

Sharing water: Engaging business

Why watershed approaches are
important to business sustainability

About the World Business Council for Sustainable Development (WBCSD)

The World Business Council for Sustainable Development is a CEO-led organization of forward-thinking companies that galvanizes the global business community to create a sustainable future for business, society and the environment. Together with its members, the Council applies its respected thought leadership and effective advocacy to generate constructive solutions and take shared action. Leveraging its strong relationships with stakeholders as the leading advocate for business, the Council helps drive debate and policy change in favor of sustainable development solutions.

The WBCSD provides a forum for its 200 member companies – which represent all business sectors, all continents and combined revenue of more than US\$ 7 trillion – to share best practices on sustainable development issues and to develop innovative tools that change the status quo. The Council also benefits from a network of 60 national and regional business councils and partner organizations, a majority of which are based in developing countries.

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Executive summary

- Business has a critical role to play in applying its expertise and experience in developing, implementing and scaling-up, through partnerships, watershed focused solutions. Over the next 20 years, **a broader focus on water management beyond the “fence-line” – outside the company – is needed** by businesses to ensure the sustainable use of one of the world’s finite resources.
- Companies should adopt a more holistic “watershed approach,” which takes into consideration upstream and downstream interactions, and direct and indirect impacts, and recognizes the needs of the environment. It also recognizes that land-use changes can impact water availability. For businesses, **local participation in the collective management of water will be key to ensuring long-term access to the resource in the context of competing demands.**
- Competing demands for water intersect at the river basin or watershed level.** Balancing these competing demands to achieve sustainable water management will have the greatest chance for success if undertaken at the watershed level, inclusive of, and resonating with, all shareholders of the resource within the river basin: government; business, including energy providers; agriculture; and communities.
- Well managed river basins provide services that are essential to business continuity and society. **Water security and quality depend on the services provided by healthy watersheds.** Their fundamental role in addressing the widening gap between global water demand and supply needs to be widely recognized and acted upon by all.
- A number of leading companies have started to develop engagement plans, recognizing the localized nature of water availability, demand and quality, as well as that their water security depends on the security of others. However, **business faces several challenges in undertaking such an approach:** for example a lack of established governance systems, weak participatory processes, and the difficulty of getting internal high-level commitment in the absence of clear quantifiable benefits.
- Robust and fair allocation systems will have to balance domestic, industrial and agricultural sector water needs, and collaboration at the river basin level is the best way to manage this process. **Effective governance models that can deal with this competition in a regulated or consensus way will be critical to success.**





Today the value of water is significantly underestimated by many. This is changing. With increased pressure on water resources, governments and businesses are focusing on better understanding the true value and pricing of water. **A growing trend towards valuing externalities can inform allocation decisions and build better business management decisions.**

To accelerate the impact of business actions, there needs to be a shift from:

- **Cooperating within sectors to collaborating across sectors** (for example, from recycling within an industrial plant to partnering with different industries, farmers or municipalities to increase water reuse)
- **Focusing uniquely on managing risk to seeing opportunities** (within agriculture for example, from micro-drip irrigation and drought resistant crops to optimized water and nutrient delivery practices and technologies)
- **Inside the fence-line to watershed-based collaboration** that effectively engages other stakeholders to improve the shared management of water
- **Taking water for granted to recognizing the value of water**, or more broadly the value of the services provided by ecosystems, to guide better investment decisions.



The imperative

Freshwater makes up a very small fraction of all water on the planet. Less than 3% of the world's water is fresh and most of it is not easily accessible because it is locked up in glaciers. This leaves a very small volume, around 0.5% of total freshwater, available to meet all human and ecosystem needs, and these needs are growing.¹

The human imprint on the hydrological cycle is apparent on a global scale.² An estimated 25% of the world's river basins run dry before reaching the oceans due to the use of freshwater resources in the basins.³ How people live off the land also affects rainfall patterns over large areas, because land-use changes affect the flow of water vapor from land and vegetation.⁴ That demand is already unsustainable in certain watersheds and is expected to continue to grow, fuelled by population growth, increased industrialization in emerging economies and increased urbanization.

In China for example, more than half of the increase in demand for water over the next 25 years is expected to result from a significant expansion in its industrial sector. Accommodating this need will require a simultaneous reduction in the amount of water used for agricultural irrigation, because the availability of freshwater is constrained.⁵

The Organisation for Economic Co-operation and Development (OECD) projects that, under business as usual, water demand will increase by 55% globally by 2050. The increase will mainly come from manufacturing (+400%), electricity (+140%) and domestic use (+130%). This leaves little scope to meet the increasing demand for irrigation water while respecting the needs of ecosystems.⁶ With no improvement in the use of freshwater, the world could face a 40% supply gap by 2030.⁷

The threat to human livelihoods due to this gap in demand and supply goes beyond access to water. There is a close correlation between the threats to water security and the threats to biodiversity and ecological health.⁸ Over the past 50 years freshwater ecosystems have degraded faster than ever before.⁹ **Box 1** provides select examples of this decline.

Adding to these challenges is the local nature of water. Water quality and quantity are determined by a range of local factors, including geography, geology, climate, demography, infrastructure, competition and regulation. No two watersheds are the same, and some parts of the world appear comparatively flush with freshwater while others face scarcity and pollution challenges.

Some 80% of the population now lives in areas where the threat to water security is high.¹³ **Nearly 2 billion people still use unsafe drinking water today while 2.5 billion lack access to adequate sanitation.**¹⁴ The interdependence of water, energy and food will create difficult challenges for many industry sectors as costs could increase on several fronts at once.¹⁵

Actions to cost-effectively reduce the gap between demand and supply in impacted watersheds will be critical to mitigating the risks associated with water quality and supply access. **A traditional business focus on operational water use will not be enough at certain locations to ensure a secure water future.** With the increased recognition of the contribution of watershed services to long-term water security, collective action at the watershed level makes sense for business and can be a more cost-effective method of addressing water risks.

Businesses can also reap **benefits and opportunities** from a watershed approach, which we describe below, in terms of new revenue opportunities, reputation enhancement, improved compliance and cost-savings. Taking a more holistic view of water management at the watershed level can help businesses compete more effectively.



Box 1

Examples of freshwater ecosystem decline

- For two decades, the once-scenic **Taihu Lake**, China's third largest freshwater lake, has been choked with devastating algae blooms which culminated, back in 2007, in 2 million people going without drinking water for a week. A US\$ 155 million cleaning up plan has been launched by the central government including relocation of industrial plants, strict monitoring of effluents and efforts to curtail nutrient loading.¹⁰
- The **Colorado river** basin, which provides water to 30 million people and thousands of hectares of farmland, no longer reaches consistently the Gulf of California. Covering parts of seven US states and two Mexican states, the basin is facing growing challenges associated with over-allocation, rapidly increasing urban population, development of unused water rights, and expected climate change. The water levels of the river's two largest reservoirs – Lake Mead and Lake Powell – have dropped significantly in recent years, threatening supplies for major cities.¹¹
- In northwest India, between August 2002 and October 2008, groundwater depletion in the states of **Rajasthan**, **Punjab** and **Haryana** was equivalent to a net loss of 109 cubic km of water (around 18 cubic km of water a year), which is double the capacity of India's largest surface water reservoir.¹²



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Watershed defined

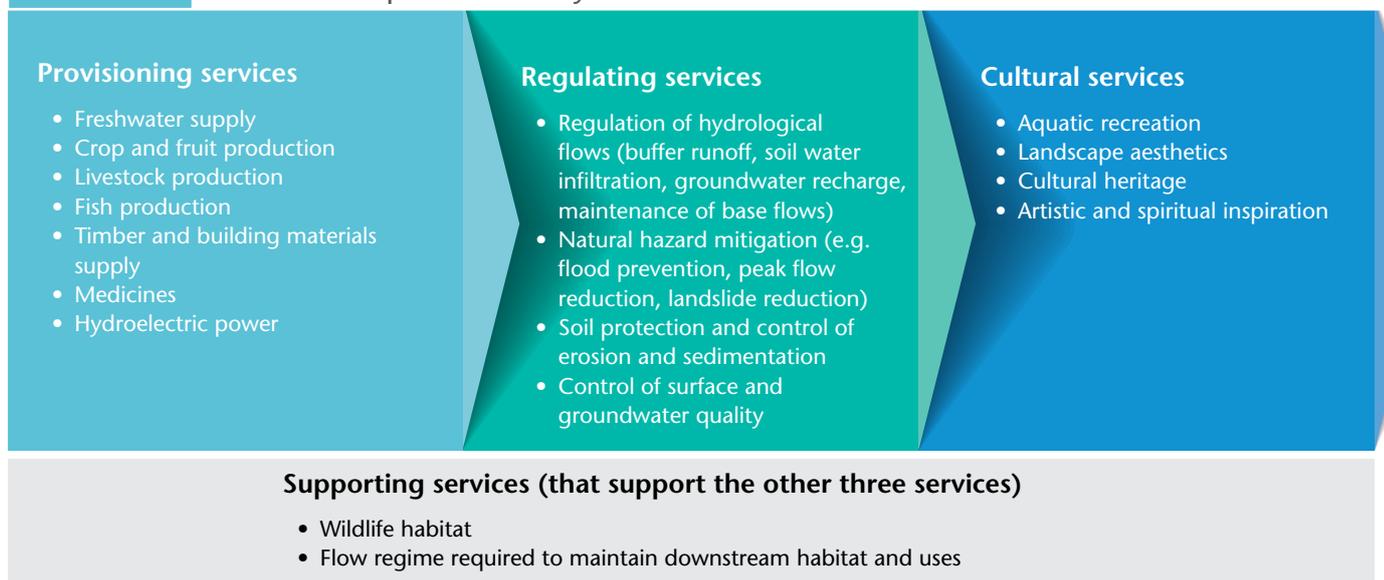
The watershed is defined by the geographic boundaries of a particular water body, its ecosystem and the land that drains into it. It is the area of land from which all surface runoff flows through a sequence of streams, wetlands, rivers and lakes into the sea at a single river mouth, estuary or delta.¹⁶ The watershed also includes groundwater aquifers and is made up of a unique mixture of landscapes that influence each other, including forests, grasslands, creeks, rivers and lakes, farms and even cities or towns. Large watersheds are sometimes referred to as river basins. Watersheds are also referred to as catchments.

Among other services, a healthy watershed:

- Provides a reliable water supply for use by business, the community, and agriculture by capturing and storing rainfall, sustaining and regulating stream flows, and recharging groundwater reservoirs;
- Mitigates water pollution by filtering runoff and retaining sediment;
- Buffers high water flow by providing a “holding space” and absorbing flood waters.

Businesses depend upon and impact on watersheds and the services delivered. Healthy watersheds provide a host of services, including water purification, groundwater and surface flow regulation, erosion control, and stream bank stabilization. The importance of these watershed services will only increase as water quality and quantity become critical issues around the world. The financial value of the watershed becomes more transparent when the costs of protecting an ecosystem for improved water

Table 1 Watersheds perform many essential services¹⁷



Box 2

Factors causing watershed degradation: examples¹⁸

Land-use changes, e.g. urban encroachment, industrial development, deforestation, mining

Unsustainable farming practices

Construction, e.g. roads, dams, levees

Invasive species

Changing climate, increasing temperatures

Increased runoff, increased sedimentation, soil erosion, habitat loss, ecosystem impacts, flash flooding, reduced infiltration to groundwater, water quality, deterioration and pollution

Depletion of ground and surface water, ecosystem impacts, reduction in vegetation cover, soil compaction, reduced water infiltration rates, increased runoff, acceleration of soil erosion, pollution from fertilizers

Alteration of natural hydrology, increased runoff, flash flooding, sedimentation

Changes to soil and water conditions, unstable soil conditions, increased evapotranspiration, loss of ecosystems

Exacerbation of droughts, severe weather events, erosion due to sea level rise, saline intrusion, loss of species due to rising temperatures

quality are compared with investments in new or improved infrastructure, such as purification plants and flood control structures, or when water allocation is capped or restricted, constraining business growth.

Table 1 lists the many essential services performed by a healthy, resilient and sustainable watershed. The appendix relates them to major industrial sectors. Box 2 provides examples of factors causing degradation.



4 Drivers for watershed approaches

A watershed approach uses hydrologically defined areas to focus collective action on the management of water resources and the activities that impact the health and sustainability of the watershed. Such an approach recognizes the often competing demands for water supply and quality, flood control and protection, navigation, hydropower generation, fisheries, biodiversity, habitat preservation, and recreation.

Watershed approaches range from local collaborative actions with communities and stakeholders to large-scale global initiatives to address iconic watersheds. Watershed management takes a balanced and adaptive approach, accounting for the need to optimize social, environmental and economic outcomes. It considers upstream and downstream interactions, and direct and indirect impacts, and recognizes the needs of the environment, including environmental flows. It also recognizes that land-use changes can impact water availability. Overall, a watershed approach should aim to keep consumptive water use¹⁹ at sustainable levels within the watershed. Figure 1 provides an illustration of a typical watershed, the various impact sources and the services it provides.

A key challenge is balancing the competing needs of the watershed. The energy, water, food and climate change nexus is an illustration of complex interdependencies within the watershed. Approaches and policies to manage water, energy, food and fiber are often developed in isolation from each other. This interconnectedness should be recognized and tradeoffs and synergies understood and properly addressed in an inclusive manner through integrated river basin management plans.

The pressure for a more holistic approach to water management by businesses will be accelerated by a number of external drivers outside the private sector, including geopolitical and humanitarian concerns and a changing climate that exacerbates shifts in the hydrological cycle. Actions to address these external drivers may be accelerated through the redesign of governance arrangements, the improved specification of property rights, the reduction and/or capping of diversion

limits, the adoption of policies that reflect the full costs of use including the costs of adverse impacts on the environment, and through improved regulation, all of which will have implications for business.

Public responses to water use leading to a strengthened focus on who gets how much are increasing, often involving a tightening of water allocations and/or the application of financing measures at the watershed level.

Box 3

Should you be taking a watershed approach?

- Have you been questioned by regulators and non-governmental organizations regarding your water allocation in a specific watershed?
- Do you know the future demand and supply for the watersheds where you have operations?
- Do you have to justify your water use to authorities in order to retain a license to operate or water extraction permit?
- Do you understand the upstream and downstream use of water in the watershed?
- Have you assessed the impact declining watershed and ecosystem services have on your business?
- Does your growth strategy assume your water allocation from the watersheds you operate in will continue to be available?
- Have you considered watershed approaches as an alternative to capital expenditure to meet water quality and/or supply needs?

Figure 1

Sample watershed showing various services it provides to businesses, the community and ecosystems



Among others, a healthy watershed:

- captures and stores rainfall
- recharges groundwater reservoirs
- sustains and regulates stream flows
- minimizes erosion losses and protects soil quality
- stores and recycles nutrients
- mitigates water pollution by filtering runoff and retaining sediment
- provides habitat for native aquatic species
- provides recreational activities
- supports resistance and quick recovery from floods, fire, insect outbreaks and other extreme events that impact home and businesses

- 1 Rainfall
- 2 Groundwater
- 3 River
- 4 Filtration
- 5 Wetland
- 6 Transpiration
- 7 Downstream city
- 8 Upstream food and energy production

For example the [EU Water Framework Directive](#), adopted in 2000, requires member states to establish river basin management plans.²¹ [Australia's Murray-Darling Basin Plan](#) proposes sustainable diversion limits (SDLs) on the volumes of surface and groundwater that can be extracted from the Basin and a mechanism that provides a transparent and scientifically valid way to take into account efficiencies and savings achieved through various initiatives in the Basin which could lead to further SDL adjustments in the future.²² [Water banks](#) have been implemented in California, Australia, Chile,

Mexico, China and Spain as a mechanism to assign water to the users so as to maximize its profitability.²³ The Economics of Ecosystems and Biodiversity ([TEEB](#)) for Water and Wetlands initiative launched at the 2012 Rio +20 conference aims to show how recognizing, demonstrating and capturing the values of ecosystem services related to water and wetlands can lead to better informed, more efficient, and fairer decision-making. And for the United Nations Environment Programme ([UNEP](#)), the opportunity to improve governance arrangements is one of the biggest opportunities to speed transition to a greener economy.²⁴

Box 4

Integrated river basin management

Integrated river basin management (IRBM) can be defined as a "process of coordinating conservation, management and development of water, land and related resources across sectors within a given river basin, in order to maximize the economic and social benefits derived from water resources in an equitable manner while preserving and, where necessary, restoring freshwater ecosystems."²⁰

There are multiple drivers for the extension of water resource management outside the operational boundary of a business. [Leading company practices illustrate the benefits of collective action within a watershed](#). These actions are based on an understanding that water is a shared but finite resource resulting in collective risk. [Table 2](#) shows key drivers and benefits for watershed approaches together with examples of where businesses have worked collaboratively with other businesses, stakeholders and communities to ensure greater water security in the watersheds where they have operations.

Table 2 Business drivers and benefits in taking a watershed approach

Drivers	Benefits	Case study example
Water security (improved water supply, access and / or quality)	<ul style="list-style-type: none"> • Improved water availability and security in the region • Improved water quality • Business growth opportunities created • Long-term planning enabled • Improved financial performance 	<p>Watershed actions can provide increased water security and improved water quality that benefits not only business but the entire catchment community:</p> <ul style="list-style-type: none"> • In response to increasing water prices at CEMEX's Morato Plant in Colombia, the company sought out a less costly supply of water.²⁵ Alternatives were limited, groundwater was over abstracted, and many of the rivers and streams were contaminated by untreated sewage and industrial and mining effluent. Adjacent to the ready-mix concrete Morato Plant, Meals de Colombia, an ice cream factory, produces 7,000 m3 of treated wastewater per month, which it discharges into a nearby river. By taking a watershed approach to its problem, Cemex partnered with Meals de Colombia to take their treated wastewater and use it for processing. As a result, CEMEX increased its water supply by 25-30% at one-fifth of the cost of municipal water. • Mondi's South African forest plantations and processing plants depend on healthy wetlands and riparian zones. Mondi has taken a leading role in promoting the awareness, better management, rehabilitation and protection of the wetlands to secure its license to operate as well as provide benefits to the local community.²⁶ • The Petrobras refinery in Paulínia, São Paulo, in partnership with the Committee of Piracicaba, Capivari and Jundiáí Rivers Watersheds, financed a series of actions to improve water availability in the watershed. These actions included reforestation of mountain areas, studies on water availability, and the implementation of measurement systems and contingency plans, allowing the refinery to increase its water collection quota in the basin.²⁷
Reputation enhancement	<ul style="list-style-type: none"> • Increased stakeholder support • Enhanced customer loyalty to the company and/or brand • Enhanced brand value • Improved access to capital via investor and stakeholder reputation 	<p>Maintaining a good reputation globally is critical to business branding. If companies fail to build a reputation as responsible water users in the watershed, their social license to operate will be at risk. There are numerous examples of companies working around the world to protect watersheds and help address the global water challenge. Examples include:</p> <ul style="list-style-type: none"> • The Coca-Cola Company, in conjunction with the World Wildlife Fund, is working to conserve seven of the world's most important watersheds by encouraging better governance, management and resource protection, balancing conservation with development needs and conserving biodiversity.²⁸ • Dr. Pepper Snapple has pledged US\$ 1 million over the next four years to support ongoing restoration and conservation activities in the watersheds of the Trinity and Brazos Rivers, the Texas Gulf Coast and the Edwards Aquifer, which serve the state's three largest metropolitan areas: Dallas/Fort Worth, Houston and San Antonio.²⁹
Regulatory and legislative compliance	<ul style="list-style-type: none"> • Maintained license to operate in the region • Avoided costs from fines, penalties and litigation • Favorable stakeholder views of the operating company in the region • Increased investor and regulator confidence 	<ul style="list-style-type: none"> • In the Ohio River Basin, the Electric Power Research Institute (EPRI) is working to develop a voluntary trading program on a watershed basis that will allow the exchange of water-quality credits for nitrogen and phosphorus, thus helping to meet regulatory requirements and improve water quality.³⁰ The trading program will enable facilities facing high discharge control costs to buy reductions from another facility with lower control costs. This exchange, or trade, will result in the same reductions at a lower overall cost, providing more flexibility in achieving water quality standards. The project enables entities in the Ohio River Basin to control nitrogen and phosphorus discharges through a trading market rather than individual treatment solutions, which can vary in cost.

Drivers	Benefits	Case study example
		<ul style="list-style-type: none"> • Coca-Cola, which operates 39 bottling plants in China, has joined forces with the World Wildlife Fund (WWF) to improve the water quality of the upper reaches of the Yangtze River, one of the top 10 most-threatened rivers in the world. Coca-Cola's involvement has helped WWF play a bigger role at the Yangtze River Forum, a biannual conference for various stakeholders. One result has been company agreement on a united recommendation to the Chinese government on the implementation of pollution regulations. Regulation of polluters in China is fairly uneven, and due to the nascent regulatory structure there is some concern about how new laws would be applied.³¹
Flood mitigation	<ul style="list-style-type: none"> • Reduced business disruption to the supply chain • Reduced property damage • Reduced costs (clean up and insurance premiums) 	<p>The Department of Public Works of Marin County, California (just north of San Francisco) launched a watershed program to integrate flood protection, stream and wetland habitat restoration activities, fish passage, and water quality improvements.³² Instead of looking at flooding issues on a site by site basis, the Department looked to solve flooding problems at a watershed scale and to employ solutions such as habitat restoration to reduce flood risks.</p>
Cost savings	<ul style="list-style-type: none"> • Avoided costs associated with infrastructure (distribution and treatment) • Avoided costs associated with transportation (of water) 	<p>The adoption of watershed management principles and tools into utility planning and management practices ensures that decision-makers consider watershed-based, cost-effective alternatives along with traditional treatment technology investment choices. Watershed management approaches considered by utilities can include source water protection, water quality trading, centralized management of decentralized systems, as well as smart growth approaches to storm water and wastewater management. In many instances, investments in "green" infrastructure can be more cost effective than conventional infrastructure solutions.</p> <p>New York City's Green Infrastructure Plan presents an alternative to conventional combined sewer outfall approaches through the use of alternative approaches to improving water quality that integrate green infrastructure, such as swales and green roofs, with targeted, smaller scale traditional infrastructure. This strategy not only significantly reduces the volume of combined sewer overflows,³³ but is estimated to save US\$ 1.5 billion compared to traditional solutions.³⁴</p> <p>In <i>Our Water Future</i>, Nestlé, in collaboration with the Water Resources Group, analyzed 140 measures and selected 37 that could help close India's projected supply/demand gap across 19 major catchment areas. If the cheapest options were selected for water resource management, annual expenditures in 2030 would be US\$ 5.9 billion (CHF 5.3 billion).³⁵</p>
New revenue growth	<ul style="list-style-type: none"> • Revenue growth associated with facility or company expansion or new markets, products and services where efficiency is a focus • Increased consumer base from new products 	<p>A number of consumer products companies are developing innovative products that use less water.</p> <p>Unilever has developed detergents that require less water per wash and has publicly set a target to provide 50 million households in water-scarce regions with detergents that use less water by 2020. In addition, Unilever aims to reach 400 million consumers by 2020 with products that use less water in skin cleansing and hair washing.³⁶</p> <p>Companies such as Jain Irrigation Systems, DuPont, Syngenta and Bayer CropScience are currently researching and developing a range of products and techniques that could play a significant role in improving the productivity of water use in agriculture. These initiatives include promoting efficient irrigation and farming practices, providing the best available seeds (including water stress tolerant species), training irrigators to optimize fertilizer use, and implementing crop stress management techniques.</p>

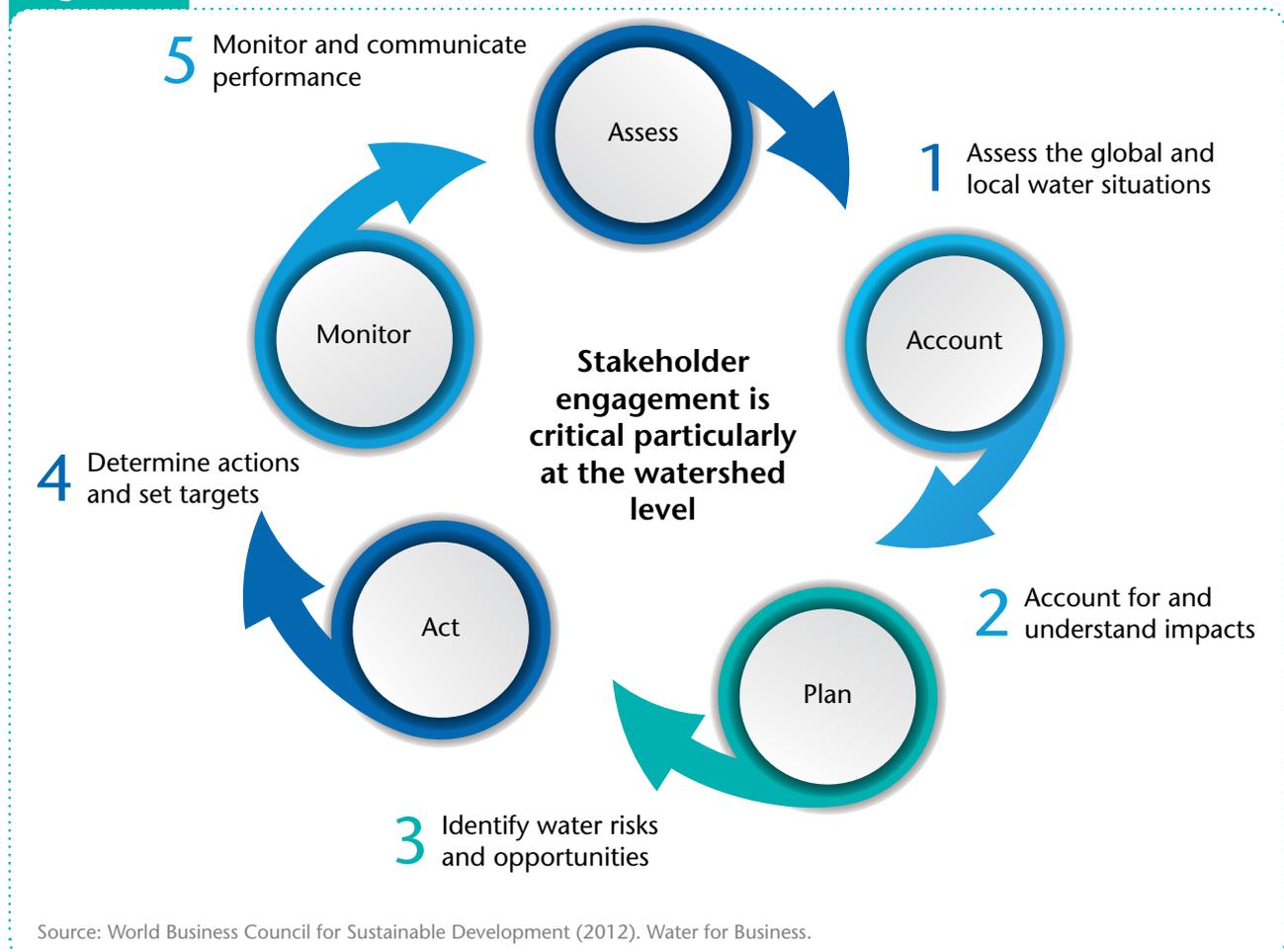
5 Taking action

Water is local, and watershed approaches must be tailored to complement specific local conditions. By placing watershed engagement into the broader context of corporate action on water, businesses can significantly enhance their water stewardship efforts and reduce cost impacts. Working collaboratively with other users and investing in the preservation of watershed services has the potential to yield long-term benefits for businesses.

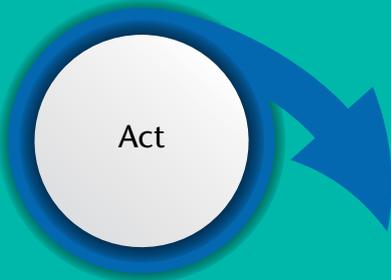
Watershed approaches to engagement and collaboration should form part of a portfolio of actions a company can take to improve water security, mitigate risks and enhance

water stewardship. The watershed approach focuses on engagement at the “act” stage of the corporate water management continuum as shown in Figure 2.

Figure 2 Corporate water management approach



Source: World Business Council for Sustainable Development (2012). Water for Business.



Act

Critical to this approach is the coordination and integration of existing programs and actions within a watershed management framework, as well as building partnerships to effectively leverage opportunities and mitigate risks associated with water management.

Engagement within the watershed can focus on:

Business to business

Engaging with the supply chain helps identify opportunities to collaborate on reducing water quality impacts and ensuring a sustainable water supply within the watershed.

PepsiCo India's direct seeding initiative in Punjab replaced transplanting of paddy with direct seeding. The initiative helped reduce water consumption in paddy cultivation by 30% and reduced greenhouse gas emissions by 75% while maintaining rice yields and quality.³⁷

Water security challenges enhance the opportunities for businesses to reuse and recycle water with other users in the watershed. **Veolia Water** has implemented a 100% energy self-sufficient wastewater treatment plant in Germany. The waste sludge treatment provides 60% of the plant's electricity. The digested sludge and treated wastewater are used as irrigation and fertilizer in nearby fields.³⁸

Community and stakeholder engagement

Watershed approaches require the participation of multiple and diverse stakeholders and the community. There are numerous issues to address, including economic and social costs, geopolitical considerations, timing and the level of effort. Collaborative approaches are essential to undertaking the necessary actions.

DuPont's Florida plant (a surface mining operation supplying titanium dioxide, zircon and staurolite for industrial use) has taken a leadership role in a local advisory council made up of concerned citizens, governmental and regulatory agencies, elected officials and industry. The group is looking for ways to enhance watershed drainage to local lakes which are low due to drought and increased demand.⁴¹

The Louisiana Water Synergy Project is a **US Business Council for Sustainable Development** and industry-led initiative aimed at finding and implementing solutions to critical regional water management challenges such as coastal resilience, water quality and quantity, and storm water management in the New Orleans to Baton Rouge Mississippi River Corridor.⁴²

Consumers

Raising the awareness of the consumer in relation to watershed issues can be a powerful way to effect change.

EDF worked with local irrigators (to whom they supply water) to develop water-saving and efficiency initiatives to optimize water management in the Durance Valley watershed in France with respect to competing multipurpose uses of water.³⁹

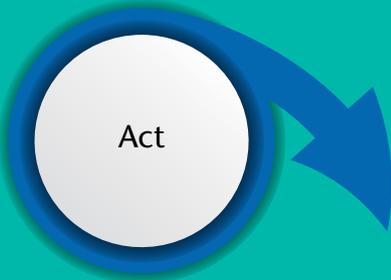
In response to water scarcity risks in Spain, **Kimberly-Clark Corporation's** community water saving program encouraged customers to use a plastic device that displaces water in the cistern, thereby helping conserve water. The initiative has reduced the draw on the watershed by up to 250 million liters per annum.⁴⁰

Partnerships and alliances

Partnering with an NGO, government or stakeholder and community-led group can help businesses accelerate collaboration, provide access to science and information, and inform on the ground actions in the watershed.

PepsiCo partnered with The Nature Conservancy to launch five Positive Water Impact pilot projects focused on understanding the watershed conditions and restoration opportunities for a group of diverse manufacturing plants in different parts of the world.⁴³

Since 2009, the Water futures Partnership (comprised of **SABMiller, World Wildlife Fund, Deutsche Gesellschaft für Internationale Zusammenarbeit** (GIZ) and a number of local partners) in South Africa has created mechanisms for companies to engage in local collective action to help address shared water risks facing businesses, communities and ecosystems. Building on the different motivations for participation by partners, they have leveraged combined expertise, resources and networks to develop a model based on a shared interest: water security. Their work highlights that effective working relationships and trust take time to develop but can realize considerable benefits for parties in the form of risk mitigation and enhanced water security.⁴⁴



By taking a watershed approach, companies can innovate and develop new products, technologies and practices. Relevant innovation is driven locally and business solutions will be enhanced through participation and partnerships. This includes new information management systems that allow for data sharing and water scenario planning to improve responses at the watershed level.

Examples include:

Innovative wastewater treatment devices

Proctor & Gamble developed the PUR packet, a powdered mixture that removes pathogenic microorganisms and suspended matter, in collaboration with the US Centers for Disease Control and Prevention. PUR was created to enable people anywhere in the world to purify dirty water in a simpler, more affordable, efficient and convenient way using technology similar to municipal water systems in developed countries.⁴⁵

California-based **WaterHealth International (WHI)** has helped to reduce the risk of water-borne diseases and associated economic loss through licensing technology developed by scientists at Lawrence Berkeley National Laboratory and the development of an innovative business model.⁴⁶ The technology, UV Waterworks (UWW), disinfects water from harmful pathogens and microbes using ultraviolet light. The result is safe, clean drinking water that exceeds the World Health Organization's water standards. WHI helps arrange loans for communities to finance the installation of its water systems and the beneficiaries pay a nominal user fee to use the service. The company also offers a franchise model to entrepreneurs where they receive a return on investment within 12 to 18 months. The proceeds have been enough to cover the expense of the UWW system, cost of installations, and maintenance of the equipment. WHI has been successful in attracting commercial financing to set up its water systems.⁴⁷

New irrigation techniques to minimize pesticide and fertilizer runoff

PepsiCo has achieved up to 50% reduction in water consumption in potato cultivation by implementing advanced irrigation techniques in watersheds in China.⁴⁹

Syngenta is developing and disseminating best management practices (BMPs) for land and water use that minimize soil erosion and sustain crop productivity.⁵⁰

New revenue streams

Clean Water Services partnered with **Ostara** to produce an environmentally sensitive phosphorus fertilizer from a wastewater side stream to help meet tightening discharge criteria on the Tualatin River in the US. The end product, Crystal Green®, is highly efficient and less polluting to the environment.⁴⁸

Water-saving information processing technologies

IBM and the **Delft University of Technology**, Netherlands have joined forces to apply technology and analytics to complex water systems to minimize the risk of flooding and ensure better water quality.⁵¹ The research applies analytics to 2,200 km of Dutch waterways to gather data to identify patterns and trends that will help minimize flooding and improve water quality. The project will be able to be applied to other watersheds in the US and China.

Clear strategic driver for R&D and new product development, as well as for brand and positioning

EVONIK Industries developed STOCKOSORB® to promote the growth of trees and plants in extremely dry locations.⁵² The product increases the usable water holding capacity of soils on a long-term basis, releasing water and nutrients on demand to the plants and surrounding soils.



Watershed management has financial and resource implications. Proactively protecting the watershed and its ecosystem may be more cost effective than other mitigation actions to address security and degradation, and to leverage benefits and opportunities.

There are an increasing number of mechanisms and incentives available that aim to create financial prospects for watershed management and ecosystem protection, including:

Valuing ecosystems

Valuing ecosystems and the services they contribute to the watershed can provide incentives for protection and restoration. The WBCSD's Guide to Corporate Ecosystem Valuation seeks to have nature's services recognized as an integral part of corporate planning and decision-making.⁵³

The **South Australian Water Corporation**, with support from **GHD** and the WBCSD, assessed the value of ecosystem services under several water catchment management options in Cox Creek, Australia.⁵⁴ The example demonstrates that a watershed approach could be more cost effective than conventional water treatment. The results show the economic viability of improved catchment management with a benefit-to-cost ratio of 1.7:1.

EDF used water valuation to decide how to optimally manage water in the Durance river watershed in southeastern France. The company's aim was to optimize water allocation between energy generation and irrigation and to demonstrate the benefits of optimizing water while developing financial incentives for saving water. Over three years, EDF and the region's two main irrigators saved 109 million cubic meters of water in agricultural consumption. They also used the saved water to generate more electricity during periods of peak demand.⁵⁵

Tradable permits such as water resource allocation permits

For example, schemes such as **mitigation banking** (in the US) focus on the restoration, creation, enhancement, or preservation of a wetland, stream or other habitat area undertaken to compensate for unavoidable resource losses in advance of development actions.⁶² Typically mitigation banking will consolidate small, fragmented mitigation projects into one large contiguous site. Within the site, units of restored, created, enhanced or preserved land are expressed as "credits" which may subsequently be withdrawn to offset "debits" incurred at a project development site. The **American Carbon Registry** recently approved the first carbon offset methodology for emission reductions from wetlands restoration in the Mississippi Delta.⁶³

True value pricing

Water users rarely pay the full cost of using water, and in some cases may not pay at all.⁵⁶ Full-cost pricing can be used to signal scarcity and create incentives for more efficient water use.⁵⁷ **Israel's** water tariffs reflect cost recovery, the scarcity of resources and the cost of rehabilitating natural assets that have deteriorated. The increased water prices have reduced consumption and encouraged water recycling and the use of desalinated water sources for irrigation.⁵⁸ **China** has announced that it will steadily introduce a progressive pricing scheme for water use before 2015. Similar to a progressive tax, water rates will rise exponentially as water consumption increases. China will also adopt high water rates for water-intensive industries and encourage reusing recycled water.⁵⁹

Creating markets

Creating markets for water-related ecosystem services, for example water trading between point sources and non-point sources. These markets are driven by increased regulatory requirements or watershed-wide caps for either abstraction or pollutant loads. The **Ohio River Basin Trading Project** in the US is an example of a water quality trading market.⁶⁰ Payment for ecosystem and watershed services can provide innovative mechanisms to fund conservation and rehabilitation initiatives. The Nature Conservancy's (TNC) Northern Tropical Andes (Northern Andes) program (a geography covering the northern parts of the Andean Mountain countries), in collaboration with numerous partners, has initiated a series of ecosystem services projects called **water funds**. These water funds are based on the premise that natural ecosystems and conservation management practices by people living upstream in the watershed can help provide a clean, regular supply of water and that downstream service users (including water utility companies, hydropower companies and other industries) who depend upon these services should pay for their maintenance and preservation.⁶¹

6

Key considerations for business

There are a number of key considerations that should be taken into account when developing a watershed approach, collaborating with stakeholders and the community, and preparing a response or action plan. Table 3 details these considerations.

Table 3 Key considerations for business: preliminary observations

Scale	Businesses face multiple challenges and drivers by facility and operation. If businesses aim at too large a scale it may have little impact within the watershed. Approaches may be difficult to replicate across multiple watersheds and geographies.
The importance of integrated approaches	Actions to improve the watershed may be counterproductive if upstream and downstream activities and impacts are not taken into account. For example, for watershed payment schemes to be successful, actions upstream need to result in identifiable benefits for downstream water users.
Availability of science and data	The scope and reliability of watershed data has improved significantly over the past 20 years. However, the quality of the data sources and availability of information vary considerably at the local and state levels.
Governance	There are multiple actors within a watershed, and their governance may be overly complex or in some cases non-existent. Leadership within the community and across stakeholders is important for success.
Resources and capabilities	Having the resources and expertise within the business to undertake a watershed approach may be challenging. Watershed approaches may be more resource intensive than actions taken at the plant or facility scale. A well planned approach to watershed engagement is critical for success and can help with resourcing issues.
Getting buy-in and agreement	Early agreement internally and externally is important for success. Without this support the ability to take effective action will be limited. Drivers for a watershed approach are inextricably linked with community drivers for water demand and supply at that location, meaning external engagement is necessary.
Ensuring outcomes	The lead time for outcomes may take longer than for other initiatives. This depends on the issue and location, but also on the collaboration and engagement within the watershed. Done effectively, watershed engagement can be a powerful enabler for action and tangible outcomes.



7

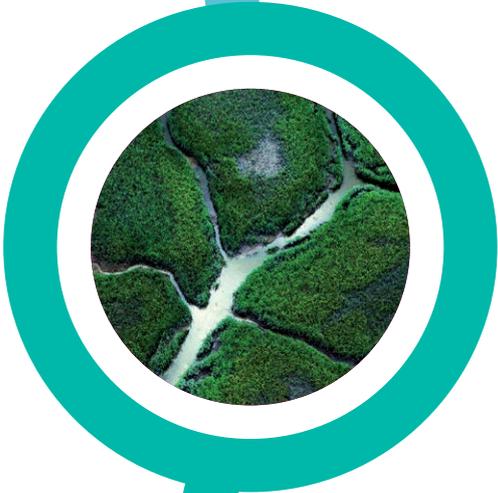
Gaps and challenges

There is a significant body of research on watershed approaches and integrated water resource management at the watershed scale. Additional information on a number of specific areas would further support businesses undertaking a watershed approach.

Table 4 provides a list of observed gaps and challenges to watershed approaches by business.

Table 4 Gaps and challenges

Quantifying the costs and benefits of a watershed approach	While it is important for businesses to understand the costs and benefits of taking a watershed approach, obtaining quantifiable data can be challenging. Other hurdles include confusion over terminology, difficulties in quantifying externalities and valuing water, and accommodating different stakeholder views in valuing watershed services and tying this to business value drivers.
Strong collaborative processes and integration	The number of actors involved in a watershed means that collaboration and engagement is challenging. Fragmented management systems add to this challenge. Integration of the watershed activity or project with other activities can be daunting and resource intensive. Frameworks and tools to strengthen the integration of activities by businesses across the watershed is a perceived gap, and weak collaborative processes can undermine efforts.
Scenario planning and trigger points	There are a number of mega-forces that will impact watersheds over the next 20 years. It is important to understand the tipping point for key mega-force impacts on the watershed to determine the type of action required. Scenario planning is a key input to developing adaptive watershed approaches and understanding the tipping points, yet it is often neglected in watershed approaches.
Frameworks to assist businesses in evaluating outcomes	Understanding the impacts from any actions – positive and negative – can assist businesses in improving and becoming more efficient in their watershed approaches. This, however, requires time and resources. Over the long term it may be difficult to quantify the outcomes and overall benefits of watershed approaches and the connection to corporate objectives if evaluation frameworks are not built into the approach at the outset.
Limited information about market-based approaches	Market-based approaches can be useful mechanisms in ensuring the efficient allocation of resources and determining cost-effective solutions in the watershed. There are, however, a number of challenges associated with the implementation of such measures. There is also limited information about the costs associated with addressing these scientific, data and information challenges. Any market-based approach needs clear price signals, the safeguarding of public interest and third party interests, and to ensure outcomes are met.
Availability of data and information regarding upstream and downstream impacts	Obtaining data and information on upstream and downstream activities within the watershed can be challenging. Information gaps between the science and practical watershed expertise and experience can also create difficulties in decision-making, implementation and monitoring. Linking local and scientific knowledge is critical for watershed management to be successful and achieve its objectives.



8

Conclusions

Taking a watershed approach can provide significant benefits to businesses, including mitigation of critical risks to long-term water security, and opportunities for cost savings and revenue growth. A watershed approach, however, is more complex and will require increased levels of participation and collaboration by businesses.

Intensifying global demand for water, increased water scarcity exacerbated by climate change, and declining water quality are strong indicators that a business as usual approach for water management will not be sufficient in the future. Leading companies are recognizing this and taking a broader “outside the fence-line” approach to water stewardship through increased collaborative action at the watershed level.

Businesses will need to take into account a number of considerations for a watershed approach, including: scale, integration with existing activities and actions, access to data and science, governance arrangements, resources and capabilities to implement actions, getting buy-in and agreement, and delivering on the outcomes. The valuation of services provided by watersheds is a growing discipline and will be a critical tool to help demonstrate the return on investment for watershed-focused initiatives by business. These considerations and challenges are also areas for future focus by the WBCSD water program and are described further below.

 **Stronger institutions.** The institutional arrangements for watershed approaches vary in relation to structure and successful outcomes. Successful arrangements will depend on the institution’s ability to reduce transaction costs, address conflicting interests across bureaucratic boundaries, and ensure that all interests are represented fairly. Where institutional arrangements exist in the watershed, companies should proactively engage. Where institutional arrangements are non-existent or challenged, companies should advocate and contribute to their establishment.

 **Clear understanding of the impacts and risks.** More businesses need to adopt a corporate management approach that takes into account the watershed boundary. Businesses will also require greater access to information regarding the processes, costs and value proposition associated with taking a watershed approach. By adopting a holistic approach to water management planning at the watershed scale, leading businesses will have a competitive advantage for opportunity creation.

 **Watershed valuation.** Valuing the set of services provided by watersheds can support decision-making as it can help assess different management scenarios or sustainable financing options, elaborate water use efficiency strategies, better allocate water between different users, support pricing and report performance. Understanding the value of water and the related services it provides can in fact significantly improve the focus and outcomes of watershed approaches. The WBCSD publication *Water Valuation: Building the Business Case* highlights the reasons that business should engage in valuing water to enhance decision-making processes.⁶⁴

 **Frameworks to evaluate outcomes.** While there are many excellent examples of collective action at the watershed level, there is limited information and evidence evaluating the outcomes, cost impacts and benefits of taking a watershed approach. This information is essential to better business understanding of the benefits and costs of such an approach, and to gaining early buy-in from stakeholders, including other businesses. Evaluation frameworks are available; however, these must be built into the watershed process steps at an early stage.

 **Market-based examples.** Market-based initiatives create incentives, assist in recovering costs associated with improving watershed health, and enable water to be allocated more efficiently and effectively among various uses. However, market instruments and payment initiatives often have a narrow focus, both in terms of the problem to be addressed and the benefits and outcomes. Market-based instruments can be a powerful tool to recover the costs of watershed activities, but they must be considered in the context of upstream and downstream activities. Market-based instruments also need to be recognized and further explored as a complement to regulations within robust and transparent governance schemes supported by a strong evaluation framework to ensure outcomes are achieved.

 **Information and data.** Linking local and scientific knowledge is critical for watershed approaches to be successful and to achieve objectives. For many locations this information may not exist at the local watershed level. Developing and or accessing scientific data and information to support decision-making on the demand and supply balance and allocation rules will be key, as will the ability to build capacity internally and through collaboration with watershed stakeholders.

Businesses hold many of the solutions and are enablers for an effective watershed approach, playing several important roles within the watershed: as a water consumer, a catalyst for change, an investor and a solution provider. Business leadership and participation will be key to accelerating collaborative action and innovative, cost-effective solutions in watershed hot spots. In the long term, these actions will help shore up water security and improve essential ecosystem services vital for business sustainability and growth.

Appendix

Services watersheds provide										
	Biodiversity-dependent industries (e.g. fishing, agriculture, forestry)		Large “footprint” industries (e.g. mining, oil and gas, utilities, construction)		Manufacturing & processing (e.g. chemicals, Information, communication & technology, consumer products)		“Green” enterprises (e.g. organic farming, ecotourism)		Financial services (e.g. banking, insurance & other financial intermediaries)	
Key ecosystem services	Depend	Impact	Depend	Impact	Depend	Impact	Depend	Impact	Depend	Impact
Provisioning										
Freshwater supply	●	●	●	●	●	●	●	○	●	●
Agricultural, aquaculture & livestock	●	●	○	●	●	●	●	○	●	●
Timber, fibers & building products	●	●	●	●	●	●	●	○	●	●
Hydropower	●	●	●	●	●	●	●	○	●	●
Genetic/ pharmaceutical resources	●	●	○	○	●	●	●	○	●	●
Regulating										
Hydrological flows	●	●	●	●	●	●	●	○	●	●
Water regulation and purification	●	●	●	●	●	●	●	○	●	●
Soil protection, erosion control	●	●	●	●	○	○	●	●	●	●
Natural hazard mitigation	●	●	●	○	●	○	●	○	●	●
Cultural										
Aquatic recreation & tourism	○	●	⊗	●	⊗	○	●	●	●	●
Landscape aesthetics/non-use values	○	●	⊗	●	⊗	○	●	●	○	●
Cultural heritage & spiritual values	○	●	⊗	●	⊗	○	●	●	○	●

● Moderate to major relevance ○ Minor relevance ⊗ Not relevant (typically)

Source: Adapted from WBCSD et al. (April 2011). Guide to Corporate Ecosystem Valuation: A framework for improving corporate decision-making, page 23.

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