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Water: Priceless Catalyst of the Global Community

Some regard 'global community' as an oxymoron, like 'virtual reality,' 'original copy,' or 'open secret.' Community conjures up local groups self-organised around shared priorities. Global evokes seven billion strangers competing without a common context. The two words may seem diametrically opposed to each other, except during one week in Sweden's capital. The Stockholm International Water Institute (SIWI) helps people rediscover how our most extraordinary catalyst unites contradictory words into a focused international congregation. That cohesive force is water.

The World Water Week in Stockholm (WWW) community is diverse in age, kind and origin. We hold 2,677 professional titles, come from 130 different countries, and speak countless native tongues. That is what makes our work and our Week so remarkable. For we are defined by the aquatic resource we share, by our passion for water, by the way we orient ourselves less by passport number or postal code than by catchment and current. And we know – from climate change impacts, from trade in virtual water, from our desire to eradicate poverty – that whatever we do in any one place alters the flow somewhere else. It is water's profound challenges – and enormous potential – that bind us through this shared matrix into a deliberate, finite, and self-organising group of people.

Water has all too often been either ignored by – or kept in isolation from – the heat of economic reality. As a result, water's value may get distorted or forgotten. The economics of water management involves understanding its scarcity and its value; ensuring that the costs and benefits of choices are clear and that the impacts of the alternatives are laid out. The challenges are the mirror image of the opportunities. Applying economics to water is challenging, and requires the ability to credibly value market and non-market costs and benefits; to estimate marginal costs and benefits of achieving differing levels of water quantity and quality; to model choices, including risks and uncertainties; and to relate to other disciplines so that there is mutual understanding. To meet this challenge in 2011, SIWI focused on, and strengthened with staff resources, the emerging competence area of water economics. Our conviction is that the water community must become better at expressing water in economic terms, through the investigation of efficiency, effectiveness, equity, preference and behavioural approaches. So we designed risk based approaches to improve decision-making for climate variability; we developed methodologies to determine the role of water in macro-economic development; and we designed a hydro-economic model to underpin cooperative action in the Euphrates and Tigris region.

The perverse incentives and complications from the economy of water did not vanish in one year. Humanity continued its urban shift; climate change continued its inexorable warming; hundreds of thousands of children continued to die from unsafe water and sanitation. Some began to argue that global water stress, manifest in higher grain prices, may have triggered political changes; others believe domestic uprisings may signal the dawning of thirst-driven conflicts. SIWI believes – and works hard to ensure – that water is and will remain a source of cooperation.

The truth is that water is both "the bloodstream of the planet," and the foundation of the global economy. Yet this duality utterly confounded the father of economics, Adam Smith. Though a genius of the ages, he was perplexed that we carelessly leaked essential water while carefully hoarding useless diamonds. In this age of global resource scarcity, we are no longer alone in coming to see the worth in water. Rather, we have opened up discussions to make water an appropriate subject for our authentic global community to address all year long. The truth is that water is both 'the bloodstream of the planet,' and the foundation of the global economy

Outlook: Priorities for Adapting to a Changing World

Last year saw many forms of change – natural volatility, economic stress, regime change, manmade disasters or quiet demographic shifts in diets. Yet all these drivers share the underlying dimension of water. The Stockholm International Water Institute (SIWI) has adjusted to our constantly changing world through our crosscutting priorities.

In *Water Governance*, SIWI understood water as a cause and consequence of weak states and political instability. Governments tapped rivers for expanding and thirsty populations, or drilled down into fossil aquifers to create new rivers where none had naturally existed. Trade in virtual water embedded in grain bought time, but increased dependency on foreign nations. The encouraging message from SIWI is that by improving water governance we can help relieve shortages in the quantity and quality of water, and turn competition into collaboration. In Liberia, for example, we worked with the administration of Nobel Peace Prize Laureate Ellen Johnson Sirleaf to improve water and sanitation as a key element in the recovery of her nation emerging from civil war.

Transboundary Water Management (TWM) found new ways of resolving external and internal tensions. SIWI's work reminded people how border crossing rivers can be a positive force that may stitch diverse nations into a common tapestry. On Europe's rivers – Danube, Ebro, Elbe, Rhine, Rhone, Tagus, Torne, Vardar, or Vistula – sharing currents lay a foundation for shared currency. SIWI brought our experience to the Mekong, Nile, Okavango, and Aral Sea to show how riparians can generate 'public goods' such as flood and drought protection, biodiversity conservation, enhanced water quality, even regional alliances. Not only can these benefits be traded between nations for peace and security, they can also be better allocated within nations for development and equity. In each case, TWM provides a stabilising force. Yet water problems can't be solved by water actors alone. That's why SIWI discourages the term 'water sector' and seeks to break down artificial walls between disciplines. SIWI thinks, works, and collaborates 'out of the bucket.'

Our *Water-Food-Energy Nexus* highlighted the interdependence between three seemingly unrelated fields. Population growth and accelerating economies escalate demand for energy and food, which in turn further increase the pressure on limited water and land resources. It hardly makes sense to deplete one resource to produce another, but SIWI found almost all nations do just that. Some use water to irrigate corn, then burn food calories as industrial biofuel, which drives pumps in hungry regions, to lift water from deep aquifers, to irrigate grain, in a vicious cycle. SIWI advocates a cross-sectorial approach to this nexus, improving efficient allocations and use of one resource to reduce waste of the others. Green economic strategies are being developed with water, energy and food at the cross-way.

SIWI has long been at the forefront of emphasising the vital role of *Water in Climate Adaptation*. But we have also shown how water is key to mitigation interventions, which require water for forest carbon sequestration, water for healthy populations, water for renewable clean energy, water for stable cities, and water for reliable agricultural practices. True resilience will come as people see health, energy, transport, food and water as interdependent.

Finally, SIWI has helped traditional banks and large multinational companies become increasingly aware of the need to embrace water for durable development; no longer a mere matter of 'corporate social responsibility, the private sector is gradually shifting the environment in general and water in particular to the a core of their business plans and supply chains. SIWI thinks, works, and collaborates 'out of the bucket'

hoto: Cristian Popescu,

SIWI's Role: Bridging Gaps Throughout the Water World

There are 263 transboundary river basins worldwide, and bridges span almost all of them. Yet the Stockholm International Water Institute (SIWI) sees the potential for rivers themselves to become bridges that connect people downstream to upstream, factories to farms, cities to countryside, fisheries to firms. And positioned at the nexus of the water world, SIWI has become an institutional bridge.

We bridge the gaps between science, knowledge and practice. We collaborate with businesses, governments, and non-governmental organisations as an honest international broker. We forge linkages within the populations sharing basin or aquifer, or trading between basins, anywhere on earth. To do all this we anchor our institutional cornerstones in four strategic objectives.

SIWI continued to reinforce trust as an independent International Institute known for closing gaps as our professionals helped translate theory into practice. We advanced Innovative Policy work that develops creative concepts and approaches, custom-tailored to basins, institutions, and situations. Our Respected Platform forged networks and partnerships that build capacity, disseminate new knowledge, and use water to develop sustainably and eradicate poverty. And we shaped pivotal outcomes through our Strategic Advocacy, influencing officials and other decision makers toward the most effective policies and pragmatic actions.

In 2011 demand for our services kept growing in direct proportion to our scaled up experience, tools, competence, know-how, models and capacity. SIWI has been asked – and we are prepared – to play a larger role on the global stage, where we shall address water challenges where and as they arise. In order to respond to escalating demands, SIWI has begun discussions with partners who are ready to support growth opportunities with additional resources and financing.

We remain focused on our original four defining thematic programme areas. Governance improves water security by steering parties away from unwise investments, weak institutions and corruption that undermines all efforts and development. Transboundary Water Management takes an inclusive approach to shared rivers, emphasising socio-economic needs, geo-political pressures, ecological contexts, economic incentives and power imbalances between rival riparians. In the Water-Food-Energy Nexus, SIWI continued to demonstrate how the fastest, fairest, cleanest and cheapest route to resource security of comes through efficient use and reduced demands. There are huge untapped synergies throughout this nexus. In terms of *Water and Climate Adaptation*, SIWI stresses how water is the medium through which climate change will manifest itself; SIWI has forcefully stressed the importance of integrating water knowledge in climate adaptation and mitigation processes, within the framework Climate Convention.

While SIWI advances these thematic priorities, our efforts rarely gain traction in isolation. More often, two or more elements of our work come together at once, in collaboration with others. Indeed, as the following boxes indicate, it is quite often the case that all four priorities converge to improve a broader long-term security and resilience for all stakeholders in a shared river basin. SIWI is now at a stage where we believe we have experience in the form of tools and models for improving water resources management. We know what works where. We know why it works and how. Bridging the gaps from West Africa to Mongolia and from the Baltic to the Aral Sea, governments and stakeholders ask for our recommendations as they develop capacity and generate and manage knowledge about water in their domain.



Institutional Architecture on the Nile

If domestic water governance is neglected, its failures can spread across international borders. For example, Egypt's internal revolution changed the balance of power among the nine Nile River basin states. Later, we witnessed the birth of a brand new tenth basin state, South Sudan, which could have complicated the situation. SIWI completed a high-profile, 18-month effort to develop institutional options for a future Nile River Basin Commission. The study sought to distil international good practice and develop options directly applicable to the Nile situation. Our successful models and options for transboundary water management showed how to improve decisions on political security between countries in a region beset by the risks of volatile and shrinking supplies of water due in part to climate change. They also incorporated economic development and benefit sharing measures that, improving the efficiency and equitable allocation of water, food and energy, and could help reduce poverty within the borders of each of those nations.

SIWI Offers Guidelines on 'Blue Energy'

The Organisation for Economic Cooperation and Development (OECD) faces a guandary. On the one hand, its affluent member states want to close the inequitable gap that leaves billions in non-OECD developing countries lacking even basic amounts of daily nutrition, electricity or clean water. On the other hand, if these 'bottom billions' actually did achieve first world parity and match our consumption levels of meats and fossil fuels without us reducing and changing our consumption, humankind would guickly strain the supply of natural resources, especially water, while accelerating irreversible climate change. After several years working in the field of water-food-energy nexus, SIWI stepped in with an alternative approach. Our reports and presentations – from Bonn, Germany to the Middle East - put a premium on water governance to bring demandside efficiencies across the three resources. We urge cross-sectoral accounting, so that emissionsfree 'clean' energy is also 'water neutral'. When appropriate we promote the role of hydroelectric power generation as a 'system enabler' to support the deployment of renewable or 'blue energy' technologies, including wind and solar power, which are intermittent. SIWI then seeks to achieve economies of scale through coordination among basin states engaged in secure water supplies transboundary water management.

Building Global Networks

Last year during World Water Week in Stockholm (WWW) we welcomed a record 2,677 men and women, each overflowing with questions. Hard questions. Whose river is it? What happens when seven out of ten people live in cities, far from the source of their water? How will climate change impact hydropower? Will demand for energy deplete groundwater, or vice versa? Can water abundance encourage investment? Will growth undermine water security? Who pays how much for a human right to water?

Few departed with conclusive answers. All went home with something better: new allies and partners who could help them wrestle with the challenges of water. They took away new perspectives. New insights. New tools, models and approaches to solve thorny problems.

In the words of dozens of participants, World Water Week remained in 2011 "the year's best networking event in the world of water." Two thirds come to WWW to network and form partnerships. Said one, "It was an excellent opportunity for exchange of ideas and a solid platform to learn simple, innovative, and adoptable strategies that can be up-scaled with required modifications to the best utility of communities." Why? In a word: diversity. SIWI brings together young and old actors from 130 countries.

Our WWW theme, "Water in an Urbanising World", brought together a large new community of urban specialists; city ministries, mayors and city leaders, urban disaster risk reduction specialists, city planners, architects, utilities, urban economists and investors, to meet with water and development specialists, such as hydrologists, sanitation specialists, meteorologists, environmentalists, hydroeconomists. In the process of forging these new networks, parties debated on how much, and how intricately, the political realities of urban governance boil down to harmonising a city's 'life support' relationship with water. SIWI also built lasting networks by breaking down walls between sector silos. Diverse interests unbundled the water-food-energy nexus to adopt the Stockholm Statement directed towards Rio+20. During 2011 the Swedish Water House established three new cluster groups of stakeholders to share expertise, publish joint reports, and establish common positions in disaster risk reduction, water-energy linkages, and transboundary water management. All three cluster groups gather authorities from dozens of environmental organisations, energy companies, relief agencies, authorities and researchers; they were set up to integrate water related dynamics into policies and to collaborate on effective resource use and energy demands in a rapidly changing climate. More broadly, SIWI helped establish the priorities and reach of the Alliance for Global Water Adaptation. This international network of institutions that helps local institutions respond to climate change impacts and to integrate water resources management in climate adaptation strategies and implementation.

Our networking opportunities can now continue 24/7 over the course of a lifetime. To strengthen relationships throughout the other 358 days, SIWI last year formally launched its Alumni Network online platform (**alumni.siwi.org**). The network swelled exponentially to 1,000 active, registered users who then launched monthly discussions on a spectrum of water issues, hosted virtual online gatherings, and organised regional reunions in Dar es Salaam and Istanbul.

In China SIWI began to unlock and access the essential wisdom from five years of studies, reports, presentations and experiences of EU-China River Basin Management Program. Our strategy implements innovative communication mechanisms, including using social-media, Internet dissemination of short video clips, and sheets which distil the key experiences of experts who have worked on the project.

Stockholm Statement to Rio+20: Build to Last on a Water Foundation

In 1992, fresh water was largely a peripheral issue, and ranked relatively low on the global agenda at a United Nations conference on sustainable development. What a difference two decades makes. This June, due in part to the emergence of SIWI and its partners, water will be highlighted as "the bloodstream of the green economy." Parties will show that in order to alleviate poverty and build a climate-resilient economy, we must first learn to value and secure the nexus of three critical and interdependent resources: energy, food, and above all, water. This won't be easy. Booming populations, expanding cities and accelerating economic growth drive up demand for energy and food, and push finite water supplies towards the breaking point. In 18 years, by 2030, humanity's demand for water may outstrip supply by 40 percent. To avoid systemic collapse, Stockholm parties issued a call to action that went beyond the Millennium Development Goals to build sustainable development on a firm human rights and policy foundation of water. Stockholm committed local, municipal, and national governments to achieve 20 percent improvements in: water pollution; safe drinking water; water for sanitation and hygiene; water efficiency in energy generation; water loss reduction in the field-to-fork food supply chain; water reuse and recycling. These outcomes will improve human well-being and deliver a new model of human and economic development for a healthy and resilient world.

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Collaboration with the World Economic Forum

The influential leaders who gather each year in the Swiss Alpine resort town of Davos used to put water on their agenda, but it was primarily seen as part of an agenda for poverty reduction in developing countries. In the last few years, however, the heads of multinational corporations have moved water up the agenda as a matter of national security, corporate sustainability; and the key ingredient in the waterfood-energy-climate nexus. Some leaders say water is the only limit to growth, as global demand may outstrip supply by 2030. SIWI has begun collaboration with the World Economic Forum's 2030 Water Resources Group to explore good practice in the areas of water use efficiency and productivity across industries. In the pilot phase, we are helping three partner governments – Jordan, Karnataka and South Africa - to identify priorities for potential water sector reforms. We draw our advice from a portfolio of good practice projects, advisors, suppliers, partnerships, and technical and policy solutions.

Providing Advice and Support

The Stockholm International Water Institute (SIWI) measures success by the level of confidence that others extend to us. Trust is our most valuable asset, and it is growing at home, abroad, and across sectors. In 2011 an increasing number of countries and organisations turned to SIWI for advice.

SIWI last year began providing advice and support services on infrastructure to Swedish Embassies and the Swedish International Development Co-operation Agency (Sida) on matters related to water and development, sanitation, governance, or water in climate adaptation. Last year the private sector – especially investors – approached SIWI for advice as they began to fathom the scale of the risks and opportunities related to water in their industries and supply chains. The intense interaction between business, scientists, government and civil society at the World Water Week in Stockholm is developing the competences of all involved by understanding each other's problems and discussing common solutions.

Post civil war Liberia sought support in *Water Governance* from SIWI and our partners to help the country address inadequate water and sanitation. The country's new leaders developed two sound legislative policies – for water supply sanitation and integrated water resources management. But these were merely words on paper unless we could help leaders decentralise the sector and devolve authority in ways that improve service and increase access to clean, functional facilities. Starting in February, SIWI helped Liberia secure donor funding, establish its Water Supply and Sanitation Commission as a working reality, operating under a two-year compact, accountable through the transparency of periodic reviews by government and its partners

Liberia is hardly the only African country trying to improve how it governs water. SIWI took on responsibilities as secretariat of the EU Water Initiative's Africa Working Group, in which donors and African leaders set out to improve the governance of funds allocated for water security in Sub-Saharan Africa. We orchestrated monthly teleconferences and several regional meetings, seeking to build consensus around the pillars of aid effectiveness: ownership, alignment, harmonisation, managing for results and above all, mutual accountability. Donors and African partners strive towards commitments beyond the transfer of funds alone; indeed, establishing inter-institutional trust was as vital as money.

In *Transboundary Water Management*, SIWI consolidated a partnership with Iran, Iraq, Syria and Turkey. By combining remote sensing, UN financial data and local research capacity, we developed a hydro-economic model that would analyse and assess how parties could improve efficiency of irrigation, hydropower, and restorative ecological flows. Rather than compete – and risk zero-sum losses through conflict, dust storms or saline degradation – with each over a shrinking water pie, SIWI can use simulations to show riparians how they could coordinate winwin efforts in ways that could expand valuable systemwide benefits for all. Our study will help explore joint investment, cooperative options, and institution building among the four nations. One result of the model is how it has begun to focus discussions amongst governments and experts on future collaborative options.

As a prominent symbol of the global Water-Energy-Food Nexus, multipurpose dams may convert currents into power and store reservoirs to irrigate food. Do these goals subvert each other, or can they work in concert? As part of its effort to develop safe, low-impact and renewable power, the International Energy Agency has asked SIWI to provide analytical input in the global development of hydroelectric plants. The roadmap will identify major barriers to, challenges of, and opportunities for a new focus on the role of hydropower in developing multiple services and respecting lessons learned from the construction of reservoirs. SIWI has been at the forefront of developing risk analysis and economic tools that help nations plan for and adapt to hydro-climatic variability. In Burkina Faso, for example, SIWI is investigating ways to reduce the vulnerability of small dams to climate change, and optimise their contribution to food security. Our goal is to increase water storage capacity, strengthen the resilience of dams, and improve livelihoods and health of communities surrounding reservoirs. Likewise, we supported a project in China and India on strategies to manage scarce water resources for local farms, firms and families in a changing climate.

SIWI has been at the forefront of developing risk analysis and economic tools

Baltic Basin-Wide Benefits: Water Governance Can Pay Dividends

Neither ocean nor freshwater, the Baltic Sea is among the largest brackish bodies of water on earth. It is also among the most vulnerable to ongoing degradation, inflows from more than 200 rivers in the basin. SIWI documented the history and evolutionary challenge of collective action. Then, SIWI followed up a cross-cutting strategy to help fourteen countries coordinate flows in the basin they share, to ensure it was effectively implemented, in particular the ecological health of the basin. We urged parties to achieve prosperity by ensuring safety, security and environmental sustainability. Our report called for an institutional assessment that would: clarify the roles, rights, and responsibilities of existing Baltic Sea governance bodies; harmonise overlapping institutions; and streamline the regulatory framework. At a smaller scale, we convened high-level stakeholders with the Kaliningrad Oblast - a small Russian enclave and its Poland and Lithuania neighbours - to improve TWM through a defined set of economic principles. Our report called for significant investments in water to generate higher yields in tourism, health, and manufacturing economies. On this successful foundation, SIWI began to advise others at the Annual Baltic Development Forum and the 14th World Lakes Conference in USA.





The Tragedy, and Opportunity, at the Heart of Central Asia

While the Baltic Sea is surrounded by stable and affluent countries, Aral Sea nations can be politically and economically vulnerable. The irony is that the tributaries that feed the Aral come from clean, abundant sources, but they are devalued, diverted, depleted and destroyed en route due to poor water governance and a legacy of distrust. Past efforts to encourage regional cooperation over water have failed; the most recent attempts stoked acrimony among participants on water-use issues, in particular the conflict between upstream hydropower and downstream irrigation. Climate change may exacerbate the situation. SIWI brought its experience in the water-food-energy nexus to bear on a thorny challenge. We drafted a report that showed how, through careful collaboration on efficiencies and markets, all parties could couple new power generation with an increase in food security. Such measures could boost economic growth while replenishing the health of what remains of the Aral Sea ecosystem. One surprising argument in our report focuses on a benefit sharing scheme that was in place while Central Asian countries were under the authority of the Soviet regime; the legacy of this historic economic framework could provide a foundation for future collaboration and investments.

SIWI Addresses EU Parliament on Food and Water Wastage

Most analysts who highlight the precarious global food security situation rightly point out the huge volumes of water that food production requires. The past 15 years have seen an increase in the human population, in the numbers of undernourished families, and in purchasing power by more affluent demographics. All these forces combine to make food security a progressively tough challenge. Mainstream thinking focuses on the need to enhance production, but few have observed that a considerable fraction of the food produced is lost before it can ever reach the market, let alone consumers, who in turn simply throw away another sizeable fraction. Any strategy that ignores what is happening with the produce in the supply chain, 'from field to fork,' overlooks the potential to both improve food security and also ease pressure on water and other scare resources. If we reduce losses and waste of food, we moderate the need to expand production. SIWI's team, led by Professor Jan Lundqvist, emphasised this more sustainable option. Given the concern about the precarious water situation in large parts of the world, the EU Parliament organised seminars to highlight the misuse, and strategic importance, of this vital resource, and invited Lundqvist to analyse the magnitude and character of the problem, its causes and consequences, and advice on what approaches should be taken to deal with the challenges.

Generating Knowledge

To improve *Water Governance*, Stockholm International Water Institute (SIWI) worked with the OECD to design effective economic approaches that would tackle one of the most challenging impacts on healthy aquatic ecosystems: agricultural runoff. These sources of high nitrogen, phosphorous, and poison can be traced to no smokestack factories, nor cities. And that's the problem. Non-point sources are silent, invisible to the eye and even undetectable to the nose... until they accumulate and lead to tipping points. SIWI contributed to a publication that showed how stakeholders across a range of very different contexts could improve the management of this diffuse water pollution from farms.

SIWI pushed our state of the art thinking on *Transboundary* Water Management (TWM) to deeper levels, making different linkages, and into new basins. Historically, TWM has won support and earned recognition as an effective way to bring peace, stability and regional integration to an international basin. SIWI further advanced TWM's real potential. Our report, "Addressing Power Asymmetry: How Transboundary Water Management May Serve to Reduce Poverty," outlined the approaches and parameters for how TWM can address power asymmetry among stakeholders in a way that can help reduce poverty. Other scientific and popular articles highlighted the tight linkages - and emerging challenges - between transboundary water management and land acquisitions, climate change, energy production, national security, new stakeholders and bilateral vs. multilateral actors. We crystallised the three key steps for how parties can implement TWM: joint scoping of the value proposition; strategic groundwork for pre-investment; and analysis of barriers to the development opportunity.

TWM linked directly with SIWI's cutting edge work on the *Water and Energy Nexus*. SIWI's analysis emphasised how both resource assets are unevenly distributed in all regions of the world. That supply-side spatial inequity, or 'lumpy-ness,' calls for demandside strategies of efficient integration through power markets and cooperative benefit sharing within and between shared river basins. Elsewhere, SIWI detailed the constraints – and opportunities – for how nations can meet the escalating demand on water with-drawals for the production of both fossil fuels and renewable energy. By identifying the water-energy linkages in advance and bringing them up front as a socioeconomic priority, SIWI demonstrated, parties can more effectively reduce impacts and secure investment finance for major development programmes in river basins.

Last year most of humanity concentrated in cities, and most cities lived, quite literally, on the edge. We have long understood the significant trade advantages of urban ports. We appreciate both the enormous climatic risks of cities – rocketing demands, distance from sources, shrinking freshwater supplies and proximity to rising tides – as well as the vast opportunities of how urban areas can improve resource-efficient services. To advance *Water and Climate Adaptation*, SIWI worked with our partners in China to address the risks/opportunities in a report, "From Source to Sea." The resulting knowledge included a joint training programme, clearer understanding, and a firm foundation for smarter investments in integrated policy.

Last year most of humanity concentrated in cities, and most cities lived, quite literally, on the edge

The Nexus: Burning Water, Eating Energy, Drinking Food

We face a growing global economy, a rising population, and a warming planet over the next 13 years. This makes us assess the water-food-energy nexus through one of two lenses. Either we need to double current supplies to meet future demands, or we slash future demands in half to meet current supplies, without sacrificing quality of life. Most global research follows the first; SIWI embraces the second. Last year we presented evidence in back-to-back reports. One showed the constraints and opportunities for how to use water for energy; the other assessed the environment as a strategic tool to use power in transboundary river basins. Both undertake holistic studies on water and energy at the appropriate spatial scale, in order to meet development objectives. Our approach led global entities to seek our advice on hydropower, food security, and development aid policy. SIWI was invited to present our finding at the International Hydropower Association (IHA) Annual Congress in Brazil, the first Water and Energy Nexus conference in Jordan, and the first Energy and Water Forum in South Africa. SIWI not only improved understanding of demand for water in energy production; we also developed strategies to tackle these challenges through stronger integration of markets.

Understanding Water from the Bottom-Up and Outside-In

SIWI holds the conviction that no culture or civilisation has a monopoly on the 'right' way to govern water. Indeed, some of the most resilient societies have been practicing decentralised water management for millennia in small, local, and indigenous systems. Which work best? Where are they? How did they emerge? And what do they have in common? To address these questions, in March 2011, over four days in Manta, Ecuador, SIWI organised the first knowledge management workshop of the Democratic and Economic Governance (DEG), that drew on the micro-economic experiences of water management programmes around the world. From Albania, we understood how to ensure better water and sanitation services through a consumer rightsbased contract. From Panama, we saw the role of community participation in water and sanitation projects, which stressed the need to develop water in close dialogue with indigenous communities. Despite the differences, participants found key areas of common ground for potential knowledge exchanges, especially related to water culture, human rights, decentralisation, tariffs, and citizen participation. The second workshop will take place in Stockholm during the World Water Week in Stockholm. In preparation we are pursuing further study along the themes of gender, inter-culturality and local management of water systems.

SIWI Generated Knowledge is Sustainable

Seven years ago SIWI developed a report on making Water a Part of Economic Development: The economic benefits of improved water management and services. It was one of the first of its kind to highlight that: Improved water resources management and water supply and sanitation services boosts countries' economic growth and contributes greatly to poverty reduction. The report debunked the common belief that countries can only invest in water once it has grown economically. The report was presented to the Commission on Sustainable Development in 2005 and received high attention from decision-makers and development practitioners. The report continues to receive high attention and demand. Upon request a revised and updated version was translated into Spanish with particular case studies from Spain. In 2011 water stakeholders requested an adapted version targeting Latin America, including local case studies from the region. The updated and revised report was also requested as background report to the UNEP (2011): Towards a Green Economy. It will also appear in 2012 in Earthscan publication.



SIWI Concepts

A few concepts coined by Stockholm International Water Institute (SIWI) have withstood the test of time. Developed by Professor Malin Falkenmark, they have quietly 'gone viral' to alter the conversation in different contexts around the world. Over the years, these 'new' words evolve and infiltrate outward, providing decisionmakers with clear and universal terms for interpreting the dynamics of water. They quickly have become common currency, the lingua franca of robust decisions that add value to the precious freshwater resource: The Evolution of Blue vs. Green Water.

In the 1990s SIWI divided all fresh water into two colours: blue and green. Blue water (rivers, lakes, aquifers) could be seen as it was dammed or pumped through canals, pipes, showers and sprinklers. Green water, by contrast, was invisible soil moisture from infiltrated precipitation. The dichotomy broke new ground, and provided a sharper water lens to show how human activities impact the landscape. Looking back, our clearsightedness evolved in four stages. The First Stage brought appreciation of how green water dominated blue water when it came to growing food; the world map of water consumed in food production turned out to be about 70 percent from rain, and just 30 percent irrigation. Our approach made it possible to estimate the food production capacity of different countries and river basins and discover regional hot spots. The Second Stage went beyond defining aquatic ecosystems as blue water to focus on the integrated habitat of the entire basin. Our grasp of green water clarified the inextricable link between rivers and the terrestrial ecosystems that fed them. Green water that plants suck up and transpire from root zone through leaves will no longer seep into a stream. Hence deforestation or afforestation effectively partitioned rainwater the moment it hit the ground (even before: when it hit the leaves). The Third Stage emphasised connections and directions in the hydrological cycle. Blue water implied semihorizontal flows down rivers and across aquifers; green water flows moved vertically - falling downwards as rain, rising upwards as vapour. American colleagues seek to categorise entire river segments by the proportion of blue vs. green water inflows and outflows. Different values of the quotient would indicate dominant water phenomena: headwaters, through-flow areas, closed end lakes, oases, deserts etc. This means that points on a greenblue water flow diagram can represent the continuous change of character of a river landscape from upstream to downstream. *The Fourth Stage* widens the focus even further to reveal interdependencies at a planetary scale: the moisture feedback link between what evaporates in one region and the rain generated from this vapour that falls over a second area downwind. Through such connections, groundwater overexploitation for largescale irrigation might generate disturbances of the Asian monsoon. Some have identified a possible 'planetary freshwater boundary' defined by the maximum globally acceptable consumption of blue water use.

'Hydrosolidarity.' For centuries, water resource rivals routinely ignored each other's use of the same stream, a situation best characterised as 'hydro-egoism.' As rivers shrank, thirst grew, and water grew scarce, that precarious state of affairs could not endure. Ten years ago at World Water Week in Stockholm SIWI introduced a term describing the desirable opposite: 'hydrosolidarity.' Hydrosolidarity conveys the vital balance of powers through which rivals avoid conflicts over their diverse water use interests and instead develop an integral system for sharing streams and aquifers in a basin. The term initially emerged as a mechanism to inject social justice and human rights into water management decisions that were largely technocratic. It has since become a central concept of discussions at recent World Water Forums. Indeed, according to the prestigious Water International, 'hydrosolidarity' has come to influence the global approach to conducting environmental research and formulating water policy. Scholars and real-world practitioners embrace the hydrosolidarity paradigm to encourage coordinated management, conflict resolution, and greater stakeholder participation.

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Building Capacity

The most effective capacity building takes parties out of their comfort zone to interact with a new geography, idea, specialty, approach or resource pressure. At home or abroad, Stockholm International Water Institute (SIWI) breaks down the silos that confine most water sector veterans. Brief but deep immersions in other fields – energy, food security, urban development, disaster risk reduction – help water experts grasp challenges from different angles, and jointly develop interdisciplinary solutions.

Mongolia, like Sweden, must treat rising urban demand for fresh water supplies in a northern latitude and cold climate. Unlike in Sweden, half of Mongolia's population lacks access to clean water. To help bridge the gap, SIWI brought Mongolian officials on a tour here to study the potential for low-cost, smallscale, and decentralised supply and wastewater facilities. By sharing insights, we expanded the range of theoretical, policy and practical options in Mongolia's context.

At SIWI, the UNDP Water Governance Facility began implementing a three-year programme to build capacity on water integrity in Sub-Saharan Africa. In a atmosphere of trust and honesty, our training encourages water stakeholders to describe their own experiences with unethical practices, risky conditions, consider tools as options, debate potential solutions, and develop effective anti-corruption transparency plans led by these "water integrity ambassadors". The programme aims to make a tangible contribution to improved water management and access to water by strengthening accountability, inclusivity and transparency in decision-making.

End users seek the laudable and equitable goal of a human right to water. But few providers can realise this right without sacrificing revenues, water, or both. Commissioned by the Spanish financed Millennium Development Achievement Fund to document, analyse and disseminate innovative approaches of their programmes, SIWI explored the relationship between water users and service providers in this context, to help structure the vital relationship for greater fairness and efficiency. In Albania, the Water Regulatory Authority developed a 'model contract' in consultation with consumer rights organisations and associations of water system operators.

The detailed contract also serves as an educational tool for users and providers to learn about their rights as well as obligations towards one another. In the Philippines, the National Water Resources Board has embarked on a similar initiative. Its "Localised Customer Service Codes" enlists entire communities to help it develop service levels and commensurate tariffs.

In 2011 SIWI wrapped up the last set of a five-year, Sida-funded International Training Programmes, involving 1,000 mid-career professionals from 80 countries trained in the latest thinking and trends on how to manage transboundary waters and integrated water resources. The ITPs have established a community of practice within and between countries – that links water management professionals under a common set of interests, standards, language, and methodologies. Some created what might be called 'communal capacity' along entire rivers. For example, SIWI's one-week short-course on conflict resolution and negotiations skills brought together a spectrum of water managers from the Kagera River Basin - a tributary of the Nile River. We ran another one-week short-course on stakeholder participation methodologies in Wuhan, China for local water managers. SIWI collaborated with the University of Dundee to engage 45 professionals and graduate students in a course called "Water Law - Water Leaders."



SIWI Supports a Thirsty Nation to Boost Its Water Security

SIWI has just embarked on a new partnership with Botswana to build officials' capacity as that country restructures its national water sector. When it comes to water, Botswana sits at the epicentre of several contested river basins – Okavango, Zambezi, Orange, Limpopo – none of which it controls. The three major industries – diamonds, ecotourism and cattle –each require vast amounts of clean water resources. Much of the country depends on pumping groundwater from uncertain supplies. Given that predicament, Botswana was eager to build on the experience of some officials who thrived on SIWI's five-year International Training Programme. The current programme will build on key concepts – stakeholder participation, basin planning, benefits sharing – introduced earlier, which now form core platforms of the Botswana water sector restructuring.

Cross-Continental Coordination Improves Water Diplomacy in Africa

Mozambique, Swaziland and South Africa each compete with each other for intensive use of precious Incomati and Maputo rivers. The three countries have begun to engage in trilateral cooperation under PRIMA (Progressive Realisation of the IncoMaputo Agreement), and enlisted SIWI to develop a training programme that could translate the words of a compact into practice. The first step was literally to lift all parties out of their physical comfort 'zone, and land as a group at the opposite end of the African continent, where they embarked on a 5-day training and field visit to a joint dam in the Senegal River. They liked the experience so much they later asked SIWI to facilitate a Steering Committee meeting of high-level decision-makers from the three nations to discuss options and select the form and content of the River Basin Organisation best suited to the IncoMaputo.

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Recognising Achievements

From its birth the Stockholm International Water Institute (SIWI) decided to invest in people. SIWI chose to honour those singular leaders, institutions, and businesses whose superior work and lifetime record of achievement in the field of water towered above his or her peers. But SIWI also chose to recognise overlooked projects, or nascent youth still in school, for the extraordinary early promise they already showed. Each 'investment' yields multiple dividends, as benefits cascade across the world.

H.M. Carl XVI Gustaf of Sweden is the patron of our oldest and most prestigious award to those scientists, humanists, institutions and organisations who have truly made a difference worldwide. Last year he presented the *Stockholm Water Prize* to Stephen R. Carpenter, Professor of Zoology and Limnology at the University of Wisconsin-Madison, USA, for groundbreaking research that showed how human activities on surrounding land impact the matrix of lake ecosystems, and what to do about it. By combining theoretical models and large scale experiments he has reframed our understanding of freshwater environments. Professor Carpenter's research on trophic cascades- how one species can alter lake's entire food chain - help us understand how we affect lakes through nutrient loading, fishing, and introduction of exotic species. In the words of the Nominating Committee, "Professor Carpenter has shown outstanding leadership in setting the ecological research agenda, integrating it into a socio-ecological context, and in providing guidance for the management of aquatic resources."

H.R.H. Crown Princess Victoria of Sweden is the patron of an international student competition that winnows 9,000 submitted projects down to a handful of finalists from more than 30 countries.

The contest encourages young people to take an interest in water issues and perhaps pursue a career in the field. Last year she awarded this *Stockholm Junior Water Prize* to Ms. Alison Bick, an American teen who developed a low-cost portable method to test water quality – using a mobile phone. Alison's project combines micro-fluidic devices, mobile phones, and chemical indicators to evaluate water quality. The International Jury hailed her project for having "the potential to revolutionise our ability to monitor water quality" with a technology that not only accurately assesses the bacteria content of water, but is also faster, more flexible and up to 200 times less expensive than standard testing procedures

The Stockholm Industry Water Award highlights good practices within the water utilities and the private sector that may inspire others to follow. Last year the prize went to Nestlé, for its leadership and performance to improve water management in its internal operations and throughout its supply chain. Over the past decade, Nestlé has reduced its total water withdrawals by over 30 percent, more than doubled the water efficiency of their internal operations, and made significant reductions in the quantity of wastewater discharged into the environment. The Award also recognises Nestlé's work to improve the water management of its suppliers, which includes over 25 million people who are involved in its entire value chain.



Stockholm Water Prize



Stockholm Junior Water Prize



Stockholm Industry Water Award

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SIWI chose to honor those singular leaders, institutions, and businesses whose superior work and lifetime record of achievement in the field of water

Strategic Outreach: High Impact Communication

The Stockholm International Water Institute (SIWI) had an active media presence last year, due in part to the ways we leveraged information communications technology. Our real time media include broadcasts and online networks, video-messaging and live streaming. Swedish Water House started with webcasted seminars during 2011 and the World Water Week in Stockholm (WWW) "livestreamed" lectures to reach those who couldn't attend in person. During WWW Euronews aired the Mayors Panel in 10 languages; SIWI's experts commented on CNBC USA, CNBC Africa, Al Jazeera and France 24. The media coverage for SIWI and its programmes increased 13 percent over the previous year, with 6,000 articles published in print and online.

To fuel online momentum, SIWI launched watermedia.org, which aggregated, concentrated and disseminated the global social media buzz during World Water Week. This inclusive new tool, combined with five new and existing sites – **www.siwi.org**, worldwaterweek.org, swedishwaterhouse.org, watergovernance. org and everydropmatters.com – helped spike media coverage, increase web traffic, and enhance our presence in search engines to reach, and influence, a higher share of our global target audience. SIWI's sites encouraged two-way interaction through blogging, RSS feeds and social media ranging from *Facebook, LinkedIn* and *Twitter* to *YouTube, LiveStream* and *Slideshare*. Taken together, our sites generated 2 million visitors from 200 countries.

And yet, when it comes to conveying critical ideas to a receptive audience, SIWI continues to embrace an extremely effective medium dating back to the Stone Age: speaking in person. WWW pulls the world in to Stockholm, but for the other 51 weeks of the year, SIWI's critical information flows out in the opposite direction. To that end, our most valuable "information communications technology" is human. We leverage our renowned team of experts to impact our four strategic themes:

SIWI's words influenced *water governance* from the global to local level. Our outreach at international processes brought water to the forefront at the UNFCCC in Bonn, informed UNEP's background

report for Rio +20, and helped coordinate the Status Report on the Application of Integrated Approaches to Water Resources Management), amongst many other reports. SIWI brought its expertise to bear in person through lectures, presentations, keynotes and projects at The Yangtze Forum in Nanjing, China; the International Hydropower Association World Congress in Brazil; the Baltic Development Forum in Gdask Poland; Good Governance Workshop in Kampala, Uganda; and the Oslo Governance Forum.

Partners asked us to share our experience in benefit generation and sharing in a *transboundary* context at the University of Geneva, conference Freshwater and International Law – The Multiple Challenges in Geneva, Switzerland; the Nile Basin Initiative Stakeholder Forum in Cairo, Egypt; the Baltic Development/EU Baltic Sea Region Forum in Gdansk, Poland; the Master of Advanced Studies in Sustainable Water Resources MAS ETH SWR, Swiss Federal Institute of Technical Zurich.

Other speakers conveyed our research on *water*, *energy and food nexus* at the first University of Amman- University of Cologne symposium in Jordan; The EU Hungary Presidency Conference on the Future of European Waters – International Development Cooperation and Sustainable Water Management, the EU Water Initiative (EUWI) work on revitalising the EUWI in support of EU's new development policy; the International Hydropower Association World Congress with a focus on Regional Cooperation for Hydropower Development; the preparation of the Bonn2011 Water, Energy, Food Security nexus conference scientific evidence paper and key note presentation at the conference

SIWI was called upon to give a keynote speech at the Nile Basin Development Forum in Kigali on *water and climate change adaptation* in the Nile Basin. The presentation informed the meeting and the Nile basin cooperation process about the latest approaches and issues in TWM and climate change adaptation informed both by on the groundwork of SIWI as well as new research.



Breaking the Water Story Behind the Headlines

The potential of a simple, face-to-face conversation shaking hands, sharing a meal, exchanging ideas - has long been the overriding draw of WWW, where our convening power, focused agenda and networking energy generates unpredictable but penetrating insights. Where else, for example, could you find water authorities, journalists, and communications specialists from dozens of different countries, sitting down with each other to look past the front page to see the underlying forces of scarcity or pollution that shape them. In the workshop, "Turning Water into News," SIWI went beyond the usual "droughts and floods" headlines to explore where, when, how, whether, and which events relate back to water. Workshop participants - journalists who developed innovative journalistic projects from Brazil, China, Zambia, and the US - overcame barriers to improving reporting on water, and drafted a list of story ideas.

SIWI Shows Water as Key to Adaptation – and Mitigation – in Climate

During 2011, SIWI's ongoing leadership of the Water and Climate Coalition influenced negotiations in several important ways. First, overcoming concern about an overcrowded agenda, we elevated the profile of water into a draft agenda item under the subsidiary bodies of the Climate Convention. June negotiations in Bonn ensured water should be given a specific attention under the Nairobi Work Programme and a request to the UNFCCC Secretariat to prepare a technical paper on water to be presented at COP 17 in Durban. Finally, COP 17 decided to request the secretariat to organise a technical workshop on water and climate change impacts and adaptation strategies and to report on the workshop to be made available by the session of the subsidiary bodies during COP 18 in Doha. Another breakthrough, people began to see water resources as a cross-cutting resource: key not only in adaptation but also in mitigation efforts - as the success of most mitigation interventions rests upon the availability and sustainability of water resources.

Finances and Administration

The Stockholm International Water Institute (SIWI) is a relatively small organisation that must be judicious about where we allocate funds and efficient in how we invest. Just as a skilled natural resource manager must do more with shrinking supplies of water, SIWI strives to maximise the impact of our budget, leveraging finances toward greater realisation of our mission through core activities.

We are in the process of reshaping our planning and reporting tools to adjust to the growth of the organisation as well as to comply with the administrative requirements of our partners and contributors. Another focal area has been the integration of our various information systems to enhance productivity within the organisation.

SIWI revenues in 2011 amounted to MSEK 76; a 15 percent increase over last year. Income from the City of Stockholm, Intergovernmental Agencies and the Swedish Government remain unchanged from 2010 while funding from bilateral donors and contributions from the private sector increased. A graphical break down of income categories and cost allocation per each department at SIWI follow below. The number of client projects is increasing rapidly and accounts for most of the staff increase during 2011.

The continuously increasing demand for SIWI's services makes an impact on revenues as well as costs, creating a pressure on financing and cash-flow. Yet once again the financial situation has continued to improve in three metrics: SIWI enjoys higher overall revenues; we take advantage of the involvement by additional clients; and we have a more diversified base of funding institutions.

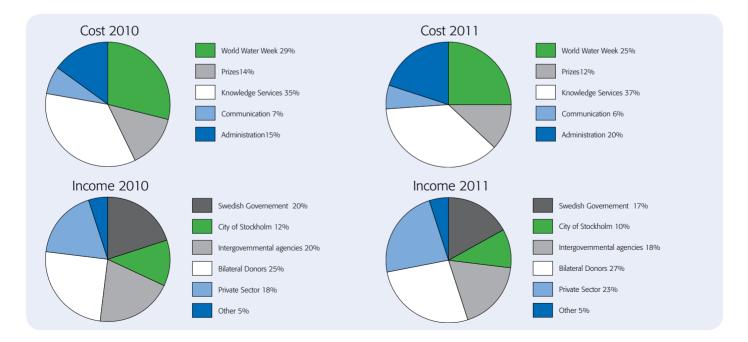




Photo: John Evans, SXC

Organisation

The Stockholm International Water Institute (SIWI) has been able to sustain its impressive growth pattern from previous years, and has done so again in 2011. The number of participants at the World Water Week in Stockholm was the highest ever, which is nice. But our real achievement was ensuring it didn't feel like too many. We keep the calm, relaxed, and open atmosphere that is so essential to reasoned debate and greater understanding.

Demand for SIWI's Knowledge Services has continued to grow. But demand has also gone beyond governments and non-profit partners and research institutions. We are now called on to provide insights on new dynamics of water by investors and other leaders in the private sector. This reflects how the world's water related challenges are becoming simultaneously more obvious, more complex, more interdependent and more serious in nature.

We are pleased to see that an increasing number of countries, organisations and individuals consider SIWI the first port of call when looking for solutions and relevant knowledge. But we are not so proud as to think we have little to learn from these partners. Rather, our trust is predicated on mutual understanding, thinking out of the water bucket, and grasping the inner missions and external pressures of other organisations before we can grasp how they depend on water, and can reduce their footprint.

In 2011 SIWI added nine positions, several through international recruitment, resulting in a further strengthened of the "world class" staff team at SIWI consisting of 50 persons which is an increase compared to 2011 of 23 percent. Staff members originate from 15 countries. SIWI has also increased the number of SIWI Associates to 10.

Board members:

Peter Forssman, Gullers Grupp – Chairman Berthold Gustavsson (m) – Vice Chairman Susanne Dahlberg, SAS Peter Dannered (m) Eva-Louise Erlandsson Slorach (s)* Fredrick Federley (c)* Anders Fredriksén, Xylem Catarina Johansson (mp)* Kim Klastrup, Grundfos Joakim Nilsson, Scandic Hotels Erik Sellberg, Ragn-Sells Kenneth Sandén, ERV Caroline Silverudd Lundbom (fp)* Jari Visshed (s)*

Deputy members:

Richard Bengtsson (fp)* Andreas Bohlin, Fujitsu Åse Bäckström, KPMG Stellan Hamrin (v)* Jessica Ottosson, Ålandsbanken Birgitta Persson (m)*

Co-opted member:

Jan Peter Bergkvist, Sleep Well – Founders Council

Legend

*(m) = Moderate Party	*(fp) = Liberal Party
*(kd) = Christian Democrats	*(s) = Social Democrats
*(mp) = Green Party	*(v) = Left Party

We keep the calm, relaxed, and open atmosphere that is so essential to reasoned debate and greater understanding

Sustainability: Where Blue and Green Converge

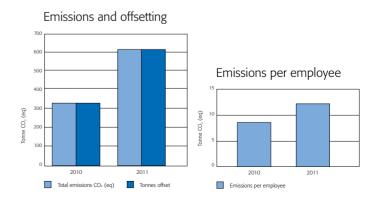
The Stockholm International Water Institute (SIWI) knows that environmental sustainability isn't a one time achievement. Nor is it a fixed position. It is a constantly evolving process in which we raise the bar on SIWI, our partners, and our associates, holding ourselves to a higher standard. Nowhere is such a relentless effort more evident than during World Water Week in Stockholm, where ISO certified conference organiser Congrex and venue Stockholmsmässan helped SIWI reduce the footprint of 2,677 participants from 130 countries. How? We made it as easy – and even as money-saving – as possible for people to go green.

We had a head start with our venue. To move toward climateneutrality, Stockholmsmässan minimises carbon emissions by streamlining the use of energy, reducing the need for energy, and tapping alternative and renewable energy sources. It reduces solid waste, reuses what it can, and burns or composts or recycles what remains. To ensure safe water, the venue strives to keep sealants, adhesives and other toxic chemicals away; collects and reuses water it can recapture; and reduces consumption through efficient use.

The city also played a lead role. Ecologically approved lodging and restaurants stood within walking distance – or were easily connected by rapid public transport – and maintained strict environmental practices approved by the Nordic eco-label, Svanen.

How did we improve on last year's already high standards? In 2011 all participants were provided with environmentally friendly and biodegradable bottles and jugs with which to tap water. Even the conference bag, pen and note-book were both biodegradable and produced in low-impact processes. Plenary speakers were rewarded with the gift of recycled float glass, designed by a local, ecologically minded artist. To reduce packaging and save time, we provided lunches as part of the registration fee, served buffet style with drinks in reusable mugs and glassware. Likewise, to slash exhaust fumes we included public transportation cards that allowed unlimited use on bus, train and subway networks; if you had to take a cab, we called on of Stockholm's environmentally friendly cab companies. In fairness, almost any organisation can be clean and green for a week. Yet SIWI strives to apply strict ethical and ecological criteria throughout the year. Under our new sustainability policy, we are constantly challenging ourselves, taking time to be deliberative in our decisions. Orders and training course materials must highlight a product's 'virtual' water footprint. We ask whether our IT services, catering, office supplies or travel agents have been environmentally and socially certified. For that matter, we ensure our flight is carbon offset and we explore whether a desired outcome could be achieved through a conference call or interactive Skype meeting. The demand for SIWI to help addressing water challenges around the world increased rapidly in 2011. We travelled to meet new clients and engage in new projects in Southern Africa, East Asia and South America and as a result our CO₂ emissions have also increased compared to previous years.

As a globally networked hub of water policies, products and services, we advise other institutions on how they can be more sustainable and water wise in the world; but we never seek to ask of others what we are not prepared to implement first, by ourselves, right here in Stockholm.



SIWI strives to apply strict ethical and ecological criteria throughout the year



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