SIWI WORLD WATER WEEK

Seminar: Industry's role in ecosystem and watershed management

ABSTRACT VOLUME

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Seminar: Industry's role in ecosystem and watershed management

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A public-private partnership implements corporate water stewardship in Colombia

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Keywords

Stewardship, Latin America, collective, industry

Highlights

- Collaboration along the value chain can increase the overall system efficiency and reduce water risks.
- Ecosystem's restoration is a promising outside the fence action, but measuring direct business benefits and long-term interventions remains a challenge.
- Scaling from Colombia to Peru and Chile; and facilitating a Latin American community of practice.

Introduction and objectives

A Public private partnership accelerates the implementation of corporate water stewardship (CWS) in Latin America. The initiative El agua nos une promoted by the Swiss cooperation in partnership with companies, institutions, industry associations, NGOs and consultancies to:

- Assess and reduce water risks and impacts of production sites and value chains
- Motivate corporate collective actions on watershed management
- Publish practices and technologies in the Water Action Hub (UN Global Compact)

About 30 business cases in Colombia, Peru and Chile developed. 2 cases will be presented in detail to better illustrate articulation among inside the fence, value chain and watershed actions.

Methodology approach

Partner companies advance on their CWS journey by assessing their internal and external water risks and impacts (water footprint) along the value chain. They prioritize and invest in reducing the impacts of their own production process. Each company also engages with a strategic value chain stakeholder, either a supplier or a client, to move from optimizing single processes to a systemic approach. Furthermore, the company identifies a relevant action to work with water basing stakeholders to jointly improve water management and ecosystem's restoration. Methodologies and good practices are shared through a Latin American community of practice.

Analysis and results

Results 2 business cases:

1. Coffee production - value chain collaboration: The impacts assessment showed the removal of coffee pulp as a hot spot of water withdrawal and water pollution. The traditional small-scale systems didn't provide water treatment. As a solution, a collective system was built by Colcafe Company and the Andes farmers' association: to process 1.800 Ton coffee (DPC)/year, from 610 farms. Water consumption was reduced from an average of 30 lt /Kg DPC to 3 lt /kg DPC. A water treatment system was also put in place. This collective action increases farmer's income and reduce time of payment between harvests and sell; improving life quality.
2. Water basin reforestation: Ingredion an agribusiness, and Celsia an electricity company, are located in an area with high agricultural, industrial and urban water demand. Reforestation of river sides,

currently degraded land (mainly pastures), were identified as a measure to reduce the water risks. Ingredion and Celsia joined their efforts to create a 20 hectares ecological corridor along the river Arroyohondo that provides freshwater to the Cali and Yumbo districts, where the companies have their operating plants. Local communities will grow and plant the native species and will raise awareness on the importance of the ecological corridor.

Conclusions and recommendation

- Ecosystems management and water governance requires strong long term commitments from local public and private actors.
- Direct economic, social and environmental benefits should be assessed to assure commitments. This, water benefits should be evaluated by a broad set of indicators (not only related to water) to capture the overall and avoid potential trade-offs.
- Scaling up requires sharing results, lessons and good practices among peers to showcase gains and risk management of an efficient and responsible water use.

Coal industry's contribution to water-ecosystem through gainful utilisation of mine-water

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Keywords

Asia, Coal Industry, Coal India, Mine Water

Highlights

Coal India Limited, World's largest Coal Producer Company has developed an innovative and sustainable model for utilizing mine discharge water from its Coal Mines for different community needs like Drinking Water, Domestic Use, Irrigation, Ground Water recharge, etc.

Introduction and objectives

Western Coalfields Limited (WCL) a subsidiary of Coal India, operates its mines in Vidarbha region which is considered to be one of the driest regions in India with most reservoirs hitting dead storage levels in summer. WCL has found a sustainable solution to this problem by utilizing its huge volumes of mine discharge water. Objective of this project is to recover this Mine Discharge water from Open Cast and Underground mines and supply it to needy areas. One of our projects Kamptee to Kanhan supplies Mine discharge water from Kamptee Open Cast Mine to drinking water channels of Kanhan

Methodology approach

WCL initiated its ambitious Mine Water Utilisation Project to utilise its 30 crore litre/day mine water. Several projects were initiated for different purposes like:

Supply as Drinking Water to Local Populace

Agriculture Use and Augmentation of Ground Water

Revival of Ponds and RiversThese projects facilitates overflow of mine discharge water from the sedimentation tank of Mines. High Tension pumps (HTP) are used to drain the water from the mine. The HTPs are located at the deepest locations in the seam/ strata. Water from different working locations is pumped using small water pumps to the HTP location.

Analysis and results

- For drinking water, WCL Installs RO(Reverse Osmosis) plants and Pressure Filters to supply water to nearby villages and municipalities. Mine water discharge, which is a natural fall out of mining process of the nearby mine is pumped to villages through pipe lines. The water is then purified at RO (Reverse Osmosis) plant and safe drinking water is provided for free of cost to the villagers.
- For agriculture use and ground water recharge, WCL drills boreholes adjacent to a seasonal nallah(channels) and discharged the mine water into it (after its widening and de-silting). Check dams are constructed at the downstream of this nallah, which has enabled to raise the water level over a stretch of approximately 1 km of the course of nallah. This raised water level has caused charging of the ground water table and accumulation of water in nearby open wells, which remained dry since the past 30 years. As the nallah passes along the agricultural fields, farmers are also using this water for cultivating their land. Various activities involving: cleaning, deepening of nallah, revival

of open well, construction of check dam, preparation of sand pits etc. has been taken up by WCL in this project

Conclusions and recommendation

WCL has pioneered in utilizing Mine discharge water for needs of the community in sustainable manner benefiting more than 1,36,000 population. WCL has succeeded in gainful utilization of our mine water and also took a leadership role in replicating this model across other coal companies which have a total mine water discharge potential of 571.6 Million m3/day. WCL has set an example for other mining companies in India and demonstrated successfully that water discharged from Mines can be gainfully used for community benefit. Slowly, this project is changing the way mining industry is looked upon in India.

Greening the construction chain through cleaner production and organizational learning

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Keywords

Cleaner Production, Construction value chain, Micro small and medium enterprises (MSMEs), Organizational learning, green industries.

Highlights

- New partnerships and learning alliances that allowed reducing negative environmental impacts along the construction value chain.
- Radical changes: New green values, policies and organizational culture that brought the integration and institutionalization of innovative cleaner technologies within firms.
- Women environmental leaders and cleaner firms acting as role models.

Introduction and objectives

Construction is a highly polluting activity. In developing countries, large construction firms greatly rely on small and medium-sized suppliers. A large private construction firm in Colombia, is greening its construction activity by encouraging and supporting its small and medium-sized suppliers in the introduction of Cleaner Production (CP) actions. For transferring CP knowledge to suppliers, the large firm created learning alliances and partnerships with the academia, utility and private companies, and NGOs. With the strategy, suppliers were trained in CP, university students were linked for research, women green leaders emerged, and all firms implemented cleaner technologies and sustained them.

Methodology approach

We aimed to demonstrate how CP external sources can help MSMEs in the institutionalization of new CP knowledge by assuming the transfer of cleaner technologies as an intense organizational learning process. A certificate program led by a local university, was the strategy to start raising the large construction firm and its small-sized suppliers´ capacities for intuiting, interpreting, integrating and institutionalizing new CP knowledge, this means their learning capacities around CP. Models that integrate OL and CP, and 'learning by doing' and 'learning by interacting' methods were used for knowledge transfer. Interviews and quantitative data were used to evaluate the

Analysis and results

A large construction firm and its suppliers acted as the case study, which provided the empirical data to prove that greening the construction chain is possible through CP transfer processes based on OL principles and learning alliances. Networking with external sources and colleagues, through learning networks, has been found as an important facilitator of learning in CP demonstration projects (Bass, 2007; Dieleman, 2007; Stone, 2006; Van Hoof,

Using photovoltaic energy for lighting common areas, 100% use of rainwater for on-site concrete production, 100% reuse of wastewater from brick cutting process, the replacement of 90% of single-use wood forms by durable metal forms, the elimination of drinking water use for construction activities, 100% reuse of backwashing waters for cleaning roads, 50% reduction in paper use, the emergence of women environmental

leaders, and new green policies and values, are some of the outcomes achieved by firms, which have been improved and sustained two years after.
The fact that 88% of SMEs suppliers effectively integrated CP is considered significant, since other authors have reported approximately 70% (Van Hoof, 2014) and 40% as the CP implementation rate in MSMEs in demonstration projects (Dieleman, 2007), or even less in developing countries (ECLAC,

Conclusions and recommendation

It was proved that CP external providers can effectively help MSMEs in the integration and institutionalization of new CP knowledge when the transfer of cleaner technologies is assumed as an organizational learning process rather than as a transfer of purely technical information. The learning by doing methodology allowed most of the work was done by the firms themselves rather than by the CP knowledge providers, differing from traditional CP projects in which CP consultants are mainly in charge of visualizing, analyzing and testing CP technologies. Large firms together with SMEs suppliers are capable of effectively help with greening value chains.

Identifying impacts of private sector water abstractions: A Kenyan application

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Keywords

water stewardship, abstraction, river basin simulation, ecological impacts, environmental flows

Highlights

- River basin simulation is an effective way for private abstractors to evaluate their risks and impacts on the watershed
- Current risks, and those under future supply or demand scenarios can be investigated.
- We demonstrate an online simulation portal for private and public water managers to share data and analysis.

Introduction and objectives

Private sector water users would benefit from being able to cost effectively evaluate their water supply risks and impact on the wider watershed. Water resources river basin simulation models can achieve both aims, but typically require a range of public and private data and take years to build and calibrate, making them inappropriate for most private abstractors. This UK funded project, in collaboration with WWF and M&S, aims to prototype an efficient and cost effective way for private and public sector water users in a basin to jointly build water system understanding and evaluate risks and opportunities.

Methodology approach

The proposed approach links a generic open-source simulation model to an abstraction license (water rights) database and a secure online geographic interface with varying levels of data access. The goal is to make it easier to build, share and update data and models between private and public water managers. The simulator is provided estimates of hydrological flows, either from global models, calibrated basin models or gauged data. The data access structure is designed so that a river basin agency can grant individual access to abstractors, to evaluate and save scenarios, without them accessing other private license data.

Analysis and results

A proof of concept application of the tool is applied to an upper subcatchment of Kenya's Tana River Basin. A hydrological model and abstractor database for the area exist. The basin has overabstraction issues and potentially unauthorised abstractions. Our collaborating partner, the Water Resources Authority (WRA) of Kenya, would like to better make use of their abstraction license database in understanding current abstraction and authorising further future licenses. At present it is not easy to consider the interactions between various uses, their cumulative impacts, impacts on environmental flows and implications of future policy- or asset-based

We are collaborating with WRA to define their needs and requests and design a access mode for external organisations such as private abstractors. The river basin model and the licensing database are linked so that individual abstractors can better understand risks and opportunities. Although water quality and flooding could be relevant, initially water supply assessment is the focus.

Conclusions and recommendation

Providing a means for water users to use modelled and observed data alongside their own permitting data to understand their water supply risks and impacts on other abstractors and ecosystems would be beneficial. The ability to assess the impacts of different future water supply or demand scenarios would be a valuable extension. This proof of concept application aims to assess technical issues, obtain feedback from the water stewardship community and produce a working online prototype for the Tana basin case.

Innovative private sector initiatives in addressing water risks

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Keywords

Corporate water strategy, Value chain water risks, Innovative partnerships, Watershed scale solutions, Valuing water

Highlights

This presentation provides a demonstration of innovative approaches to corporate water strategy that are aimed at building partnerships, driving growth and supporting sustainable water resource management. An overview of how companies are moving beyond risk mitigation to opportunity creation is provided along with several leading examples that demonstrate this trend.

Introduction and objectives

Water is increasingly being used to drive growth and transform risk into opportunity. In doing so, companies are identifying a 'license-to-grow' water strategy that often is focussed on supporting sustainable water resource management. This work set out to explore these initiatives further and understand how an appreciation of the full value of water can be quantified to support commercial investment decision-making.

Methodology approach

This work has been developed through a detailed desktop study and discussions with key stakeholders.

Analysis and results

Water scarcity is driving innovation in the private sector – new technology and the application of different partnership approaches to reduce risk and enhance business growth and sustainability. By appropriately valuing water, previous risks can become a business opportunity. Two case studies are used to demonstrate these findings:

1. A major global resources company is moving past the existing legislative limitations in water markets to address water scarcity by 'making a market' through leveraging the power of blockchain technology and catchment partners.
2. A US based beverage company has engaged with their stakeholders within their watersheds to address water conservation and security. The results include increased water conservation and improved social license to operate.

Conclusions and recommendation

Corporations are increasingly engaging in water-related investments beyond the site boundary with a focus on managing risk, seeking growth and in doing so defining their 'social purpose'. Common 'input/output' analysis from a site is now being enhanced by recognizing the importance of negotiation on water, the ability to influence, the ability to find partners and the ability to identify revenue. The examples provided demonstrate a broader appreciation of the quantification of the value of water to mitigate risk and find opportunity. Companies are increasingly making water-related investment (and divestment) decisions driven by an on-site need within the context of off-site

Leveraging artificial intelligence to accelerate solutions to wicked water problems

Presenting Author: Mr. Josh Henretig, Microsoft, United States
Co-Authors:

Keywords
technology, ecosystems, agriculture, private sector

Highlights
This session will explore the power of AI to address global and local water challenges. We will offer stories and case studies to show the power of AI already at work and discuss potential future use scenarios.

Introduction and objectives
To achieve SDG6, the private sector will need to engage beyond the fenceline to address water risks and contribute solutions to social and environmental issues. There are few societal areas where AI can be more impactful than in helping address water global and local water challenges. Yet these technologies are not yet widely adopted or utilized to their full potential. This session will showcase how the organizations can gain access to these technologies and leverage them to drive more effective water stewardship policies and outcomes.

Methodology approach
At Microsoft, we believe artificial intelligence is a game changer. The AI for Earth program builds on Microsoft's commitment to use AI technology to amplify human ingenuity, advance sustainability, and address water challenges around the globe. Through ongoing projects and partnerships, Microsoft strives to empower people and organizations to develop and deploy technology enabled solutions to water challenges. With an expanded strategic plan and committing $50 million over the next five years to put artificial intelligence technology in the hands of individuals and organizations around the world who are working to protect our planet.

Analysis and results
Already, we are seeing the transformative potential of AI. Through the access to cloud and AI computing resources, educational opportunities on how to use them, and nurturing of innovative projects, the individuals and organizations involved in the AI for Earth program are demonstrating results that improve management of water resources.
The strategic use of Azure and focused machine learning is providing faster, more effective, and lower cost land cover mapping tools to a small NGO that works to conserve the Chesapeake watershed. By using these tools to analyze, monitor, and manage their precious conservation resources, the NGO benefits from increased productivity, allowing them to pursue actionable solutions previously thought unattainable.
In Australia, high labor and import costs, dry weather and the highest variability in climate of any country in the world make farming increasingly challenging. The Yield, a Tasmanian ag-tech company, has created a solution that uses sensors, analytics and apps to produce real-time weather data, right down to field level, helping growers make smarter decisions that can reduce their use of water and other inputs while also increasing their yield.

Conclusions and recommendation

AI for Earth will be a force multiplier for groups and individuals like these who are creating sustainable solutions. As these projects advance, Microsoft will identify and pursue opportunities to incorporate new AI advances into platform-level services so that others can use them for their own sustainability initiatives.

We face a collective need for urgent action to address global water issues. AI technology offers an opportunity to leverage cutting-edge technology to develop innovative solutions to sustainably manage water resources.

Mining sector collective action on water: Challenges and opportunities outside the fence line

Presenting Author: Mr. Scott Miller, Newmont, United States

Co-Authors: Ms. Briana Gunn, Newmont, United States

Keywords

watershed, management, engagement, stewardship, water

Highlights

Mining companies play an important role in the watersheds where they operate. This presentation will provide case studies on the challenges and opportunities that mining companies face related to collaboration with stakeholders in the watersheds where they operate.

Introduction and objectives

This this presentation will highlight several case studies where Newmont Mining Company has been successful in collaborating with external key stakeholders and working outside of our fence line. The first example is the Water for Cajamarca project lead by Newmont's Yanachocha mine. This included providing increased capacity for the Cajamarca water supply system in Peru through improved infrastructure. The second represents collective action with regulatory authorities when representatives from the mining industry, including Newmont supported to the Governor's Drought Forum in Nevada providing watershed data and technical expertise. This has continued throughout engagement and representation of the mining industry in the Humboldt River Basin Authority where Newmont has collaborated on challenges within the watershed including water rights and availability.

Methodology approach

Reliable and sustainable water sources are vital to our operations. Milling and ore processing activities require large amounts of water from sources that include direct precipitation, rivers and streams, groundwater and municipal water. Our operations also consume water through evaporative and/or entrainment loss (such as seepage) on heap leach and tailings storage facilities, stormwater and process ponds, and waste rock facilities. We work to minimize the amount of water impacted by mining activities through diversion channels and by separating water based on quality to ensure we discharge water in a manner that complies with all laws, regulations and beneficial water use standards.

Rising production, changing regulations, growing populations and a changing climate are among the more significant factors increasing our exposure to broader and more complex water challenges. We also recognize the impact our business activities may have on local communities' access to water. Our commitment includes understanding the availability and uses of water within the watersheds where we operate and developing management methods that reduce or mitigate our impacts on water quality and quantity.

Analysis and results

Developing and implementing an effective watershed strategy allows mining companies to manage risks and maintain a social license for growth while being stewards of the environment during operation, closure and post-closure. The evaluation of the evolving challenges and opportunities play and import role in developing operating plans to manage water as a shared resource.

Challenges:

- Mines have long lives (often spanning decades) with evolving potential impacts within dynamic watersheds lacking appropriate governance.
- Mine operations have historically focused within the fence line on lowering costs and maintaining operational efficiencies for water (e.g. recycle/reuse, dewatering, stormwater management, treatment and discharge). While water efficiency improvements still exist, significant changes in mine water uses require new technology or significant investment.
- Mines operate in remote locations where there may be limited availability/capacity of forums for collaborative management of the watershed.
- Mines, because of formal approvals (e.g. permits, environmental impact assessments) for water use within the fence line, have not historically reacted to challenges in the surrounding watersheds until conflicts development.

Opportunities:

- Large data base of water information that can be used to characterize watersheds, assess impacts, evaluate opportunities and improve governance.
- Ability to leverage water infrastructure design, construction and operational experience to collaborate/support other watershed users and stakeholders in watershed improvement projects.
- Leverage existing economic and social development program related to community water supply and sanitation
- Public partnerships on large water infrastructure projects (e.g. desalination plants, regional dams and sanitation projects).

Conclusions and recommendation

Mining companies are well positioned to collaborate with other water users and stakeholders to identify and mitigate the potential water risks within a watershed.

Newmont has developed a Global Water Strategy to focus on water as a valued asset. This strategy has allowed Newmont to have success in some areas of water management including: collaboration, collective action, research and innovation, management and efficiency. Although there have been significant accomplishments there is still a need to mitigate long -term risks and to progress to the next level of maturity of water stewardship. We need to develop a robust understanding of the watersheds surrounding our operations including the changing conditions and current and future risks and opportunities. The ultimate goal is to delineate actions and partnerships that will secure access to water in a socially, economically and environmentally response way.

Public and private roles beyond 'fencelines': Interrogating the boundary critically

Presenting Author: Dr. Therese Rudebeck, University of Oxford, United Kingdom
Co-Authors:

Keywords
Corporation, water, governance, role, boundary

Highlights

- Critically engages with where the private responsibility ends, and where public responsibility (should) pick up beyond fencelines;
- Finds that the boundary between the public and the private responsibility is fluid rather than fixed;
- In order not to discourage corporate involvement, a more open conversation about boundaries is necessary.

Introduction and objectives
Whilst it is widely accepted that companies have a critical role to play in addressing water issues – within and beyond their fencelines – their specific role and responsibility is still debated. More specifically, one of the greatest points of tension revolving around corporate water stewardship is where the private responsibility ends, and where public responsibility (should) pick up. The aim of this paper is therefore to interrogate this 'boundary' critically. The paper makes a valuable contribution to this session, as it illustrates the opportunities and limitations to companies driving innovation and finding solutions to water issues.

Methodology approach
This paper puts forth the idea that the boundary between public and private roles and responsibilities is fluid rather than fixed. The paper suggests that the role prescribed to the corporation is context dependent, and that under certain conditions, the corporation is able to move into what is commonly perceived to be 'the public domain'. Looking beyond the capacity of the corporation itself, this paper is guided by the question: 'What factors determine the boundary between public and private roles?' This study draws on qualitative interviews, as well as case studies from the agricultural and mining industries.

Analysis and results
The research develops a framework where the nature of the boundary is examined from three different perspectives: a moral perspective (where the boundary is determined by subjective values), a circumstantial perspective (where the boundary is determined by the capacity of the public sector to address these issues without corporate involvement), and a sectoral perspective (where the boundary is determined by the corporate sector to which a company belongs). Examining the boundary from these different perspectives will produce different answers to where the boundary is, or ought to be. Whilst the literature on corporate involvement – academic as well as grey – has made great progress in terms of outlining the private and public roles in water management and governance, no study has yet engaged directly with the boundary where the responsibilities of these two actors meet.

Conclusions and recommendation

This paper concludes that the boundary between the private and the public sector is flexible. However, seeing that the last 40 years has seen a complete reversal in the market value composition in terms of tangible and intangible assets, and that the value of intangibles at least in part is determined by public perception, many corporations are worried about overstepping the appropriate mark. A more open conversation about boundaries is therefore critical. Failure to adequately address this may lead some corporations to avoid engagement altogether, which could be detrimental for the health of the world's water resources.

Sinopec: Grey-green infrastructure to serve industry and nature

Presenting Author: Mr. Arnaud Penverne, Veolia, China
Co-Authors:

Keywords
Industry, permit, China, wetland, oil

Highlights
Beijing Yansan Petrochemical Company (BYPC) processes 10 million tons of crude oil into 494 grades of products. To meet the stringent discharge standards, new wastewater treatment units were constructed, including an ultimate polishing wetland where 1600 m3/h are treated through 9 Ha of land.

Introduction and objectives
BYPC is a fully-owned subsidiary of Sinopec Group, China #1 petro-chemical group. This site is located 50 km south-west from Beijing center. It produces 800,000 tons of ethylene annually, and 120 kinds and 494 grades of petrochemical products, including synthetic resin, rubber, phenol, acetone, etc. As a high profile heavy industry, BYPC is held to a high standard and must comply with some of most stringent environmental discharge standards in the world (e.g. 30 ppm of COD) and reducing its overall water and energy footprint, to preserve its license to operate.

Methodology approach
In 2007, BYPC outsourced the operations of its wastewater treatment facilities to Beijing Yansan Veolia (BYV) as a 50-50 joint-venture company between BYPC and Veolia. The partnership was extended in 2016 to include the management of the cooling, demineralized, chilled and industrial water facilities.
BYV manages the full water cycle, with the design, operations and maintenance of the industrial and domestic wastewater treatment facilities, the bromine extraction facility, cooling towers, demineralized water facilities, and the rehabilitated wetland. BYV support its client on its environmental and CSR agenda to the benefit of the environment and the local communities.

Analysis and results
The technologies selected and installed include conventional treatment plus Ultra-filtration/Reverse Osmosis, Dissolved air flotation, Membrane bioreactor, Actiflocarb and TGV filters, plus a Liquid-Liquid extraction for Bromine extraction.
To further guarantee water quality and protection of the local water resource, the existing wetland system is restructured in a succession of 20 terraces, designed for optimum hydraulic functioning, phytoremediation and biodiversity enhancement, by leveraging the diversity and continuity of landscapes, such as water ponds, bank, wet and dry meadow, willow forests, each of which corresponding to particular a habitat. The turbulent flows enhance oxygenation and stirs the microbial fauna to enhance the depurative capacity of the wetland, while laminar flows in a large open area increase hydraulic retention time (HRT) which in turn increases sedimentation and allows a longer contact time with the purification agents (plants and microfauna).
Because Niukouyu park is open to the public, this site also includes a bridge promenade and educational media for local communities to learn about the benefits of wetlands.
It attracts 200 people per day, and thousands of professional photographers every year who enjoy the 30 species of birds that re-colonized this biodiversity refuge.

Conclusions and recommendation

This project in China is a unique example of combining innovative technology with ecosystem services to create a wetland sourced by industrial petrochemical discharged water. The discharged water meets the tight environmental standards as the Chemical Oxygen Demand remains below 30 ppm, and N-NH4 remains <1.5 ppm (2.5 winter).

This design avoids possible penalties for wastewater discharge non-compliance, which can exceed several million euros. This initiative could be duplicated in other locations, and demonstrates how to integrate grey and green infrastructures.

Trends in water-related innovation to manage water risks

Presenting Author: Mr. Xavier Leflaive, Organisation for Economic Cooperation and Development, France
Co-Authors: Mr. Ben Krieble, Paris School of Economics, New Zealand

Keywords
innovation, risk management, private sector, financing

Highlights
Innovation is central to managing increasing water scarcity and quality risks in the context of degraded ecosystems and increasing demand for water. New empirical analysis shows that water-related technological innovation more than doubled between 1990 and 2013. The analysis provides new findings on global trends and industry- and policy-relevant issues.

Introduction and objectives
Benefiting from water's myriad productive uses and its role in maintaining ecosystems, while managing water risks, is crucial for economic growth and development. Innovation in water-related technologies can provide a cost-effective means for water users (firms, irrigators, etc.) to manage risks as well as also business opportunities.
This paper analyses global trends in water-related innovation between 1990 and 2013 for over 200 jurisdictions. It identifies the leading countries for water-related innovation and the leading markets where such innovations are diffused, providing valuable insights for policy and financing discussions intended to promote innovation that contributes to water security and sustainable growth.

Methodology approach
Drawing on the most comprehensive data set of its kind, this paper uses patent data from the OECD.Stat database to analyse global trends in water-related innovation between 1990 and 2013 for over 200 jurisdictions. The data cover technologies that can manage risks of water scarcity and pollution, broadly categorised as demand-side, supply-side and pollution abatement technologies. The data outline patterns of invention, including which types of water-related technologies are being patented, where technological invention is occurring and in which markets inventors seek patent protection. It also identifies which countries specialise in water-related innovation.

Analysis and results
New analysis of global trends shows that water-related technological innovation more than doubled between 1990 and 2013. The five largest overall inventors of water-related technologies, by patent count, are the US, Korea, Germany, China, and Japan, with about 70% between them. China and Korea have exhibited substantial growth in their share of world patenting. The top inventor countries are also major potential markets for the technologies, reflecting partly the propensity of inventors to protect their inventions in their country of residence, but also the attractiveness of these markets to foreign inventors.
The countries with the largest share of their own patenting linked to water-related technologies include Kuwait, Saudi Arabia, Chile, Pakistan, and Australia. This suggests that even if countries do not account for a major share of overall water-related technologies, domestic factors, including environmental pressures, can lead to a relative specialisation in water-related technologies.

The most water-stressed countries show a pronounced relative advantage in water technologies, registering about 30% more than would be expected based on their share of overall patents. Overall, the analysis suggests that necessity is only one parent of invention, as a country's economic size and general propensity to innovate are also likely important factors.

Conclusions and recommendation

The analysis provides valuable insights for policy makers and the private sector working to improve the management of the risks of water scarcity, pollution and impacts on ecosystems. Policy makers can better target policies to support innovation by understanding how their own country ranks and whether it exhibits a relative technological advantage. The private sector can gain insights on where inventive activity is taking place and where it is diffused, highlighting opportunities to better manage risks through innovation. This paper also inspired discussion on approaches to financing water innovation in the context of the OECD-WWC-Netherlands Roundtable on Financing Water.

Water stewardship and business value: Creating abundance from scarcity

Presenting Author: Mr. Andre Fourie, ABInBev, South Africa

Co-Authors: Mr. David Grant, ABInBEv, South Africa
Mr. William Sarni, Water Foundry, United States

Keywords
water stewardship, industry, business value, watershed, innovation

Highlights
The private and public sectors are reframing water as more than a scarcity and risk issue, through innovation in public policy, technology, financing and business models. Water can 'fuel' economic development, business growth, social well-being and ecosystem health.

Introduction and objectives
For the private sector to invest in addressing water risks beyond the fence line we must quantify the value to businesses.We need to expand our view of the value of water and, more importantly, drive improvement in how the private and public sectors are incentivized to incorporate our expanded view of the value of water into their strategic planning. Without action in these areas we fear that we are destined to continue to 'manage' water instead of being stewards of our most valuable natural resource, failing to meet the needs of all stakeholders.

Methodology approach
The methodology in developing the case for the business value of water and a roadmap for action consisted of 20 case studies, 6 interviews with industry leaders across a range of sectors, participation in innovation programs and research on brand value. Case studies and interviews included: Nestle Waters NA, Microsoft, Ford, The Coca Cola Company, Intel, Water for People, Oxford University and ABInBev.
Research on corporate brand value, socially responsible consumers, investors and rating/ranking frameworks was also performed to quantify business value and, in turn, investment in beyond the fence line actions.

Analysis and results
Companies are just beginning to experiment with strategies of abundance by funding prize competitions, crowdsourcing technology solutions and establishing venture funds. These actions are not held captive by CSR, CR and Sustainability programs – they are more aligned with creating business and societal value.
If companies frame water as a critical resource and part of their business strategy (a 'license to grow' water strategy) they will invest in outside the fence line initiatives. A 21st -century water strategy is defined by:

- Building and catalyzing ecosystems of stakeholders. Not collective action – tangible joint business planning and execution.
- Quantifying the value of water – business value and economic value (including natural capital).
- Fully integrating energy – water – food – ecosystem nexus considerations in business growth and economic development.
- Quantify the brand value of a water strategy – what is the intangible value in a water strategy?
- Develop an innovation plan – technology, financing, partnerships (business ecosystems) and business models (also for the public sector).
- Embrace 'radical transparency' about water risks and opportunities.

Conclusions and recommendation

The authors believe companies can create value and positive impact beyond our traditional framework of water stewardship.It is about creating value and having an impact beyond the value chain and well outside their fence line.. It is solving a 'wicked problem' regardless of the footprint of your value chain. It is actively being part of the solution and creating intangible value (brand) by 'being in the game.'