poor sanitation and hygiene.²

Access to water has been declared a basic human right. International concern for water and sanitation issues was expressed in the United Nations Millennium Declaration. Despite this concern there has been limited progress towards meeting the Millennium targets on water and sanitation. The consequences for people and business are severe and will grow with increasing populations and urbanization, and as the effects of climate change take hold.

Sustainable water management requires collaboration between business, civil society and governments; none of

these sectors can deliver it on their own. Business has a key role to play, but must work proactively with other sectors in order to achieve lasting results. Many companies need a better understanding of the benefits that could be delivered to their business, the surrounding community and the environment and some mistakenly believe that actions of this kind cost money while providing no shareholder return. The WBCSD is publishing this discussion paper to show what can be achieved, to prompt dialogue among stakeholders and to encourage further practical actions by its members and other companies.

The “Collaborative Actions” document

Sustainable water management makes an important contribution to the achievement of social and economic development. This can only be done through all sectors working closely together. The “Collaborative Actions” presented in this document identify steps that business can take, in interaction with other stakeholders.

The actions are supported by case studies demonstrating how companies are working in collaboration with communities and governments. The case studies are intended to illustrate key parts of each collaborative action in practice, rather than present a comprehensive display of all aspects. Other case studies can be found at www.wbcسد.org/web/casestudy.htm.

For ease of use, the collaborative actions have been divided into three sections to emphasize areas where business can take a lead in their own activities and where they should work in partnership with local communities and governments. In many cases, however, the best solution will involve all three sectors working together to achieve lasting improvements in water management.

These collaborative actions provide a partial answer. They can be adopted by any company as part of its commitment to sustainable water management and corporate responsibility. The WBCSD water program members intend to use this document to share good practice with other businesses in their sectors and countries where they work.

We welcome further interaction with other stakeholders as we seek to work openly toward the goal of sustainable water management.

1 – Industry, Freshwater and Sustainable Development. (March 1998) Partnerships in Practice. (April 2000) Water for the Poor. (July 2002) See www.wbcسد.org/Water/publications

2 – Global environmental Outlook 3. UNEP

An ongoing dialogue

The WBCSD Water and Sustainable Development Program aims to enhance understanding in the business community of critical water issues while actively promoting mutual understanding between business and non-business stakeholders. Engaging leading companies representing a broad spectrum of activity, the current program is focused on the role of business in sustainable water management and on strengthening the foundation for effective business action.

Member companies of the WBCSD believe that ongoing dialogue with other stakeholders is one of the keys to successfully navigating the future. The Water Working Group has therefore launched a scenario planning process, with the participation of non-business

stakeholders, to develop alternative narratives on how water issues might evolve over the next 20 to 25 years. The project is examining the influence of water-related issues on social, economic and environmental development and exploring the roles business can play in shaping appropriate actions and outcomes.

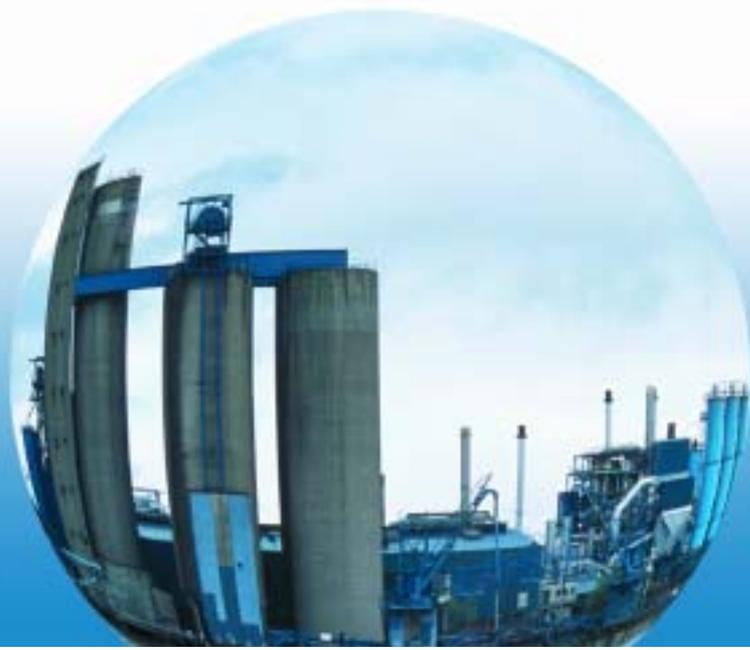
The discussion generated by this document highlighting “Collaborative Actions” is contributing to this process. The present version reflects comments on both form and substance received in a consultation process that has included a side event at the 13th Session of the UN Commission on Sustainable Development in April 2005 and a subsequent discussion forum on the WBCSD website (www.wbcسد.org).

Disclaimer

This discussion paper is the result of a collaborative effort by members of the WBCSD Water Working Group representing several companies from various sectors of business activity.

It is intended to support ongoing dialogue within the WBCSD membership and with other stakeholders in civil society and government on the role of business in sustainable water management.

The views expressed in this working document reflect those of Working Group members who participated in its elaboration. The document is not necessarily a statement of the position or policies of any WBCSD member company or of the WBCSD itself.



Section 1

Businesses taking the lead

Section 1 presents actions and case studies showing where businesses can demonstrate sustainable water management in their operations, products and services.

1. Water management plans

Management plans for water should be developed by all businesses that use significant amounts of water.

These plans work best when they place sustainable water management in the context of an organization’s overall approach to social and environmental responsibility and include details of how it intends to interact with

stakeholders on water issues arising from the plans. The plans should include a water policy and set targets for water use efficiency and for minimizing pollution.

Business should be prepared to formulate and publish plans and work with government and civil society to ensure they are sustainable.



Alcan’s “One of our most precious resources” position paper is an example of how a global company can plan for the sustainable management of water in all of its activities.

Case study

A water management plan by a global company

Alcan is a global producer of aluminium with an interest in a diverse range of production and manufacturing processes. The company requires significant amounts of water and recognizes the need to plan how it uses this natural resource.

The company has invested significant resources to identify and understand the life cycle of water in its organization. This includes a systematic assessment of all potential upstream and downstream impacts associated with producing and manufacturing aluminium and specialty packaging.

Aluminium smelting is an energy-intensive process requiring large and reliable amounts of electricity which Alcan mostly provides through hydropower or thermal energy conversion. The company also transports millions of tons of raw materials and semi-finished products by sea and is keenly aware of its responsibility to protect vulnerable ecosystems in these waters.

Alcan’s “One of our most precious resources” position statement includes its commitment to sustainable management of freshwater and shares examples of how this is implemented. This includes effective watershed management; increased process efficiency; conservation efforts aimed at reducing and, in some cases, eliminating industrial water consumption; the reduction of wastewater and improved wastewater treatment; and water system remediation.

Alcan’s commitment to the sustainable management of freshwater is broken down into the following elements:

- Challenges the company faces on freshwater issues;
- The company’s motivations for managing water sustainably;
- The actions the company has taken to ensure sustainable water management;
- The costs and benefits to the company of sustainable water management.

Alcan has learned that it can no longer act in isolation on matters related to water management. The company believes that its long-term success and its license to operate and grow are secured by systematically engaging a broad range of stakeholders. This approach is founded on the company’s acceptance that water is a shared resource that must be managed in the context of sustainable development.

For more details of this case study see www.alcan.com

2. Water and wastewater footprint

Programs should be developed to reduce a company's overall water and wastewater footprint.

In addition to the direct impacts of a company's water use, business should also consider what impact the products they make and the suppliers they employ have on the water environment. These could be much greater than the direct impacts and business should ensure that they are minimized.

By better designing their products, companies can minimize

their impact on the water environment in terms of the water they use or the pollution they cause.

Footprint programs are stronger when business also engages in supply chain management programs aiming to reduce water consumption and pollution for all industrial and agricultural processes. They range from acquiring raw materials to producing finished products. This is particularly relevant to agriculture and the industries that process food for consumption.



The work that Shell and Petroleum Development Oman are doing in Oman is an example of how a company can reduce its water and wastewater footprint.

Case study

Reducing a company's water and wastewater footprint in Oman

The Royal Dutch Shell Group and Petroleum Development Oman (PDO) have worked at reducing the water and wastewater "footprint" of their operations in Oman.

Shell and PDO have more than 800 water supply wells abstracting water from shallow aquifers. The water is used for industrial purposes and to provide a domestic supply to employees and local communities.

Oil extraction produces more than 700,000 m³/d of water. This figure will increase to over one million m³/d by 2015. A further 55,000 m³/d of water is abstracted from aquifers for use in industries related to oil production and for domestic supplies.

The following hierarchy of management principles is in place to minimize cost and maximize value. The aim is to turn wastewater into a resource:

- Minimize volume produced;
- Maximize reuse of production water;
- Phase-out shallow disposal wells into aquifers;
- Return water to producing oil reservoirs;
- Dispose surplus water to producing oil reservoirs.

Applying these principles has prompted innovation with advances being made on many fronts. Shell and PDO are working on technologies around wells and reservoirs which minimize water production and ensure that water is being reused to maximum advantage. This includes re-injecting the extracted water to increase oil reservoir pressure which improves the efficiency of oil extraction. Seismic imaging technology is crucial to this operation.

Shell and PDO are working on ways to separate the water coming out of the oil reservoir while still in the well bore or at the wellhead. Cyclone-based technology is one example. This reduces the cost and energy intensity of the separation which otherwise has to take place at the surface with conventional technologies.

Once water is at the surface, Shell and PDO have developed some innovative approaches for its reuse (in addition to re-injection into the oil reservoir). For example, Shell and PDO constructed a pilot facility to channel the water through reed beds to improve its purity. After reed bed treatment, the water is still saline but is acceptable for use for irrigation of salt tolerant crops. A variety of crops and trees are being examined to test their suitability. Some of them may be useful in fiber production and could create new businesses and employment in Oman.

In the past surplus production water was disposed through wells into shallow aquifers. This practice is being phased-out to avoid polluting the ground water, thus ensuring that it is available for future use.

The sustainability of existing and future water supply schemes has been analyzed using hydro-geological models. The studies indicate that natural replenishment matches demand so the necessary water supplies can be maintained for the foreseeable future. This approach to water management has been fully integrated in Oman's national water management plan and has been selected also as an example for best practice sharing in the oil industry's "Water Management Good Practice Guidelines".

For more details of this case study see [www.shell.com/environmental & society/issues/water](http://www.shell.com/environmental&society/issues/water)

3. Measure performance of water and wastewater activities

Management systems to measure performance and improve efficiency of water use and reduce the strength, quantity and pollution load of wastewater should be introduced by business.

A robust business approach includes measuring performance and establishing performance improvement programs with respect to the use of water and the production of wastewater.

Applying routine performance measurement and business efficiency techniques to water and wastewater management can reduce significant environmental impacts arising from water use.



BP's work at its plant in Perth, Western Australia shows how measuring water and wastewater performance delivers results.

Case study

Measuring water and wastewater performance in Western Australia

BP operates a major refinery south of Perth in Western Australia. The region suffers from severe seasonal water shortages and domestic water restrictions. The refinery has needed large amounts of potable water for its processes.

BP recognizes the need for responsible water management and the local need to conserve this valuable resource. To address these issues, BP began a water minimization program to optimize its water supply, reduce its consumption of high-quality drinking water and minimize its treated water discharge to the environment.

Before the program's implementation, refinery processes used 7,250 m³ of water a day with the majority being purchased from the local Water Authority.

Initially BP carried out a site water balance and three main strategies emerged:

1. Deliver water 'fit for purpose' at the lowest possible cost (the economic benefit);
2. Reduce drinking water consumption from the Water Authority (the community benefit);
3. Minimize any potential environmental risks from water discharges (the environmental benefit).

Water conservation training was implemented throughout the refinery and a number of activities resulted. These included:

1. Recycling CO burner seal pot water, saving water make up;
2. Reuse of stripped sour water, replacing process water for washing crude;
3. Steam trap program, reducing leakage and returning condensate;

4. Improved piping system, for returning process water for reuse;
5. Replacing municipal water with groundwater, for cooling make up;
6. Increased attention to reducing spills and the water used for cleaning up.

BP has also worked with the Water Corporation to build a new Water Corporation plant at Kwinana. Located on BP refinery land, the plant produces 5 million m³ of recycled municipal wastewater a year for industrial use. This frees up an equal amount of potable water for public use. This has also produced a marked reduction in treated industrial wastewater discharged into the sensitive Cockburn Sound and treated municipal wastewater into the ocean.

To date, the Kwinana Refinery has reduced water consumption by over 40%; reduced use of drinking water from the municipal supply by 70%; saved \$AUS 950,000 a year in water charges; reduced discharge of wastewater from its plant by 40% and costs by \$AUS 425,000 a year.

BP is working in partnership with government and other industry to reduce environmental impacts and deliver the sustainable use of water resources. BP and other oil companies are working with the International Petroleum Industry Environmental Conservation Association to develop "Water Management Good Practice Guidelines" for the oil industry.

For more details of this case study see www.wbcasd.org/water/case-studies

4. Carry out environmental impact assessments

Business ventures which require significant amounts of water, or schemes to provide water service infrastructure, or programs to provide water services should encourage environmental impact assessments (EIAs).

The EIA process is a useful tool to help protect the environment and ensure that solving one environmental problem does not cause another. A well managed EIA can provide a sound basis for engaging with stakeholders to develop an environmental improvement program.



An environmental impact assessment in conjunction with extensive stakeholder engagement by **Alcan** at Lac Saint-Jean in Canada shows what can be achieved on behalf of business, communities and the environment.

Case study

Environmental impact assessment in Quebec, Canada

Lac Saint-Jean is used as a reservoir to generate power for Alcan's Alumina and smelter operations in Quebec. The area is also home to six Alcan-owned and operated hydropower facilities. Alcan needed to balance their need to generate power from the area's water resources with the economic, environmental and social interests of the lakeshore communities.

Alcan has used Lac Saint-Jean as a water reservoir for its Isle-Maligne power station in Alma, Quebec since 1926. Initially average water levels were raised by 2 to 3 meters and in operation water levels fluctuated. This has had two main effects. First it enhanced the lake's recreational potential, which has made the lake more attractive for cottages and outdoor activities. Secondly it has increased shoreline erosion caused by wind, waves and currents.

In 1981 as part of a new approach to shoreline management, Alcan commissioned a shoreline environmental impact assessment and began a public consultation process with the general population, lakeside residents and other interest groups. The results of the EIA and the consequent action plan were submitted to the Quebec Environment Ministry for approval and public hearings were conducted culminating in government authorization to proceed with a 10-year Shoreline Stabilization Program.

For Alcan the challenge has been to maintain open communication with shoreline property owners, some 90 shoreline residents' associations, 16 municipalities, three regional county administrations and several federal

departments and provincial ministries. This has involved the submission of action plans to relevant authorities and actively engaging with lakeside residents and their associations to discuss shoreline work. This has ensured that all remediation work is understood and accepted.

During the first 10 year phase of the Shoreline Stabilization Program, work on 115 kilometers of shoreline was completed at a cost of CAN\$ 52 million. In the process Alcan acquired valuable knowledge of the lake's ecosystems. This has been used to measure the physical and biological effects of the works on the shoreline and minimize environmental impacts. Continuous monitoring has shown that Alcan's works have had no material adverse environmental effects.

Monitoring public opinion has indicated a rise in general satisfaction with Alcan's communication process and the results of the civil engineering works to protect the shoreline.

A second phase of work began in 1995 which will cost between CAN\$ 15 and 20 million and include maintenance on previously completed improvements, construction of three jetties and shoreline reinforcement using stone and vegetation planting.

The public consultation and regulatory compliance aspects of the Shoreline Stabilization Program are an integral part of its success.

For more details of this case study see www.alcan.com

5. Tackle pollution at its source

Both run-off and industrial emissions are best tackled and prevented at source through better planning of water treatment and resource efficient practices.

This is particularly relevant to dealing with emissions from industry or agriculture which may not be biodegradable. The use of treatment processes to remove pollution after it has occurred should be a last resort because they are usually energy intensive and can become unreliable if the pollution being treated is severe.

Business should introduce procedures to prevent pollution occurring and, in the event of an accident, ensure immediate remedial measures are taken to clear up the pollution.



Weyerhaeuser's wood products mills provide an example of how a company can prevent or reduce pollution by focusing on the source rather than end-of-pipe remedies.

Case study

Tackling pollution at the source in the paper industry

The process of making pulp and paper requires large volumes of water. In the pulping process, water and chemicals are used to cook wood chips until a slurry of pulp is formed. The pulp is rinsed and further treated, ultimately creating a solution that is 99 percent water and one percent cellulose fiber. This solution passes over a series of screens, rollers and dryers to remove the water and form a continuous sheet of cellulose fiber or paper. Treated water is then returned to the environment.

Since 1980, Weyerhaeuser has reduced the amount of water required to produce a ton of cellulose fiber or paper by 59 percent – from 25,900 gallons to 10,600 gallons. Also, in Weyerhaeuser's wood products mills, water use per ton of production has declined by nearly 25 percent since 1999. Reducing water use is only part of the challenge – the company also aims to reduce pollution in the water it discharges to the environment.

The company's philosophy of working to continually reduce the impact of its manufacturing activities on the environment has prompted Weyerhaeuser to prevent or reduce pollution by focusing on the source rather than end-of-pipe remedies.

Examples include:

- Reusing 98% of the chemicals used for making pulp and paper;

- Increasing operational efficiency;
- Eliminating the use of some chemicals.

Over the past decade, releases of dioxin have been of particular concern to customers, shareholders and the environmental community. Dioxins are byproducts of bleaching processes that use elemental chlorine to whiten pulp. Because Weyerhaeuser has eliminated the use of elemental chlorine bleaching at all of its mills, its releases of the dioxin compound TCDD in wastewater have been virtually eliminated. Discharges of adsorbable organic halides have also decreased more than 90 percent since 1990.

Some of Weyerhaeuser's mills use advanced technologies, such as oxygen delignification systems (which remove lignin, a chemical that binds wood fibers together) and extended delignification systems, that further reduce the amount of bleaching chemicals used. As a result of these and other improvements, the concentration of dioxins in treated mill wastewater across the company's operations has dropped to non-detectable levels.

For more details of this case study see www.wbcd.org/water/case-studies

6. Innovate and use the best available and most appropriate technologies to ensure water quality and availability

Businesses should employ the best available, economically viable and most appropriate technologies compatible with expected asset life.

Industrial users of water should ensure that waste and energy use is minimized and that effluents are treated to the required standards. The best technologies deliver the right results with a minimal environmental impact, while the most appropriate technologies are those best suited to ongoing economically sustainable maintenance. Water reuse and grey water technologies should be encouraged to reduce the

demand for local drinking quality water and to employ used water in the most efficient way.

The water service industry should also apply the best available, economically viable and most appropriate technologies for the processes they install in plants for treating water and wastewater. Companies that produce water and wastewater treatment products and equipment should search for innovative solutions which will speed up the delivery of safe water services to the poor and the unserved.



Procter & Gamble's PuR Purifier of Water is an example of innovative products delivering the right results in emergency situations.

Case study

Purifying water for drinking in emergency situations

Scientists from Procter & Gamble Health Sciences Institute have been looking for new ways to purify drinking water since 1995. Much of this work has been in collaboration with the U.S. Centres for Disease Control and Prevention (CDC). This has led to the development and testing of an affordable and simple to use in-home water purification product, PuR Purifier of Water.

This new product uses the same ingredients as those used in municipal water systems acting as a mini-water treatment plant in a sachet. A small sachet of powdered product visually clarifies water and reduces pathogenic bacteria, viruses and parasites to result in drinking water that meets World Health Organization guidelines. The packaging of the product in small sachets that will treat ten liters of water is a valuable innovation because they are convenient to transport and store. PuR can also be bought in bulk for use in emergency disasters or miniature treatment plants.

P&G has provided, at cost, PuR Purifier of Water to global relief agencies, including UNICEF, the Red Cross, the International Rescue Committee and AmeriCares so they can provide drinking water in emergency situations. PuR has been used in Bangladesh, Botswana, Chad, Iran, Malawi, Liberia, Sudan and

Zimbabwe. Fifteen million sachets (150 million liters) of safe drinking water have also been provided by P&G to relief agencies working in tsunami affected areas of southeast Asia.

PuR is also being tested in several markets to learn how it can be provided on a sustainable basis in the developing world. The P&G Health Sciences Institute has joined the U.S. Agency for International Development, Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs, CARE, and Population Services International to create the Safe Drinking Water Alliance and help make drinking water safe in three separate countries.

Guatemala was the first test market for PuR. The awareness raising efforts and what was learned in the test market are being reapplied to the ongoing safe drinking water program.

In Haiti UNICEF and the US Government procured PuR to provide safe drinking water following devastating floods. P&G has made PuR available throughout Haiti in collaboration with the non-profit non-governmental organization Population Services International.

For more details see www.wbcsd.org/water/case_studies



Section 2

Working with civil society

Section 2 includes actions and case studies showing where businesses can work with local communities to ensure better water provision for those communities.

7. Stakeholder engagement

Programs using significant levels of water, wastewater and sanitation services for industrial or agricultural purposes, or programs to provide water services are best decided in consultation between business, government and civil society.

Stakeholder engagement is a key to transparent and inclusive business activities. When properly carried out it shows that business is responsive to the needs of civil

society and is central to maintaining a company's license to operate.

Businesses should participate in stakeholder consultations and the views of appropriate stakeholders should be taken into account when they are developing business ventures which require significant amounts of water or when providing new water infrastructure and water services.



DuPont's work at its former plant in Victoria, Texas is an example of how stakeholder engagement can lead to a project which benefits the environment and the company.

Case study

Stakeholder engagement in Texas USA

The DuPont plant in Victoria, Texas, produces nylon intermediates, used in fabrics, and ethylene based polymers, a type of plastic, from hydrocarbon-based resources. The manufacturing process requires freshwater from the Guadalupe River and produces liquid waste streams which were disposed to underground strata using deep-well injection. The plant is surrounded by wetlands.

Although the deep-well injection was into non-porous rocks well below the aquifer, public concerns led to the initiation of a voluntary program to eliminate reliance on this method of disposal. This would dramatically improve environmental performance and ensure long-term viability for the manufacturing facilities. Additionally DuPont had voiced its intention to discharge treated wastewater containing some salts into the Guadalupe River. The company was confident that the environmental impact would be minimal, but some thought otherwise.

DuPont began research into its environmental improvement program in 1980 to reduce waste and eliminate deep-well disposal at the site. The company gathered a panel of stakeholders, experts and company engineers to determine the best way to structure the wetland area. The group included representatives of several sectors of the community, including the Victoria Independent School District and Victoria College, the Sierra Club, the Victoria Birding Club and government representatives. Community input was a key factor in the inclusion of a treatment wetland to visually demonstrate water quality prior to its return to the Guadalupe River.

This group, called the Wetland Advisory Team, suggested enhancements including:

- Selection of plants to provide forage and habitat, deep open water zones for waterfowl and inclusion of protected islands;

- An outdoor education center suitable for classroom groups and the development of an educational program that includes a full time educator;
- Public access features including an observation platform, information kiosk, bird watching blind, walking trails, boardwalk across the wetlands and a water sampling pier;
- Cost-effective treatment capacity that is designed to polish effluent and provide buffering in the event of a bio-treatment unit upset.

In addition the group produced a set of selection criteria for plants to be included in the wetland.

Creating the wetland as a buffer between the plant and the river meant that treated water could be released into a relatively isolated area which employed natural methods of purification. Any remaining impurities could be monitored and removed before flowing into the Guadalupe River system.

The wastewater treatment facility includes several technical innovations that improve performance and reduce investment costs. The buffering capacity of the treatment wetland reduced the size and amount of equipment necessary to handle process upsets and avoid permit incursions. Providing equivalent buffering capacity using conventional processing equipment would have cost 3-4 times the wetland's investment cost of US\$ 3 million.

DuPont sold its Victoria Plant as part of the sale of Invista in April 2004.

For more information see www.wbcd.org/water/case_studies

8. Build local capacity

Building the capacity of local businesses and skilled workers is essential for the long-term management of water and sanitation systems.

Water infrastructure inside factories or in the community is expensive and needs careful management throughout its life. The life of this infrastructure can be very long, making plans for its maintenance and renewal essential.

Where appropriate, businesses working in the developing world should build the capacity of local industry so that it can undertake operational, maintenance and renewal works. This avoids dependence on imported skills and ensures that water facilities continue to deliver their social, economic and environmental benefits in the longer term.



The SUEZ joint venture in Casablanca provides an example of how business can raise skill levels in the area where it is working.

Case study

Training and technology transfer in Morocco

LYDEC is a joint venture between the SUEZ group and local Moroccan investors. It has the contractual responsibility of distributing water and electricity, and of collecting wastewater for the “Grater Casablanca” conurbation.

When LYDEC started operations in 1997 it was faced with a serious skills deficiency. A large part of the workforce was ill prepared for the tasks that needed to be accomplished. This limitation concerned immediate job skills, and health and safety awareness. Supervisory and management staff were poorly qualified, and lacked access to appropriate modern technology and computer skills.

The skills deficiency extended well beyond the bounds of the company itself. Suppliers and subcontractors were unable to meet performance requirements. In addition, the low quality of work by artisans working on customers’ premises gave rise to frequent repercussions for the public service networks managed by LYDEC. These problems were greatly aggravated by very high levels of illiteracy (currently 52% of the population).

SUEZ and LYDEC have been tackling these issues through a formal process of technology transfer from the parent company, a series of “Culture Change Management” programs, qualification and certification of both the company itself and its sub-contractors and suppliers and an extensive training program.

By coordinating the development of these four axes (technology transfer, culture change, certification and training), this program has contributed to significant improvements in the quality of services offered to LYDEC’s customers, and to the efficiency and performance of the company. It is also having a beneficial impact in the wider community.

Training plays a central role in SUEZ’s activities. It is essential for the development of basic skills and contributes to wider objectives by opening avenues of development to the people who benefit from it. As soon as the contract with the government was signed, SUEZ embarked on an evaluation of training needs and a “train the trainer” program.

Initially the training provided focused on the immediate operational needs and on internal trainees. The re-furnished training center was inaugurated in 1999, and was opened to staff from the public sector, notably the National Water and National Electricity companies, and NGOs. It now also offers training for sub-contractors and suppliers. This external training is provided in the economic interests of the company and not for the profit of the company.

The needs evaluation highlighted problems of basic illiteracy and of computer illiteracy. The latter was a serious impediment to improving operations and therefore a significant information technology training effort was started in 1998.

General illiteracy limits the ability to introduce new methods and to offer career development to staff. To overcome this “functional literacy” training was started in 2001. Setting up the program required that the sensitive social aspects of illiteracy were taken into account as well as business needs. Careful consultation with staff and trades unions took place. The course content, teaching and evaluation are conducted by a specialist NGO with the involvement of the OFPPT (Moroccan Training Bureau). Evaluation of this action shows that in addition to direct benefits for the company, it brings advantages for the staff in their private lives and in their communities.

Qualification, training and certification of suppliers, sub-contractors and artisans has distinct benefits beyond the immediate interests of the company. To be a certified partner of LYDEC is now a positive reference for businesses of all sizes in Casablanca and the rest of Morocco.

Combining technology transfer, culture change, certification and training has enabled LYDEC to go beyond its contractual obligations of improving direct service performance. It is also making a positive contribution to commercial and social activity in Casablanca.

9. Involve communities

When agricultural or industrial sectors propose to increase their use of water and sanitation services, they should include local communities in the decision-making process to ensure their needs are not overlooked.

Business should engage with the communities they share water or water services with to promote sustainable water management by everyone.

Community consultation processes work best when they include local civil society organizations trusted by the local

population. It is essential that women in the communities are involved in the consultation process because they are usually responsible for domestic water management.

Communities should also be involved in determining the nature of water and sanitation services they will receive when these are being provided for the first time. Involving communities protects existing uses and ensures that new uses are acceptable to everyone.



Veolia Water works closely with communities in Morocco to provide water and sanitation services to the poor.

Case study

Working with communities in Morocco

The main obstacle to providing water and sanitation services to the poor is their cost. In 2002 Veolia water started to provide quality water and sanitation services to the poor in Morocco by working closely with communities through its subsidiaries La Redal and Amendis.

Connections to water and sanitation services in Morocco typically cost between US\$ 600 and US\$ 3,000, a sum that is substantially more than most residents can pay in one lump sum or in twelve monthly installments. Veolia offers customers the option of paying over five to seven years, provided:

- A family's total income is less than 3,500 dirhams (US\$ 400) per month;
- They live in a house or neighborhood classified as eligible by a neighborhood committee.

Veolia finances the installment payment arrangement but is in contact with potential partners. Veolia is also investigating subsidies provided by communities or local governments and other possibilities.

The most important task for Veolia is to work with local populations and establish a successful partnership with neighborhood residents. This involves selecting the right neighborhood leader, or association, to advise on how the company's proposals should be explained and to speak on the company's behalf.

In 2003 Veolia joined forces with UNICEF and the French Committee for UNICEF to participate in a program to combat the causes of children dropping out of school, especially girls. Backed by the Moroccan government, the partnership associates the urban district of Tangiers, a Moroccan law NGO, the Amendis Corporation and Waterforce. The focus areas are:

- Improvement of health infrastructure in schools (installation of permanent water points and toilet facilities, the lack of which often pushes girls to leave school);
- Building teacher and parental hygiene awareness and health issues for school children and families.

The NGOs involved in this and other issues are useful for communicating the availability of socially assisted connections by first promoting hygiene awareness campaigns. However the most important groups are the neighborhood associations.

Amendis and Redal operate mobile agencies that go to remote neighborhoods and ensure that administrative services like subscriptions, bill payment, providing information, etc. are provided. They are also operational bases for socially assisted connections. These mobile agencies bring the company closer to underprivileged customers and those living in rural communities.

Veolia Water is a subsidiary of Veolia Environment.

For more details see www.wbcsd.org/water/case_studies



Section 3

Supporting good governance and development

Section 3 presents actions and case studies showing how business can work in responsible interaction with governments.

10. The water cycle and Integrated River Basin Management

Management of water and land are best considered together in the context of integrated river basin management.

Integrated river basin management protects the environment by considering the polluting effects of sanitation and other wastes along with the consequences of taking water from rivers and aquifers. In agriculture inefficient irrigation practices need to be changed to allow for other uses for the water, such as domestic water supply or protecting ecosystems.

Managing pollution and water use together ensures that ecosystems are not exploited beyond their natural capacities to recover and that businesses reduce their impacts on the whole water cycle.

All businesses, including agricultural, need to encourage integrated water and wastewater management within river basin boundaries.



The SWIM management tool developed by **Unilever** is an example of how business can engage in integrated river basin management.

Case study

Integrated river basin management

SWIM is a practical management tool developed by Unilever in conjunction with an international panel of water experts to focus on sustainable water management projects. The Sustainable Water Integrated Catchment Management (ICM) principles define how a company can make an effective contribution to community water issues. It is particularly relevant for companies operating in regions facing water stress.

The SWIM principles combine a structured approach to understanding the full scope of demands in a specific water catchment area with a framework for systematic management of partnership projects. They make it easier for companies and potential partners to engage with each other in water initiatives and agree joint objectives and actions.

The SWIM principles:

1. Water development and management should be based on a participatory approach involving users, planners, policy-makers and all other appropriate stakeholders, at all levels, taking account of social and cultural diversity;
2. Freshwater is a bounded, finite but infinitely renewable and vulnerable resource, essential to sustain life, development and the environment;
3. Water has an economic, social and environmental value in all its competing uses.

ICM involves assessing all current and potential uses of water in a catchment, including all water related activities, as well as the factors that impact or influence them. An ICM assessment should identify important and relevant environmental, social

and economic impacts, plus issues and variables that must be tackled to make the catchment sustainable.

SWIM proposes a five-step process

Step 1 - Select an appropriate region

Businesses should focus on areas where their operations have the greatest impact on the local catchment.

Step 2 - Seek partners

Form a working group of interested parties and develop terms of reference, aims, objectives and targets for the group.

Step 3 - Assess the catchment

Assess the local environmental and economic/social situation in the catchment.

Step 4 - Prepare and implement action plan

Formulate an action plan to tackle the critical areas for improvement identified in the catchment assessment. Implement according to agreed timescale.

Step 5 - Evaluate the project

Evaluate the project against the SWIM principles to ensure that the initial aims and action plans are appropriate.

The SWIM approach is based on the conviction that water problems cannot be tackled in isolation. Using water for whatever reason-cooking washing irrigation, in industry, leisure and many other activities-is bound to have an impact on someone else and usually many people.

For more details see www.unilever.com

11. Provision for the poor

The provision and pricing of water and sanitation services for the poor and the unserved is primarily the responsibility of governments. The business community should work creatively, in partnership with governments and civil society to help achieve better provision of water services for the unserved.

Serving the poor improves health and provides the potential for economic development to a large sector of society.

The water service industry can only work with governments to arrange service delivery alternatives including service levels and tariff options that the poor and the unserved can afford.

Businesses should cooperate with governments to ensure that their abstraction of water from natural resources and their use of water services does not interfere with provision for the poor or make it more difficult to provide services to the unserved.



A joint venture in Brazil shows how water services can be made affordable for the poor.

Case study

Providing water for the poor in Brazil

Aguas do Amazonas, a subsidiary of Suez, has successfully teamed up with French development NGO ESSOR and Brazilian NGO ADEIS to connect impoverished communities to the water grid.

“The Water for All” pilot project focuses on four low-income areas with a population of 15,000. The monthly cost of water was US\$ 8.50, around 11% of average household income. After connection to the grid the monthly cost, for three times more water, was reduced to US\$ 3.50, or around 4% of average household income.

Suez aims to connect 95% of the population to water and 31% to sanitation by 2006. This will cover unmet demand for water services estimated at 50,000 water connections. The project aims to make access to water services more affordable for low-income communities by introducing a comprehensive tariff structure together with social engineering methods and approaches which can then be replicated elsewhere in Brazil.

The NGOs improve the community’s understanding of the need for safe, clean water and to appreciate that paying for legal

connections ensures a reliable supply at lower prices than independent providers. The success of the project depends on the mobilization of people in favor of the initiative and the development of effective community water services management within the neighborhood.

The project has given Aguas do Amazonas the opportunity to develop new tools and methods to expand services in informal settlements and demonstrate the feasibility of service delivery to low-income communities. The NGOs have shown that they can act as facilitators in the process of adapting water services to the specific characteristics of low-income communities.

Undertaking water concessions requires long-term engagement. This is justifiable if all areas of a city, including poor communities, benefit. Servicing poor communities requires additional income from other institutions and requires cooperation between the municipality, the community and the service provider.

For more details see www.wbcsd.org/water/case_studies.

12. Encourage an effective water governance framework

Business should encourage the introduction of appropriate and effective governance instruments and work within their terms.

Good governance is at the heart of sustainable development and companies are more successful when they operate within effective governance structures.

Providing effective water governance including basic environmental, water and commercial law and a national water resources plan based on Integrated Water Resources Management is the responsibility of governments and business should be supportive of such a framework.



The work of **Severn Trent Water International** in the Russian Federation provides an example of a company working with the government to introduce an effective governance framework when considering private sector involvement in water service provision.

Case study

Effective water governance in Russia

The government of the Russian Federation (RF) has initiated a local housing and utility reform program for medium-sized cities. One of the objectives of the program is to provide assistance to water and wastewater utilities, Vodokanal's, to become better managed and operated, and financially self-reliant municipal utilities capable of providing adequate water and wastewater services at reasonable and affordable costs.

The Management Strengthening and Operational Improvement Program is funded by the World Bank and the UK, Swedish and Finnish governments. Severn Trent Water International is lead consultant for two management strengthening and operational improvement contracts under the program with some services sub-contracted to Mott MacDonald (UK Consultants), Trade House Utilities (Russian Consultants), and the Risk and Safety Institute (Russian Consultants). Co-consultants from Sweden (SWECO) and Finland (Soil & Water) also work on specific technical components on one of these projects.

The project deals with governance and strategic planning issues including:

- Ownership;
- Regulatory framework and governance;
- Corporate development planning.

The management development aspects include accounting, management information, customer billing and collection, organizational restructuring, operations and maintenance management, environmental management, public information and consumer relations, risk management and change management.

System rehabilitation work includes production and consumption metering, energy efficiency management,

system automation, laboratory facilities improvement and wastewater treatment performance.

Since the fall of communism it has been recognized that the water and wastewater sectors must dramatically improve performance and move away from the 'old' state controlled and subsidized system. This is being achieved by building on the current management approach using appropriate best practice. Efficiency through business focused management is recognized as a 'must have' by the RF to gain the best possible benefit from capital investment programs.

The key goal for the program is to stop the decline of water and wastewater services and support the most critical and immediate investments needed. In addition institutional and commercial reforms are to be addressed such as the relationship between the asset owner (city administration) and operator (Vodokanal) and consideration of sustainable options for private sector participation in the delivery of water and wastewater services.

One of the most important aspects of technical assistance services is to support Vodokanal management and local government in defining more clearly the local government-utility relationship in order to facilitate professional management of Vodokanal's, unencumbered by political interference, yet responsive to the legitimate interest of local government.

The Russian Federation will extract lessons from the project over a wide range of local conditions which will support the preparation of replicable methodologies, guidelines and case studies to guide the government's municipal services reform program.

For more information see; www.stwi.co.uk

13. Demand management

Demand for water, rather than the capacity to supply it, is key to water management. Demand management consists of policies and practices that influence how people use water. The main tools are water conservation and tariff policies.

Demand for water must be managed to ensure that its use does not exceed the natural rate of replenishment. This discourages waste associated with over-production, which is

often the cause of depriving the environment and other users of essential supplies.

A business works most eco-efficiently when it encourages and adopts demand-management approaches to its use of water. Available water resources and competing demands for those resources should be considered when choosing a site for new facilities.



General Motors of Mexico provides an example of demand management at its Ramos Arizpe Automotive Complex in northeast Mexico.

Case study

Using demand management in Mexico

General Motors de Mexico (GMM) Ramos Arizpe Automotive Complex (RAAC) is located in an arid region in the state of Coahuila, in northeast Mexico. The complex manufactures engines and transmissions and assembles passenger vehicles.

The only source of water in the area is a small semi-confined aquifer with limited storage capacity and a relatively high salt content which is not suitable for direct industrial or domestic use.

A number of events have changed RAAC's approach to water management: well water levels have decreased; fees for water rights have increased; limits have been imposed on well water withdrawal; limits on concentrations of several parameters in wastewater streams have been issued; expansion of RAAC has increased demand for high-quality water.

The company's challenge was to secure water for production without depleting the aquifer (which is also the local drinking water source), desalinate the well water and establish a recycling and reuse process for industrial wastewater.

GMM has undertaken several programs to reduce water consumption, suppress pollution due to sanitary wastewater discharges and to reuse treated effluents.

Programs include:

- An intensive water conservation program;
- Implementation of an innovative system to recover most of the brine from the reverse osmosis systems and increase the amount of water available for reuse;

- The construction of solar evaporation ponds to convert the final brine stream to solid salts for potential resale, thereby avoiding discharge of salts into watercourses used for irrigation;
- Implementation of a physical, chemical and biological wastewater treatment facility to treat all industrial and sanitary wastewater;
- Reuse of treated sanitary wastewater to irrigate RAAC gardens and sports fields and to create a lagoon.

These programs have resulted in a steady reduction in the amount of water taken from wells. For example:

- The brine recovery system has allowed RAAC to substantially reduce well water withdrawal by increasing the usable proportion of water drawn from the well from 67% to 94%;
- Solar evaporation ponds enable RAAC to avoid discharge of salt laden effluent to a creek whose water is used for irrigation;
- The industrial and sanitary wastewater treatment plant has reduced the amount of pollution discharged to this stream and prepared the wastewater for recovery through the brine recovery system.

GMM has halved annual well withdrawal and reduced the amount of water needed to produce a vehicle from 32 to 22 m³. At the same time vehicle production has increased seven-fold.

For more details of this case study see www.wbcsd.org/water/case_studies

14. Promote and conform to regulation

Given that water is regarded as a public good and given the natural monopoly aspects of water management, the provision and use of water and sanitation services should be subject to environmental, economic and quality regulation. Regulators should be appointed by governments to carry out their functions on behalf of society. Business should support their role and work transparently with them.

1. Environmental regulation should ensure that taking water from rivers and aquifers and its eventual disposal as wastewater should not have unacceptable environmental impacts. It should also ensure sustainable and equitable allocation of environmental resources among water users. If an adequate amount of water is

not left in the environment ecosystems will fail and the water resource will not be renewable.

2. Economic regulation should set the context for reasonable prices for all users and ensure that all costs associated with delivering water and sanitation services are covered.
3. Drinking water quality regulation should ensure that water for drinking or use in agriculture or in products that are for human consumption meet standards that ensure it is safe for its purpose.

Businesses should encourage appropriate and efficient regulation and conform to its requirements.



Coca-Cola Beverages Hrvatska of Croatia has illustrated the importance and the benefits of meeting and exceeding regulatory requirements.

Case study

Wastewater treatment in Croatia

Coca-Cola Beverages Hrvatska (CCBH) has a wastewater policy which states that wastewater treatment systems must constantly meet the wastewater and quality standards that are in force in the country. In addition, all existing factories that let their wastewater out into natural sources like rivers or lakes shall build a system of wastewater treatment and achieve a level of wastewater purity that is supportive of the existence of fish.

CCBH has reconstructed wastewater separation facilities and redesigned its wastewater treatment systems at its plants in Zagreb and Solin. New wastewater treatment facilities were developed in both locations.

An 80 m³ reservoir was constructed to reduce the quantity of wastewater disposed. This collects purified wastewater which is used for watering lawns and similar purposes.

Wastewater quality control, by internal staff and by an independent external institution, confirms that treated water quality exceeds the legally required levels of purity. Sludge, a by-product of the treatment process, meets the requirements for use on agricultural land.

Reconstruction of the drainage system and development of the wastewater treatment facility has produced the following “win-win” benefits:

- Wastewater policy requirements have been met and wastewater quality is sufficient to support the existence of fish;
- Considerable savings have been made through reduction of wastewater pollution fees;
- Treated wastewater is partly used for other purposes as well, saving 60 m³ of mains water a day during the summer.

CCBH believes there is always room for improvement and has managed to reduce its use of water through technological and organizational changes and increase its reuse of treated water. Coca-Cola Beverages Hrvatska is a domestic company with foreign ownership. It is a member of Coca-Cola HBC.

In 2003 Coca-Cola worked with their bottlers to improve water use efficiency system-wide, and achieved a 7% improvement: product volumes grew by 4% while water use declined by 3%.

For more details see www.wbcsd.org/water/case_studies

Notes

About the WBCSD

The World Business Council for Sustainable Development (WBCSD) is a coalition of 175 international companies that share a commitment to the principles of sustainable development via the three pillars of economic growth, ecological balance and social progress. The WBCSD benefits from a global network of national and regional business councils and partner organizations representing a large and diversified group of business leaders.

Our mission

To provide business leadership as a catalyst for change toward sustainable development, and to support the business license to operate, innovate and grow in a world increasingly shaped by sustainable development issues.

Our aims

Our objectives and strategic directions, based on this dedication, include:

Business leadership: to be a leading business advocate on sustainable development.

Policy development: to participate in policy development to create the right framework conditions for business to make an effective contribution toward sustainable development.

The business case: to develop and promote the business case for sustainable development.

Best practice: to demonstrate the business contribution to sustainable development solutions and share leading-edge practices among members.

Global outreach: to contribute to a sustainable future for developing nations and nations in transition.

The activities of the WBCSD are carried out worldwide.

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