



### Tool 1: Economic instruments and policies in water management

Case and region	Issue	Type of tool	Description	Economic impacts	Benefits for the environment	Social /poverty alleviation impacts	Governance issues	Scaling up and relevance for developing/ transition countries	Constraints
<p><b>(1)</b> Subsidies for water infrastructure as an engine of growth in South Africa</p> <p><b>Africa</b></p>	Industry	Economic instruments and policies in water management	<p>The country has limited water resources, extremely unevenly distributed and much far from the location of economic activities and populations</p> <p>Infrastructure development has enabled the storage and transportation of this water to support social and economic development</p> <p>The use of subsidies for infrastructure as a tool must be assessed to ensure benefits are greater than costs</p>	Water infrastructure has supported the gold and diamond mining industries which have been the main driving force of South Africa's economic growth					Of particular concern are environmental costs and impacts on indigenous communities dependent on present river flows and hydrographic conditions
<p><b>(2)</b> Trading and step by step legal reform on water use rights in the Murray-Darling Basin</p> <p><b>Australia</b></p> <p>Source:  <a href="http://www2.mdbc.gov.au/nrm/water_issues/water_trade.html">http://www2.mdbc.gov.au/nrm/water_issues/water_trade.html</a></p>	Watershed/agriculture/cities	Economic instruments and policies in water management	<p>Water trading has increased with increasing water scarcity problems</p> <p>Two elements of success: decoupling water rights from land rights and making water rights proportional shares of available resources rather than fixed volumes</p>	Water trade has enabled irrigators to respond flexibly to drought and other external factors, reducing the economic impact of low water allocations on business	Through the "Restoring the Balance" program, the Federal Government has allocated \$3.1b for purchasing water entitlements and \$5.8b for recovering water through infrastructure investments, to restore water to the environment	Water trade has enabled governments and utilities to purchase water to ensure water security for urban citizens, including during critical drought periods	A new Water Act in 2007 established an independent Murray-Darling Basin Authority with the functions and powers to manage the entire basin's water resources	Relevance for managing water in a context of climate change and variability, managing water scarcity	High administrative requirements
<p><b>(3)</b> Water pricing and command and control for water demand management in cities and agriculture in</p>	Cities / Agriculture	Economic instruments and policies in water management	<p>Metering everywhere and everyone pays</p> <p>Mixed model of pricing/penalties and command and control</p>						Decisions on pricing are sometimes subject to other social and political goals



Israel <b>MENA</b>									
<b>(4) Dutch agriculture and environmental sustainability</b> <b>Europe</b>	Agriculture	Economic instruments and policies in water management	Combination of public policies and market incentives to encourage environmentally sound agriculture Long history of addressing environmental impacts of agricultural intensification (e.g. pollution, ammonia emissions, pesticide use, biodiversity issues) through policies and system-wide changes Preventative rather than 'end of pipe' approach to sustainable production Market initiatives respond to consumer preferences to environmentally friendly products, e.g. the Horticulture Environmental Programme requires producers record their use of crop protection products, fertilizers and energy; retailers demand use of environmentally-friendly methods in primary production	The Ministry of Agriculture focuses the sector on increasing profits by marketing new products and solving problems (e.g. environment, animal welfare) better and earlier than competitors	Successful implementation of policies to restrict pesticide use and encourage more environmentally sustainable chemicals, e.g. the Multi Year Crop Protection Plan (1991-2000) significantly pesticide use		A leading Government and advanced environmental regulations (often ahead of EU policies)	Favorable soil conditions and geographical proximity to several EU countries has given the Netherlands considerable comparative advantages in the EU system of free internal trade	
<b>(5) Netherlands tax on nutrients</b> <b>Europe</b>  <i>Source: AstanaECE</i>  <a href="http://www.economicinstruments.com/index.php/land/article/140-">http://www.economicinstruments.com/index.php/land/article/140-</a>  <a href="http://edepot.wur.nl/121333">http://edepot.wur.nl/121333</a>  <a href="http://www.economicinstruments.com/index.php/la">http://www.economicinstruments.com/index.php/la</a>	Agriculture	Economic instruments and policies in water management	The centrepiece of the current Dutch nutrient pollution policy is a farm-level nutrient accounting system enforced by a tax on annual net balance of nutrients in excess of a levy-free minimum. This is accompanied by a cap on manure application per hectare coupled with a system of manure trading started in 2002. The principle behind the Dutch Mineral Accounting System (MINAS) is that farmers record the amount of nitrogen and phosphorus that comes onto the farm, e.g. through feed, livestock, fodder, manure and chemical fertilizer, and the amount that leaves it in such forms as livestock, forage, manure, grain, milk and eggs.  The MINAS programme sets a loss standard that represents uncontrollable nutrient loss.  The farmer is charged a levy on nitrogen and phosphorus surplus in excess of this loss standard. The		Decrease in nitrogen and phosphorus	The taxes are viewed as substantial enough to motivate behavioural changes.	Nutrient management policy partly driven by external forces, including standards set by the EU. MINAS was introduced to ensure compliance with the EU Nitrate Directive.  In 2003 the Court ruled that the Dutch government had "failed to fulfill its obligations under the Directive". It was concluded that the loss standards under Minas were a means of control which was applied too late in the N cycle.  The Nitrate Directive aimed to limit and prevent the pollution of water by N and was	Disadvantage of the obligatory minerals accounting system is that it is rather complicated and that it causes a heavy administrative burden - manure that is disposed of must be sampled and weighed. Furthermore when the minerals accounting system was introduced it emerged that checks on accounting had not been properly structured.	



<p><a href="http://www.economicinstruments.com/index.php/land/article/140-">http://www.economicinstruments.com/index.php/land/article/140-</a></p> <p><a href="http://files.foes.de/download/tagungvilm2005/netherlandsstudy.pdf">http://files.foes.de/download/tagungvilm2005/netherlandsstudy.pdf</a></p> <p><a href="http://www.journals-tes.dk/vol_7_no_2/No_5_Stuart_Wright.pdf">http://www.journals-tes.dk/vol_7_no_2/No_5_Stuart_Wright.pdf</a></p>			<p>farmer must account for the nitrogen and phosphorus content of the inputs and outputs. The MINAS phosphorus tax currently is set at €9 per kilogram of excess phosphate. Excess nitrogen is taxed at a rate of €2.3 per kilogram.</p>				<p>therefore focused on prevention i.e. combating pollution at source. The Court decided that this obligation could only be satisfied by using an application standard system. The Netherlands was fined €250 million and ordered to replace Minas in 2006 with a system based on application standards for manure and total N fertilisation on farms in line with the Nitrate Directive.</p>		
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<div style="display: flex; justify-content: space-between; align-items: center;"> <span><b>Tool 2: Green Jobs</b></span>  </div>									
Case and region	Issue	Type of tool	Description	Economic impacts	Benefits for the environment	Social /poverty alleviation impacts	Governance issues	Scaling up and relevance for developing/ transition countries	Constraints



<p><b>(1)</b> Maynilad Water District, Philippines</p> <p><b>South-east Asia</b></p> <p><i>Sources:</i></p> <p>Zaragoza Conference case study paper by Roel Espiritu</p> <p><a href="http://www.mayniladwater.com.ph">www.mayniladwater.com.ph</a></p>	-	Green jobs	<p>Employee associations engage in a social dialogue with the management of water utilities to resolve conflict, without seeking mediation from government. The management, unions and workers together have successfully combated the high rate of non-revenue water (NRW).</p>	<p>In general, this has resulted in a good relationship between workers and management, and increased productivity.</p> <p>Due to the effective reduction of NRW and determination to grow the business, financing institutions have shown confidence in Maynilad's ability to repay its obligations. The company has secured a Php7B loan to partly fund its capital expenditure programs for 2011 and 2012 and a US\$137.5 million loan from the World Bank which will be used to fund its wastewater treatment projects</p>	<p>One of the results of the project was that the level of NRW has been reduced from 66% in 2007 to 47.8% in 2011. In 2007, Manila had to produce 4,500 litres per day for each individual service connection. Now it only has to produce 2,500 litres per day. This represents a reduction of 44% in Maynilad's water demand. Additionally, every 1% reduction in NRW is equivalent to more than 20 million litres of water saved. Hence a reduction of 28% in NRW (from 66% in 2007 to 48% in 2011) is equivalent to 560Million litres of treated water saved and redistributed.</p>	<p>In general, this has resulted in a good relationship between workers and management, and increased productivity.</p>	<p>Since the privatization of the company, the new management successfully focused on the reduction of NRW.</p>	<p>The company intends to offer NRW expertise to other water utilities both in the Philippines and overseas.</p>	<p>In a few cases, conflicts have remained unsettled and/or have had to be resolved through judicial means and/or taken several years to resolve</p>
<p><b>(2)</b> Employment-Intensive Investment Programme (PIIE) in Panama</p> <p><b>LAC</b></p> <p><i>Sources:</i></p> <p>Zaragoza conference case study paper</p>	-	Green jobs	<p>The programme involves indigenous rural communities in water management, empowered to be partners rather than beneficiaries. Community participation in design and construction. The community required to pay for water services, to ensure sustainability and maintenance of the system. Reactivated Management Boards for Rural Water Sanitation and hygiene education Specialists in indigenous capacity building have built a network of facilitators to promote entrepreneurship. A social dialogue with the communities was set up through programmes, regional and local indigenous conferences and the</p>	<p>Promotion of entrepreneurship generates employment and support local development. The programme fosters an inclusive development in the communities.</p>	<p>Workshops were set up and information toolkits were published to encourage sustainable use of water and sanitation services.</p> <p>In the programme areas, quick scans were conducted together with the community to assess the current state of the water resources and solid waste situation in these</p>	<p>The programme aims to improve the health of the community by expanding the number of people that have access to water and sanitation services, for example by constructing and renovating sanitation infrastructure.</p>	<p>The establishment of local and national coordination bodies has been a crucial element for the sustainability of the programme.</p> <p>Cooperation frameworks such as memorandums of understanding were created to empower the local traditional actors and to make them</p>	<p>The combined use of local participation in planning with the utilization of locally available skills, technology, materials, and appropriate work methods has proven to be an effective and economically viable approach to infrastructure works in developing countries.</p>	



<a href="http://www.ilo.org/public/spanish/employment/recognition/eiip/index.htm">http://www.ilo.org/public/spanish/employment/recognition/eiip/index.htm</a>			undertaking of reports that assessed the progress of the programme.		areas.		partners in the programme, rather than beneficiaries.		
<p><b>(3) Working for Water program (WfW) in South Africa</b></p> <p><b>Africa</b></p> <p>Source: <a href="http://www.dwaf.gov.za/wfw/default.aspx">www.dwaf.gov.za/wfw/default.aspx</a></p>	Industry	Green jobs	<p>WfW is an invasive species management program that was launched in 1995 and is administered through the Department of Water Affairs and Forestry of the South African government. WfW employs members of local communities to clear thirsty alien tree and plant species and as a result, increase water supplies. WfW partners with local communities, government, conservation and environmental organizations, and private companies. The program provides jobs and training to people from among the most marginalized sectors of society.</p>	<p>Jobs and training provided to approximately 20,000 people from among the most marginalized sectors of society per annum, 52% of which are women.</p> <p>Short-term contract jobs created through the clearing activities are undertaken, with the emphasis on endeavoring to recruit women (the target is 60%), youth (20%) and disabled (5%).</p>	<p>About 1 million hectares of invasive alien plants were cleared over the past seven years, which has yielded an estimated release of 48 –56 million cubic meters of additional water per annum.</p>	<p>Support for creation of secondary industries in poor rural communities in the vicinity of the projects, including charcoal making and furniture manufacturing.</p> <p>Creating an enabling environment for skills training, it is investing in the development of communities wherever it works. Implementing HIV and Aids projects and other socio-development initiatives are important objectives.</p>	<p>WfW has set up a partnership with the private sector through the South-Africa Nursery Association, to educate the industry about the amendments to the law regarding invasive alien species (IAPs) and to ensure that IAPs were no longer being sold. The partnership further ensured that the public was aware of the law.</p>	<p>WfW currently runs over 300 projects in all nine of South Africa's provinces.</p> <p>Awareness raising campaigns on the activities of WfW are mostly targeted at South-Africa, but are also linked to Australia and New-Zealand through the Global Invasive Species Programme.</p>	
<p><b>(4) The Peepoo Project in Kenya</b></p> <p><b>Africa</b></p> <p>Source: <a href="http://www.peepople.com">www.peepople.com</a></p>	Industry	Green jobs	<p>Peepople, a Swedish company founded in 2006, has developed a hygienic, single-use, odor-free, biodegradable toilet bag (the "Peepoo" bag), that can be knotted and buried. A layer of urea crystals breaks down the waste into fertilizer killing off disease-producing pathogens. The bag uses a minimum of material while providing maximum hygiene. The Peepople initiative also enables collection and reuse systems to arise, thus providing service systems and employment opportunities. The Peepoo is now being sold in the Silanga Village, in Kibera, by local micro entrepreneur women, contributing to their daily income. A successful collection system has also been established with different, staffed drop points, where Peepoo users can drop off their used peepoos every day. As the Peepoos turns into</p>	<p>There will be some 1000 employment opportunities for distribution and collection services, with a focus on empowering women.</p>	<p>Decreased risk of groundwater and drinking water contamination.</p> <p>Creation of fertilizer through bag disposal.</p>	<p>Improved sanitation and human health benefits.</p>			



			valuable fertilizer, each Peepoo user receives a refund for every used Peepoo handed in at the drop point.						
<p><b>(5)</b> Community Based Natural Resource Management Programme (CBNRM) in Namibia</p> <p><b>Africa</b></p> <p>Source:  <a href="http://www.nacso.org.na/index.php">http://www.nacso.org.na/index.php</a></p>	<p>Industry Agriculture</p>	<p>Green jobs, Investments in the protection and improvement of biodiversity</p>	<p>Namibia's establishment of conservancies – legally gazetted areas within the state's communal lands – is among the most successful efforts by developing nations to decentralize natural resource management and simultaneously combat poverty. It is one of the largest-scale demonstrations of CBNRM and the state-sanctioned empowerment of local communities. Conservancies are run by elected committees of local people, to whom the government devolves user rights over wildlife within the conservancy boundaries. This has provided the incentive to sustainably manage wildlife populations to attract tourists and big game hunters. Technical assistance in managing the conservancy is provided by government officials and local and international NGOs.</p>	<p>Over 95,000 Namibians have received benefits of some kind since 1998 including jobs, training, game meat, cash dividends, and social benefits such as school improvements or water supply maintenance funded by conservancy revenue.</p> <p>547 full-time and 3,250 part-time locals employed via tourist lodges, camps, guide services, and related businesses such as handicraft production.</p> <p>Women's livelihoods and status have improved within the conservancies. Women fill more than half of the full and part-time jobs generated by conservancy businesses.</p>	<p>Conservancies represent 14% of total land area as of 2007.</p> <p>Increased populations of elephant, zebra, oryx, springbok, and black rhino due to reduced poaching on conservancy lands.</p> <p>Managing land primarily for wildlife has reduced cattle overgrazing in many areas.</p>	<p>One of the pillars of the project is a rural development programme. This seeks to devolve rights and responsibilities over wildlife and tourism to rural communities, thereby creating opportunities for enterprise development and income generation.</p> <p>Another pillar of the project is an empowerment and capacity building programme. This encourages and assists communities and their local institutions to develop the skills and experience to sustainably develop and pro-actively pilot their own futures.</p>	<p>New legislation in 1996 allowed for the formation of communal conservancies and provided a structure for the CBNRM concept to develop. These conservancies would take responsibility for the natural resources, mainly wildlife, within their boundaries by monitoring numbers and preventing poaching, but it was essential that they should perceive wildlife as a valuable resource.</p>	<p>The conservancy movement has now over 50 registered conservancies in Namibia, and several in the process of registration.</p>	
<p><b>(6)</b> The remunicipalisation of Paris' water supply service</p> <p><b>Europe</b></p> <p>Source:  <a href="http://www.eaudeparis.fr/page/">www.eaudeparis.fr/page/</a></p>	<p>Cities</p>	<p>Green jobs</p>	<p>End of privatized water services in 2009, decision to prioritize the re-empowerment of the municipal bodies to give them a minimum control over water service provision. Since January 2010, Paris' water services provided by a single public operator – Eau de Paris          A citizen's control mechanism has been introduced, enabling users to evaluate water services and providing a space for stakeholder discussion and engagement</p>	<p>Money reinvested in water services, with initial benefits estimated at 35 million Euros per annum</p> <p>The reform will remain stable at a cost below that of national average</p>		<p>The Parisians have regained control of their water services and introduced designated environmental, economic, democratic and social objectives</p>	<p>Change from private to public ownership of the Parisian water services.</p>		



<p>(7) Participatory management in the water sector, Argentina</p> <p><b>Latin America</b></p>	<p>Cities</p>	<p>Green jobs</p>	<p>An innovative system of public management of water services in Buenos Aires has been developed since 2002, following the failure of private management initiated in 1990. Trade unions and government agreed to create a company with a double participation: 90% Buenos Aires State and 10% workers, managed by the trade unions under the responsibility of workers.</p>	<p>Double participation has served the sector well and has resulted in better productivity and provision.</p>		<p>In the last 9 years of management, the company has increased the coverage and quality of its provision.</p> <p>Successful example of how engaging workers, users and non-users as important actors of participatory management can have a positive impact on performance and service provision.</p>			
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<p><b>Tool 3: Cost recovery and financing of water and sanitation services</b></p> 									
Case and region	Issue	Type of tool	Description	Economic impacts	Benefits for the environment	Social /poverty alleviation impacts	Governance issues	Scaling up and relevance for developing/ transition countries	Constraints
<p>(1) Social contract formulas in rural areas: the India Naandi Foundation water treatment plants</p> <p><b>South Asia</b></p> <p>Source: <a href="http://www.naandi.org">www.naandi.org</a></p> <p><a href="http://www.naandi.org/strategy_papers/PDFs/OBApproaches2_1_IndiaWater.pdf">http://www.naandi.org/strategy_papers/PDFs/OBApproaches2_1_IndiaWater.pdf</a></p>	<p>-</p>	<p>Cost recovery and financing of water and sanitation services</p>	<p>Community Safe Water Schemes (CSWS) – based on an innovative public-private partnership model using cost-effective water purification technology and an Output-based Aid approach – provide safe drinking water to poor families in 25 rural villages, Andhra Pradesh.</p> <p>As project manager, Naandi secures pre-financing and contracts a private company (WaterHealth International) to build the UV filter water treatment plant and undertake O&amp;M for 8 years. The community provides land, a water source, a financial contribution (20% of capital cost) and a pre-agreed electricity tariff. Naandi develops education and awareness campaigns on water use and health, mobilizes the community to raise their financial contribution and collects water user fees.</p> <p>Naandi receive a performance-based</p>	<p>The subsidy has made it easier for Naandi to borrow funds from commercial banks. Safe drinking water is provided at a price well below bottled water. The grassroots fee-for-service model coupled with a sense of community engagement and ownership will help ensure the long-term sustainability of the CSWSs. Expected long-term impacts include reduced expenses on alternate sources of water, reduced health costs and freeing up time for other economic activities.</p>		<p>The project (2007-2009) has benefitted 16,104 families, providing access to clean, affordable drinking water for 77,878 people.</p> <p>Naandi trains Safe Water Promoters and Village Health Workers to facilitate behavioral change and improve sanitation and hygiene practices.</p> <p>Average time spent collecting water has reduced by 40 minutes per trip. Incidence of waterborne diseases has dropped by 85% with Rs650-750 per year savings on medical expenses.</p>	<p>The CSWS model is built on collaborative partnerships between the states, villages, and technology partners. Naandi facilitate the projects, but strong support from the local village council – the <i>Panchayat</i> – is essential.</p>	<p>All partners in the project believe scaling up is possible, as the impacts in one project will motivate adjoining villages to engage in similar projects, accelerating demand and willingness to pay for clean water through user fees.</p> <p>WaterHealth International has entered into similar public-private partnerships in Ghana, the Philippines and India. Naandi is now introducing rural private operators into its schemes in central Vietnam with the aim of improving the financial and technical</p>	<p>It takes time to change mindsets and behaviors in a community, and to convince communities of the need to pay for the water purification service provided.</p> <p>It is sometimes a challenge to get local political support for the project.</p> <p>The estimation of unit costs is a lengthy and complex exercise. Hence, the ex ante preparatory process could be lengthier.</p>



			donor (GPOBA) subsidy upon delivery of pre-agreed outputs which include water services. These services are verified by the presentation of three months of billed water.					sustainability of its schemes.	
<p><b>(2) Output-Based Aid:</b> extending water and sanitation services to the poor in peri-urban Morocco</p> <p><b>Africa</b></p> <p>Source: <a href="http://www.gpoba.org/gpoba/sites/gpoba.org/files/GPOBA%20Morocco%20Urban%20-%20Final.pdf">http://www.gpoba.org/gpoba/sites/gpoba.org/files/GPOBA%20Morocco%20Urban%20-%20Final.pdf</a></p>	Cities	Cost recovery and financing of water and sanitation services	<p>Growing informal peri-urban settlements are a growing challenge in Morocco. They lack access to water and sanitation services and connection costs are unaffordable. Project funded by the Global Partnership on Output-Based Aid (GPOBA) to expand access to water and sanitation services in targeted poor peri-urban communities in Casablanca, Meknes and Tangiers. Operators pre-financed expansion of services and a pre-agreed Output-Based Aid (OBA) subsidy was disbursed once outputs were achieved – 60% upon a functioning household connection and 40% upon 6 months of service, independently verified. The subsidy allowed for reduced connection fees, bridging the gap between capacity to pay and actual cost of connection.</p>	Reduced time queuing at standpipes enables people to spend more time engaging in income-generating activities		<p>The pilot provided subsidized access to water supply to a total of 10,504 households and sanitation services to a total of 9,036 households, benefitting more than 52,500 people.</p> <p>The project has resulted in important direct benefits to households in terms of time savings, reduced health costs and improved hygiene practices.</p>	<p>The National Initiative for Human Development (INDH) was launched in 2005, with a focus on upgrading public utilities and social services in poor neighborhoods, particularly in urban and peri-urban areas. This recognized informal settlements (previously considered ineligible for services) and gave momentum for operators and local governments to expand access and find low cost solutions for the poorest. The project targeted INDH priority areas.</p>	<p>The World Bank is now working with the Government of Morocco to plan a scale-up program to bring water and sanitation services to other poor peri-urban settlements throughout the country, using the OBA method.</p> <p>The OBA approach is seen as strategically relevant to Morocco, given the lack of targeted subsidy mechanisms for poor households, especially in informal urban settings.</p>	<p>The pilots experienced a slow start due to implementation difficulties unrelated to the OBA approach: World Bank procurement procedures, upstream investment delays, and lack of clarity over land tenure. Connection rates accelerated significantly thereafter.</p>
<p><b>(3) Small scale urban sanitation financing in Vietnam</b></p> <p><b>South-east Asia</b></p> <p>Source: <a href="http://www.wsp.org/userfiles/file/financing_analysis.pdf">www.wsp.org/userfiles/file/financing_analysis.pdf</a></p>	Cities	Cost recovery and financing of water and sanitation services	<p>A Sanitation Revolving Fund (SRF) (financed by World Bank, Governments of Australia, Finland and Denmark) provided loans to low-income households for building or improving sanitation facilities in 3 cities (both on-site and with sewer connections). Facilities included mostly septic tanks, but also urine diverting / composting latrine and sewer connections, with average hardware costs US\$197 per household. There was also software support (US\$21 per household) for sanitation promotion, hygiene promotion and creation of Savings and Loan groups. The Savings and Credit groups were seen as critical to ensure repayment of the loans and regular saving contributions. The program facilitated access to credit via Sanitation Revolving Funds. Small loans (US\$145) were granted for hardware construction, over 2 years with subsidized interest rates equivalent to US\$6 per loan</p>	<p>The revolving fund proved highly sustainable, as the funds were revolved several times before being transferred back to municipalities to allocate further. The scheme was a very efficient use of public funds which covered 7% of total costs and are sustainable (have revolved many times). Lending procedures were attractive to borrowers, and the loans worked as a catalyst for the households to find additional financing and invest. The scheme has also generated revenues to provide loans for income-generating activities, contributing to reducing poverty in</p>		<p>Program resulted in a rapid extension of coverage and benefitted almost 200,000 people over seven years (2001-2008). It contributed to increasing coverage in target area by between 13% and 21%. All facilities built appear to be still operating 5 years later.</p> <p>People in targeted areas were predominantly poor.</p> <p>Awareness of the linkages between hygiene, sanitation, environment, and health was raised by many hygiene promotion campaigns. These were critical for generating demand for sanitation investment.</p>	<p>The revolving funds were initiated by local utilities, who placed them under management of local Women's Unions – well organized and pervasive organizations experienced in managing microfinance schemes. The Women's Unions received assistance from the local utilities in order to develop technical solutions and supervise the quality of constructed work.</p>	<p>Scaling-up to cover the remaining uncovered population is achievable and affordable compared to the government's budget for sanitation</p> <p>Scale-up has been achieved in country through World Bank and government-led projects.</p>	<p>Although loans helped spread the burden of investment costs over time, the solutions built still represented a high proportion of poor household's income (around 45% for the poorest) and were therefore not affordable to the poorest. In order to reach the very poor, it may be necessary to define alternative lending schemes, with a higher level of subsidized interest rate or perhaps a small hardware subsidy.</p>



			(and 50% lower than commercial bank rates). Loans covered 65% of average costs of septic tank, and households had to find other sources to cover the total investment cost.	the project area.					
<p><b>(4) Pro-poor financing and tariffs in Medellín, Colombia</b></p> <p><b>Latin America</b></p> <p>Source: Pers. comm. Rubén Darío Avendaño, Empresas Públicas de Medellín</p>	Cities	Cost recovery and financing of water and sanitation services	<p>Empresas Públicas de Medellín (EPM), a service provider owned by the Municipality of Medellín have designed a number of programs aimed to increase water services coverage, improve efficiencies, and target low-income households and peri-urban areas.</p> <p>Initiatives include a program offering long-term credit at low rates to low income populations for construction of water and sanitation networks and connections to public utilities; a program providing people with low payment capacity and bill debts access to low cost financing; a program offering credit at competitive rates for home improvements and efficient appliances; contracting small community organizations for work related to network expansion, operation and maintenance in water and sanitation services; and provision of public water services to peri-urban areas.</p>	<p>The programs have resulted in significant investment in water and sanitation services, and extensive financing which has prevented delinquent accounts and resulted in interest rate savings for consumers (compared to conventional financing). Community organization contracts have been awarded, generating jobs, increasing incomes for communities and stimulating local, regional and national economies.</p>	<p>EPM invest in campaigns and customer training programs to raise awareness of water use and water efficiency; credit facilities promote the adoption of more efficient appliances, contributing to significant energy, water and gas savings. The community organization contracts include environmental protection clauses complemented with auditor procedures to verify compliance.</p>	<p>During 1998-2010, the 10,163 drinking water and 13,917 sanitation domestic connections were made, benefitting 55,670 people and contributing to improved welfare of low-income groups. Programs have effectively targeted low income groups and provided credit with low interest rates and payment flexibility to people who otherwise would not be eligible for financing.</p>	<p>EPM, as the governing body of these initiatives, has taken a proactive lead in designing strategies to increase access to services and target low income households. They have the institutional capacity to manage the whole process from problem identification to program evaluation. Strategies are based on an extensive analysis of the beneficiaries' conditions and include permanent monitoring and evaluation procedures to ensure objectives are continually being met.</p>	<p>The NCFP and RFWC are suitable for replication in other developing countries due to their positive economic and social impacts.</p> <p>The results of the 'minimum for life' initiative are being analyzed by regional government to evaluate its replicability in the entire region of Antioquia.</p>	<p>Fraud is persistent in poor neighbourhoods, reducing the effectiveness of some of the measures.</p>
<p><b>(5) Community water management improvement project for traditional farmers in Mkushi, Kapiri Mposhi, Masaiti and Chingola districts, Zambia</b></p> <p><b>Africa</b></p> <p>Source: <a href="http://www.africanwaterfacility.org/fileadmin/uploads/awf/projects-activities/PA">http://www.africanwaterfacility.org/fileadmin/uploads/awf/projects-activities/PA</a></p>	Agriculture	Cost recovery and financing of water services	<p>The project aims to promote the use of improved on-farm water resources management methods and low-cost irrigation technologies for rural poor smallholder farmers. It addresses 3 critical constraints on using agriculture as a poverty reduction strategy - access to technology, know-how and finance. Project components include: enhancing institutional capacity; increasing knowledge on water management, horticultural practices and basic business skills; improving access to water and technologies; improving access to financial services.</p> <p>The credit access and investment facilitation component of the project involves capacity building and training of farmers and private sector pump entrepreneurs in micro credit management; supporting a micro-finance institution in issuing loans for smallholder micro-irrigation investments; and technical</p>	<p><i>Expected:</i></p> <p>1000 loans issued for smallholder micro-irrigation investments and 90% of loans paid back in time.</p> <p>Creation of enabling environment for smallholder self-supply investments, bridging the gap between smallholders and the financial services sector. This will increase agricultural productivity and growth.</p> <p>The project aims to enhance traditional farmers' ability to more towards a more efficient and commercially oriented</p>	<p><i>Expected:</i></p> <p>To ensure long-term sustainability of crop production and climate change resilience, the project activities include promotion of water resource awareness, good water management practices and sustainable farming methods.</p>	<p><i>Expected:</i></p> <p>Improving smallholder farmers' access to finance improves their access to affordable irrigation systems. This is expected to result in an increased number of farmers investing in self-supply solutions for improved production and income generation.</p>	<p>Critical to the success of the intervention is the involvement of a well-established, private sector micro-finance institution, and the close collaboration with the Ministry of Agriculture and Cooperatives.</p>	<p>The project will closely involve staff from the Ministry of Agriculture and Cooperatives so that lessons learnt can be used for scaling up.</p> <p>The micro-finance institution involved is looking to expanding their services into rural areas, so the project will enable them to develop, learn, and consolidate a loan scheme for traditional farmers which can then be scaled-out after the project ends.</p>	<p>Farmers are trained on pest-management and given technical assistance on horticulture to mitigate risks of crop failure.</p> <p>The risk that land tenure insecurity will undermine farmers' interest in investing will be mitigated by raising awareness on procedures and requirements for land tenure security. Risks of weak market demand and instable prices for horticultural produce will be mitigated by aligning investments with dry season production (when prices are higher), value-chain analysis to identify markets with most price-stability, and training in</p>



<p>R%20-%20DAPP%20Zambia%20%20post-IDWG%2020%20Oct%2009%20-%20final.pdf</p>			<p>assistance to farmers and micro-irrigation institution throughout the investment cycle.</p>	<p>mode of production, moving away from dependency on rain-fed agriculture geared towards own-consumption.</p>					<p>business management skills to enable farmers to strengthen links to traders and sellers.</p>
<p><b>(6) DISHARI: Decentralized Integrated Sanitation, Hygiene and Reform Initiative in Bangladesh</b>  <b>Asia</b>  <i>Source:</i> <a href="https://www.wsp.org/wsp/sites/wsp.org/files/publications/financing_analysis.pdf">https://www.wsp.org/wsp/sites/wsp.org/files/publications/financing_analysis.pdf</a></p>	-	<p>Cost recovery and financing of water and sanitation services</p>	<p>The approach adopted aimed to scale up the Community Led Total Sanitation approach and strengthen local governments to become main implementers. The project mobilizes households in rural areas (with strong demand for low-cost solutions) to build basic latrines, reducing dependency on external subsidies. The financial approach is based on software support for community mobilization, sanitation promotion and local government strengthening (US\$7 per household). Households are responsible for investing in latrine construction using low-cost materials and simple designs (average cost US\$17). Up-front in-kind hardware subsidies (US\$7) targeted the poorest only. Outcome-based financial rewards were provided to villages that achieved 100% sanitation coverage (no strings attached and do not need to be spent on sanitation).</p>	<p>Basic sanitation costs were reasonable when compared to household income (3-4%). Public investment (from project and government funds) led to a relatively high ratio of private investment from households.</p>		<p>The project resulted in a substantial and rapid increase in coverage, and contributed to an increase in coverage from 20% to 90% in 4.5 years (up to June 2008). 81% of the unions in the project area achieved 100% sanitation. High levels of maintenance and user satisfaction were attained. 1,631,000 people have benefitted in 5 districts with high incidence of poverty. 7% of households received a hardware subsidy and community involvement ensured highly effective targeting of the poorest.</p>	<p>The project was initiated by group of donors and NGOs, but aimed to strengthen local governments to become main implementers instead of NGOs. The project complements the government's national sanitation program.</p>	<p>Involving local governments aimed to strengthen the approach's scalability and sustainability, rather than relying on NGOs. The project deliberately targeted poor areas in order to demonstrate the effectiveness of its approach in the most difficult to serve areas and encourage scale-up. Scale-up achievable at a reasonable cost. Ending open defecation in 1,800 remaining unions is deemed achievable in 2 years.</p>	<p>High pressure on delivering fast results may negatively affect long-term sustainability. Weak monitoring and evaluation systems, based on self-reporting with tendency to over-report and no independent verification. Levels of service provide are very basic. An alternative financing approach may be needed to help thousands 'climb the sanitation ladder', potentially with microcredit to help them prefinance investment in higher levels of service.</p>
<p><b>(7) Total Sanitation Campaign in Maharashtra, India</b>  <b>South Asia</b>  <i>Source:</i> <a href="https://www.wsp.org/wsp/sites/wsp.org/files/publications/financing_analysis.pdf">https://www.wsp.org/wsp/sites/wsp.org/files/publications/financing_analysis.pdf</a></p>	-	<p>Cost recovery and financing of water and sanitation services</p>	<p>The approach adopted was based on the Community Led Total Sanitation model, combined with small hardware subsidies for poorest households and monetary rewards for villages that achieve overall cleanliness objectives. Software activities are used to generate demand for sanitary facilities, mobilize communities and promote hygiene behavioral change. Households fund about 90% of the total costs of adopting sanitation. Outcome-based financial rewards are given to villages reaching Open Defecation Free (ODF) status to be spent on sanitation investments. Hardware subsidies (US\$24) are given to poorest households after the village is declared ODF.</p>	<p>Households invested in a level of service based on what they could afford. Community mobilization was a major driver for household investment. In some districts, banks have started to respond to sanitation financing needs with locally developed credit products. The program made low demands on and represented efficient use of external public funds (accounting for only 9% of total costs).</p>	<p>Environmental benefits derived from the reduction in open defecation – the program focuses on the sanitary confinement and safe disposal of human excreta within the physical environmental of households and institutions present in the village (e.g. schools).</p>	<p>Rapid increases in coverage (with some cases of relapse) and has benefitted 21,200,000 people (over 4 years) in rural areas throughout the state – an 18% increase in coverage. Means-tested poverty targeting was effective, although some were excluded. Outcome-based subsidies have helped to meet the needs of the poor. Communications campaigns effectively improved hygiene practices.</p>	<p>The program was part of a nationwide 'Total Sanitation Campaign', launched in 2001.</p>	<p>The program has already been scaled-up throughout the state (though coverage still needs to improve) and budget is affordable at state level. At a national level, the Total Sanitation Campaign has scaled to 587 of 608 rural districts in the country, with sufficient funds available for completing the remaining rural districts.</p>	<p>The formal monitoring system for the village ODF awards is largely a one-off event, which means lasting improvements may not always be achieved.</p>



<p><b>(8)</b> Using market finance to extend water supply services in peri-urban and rural Kenya</p> <p><b>Africa</b></p> <p><i>Source: Advani, R. (2010) SmartLessons IFC publication, November 2010</i></p>		<p>Cost recovery and financing of water and sanitation services</p>	<p>In Kenya, community-based organizations (CBOs) are important water service providers in areas not served by public utilities. However much of the infrastructure is run down and access to finance for infrastructure investment is a significant constraint. An innovative program has combined commercial debt with subsidies to finance investments in community water projects. CBOs borrow up to 80% of the cost of infrastructure development from a Kenyan commercial bank specialized in microfinance lending, with the remaining 20% financed by equity from the CBOs. On completion of the project, up to 40% of the total project cost is paid to the CBO as a donor-funded subsidy, paid against predetermined output targets including increase in coverage and increase in revenue raised by the project.</p>	<p>The program shows that subsidies can be leveraged by 2.5 times to secure cofinancing from the private microfinance sector. The sustainability of these investments is increased by linking debt service to system functionality. In secure of its interest, the bank provides a level of oversight to management. Since 2007, the commercial bank has lent \$1 million to 12 CBOs, 9 of which have completed their projects and received subsidies.</p>		<p>The program has financed investments in water resource development and augmentation, water treatment, distribution and meters. The investments made to date are expected to increase the number of connections in the projects financed from 5,300 to 9,900 and target about 67,000 beneficiaries.</p>	<p>CBOs must be formally registered as cooperatives or societies in order to borrow and must secure the legal right to sell water within their demarcated area of operation (this is essential for giving the commercial lender security).</p>	<p>The program is now being scaled up to target 50 projects countrywide, targeting 165,000 beneficiaries. The disbursement rate is expected to increase significantly as the implementing agency's project management experience has increased.</p>	<p>Experience from piloting the project suggests communities lack the capacity to implement and manage water projects efficiently. The Public-Private Infrastructure Advisory Facility provided funds and the Water and Sanitation Program-Africa technical assistance to support communities in the loan application and project implementation process.</p> <p>Individual CWPs financed under the pilot were not financially viable. Projects should be clustered, with each specialized operator tasked with management of a number of close projects.</p>
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<p><b>Tool 4: Investments in the protection and improvement of biodiversity</b></p>									
Case and region	Issue	Type of tool	Description	Economic impacts	Benefits for the environment	Social /poverty alleviation impacts	Governance issues	Scaling up and relevance for developing/ transition countries	Constraints
<p><b>(1)</b> Fund for the Protection of Water (Fondo para la Protección del Agua – FONAG), Ecuador</p> <p><b>LAC</b></p>	<p>Watersheds</p>	<p>Investments in the protection and improvement of biodiversity</p>	<p>FONAG was established in 2000 as a trust fund into which water users in Quito Metropolitan District could contribute to support watershed conservation and management activities to protect the supply of water.</p> <p>The Fund constitutes a Payment for Environmental Services scheme, in which local water users, including hydropower and water supply companies contribute regularly under a self-taxing arrangement.</p> <p>Activities involve land purchase in critical areas to sustain ecosystem services and improvement of</p>	<p>Water users who pay into FONAG safeguard their future economic performance by securing long-term quantity and quality of the natural resource (i.e. water) on which their businesses depend.</p> <p>Yields on FONAG's capital and investments are utilized for watershed protection, including payments to landowners to protect ecosystem services.</p>	<p>Improved forest conservation, especially in key forested corridor between existing protected areas.</p> <p>Maintenance of water quality and quantity in river and associated ecosystems improves conservation status of freshwater habitats and the species that depend on them.</p>	<p>Improved animal husbandry and agricultural management practices increase productivity; more direct involvement of local communities in management of local resources; access to financial services.</p>	<p>The National Water Secretariat (SENAGUA) was established by Executive Decree in 2008. SENAGUA is responsible for sustainable and integrated water management. One of its main objectives is to promote policies for watershed protection, with an emphasis on the conservation of native forests and maintenance of water quality at source (rather than through</p>	<p>Following the successful establishment and operation of FONAG, more than 10 similar 'water funds' have been or are being established in the Latin America &amp; Caribbean region.</p> <p>Replication of this initiative in watersheds elsewhere in the LAC region (and in other regions) is highly possible.</p>	<p>Restricting use of the fund to yields from interest and investments – NOT capital – meant that the fund grew slowly (but sustainably).</p>



			agricultural management practices, but no direct payments to farmers.				water treatment).		
(2) Payment for Environmental Services pilot project in Lake Naivasha basin, Kenya <b>Africa</b>	Watersheds	Investments in the protection and improvement of biodiversity	<p>Economic activities around Lake Naivasha include agriculture, horticulture, ranching, pastoralism, tourism, fishing and geothermal power production. Over 50 km<sup>2</sup> is under intensive, commercial horticulture and flower farming. Together, these activities provide livelihoods for over 500,000 people living within the basin.</p> <p>Significant environmental threats come from poor land-use practices, unregulated and excessive water abstraction for domestic and agricultural/ horticultural use, weak policy enforcement, and population pressure on natural resources, water pollution and climate change. These have resulted in degradation of ecosystem services, economic losses, worsening poverty and reduction of biodiversity.</p> <p>Lake Naivasha Water Resource Users Association – on behalf of ecosystem service beneficiaries, notably the region's major floriculture &amp; horticulture industry – agreed to compensate small-scale landowners/farmers, represented by two upstream Water Resource Users' Associations, to forego some potential income for managing their land to provide good quality water to downstream users.</p>	The two WRUAs were provided with an initial financial incentive of USD 10,000, followed by a second payment of USD 10,000. The first incentive rewarded 470 farmers and the second benefited 504 farmers.	<p>Land management changes aimed at improving downstream water quality and quantity include: rehabilitation and maintenance of riparian zones;</p> <p>establishment of grass strips/terraces to reduce runoff and erosion on steep slopes; reduced use of fertilizers and pesticides; planting of native trees, high-yielding fruit trees and cover crops to reduce runoff/erosion and increased biodiversity.</p> <p>Increased fodder production has reduced pressure on forests from grazing.</p> <p>The structures introduced in the farms have dramatically reduced soil erosion and surface water run-off. Soil fertility has been enhanced by on-farm planting of appropriate trees.</p> <p>Farmers along the target tributaries are reporting positive changes in water clarity though there is not yet empirical evidence for this (hydrological data collection is on-going).</p>	As well as the direct payments to the WRUAs, participating communities have seen a number of livelihood improvements. Grasses planted for soil conservation purposes have increased fodder supply resulting in increased milk production. Planting of fruit trees and use of higher quality material for potato planting bring additional income.	Relevant policy makers will be engaged through dialogue and advocacy with the goal of PES schemes being integrated into natural resource management policies. The Water Resource Management Authority –WRMA is already engaged in the current project.	<p>The project has continued to receive overwhelming support from Lake Naivasha Water Resources Users Association.</p> <p>The scheme will be upscaled in future and linked with efforts to reduce carbon emissions through improved forest management.</p>	<p>The pilot farmers' on-farm benefits have triggered very high demand for change in the region. More than 300 additional farmers have joined the projects stretching the project resources.</p> <p>Climate change has disrupted the seasons resulting in adverse effects within the pilot area.</p> <p>Diffuse sedimentation from degraded public land may threaten efforts to prove a business case for PES through water quality monitoring since such sedimentation may obscure the hydrological benefits arising from land-management improvements on the targeted hot-spot farms.</p> <p>Complex land ownership – there is much dynamic of land ownership in the pilot area due to inheritance, subdivision and use changes. These threaten the main pillar of the project, namely farm ownership</p> <p>Securing commitment from beneficiaries is challenging; especially in a situation where they are already paying a statutory water fee to the regulating body and therefore payment for PES appears as if it is a 'double' payment.</p>
(3) Payment for Forest Environmental services	Watersheds	Investments in the protection and	Following the Vietnamese Government's adoption of a pilot policy on Payment for Forest Environmental Services, pilot	Early in 2009 hydropower, water supply and tourism businesses signed	With support from ARBCP, Lam Dong Province established a watershed	The income of households involved in the implementation of the policy was shown to	In 2007 ARBCP assisted the Vietnamese Ministry of Agriculture and Rural Development	In September, 2010, the successful trialling of the PFES policy in Lam Dong Province	The identification and emergence of champions at all levels of the implementation process



<p>(PFES): pilot implementation in Lam Dong Province, Vietnam</p> <p><b>Asia</b></p>		<p>improvement of biodiversity</p>	<p>implementation took place in Lam Dong Province in 2009-2010 with support from USAID's Asia Regional Biodiversity Conservation Programme (ARBCP). Two hydropower companies, two water-supply companies and various tourism businesses were identified as buyers of Forest Environmental Services (FES). As determined under the pilot policy, the hydropower companies were required to pay VND 20 per kilowatt-hour into a specially established Lam Dong Forest Protection and Development Fund (FPDF). In January 2009 (start of project implementation) 100 Vietnamese Dong (VND) was equivalent to just over half of one United States cent (USD 0.005). Water supply companies had to pay VND 40 per cubic metre, while tourism companies contributed 1% of their annual gross revenues.</p>	<p>MoUs committing payments of USD 3.4 million to protect more than 220,000 hectares of forests and the ecosystem services they provide. By the end of the pilot implementation phase in December 2010, a total of approximately VND 108 billion (over USD 5.5 million) had been paid into the PPDF, which is overseen by a governing board composed of national and provincial authorities and monitored by independent auditors.</p>	<p>monitoring system in sub-catchments of the Da Nhim watershed. This action supports the scientific premise that effectively maintaining and managing forest cover will reduce soil erosion and enhance water regulation, and in turn reduce future production costs for hydropower and water supply companies.</p>	<p>have increased significantly. PFES payments were becoming an important source of income for poor households, especially those of ethnic minorities.</p>	<p>to develop a pilot policy PFES. The policy came into effect in April 2008 paving the way for implementation of pilot testing activities.</p> <p>In September, 2010, the successful trialling of the PFES policy in Lam Dong Province culminated in the Prime Minister's announcement of Vietnam that a National PFES Decree had been approved. This transforms the way forests are seen and managed in Vietnam. This regionally and globally significant achievement serves as a model for other countries in South-east Asia struggling to find economically viable approaches to support biodiversity conservation.</p> <p>Vietnam is now developing as a regional centre of knowledge and experience of PES.</p>	<p>culminated in the Prime Minister's announcement of Vietnam that a National PFES Decree had been approved. This transforms the way forests are seen and managed in Vietnam. This regionally and globally significant achievement serves as a model for other countries in South-east Asia struggling to find economically viable approaches to support biodiversity conservation.</p> <p>Vietnam is now developing as a regional centre of knowledge and experience of PES.</p>	<p>(national, provincial, district, and commune) was a key factor for success.</p> <p>The limited number of environmental services implemented under the pilot policy (water regulation, soil conservation, and landscape visual quality) reduced the risk of implementation failure.</p> <p>Despite the fact that extensive scientific/technical studies were carried out to value ecosystem services, the final payment structure had to take into consideration the socioeconomic and socio-political context of the communities in question. Strictly adhering to the valuation studies, while scientifically robust, would not have guaranteed the uptake of the project and the backing of the community and payers.</p> <p>The proper and equitable distribution of payments is contingent on the equitable and precise allocation of forest parcels to households. However, lacking a private land tenure system and integrated land-use planning system, the process of forest demarcation, allocation, filing, and approval in Lam Dong Province required significant time and money, at times impeding the proper and timely disbursement of payments to households.</p> <p>There was an issue of whether payments under PFES should be</p>
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									considered as being made from the state budget or whether they replaced the water-resource tax that hydropower plants had to pay. These and many other issues, connected to the innovative concept of PES, took time to resolve among various stakeholders.  Establishing automated gauging stations in a relatively remote provincial river basin was a great challenge.
<b>(4) Payment for Ecosystem Services and alternative livelihoods in rural China</b>  <b>Asia</b>	Watersheds	Investments in the protection and improvement of biodiversity	<p>Yujiashan (in Sichuan province) is a forested area that constitutes the watershed for water supply to Pingwu town, the seat of Pingwu county administration. Yujiashan, most of which is a designated Nature Reserve, also includes habitat for the critically endangered giant panda.</p> <p>Pingwu county and Conservation International recognized that quantity and quality of freshwater resources from the Yujiashan watershed was directly linked to the effectiveness of land and water conservation efforts and in turn impacted the degree of treatment – and hence unit price – necessary in order to deliver clean, safe water to industrial and domestic consumers. The county was faced by deteriorating water quality, rising consumption and rising prices.</p> <p>While total fertilizer applications in the watershed decreased from 1997 to 2007, the quantity per unit area rose dramatically. Total usage of pesticides and herbicides grew rapidly between 2002 and 2007. Increasing erosion and runoff resulted in serious diffuse pollution of water courses. Deforestation for timber and firewood exacerbated the problem.</p> <p>In the past the water fees collected from consumers and companies were not reinvested in watershed conservation. This project aimed to re-establish the link between water</p>	The Pingwu Water Conservation Fund is the first of its kind in China. The Fund provides income from a hydroelectric dam – which depends on the continued flow of freshwater and the avoidance of erosion and sedimentation – to the communities outside Pingwu City responsible for protecting the watershed. Representatives from the Government of Pingwu County, as well as Conservation International and local NGO partners serve on the board of the Water Conservation Fund, which helps communities embrace sustainable livelihoods like honey and mushroom farming, replacing income generated by practices such as deforestation for farming or grazing.	By establishing viable livelihood alternatives, the project aims to tackle the drivers of environmental degradation in the watershed and, in particular, to reduce deforestation, sedimentation and pollution by agro-chemicals.	Villagers have been provided with start-up capital and training to cultivate mushrooms and keep bees as “forest and water-friendly” alternative livelihood options.			



			users and water supply areas and to lay the groundwork for developing sustainable PES schemes by demonstrating a viable long-term conservation financing model.						
<p><b>(5)</b>  Conserving and managing forests as source of water for Fukuoka City, Japan  <b>Asia</b></p>	Watersheds / cities	Investments in the protection and improvement of biodiversity	<p>Fukuoka City is the only major city in Japan without a large river flowing through it. It has relied on extraction from the nearby Chikugogawa River for one-third of its needs, as well as on desalination of seawater and on supplies from eight dams. However, the degradation of forests surrounding the dams began to impairing their water recharge functions, jeopardizing a key part of the city's water supply.</p> <p>The Fukuoka City Foundation for Water Resource Conservation Projects was established in 1997 to serve as a fund for forest conservation and management in catchments where the city's water supply originates.</p>	<p>The Fukuoka City Waterworks Bureau allocates JPY 1.00 per ton of water consumed in the city to the Watershed Conservation Fund. Half of this amount is derived from water-use charges and half from the city's budget. From its revenue, JPY100 million (approx. USD 1.3 million) is allocated annually for initiatives which promote forest conservation and management in watershed areas. The total fund stood at JPY 1.06 billion yen in 2009).</p> <p>The project fosters cooperation between local governments upstream and downstream, with conservation activities implemented jointly by Fukuoka City and municipalities in water source areas.</p>	<p>Fukuoka City is improving watershed forests in catchment areas near the dams developed to source drinking water only, by planting broad-leaved forests, clearing underbrush and tree thinning. For other dams, the Waterworks Bureau is engaged in efforts to purchase forests in catchment areas in order to enhance water recharge capacities and prevent water contamination from excessive development. As of fiscal year 2008, approximately 30 percent (505 hectares) of the catchment areas of the three local dams has been bought by the city. For the appropriate management of these forests, the city formulated the Fukuoka City Water Source Forest Management Plan covering 60 years in fiscal 2004.</p>	<p>The project also includes awareness-raising amongst the citizens of Fukuoka City about the origin of its water supply and the value of forest ecosystem services; exchange programs for citizens to participate in activities such as silvicultural management, rice planting and trout fishing in the water source areas; and offers grants for tree planting and clearing underbrush.</p>	<p>The initiative fosters collaboration between Fukuoka City and neighboring municipalities to implement joint conservation activities in the water source areas</p>		
<p><b>(6)</b>  PROCUENCAS Payment for Ecosystem Services scheme, Costa Rica  <b>LAC</b></p>	Watersheds	Investments in the protection and improvement of biodiversity	<p>PROCUENCAS is a private PES scheme (independent of the government's National Forestry Financing Fund) set up in 2000 and operated by the Public Services Enterprise of Heredia (ESPH) in Heredia province. It covers the five micro-watersheds from which ESPH obtains the water for public supply to 188,000 citizens in three municipalities.</p>	<p>Landowners enter into 10-year contracts and receive (2011 payment rates) about USD 140 per hectare for participating in one of four activities: (i) conservation of existing natural forest; (ii) supporting natural forest regeneration; (iii) reforestation through tree planting; and (iv)</p>	<p>Enhanced forest conservation. Improved status of surface and ground water.</p>	<p>PROCUENCAS currently has 30 contracts with landowners covering some 830 ha (806 ha through conservation of existing natural forests, 7 ha through reforestation and 27 ha through management of established plantations). These</p>	<p>National legislation on environment (law no. 7554 of 1995) forestry (law no. 7575 of 1996), regulation of public services (law no. 7593 of 1996), and biodiversity (law no. 7788 of 1998), all helped successful development of PES approaches in Costa</p>	<p>Other local water companies and municipalities have approached ESPH to acquire knowledge about the programme and implement similar approaches in their territories.</p> <p>The success of PROCUCENCAS</p>	<p>There were some evident weaknesses in the early stages of the programme – due to a lack of communication of the objectives and benefits to the users, people being unaware of the new fee or even the importance of preserving upstream watersheds. Municipalities are allowing (illegal) new</p>



			<p>PROCUENCAS receives revenues from a government-approved 'hydrological fee' included in each user's water bill, as well as from partnerships between ESPH and other private companies, and additional private contributions.</p> <p>PROCUENCAS supports forest conservation, reforestation programmes, environmental education programmes and protection of ground-water sources.</p>	<p>caring for established plantations. From 2014, onwards the emphasis will be on conservation and natural regeneration, rather than on new plantations.</p>		<p>contracts provide important sources of income to local landowners, rewarding them for measures to manage the upper parts of the five micro-watersheds sustainably.</p>	<p>Rica.</p> <p>The forest law identifies a range of environmental services derived from natural forests, tree plantations, and agro-forestry systems, such as carbon fixation, hydrological services, biodiversity protection, and provision of scenic beauty.</p>	<p>inspired the Costa Rican Ministry of Environment to apply and upscale this financial mechanism to the national level, creating an additional income for the governmental PES programme.</p>	<p>development projects close to water sources – could jeopardize achievements made</p>
<p><b>(7)</b> Programme for Payment of Hydrological Environmental Services (Programa de Pago por Servicios Ambientales-Hidrológicos – PSAH), Mexico <b>LAC</b></p>	Watersheds	<p>Investment in the protection and improvement of biodiversity</p>	<p>Between 1993 and 2000, 8.2 million hectares of Mexico's forests were converted for agriculture or grazing, exacerbating problems of water quantity and quality in many areas.</p> <p>Since 2003 landowners have been able to apply for public payments in exchange for commitments to conserve forested land and to forego certain uses, such as agriculture and cattle raising.</p> <p>The scheme focuses on areas that are important for aquifer recharge, maintaining surface-water quality and reducing the frequency and scale of flood damage.</p> <p>The main actors are the forest-owning communities and individuals on one hand and the different water users (companies, municipalities and citizens, and their respective associations through which they influence public policy) on the other.</p>	<p>More than 3,000 forest owners have been enrolled in the scheme and payments to them total more than USD 300 million.</p> <p>The scheme is funded through an earmarked percentage of the federal fiscal revenue derived from water fees.</p> <p>Primary forest owners receive 300 pesos/ha/yr (about USD 27.) and cloud forests owners receive 400 pesos/ha/year (USD 36) due to the perceived higher delivery of hydrological services associated with this type of forest.</p>	<p>By 2005, deforestation had been reduced by some 1,800 km<sup>2</sup> and the annual rate of deforestation had been more than halved, from 1.6% to 0.6%. The scheme had contributed to protecting water catchments and the biodiversity of cloud forests, in addition to cutting emissions of carbon dioxide by about 3.2 million tonnes of CO<sub>2</sub> equivalent.</p> <p>Between 2003 and 2005, satellite images showed that less than 0.1% of the nearly 300,000 ha covered by PSAH was deforested.</p>	<p>Poverty reduction: Payments were targeted at owners who were not already deriving an income from their forests and who would have "nothing to lose" from converting the land to other – environmentally damaging – uses.</p>	<p>A change in the Federal Rights Law allowed a portion of federal water revenues to be used to support watershed conservation through payments for forest environmental services. This was initially set at 2.5% of annual revenues.</p>	<p>The principles of the scheme could be applied elsewhere in the region and beyond.</p>	<p>Constraints that the scheme has had to deal with included identifying contract conditions/ indicators that could actually be monitored (e.g. rates of deforestation via satellite photos) against a baseline scenario.</p> <p>Criteria also had to be developed set geographical priorities so that over-subscription of the scheme could be dealt with. In this case a points system was used to prioritize areas according to the value of environmental service, as well as the level of poverty and risk of deforestation.</p> <p>A special feature of forest ownership in Mexico is that almost 80% of forests are held as common property by groups of peasant farmers. This brings both opportunities and challenges.</p>
<p><b>(8)</b> Economic value of the Sourou valley, Burkina Faso – a preliminary evaluation</p>	Watersheds	<p>Investment in the protection and improvement of biodiversity</p>	<p>In 1994 a government master plan for agricultural development of the Sourou river valley identified 30,000 ha of wetlands as having potential for conversion to agricultural use. About 13% of this area had been converted by 2010.</p> <p>Assuming that increased agricultural</p>	<p>The annual (minimum) value of the ecosystem services evaluated was about 15 million Euros (USD 21.2 million) for a population of 62,224 people.</p> <p>Timber products for</p>	<p>The IUCN study suggests that any agricultural policy that does not take into consideration the interlinkages with other ecosystem functions might work</p>	<p>Responses were gathered from focus-groups and workshops, plus individual surveys with men &amp; women from &gt;300 households close to the Sourou river.</p>	<p>IUCN recommended that policy makers in Burkina Faso should reshape agricultural policy to adopt approaches that integrate environmental and</p>	<p>The overall approach is relevant as an essential preliminary stage of all PES projects. Ecosystem services must be identified and valued before they can be paid for.</p>	<p>The valuation study happened after conversion of natural ecosystems was already underway and significant investment in agriculture development made. Ecosystem valuation</p>



<p><b>Africa</b></p>			<p>production would have economic benefits, including increased food security, little attention was paid to other ecosystem values – partly due to lack of information.</p> <p>While economic benefits did not meet expectations, the natural resource base was being continuously depleted.</p> <p>IUCN conducted an economic valuation of ecosystem services to raise awareness of decision makers about the true existing economic value of the region's wetlands with a view to influencing future development policies.</p>	<p>fuelwood and construction accounted for 37% of this total value, non-timber forest products 21%, grazing 18%, fisheries 10% and fluvial transport 10%. Agriculture accounted for only 3% proving that crop production is not the major economic good to be drawn from the region, despite the policy decisions and investments of successive governments since 1970.</p>	<p>against the policy's objective.</p> <p>In fact, field surveys revealed that current agricultural practices threaten ecological services such as flood control, biodiversity conservation and climate regulation. This could compromise the other economic values provided by the Sourou valley.</p>	<p>In spite of two decades of agricultural development, benefits had not materialised for local communities. On the other hand, such communities are reliant on other ecosystem goods and services for their livelihoods and income generation.</p>	<p>economic factors.</p> <p>The current master plan for the Sourou Valley should be reviewed to better highlight the interrelation between economic development of the region and conservation of its natural resources.</p> <p>Because of the transboundary nature of the Sourou River, it seemed particularly important to promote water-resource management approaches that take into account the needs of communities in Mali.</p>	<p>&gt;20 national institutions and socio-professional groups participated in an event to share results from the study. All of them expressed willingness to use the information to define properly the role of natural ecosystems in the new national strategy for</p> <p>growth and sustainable development as well as in local plans.</p>	<p>should be used as a proactive, not reactive tool.</p>
<p><b>(9) Payment for Ecosystem Services (PES): Feasibility and Implementation in the Maloti-Drakensberg Transfrontier Project Area, South Africa</b></p> <p><b>Africa</b></p>	<p>Watersheds</p>	<p>Investment in the protection and improvement of biodiversity</p>	<p>Water is predicted to be the single biggest future development constraint in South Africa. A new water supply augmentation option has been identified which can promote local economic development in rural areas and create hundreds of jobs.</p> <p>The Maloti Drakensberg bioregion falls within the country's most important water supply area. River catchments within the bioregion form the source or contribute to a number of major rivers, including the Mzimvubu, Mzimkulu, Mkomazi and Thukela on the South African side, and the Vaal and Orange Rivers on the Lesotho side.</p> <p>Paying people to manage the Maloti Drakensberg transfrontier catchments for enhanced water supply has been shown to be a financially feasible.</p> <p>In this pilot project, the first PES implementation in South Africa, funding (ZAR 3.3 million = approx USD 0.46 million) was obtained from the South African Government's <i>Working for Water</i> Programme for the first year. Approximately 546 people were employed, 15 hectares of degraded land rehabilitated and 15</p>	<p>The following services have high value, and can be traded:</p> <p>additional and more regular water supply for users - improving assurance of supply and adding value to both reticulated and raw water users;</p> <p>reduced sedimentation of water infrastructure and river ecosystems which reduces water storage and abstraction costs – thereby making cost savings; and</p> <p>additional carbon sequestration which is tradable, and which also improves grassland productivity.</p> <p>Management costs are at the most 20% of the direct value of tradable benefits, making this a financially attractive option.</p> <p>A range of other ecosystem services are economically beneficial</p>	<p>Recent research in the Drakensberg shows that robust vegetation cover in the upper catchments – through rehabilitating degraded areas, maintaining the recommended cattle carrying capacity and by burning the mountain grasslands in the spring every second year can enhance water resources by: reducing summer stormflows; increasing winter baseflows by an additional 13 million m<sup>3</sup> in the upper Thukela catchments; reducing annual sediment yields by 1.3 million m<sup>3</sup> in the upper Thukela rivers, and sequestering 134,000 tonnes of carbon per year in the upper Thukela catchments.</p>	<p>Improved management and rehabilitation will result in 1800 restoration jobs in the first 7 years, with some 500 permanent jobs, making it socially compelling.</p>	<p>The feasibility study and pilot implementation was part funded by the South African Department of Water Affairs' <i>Working for Water</i> programme, which has pioneered other innovative approaches to sustainable water management.</p>	<p>This is a pilot project in its early stage of implementation, so it may be too early to speak of scaling up - especially beyond the region.</p> <p>However, Working for Water has committed to funding the project for a further three years.</p> <p>The 2011/12 implementation plan includes budget for grazing and fire management, aims to begin to develop the framework necessary to establish a market (beyond payment for labour) for the sale of ecosystem services from these catchments for the benefit of the upper uThukela communities.</p>	<p>Approx 40% less funding obtained than required.</p> <p>Administrative delays with obtaining funding, signing agreements and administering the project – hence delayed start.</p> <p>Only degraded land rehabilitation and alien plant clearing were initiated during 2010/11. Grazing and fire management could not be addressed.</p> <p>Local political and "vested interest" issues interfering with progress.</p> <p>Co-ordination of project and implementing monitoring.</p> <p>Capacity at community level to manage a business relationship, contracts etc.</p>



			hectares of alien plants along water courses were cleared.	to society but cannot be traded yet in this location. These include as flood control, improved water quality, improved fishing, biodiversity conservation and improved grazing.					
<b>(10)</b> Rewards for watershed services in Sumberjaya, Indonesia  <b>Asia</b>	Watersheds	Investment in the protection and improvement of biodiversity	<p>Government perception that uncontrolled deforestation and conversion to coffee farming on the slopes of Sumberjaya has led to increased soil erosion, threatening the operation of the Way Besai hydropower dam and reducing water availability for irrigated paddy rice downstream has resulted in the eviction of thousands of farmers between 1991 to 1996. More recent studies show that in fact multi-strata coffee farms provide livelihoods and also control erosion in a way similar to that of natural forest.</p> <p>The 'Rewards for Use of, and shared investment in Pro-poor Environmental Services' (RUPES) project in Asia, facilitated the design and implementation of environmental services (ES) rewards schemes in Sumberjaya.</p> <p>The scheme was based on rigorous research and modelling of the impacts of coffee farming on erosion and sedimentation to generate evidence of the relations between land use and watershed functions</p> <p>RUPES comprised of three programs: the Community Forestry Program (HKm), providing farmers with conditional land tenure for forest protection; the Rive Care Program wherein a hydropower company finances activities which improve water quality through sedimentation reduction; and a Soil Conservation Program which pays farmers for reducing erosion and sedimentation.</p>	Local people directly benefit from higher yields in the multi-strata coffee production system and cash payments from soil erosion control and sediment reduction. The payments may be small, but could represent an increment in household incomes.	All programmes have a strong 'conditionality', which is essential in a contract-mediated ES reward scheme. The payments or rewards are conditional, subject to environmental performance in the area of forest protection, soil and water conservation and sediment reduction. The benefits to the environment are thus manifold. The HKm conditional land tenure scheme requires protection of remaining natural forest and adoption of sustainable coffee production techniques whereas the RiverCare and the Soil Conservation Programs involve soil and water conservation technologies to reduce on-and off-farm soil erosion and sedimentation in waterways.	<p>Experience from the implementation of RUPES suggests that reward schemes for delivery of environmental services, supporting coffee farmers as partners in forest and watershed management, is a better option than 'eviction' of forest people.</p> <p>All programmes have had positive social impacts. Because poverty is multi-dimensional, the conditional land tenure acquired by forest people was a step towards emancipation from poverty. Local people are no longer threatened from eviction, giving them a sense of protection and security for their livelihoods. Members of the RiverCare program and farmers involved in the Soil Conservation Program not only earn additional income from soil erosion control and sediment reduction activities, but also raise their profile and value from doing extra work for the community.</p>	The HKm is implemented by the Local Forest Department following the rules and regulations of community forestry, hence the implementation scheme was clarified at the very beginning of the program	<p>Particularly relevant for forest contested areas in developing countries where poor people eke-out a living from small-scale cultivation and extraction of forest products.</p> <p>The experience is very relevant for governments who often have full control, but have limited capability to manage forests and watersheds. It shows that educating decision-makers and stakeholders with research-based information can lead to changes in attitudes and actions towards sustainable forest/watershed management. It also shows the business case for private-sector engagement in ES rewards schemes.</p> <p>The case demonstrates that rather than coercion, provisioning environmental services can be secured through negotiated arrangements amongst the government, private sector, local people, and scientists with a shared understanding on the relations between land use and watershed functions as a first step.</p>	The potential constraint for scaling up however, is the amount of research and information gathering needed to structure an ES reward scheme. Substantial data is needed to inform decisions and to agree on the conditions binding the ES contract. However, research collaboration can be developed by governments intending to initiate a PES program—they can also streamline their line ministries and mainstream the PES concept in sectoral plans, and using common sense knowledge and available data, a PES program or policy can be designed at the national level.
<b>(11)</b> Las Pinas-Zapote River System	Watersheds	Investment in the protection	Water and air pollution are major problems in Las Pinas City, driven by population growth and industrial	62 jobs created for river dredging, clean-up and re-greening activities	Siltation of the river system reduced as a result of soil erosion	A number of training, education and communication	Co-management of program from central government agencies,	The water lily livelihood project has been replicated in	One challenge which still exists is the persistence of informal settlers nad



<p>Rehabilitation Program, the Philippines</p> <p><b>Asia</b></p> <p>Source: UN 'Water for Life' best practice awards</p>		<p>and improvement of biodiversity</p>	<p>development. The cities rivers – Las Pinas and Zapote – were heavily silted and polluted, used as a dumping site for waste, and void of life. There was frequent flooding due to siltation and clogged drainage systems</p> <p>A congressional representative of Las Pinas City developed and implemented a comprehensive management scheme for the rehabilitation of the Las Pinas-Zapote River system focused on dredging, clean-up and re-greening.</p> <p>Activities included: river cleaning, installation of wire mesh strainers to filter waste and debris, solid waste and river management, re-greening of river banks with bamboo and mangroves for soil erosion control.</p>	<p>Income generated through harvesting bamboo poles</p> <p>Social enterprises: composting or production of organic fertilizer from wet garbage; making lanterns from bamboo; weaving baskets from water lilies impeded the river's flow and contributed to flooding; production of coco nets and coco peat from coconut husks thrown into the river</p>	<p>control efforts Dredging and clean-up resulted in notable improvements in the catchment areas of the rivers, and reduced the incidence of flooding in the city</p> <p>Fish have returned to the river</p>	<p>initiatives were implemented with participation of local government officials and local communities, successfully generating change in attitudes and behaviour towards river and water conservation</p> <p>From 2002 to 2005, 9,070 people from communities on or near river banks were trained in ecological solid waste and river management</p> <p>Establishment of river watch volunteer groups to attend to the areas bordering the rivers</p> <p>High female participation</p> <p>Program resulted in a reduction of health-related problems</p>	<p>local government units and the communities of Las Pinas City. The program came about by virtue of strong support and funding from municipal authorities.</p>	<p>several other cities and towns</p>	<p>illegal infrastructures along the length of the river, due to weak enforcement of law.s</p> <p>Some factories and malls continue to discharge untreated wastewater directly into rivers.</p> <p>Resistant residents from nearby communities throw garbage into rivers. Some of the village local government units were not very supportive of the program, especially in with regards to imposing penalties for residents caught throwing trash into the river.</p>
<p><b>(12)</b> Restoring the health of the Yellow River, China</p> <p><b>Asia</b></p> <p>Source: UN 'Water for Life' best practice awards</p>	<p>Watersheds</p>	<p>Investment in the protection and improvement of biodiversity</p>	<p>The Yellow River Basin has suffered severe water shortages – in 1997 the river ran dry, causing social, economic and ecological crisis. The river has the highest sediment load of any river worldwide, causing the river bed to rise, the river's course to change and severe flooding.</p> <p>The Yellow River Conservancy Commission initiated the Yellow River Environmental Flow Management Program with 3 parts: water allocation scheme; water and sediment regulation; ecological restoration projects.</p> <p>Watershed management in the Loess Plateau addresses soil erosion, including massive reforestation, agro-measures and sediment control structures.</p>	<p>Flood risk significantly reduced by regulation of water and sediment flow, through structural (e.g. embankments) and non-structural measures (e.g. monitoring and warning systems), preventing economic losses.</p> <p>Water allocation program secures water for domestic supplies, agriculture and industry.</p>	<p>In 1999 the continuous flow of the river was restored and has not dried up again since.</p> <p>Environmental flows for wetlands and sediment flow are guaranteed, increasing the wetland area and restoring biodiversity and ecosystem health.</p> <p>Significant reduction in erosion and of 300 million tons of sediment inflow.</p>	<p>Watershed management initiatives in the Loess Plateau jointly with local people over the last 10 years have helped lift one million people out of poverty.</p>	<p>The Yellow River Conservancy Commission is a government agency of the Ministry of Water Resources and has full control over water resources for the entire basin.</p> <p>A key part of the program included building the necessary legal framework and institutional capacity for environmental management of the Yellow River basin.</p>		



## Tool 5: Water technology

Case and region	Issue	Type of tool	Description	Economic impacts	Benefits for the environment	Social /poverty alleviation impacts	Governance issues	Scaling up and relevance for developing/ transition countries	Constraints
<p>(1) Improvement of water supply through a GIS-based monitoring and control system for water loss reduction in Ouagadougou , Burkina Faso</p> <p><b>Africa</b></p> <p><i>Source: Case study paper, Zaragoza Conference</i></p>	Cities	Water technology	Pilot project to reduce water losses in the distribution system of the municipal utility, with leak detection devices, pressure and flow control sensors with real-time and online data transmission, and automated pressure valves, all controlled by a GIS-based computerized system. Implementation was supported by intensive capacity development programme to secure the necessary change process.	Local jobs created from the investment in and operation of the water loss reduction program. Wider job creation from the knock-on effect of improved water supply on the local economy and public and environmental health. Transparent structures and reduced water theft.	Following improvements in water efficiency, the environmental situation will improve step by step, provided that the development in sanitation will follow the development in water supply efficiency.	Improved water supply, where before the project there would be no supply in certain town areas and at certain times. Improved attitude amongst customers, awareness of the importance of protecting water resources and caring for public water supply property.		<p>The scaling up of such water loss reduction technologies and programmes in other developing and transition countries could be done.</p> <p>Lessons learnt from project have been disseminated to other utilities through an African Water Association conference and through UN-Water DPC.</p>	Implementation was successful for a limited zone within the city and service area of the utility. Due to instable political situation in the country, and due to other issues gaining higher priority over water loss reduction (politically as well as financially), implementation could not yet be completed throughout the whole service.
<p>(2) The Role of Water Technology in Development: A Case Study in Gujarat, India</p> <p><i>Source: Case study paper, Zaragoza Conference</i></p>	-	Water technology	'State Wide Water Grid' and water filtration treatment plants to provide assured drinking water to 10501 villages and 127 towns in Gujarat suffering from water scarcity or water quality problems. Creation of the Water and Sanitation Management Organisation (WASMO) and a new water governance model, empowering village level institutions and extensive capacity building of women for recovery of water charges. Sardar Patel Participatory Water Conservation Project for Micro Water Harvesting and creation of over 350,000 theckdams, village ponds etc. Jyotigram (lighted village) Scheme for pioneering a real time co-	Reduction in number of villages under tanker water supply from 3961 in 2002-03 to 326 in 2008-09 and reduction in costs of tanker water supply from 10 million US\$ to just 0.25 million US\$ 96% saving. Tremendous increase in agricultural production around 10% growth rate in agriculture as against 4% growth rate of the country. Substantial income increase in Animal Husbandry, Fisheries and Horticulture sectors.	Reduction in fluoride contamination of water. Reduction in carbon footprints in water supply due to substantial electricity savings. Increase in Ground Water Tables.	<p>Safe and secure water supply for about 65% of the State's population in drought-prone and poor water quality areas.</p> <p>Increase in opportunities of women education and self employment.</p> <p>Reduction in household drudgery of women.</p>	Creation of the WASMO shifted the role of governance from provider to facilitator, providing an enabling environmental for communities to take ownership of their water service delivery and water resources management at a decentralised level.		



			management of electricity and ground groundwater for the agriculture.	Creation of hundreds of thousands of jobs in rural form and non-form economy.					
<p><b>(3)</b> Web-based system for water and environmental studies</p> <p><b>MENA</b></p> <p><i>Source: Case study paper, Zaragoza Conference</i></p>	-	Water technology	<p>EU-funded web-based Learning Management System (LMS) for water and environmental studies, initiated by a partnership of institutions from Germany and Egypt. Online courses on sustainable water management, and the interrelationship between technical, social, economic and environmental aspects. The LMS offers communications tools to ensure social learning Provides training to professionals from Egypt's Ministry of Water Resources.</p>	<p>Knowledge of environmental and water management supports newly created green jobs. Students have started businesses for decentralized water treatment units for rural areas.</p>	<p>Developed online modules included many environment related courses which helped thousands of people to enhance their environmental capacities and knowledge.</p>	<p>eLearning systems include social networking tools that bring not only people from the same country to communicate and work together but also people from all over the world who have common interests.</p>		<p>Developed LMS and training materials of this project were used by different other Egyptian universities.</p> <p>The Ministry of Higher Education realized the acceptance of such technologies for education and capacity development.</p> <p>The government started to promote using such technologies for the undergraduate students by motivating the professors to develop their undergraduate courses using web-based techniques</p>	
<p><b>(4)</b> Three Gorges project</p> <p><b>Asia</b></p> <p><i>Source: Case study paper, Zaragoza Conference</i></p>	Watersheds	Water Technology	<p>The Three Gorges Hydropower Complex Project, commonly known as the Three Gorges Project (TGP), rectifies and develops the Yangtze River, producing significant integrated benefits, including flood control, power generation, and navigation facilitation.</p>	<p>Since July 2003, 450 billion kWh of electricity (as of the end of 2010) was produced, equivalent to one-tenth of China's total power production in 2009. Water storage in the Three Gorges Reservoir strongly facilitates navigation along the Yangtze River and the development of the regional economy. In 2009, the area's GDP hit RMB 276.466 billion, representing a 515 percent growth from 1996 and an average annual growth of 12.1 percent; and per capita GDP surged to RMB 19,518, up 524 percent from 1996.</p>	<p>Hydropower helps reducing Greenhouse Gas Emissions</p> <p>The project includes systematic geological hazard prevention and mitigation works, and joint monitoring and prevention systems.</p> <p>Water pollution prevention and treatment programs launched. 49 % of household sewage and 70 % of waste in the towns in the reservoir area receives treatment, higher than</p>	<p>Opportunities for transforming the mode of economic growth in the reservoir area and for lifting local residents out of poverty and improving their living standards through funding for the resettlement of residents relocated for the TGP. Resident resettlement and town reconstruction upgraded and optimized the structure of the economic sectors of the Three Gorges Reservoir.</p>			



					the national average				
					Various biodiversity protection programs launched, including the replenishment of water in the lower reaches of the river during dry seasons improving water quality and reducing salinization at the estuary.				
<p><b>(5)</b> International Hydropower Association's Hydropower Sustainability Protocol</p> <p><i>Source: <a href="http://www.hydropower.org">www.hydropower.org</a></i></p>		Water technology	<p>The Hydropower Sustainability Assessment Protocol provides a globally-applicable framework for assessing the sustainability of hydropower projects according to over twenty vital topics. Developed through multi-stakeholder initiative over 2008-2010 including developed and developing country governments, social and environmental NGOs, Equator Banks, the World Bank and hydropower industry. Now endorsed by leading NGOs and financial institutions, and governed by a multistakeholder governance structure. Provides an unprecedented framework for stakeholder dialogue on sustainability performance of hydropower projects assessed using the Protocol. Consists of four separate tools corresponding to four stages of hydropower project development. Builds on lessons learnt from previously existing tools as well as from an extensive trialling period.</p>	<p>Promotes improved performance in financial and economic viability of hydropower projects, and sharing of project benefits. By providing a common platform for dialogue on sustainable hydropower, the Protocol promotes the contribution that sustainably developed hydropower will make to economic development.</p>	<p>Promotes improved performance in environmental and social assessment and management, hydrological and sedimentation management, and water quality and biodiversity.</p>	<p>Promotes improved performance in a wide range of social issues, e.g. project-affected communities, resettlement, indigenous people, working conditions and cultural heritage. Assessment will score the performance of a project in relation to basic good practice, and proven best practice.</p>	<p>The Protocol has been developed in a multi-stakeholder process. Protocol implementation is governed by a multi-sectoral Governance Council, which is currently chaired by an environmental NGO.</p>	<p>Demand for Protocol application is already very high from the hydropower industry in all parts of the world.</p> <p>Very high relevance to Asia and Africa which have the largest untapped hydropower potential, but also where sustainability is critical.</p>	
<p><b>(6)</b> Industrial wastewater reclamation technology for urban irrigation in Windhoek, Namibia</p>	Industry Agriculture	Water technology	<p>Wastewater reclamation plant based on cost- and energy-efficient technologies to purify urban and industrial wastewater which may not be suitable for drinking water, for reuse in irrigation. The technical components of the process are conventional mechanical treatment (buffer tank, robust type screening and sand trap), advanced biological treatment (membrane bioreactor, equipped with</p>	<p>Increase in land value in project area (dry land with no water resources for irrigation is worth little, whereas irrigated land has higher value).</p> <p>Additional land will be ready for utilisation,</p>	<p>Reducing the quantity of water abstracted leaves more to meet environmental requirements. Ecosystems benefit from a reduction in discharge of contaminated wastewater.</p>	<p>The project does not directly focus low income settlements or poverty alleviation. Anyhow, it will generate a considerable social benefit, as the stimulation of the local economy will serve the public budgets,</p>	<p>Without cooperation of professional technology providers from the private sector, and a very active public utility as employer, both focusing on greentech business development in their local water sector, the scheme could not have been realised. Technological</p>	<p>Good potential for scaling up once project demonstrates success and once water tariffs and wastewater charges reflect a reasonable proportion of real costs (whereas a scale-up would be difficult wherever water and</p>	



<p><b>Africa</b></p> <p><i>Source: Case study paper, Zaragoza Conference</i></p>			<p>instrumentation for remote control, automation and easy operations onsite), compact final settlement tank and post-disinfection through UV (with additional chlorination on request). Implemented through a BOOT-type contract (build, own, operate and transfer) with a contractors consortium of companies from Africa and Europe</p>	<p>after reuse water is available for irrigation. This land will generate business activities, contributing to the economic development of the City of Windhoek.</p>		<p>including those for social welfare.</p> <p>River contamination will be reduced after the reuse plant comes into operation. This will decrease the pollution of the drinking water (raw water), which the poor downstream use.</p>	<p>progress, as well as BOOT and good municipal governance and national finance, were essential to go forward with this greentech project.</p>	<p>wastewater are free of charge, and represent no or little value to the consumers and decision makers).</p>	
<p><b>(7)</b> Water harvesting project for water supply and agriculture in rural districts of the Republic of Djibouti</p> <p><b>Africa</b></p>	<p>Agriculture</p>	<p>Water technology</p>	<p>Construction of hydraulic structures including 14 underground storage tanks, surface reservoirs and diversion works. Improved knowledge of the hydrogeologic conditions in the project zone. Capacity building of government water resource engineering departments. Sector assessment and preparation of bankable projects for funding.</p>		<p>Study on the initial environmental status of the project area completed.</p>	<p>Expected: Improved access to water for multi-purpose uses by the rural nomad populations (2,400); better knowledge of the available water resources in the project area.</p> <p>Achieved: 37 rain water harvesting structures constructed and utilized for drip irrigation and water supply for vulnerable populations and sites for construction of new structures identified; feasibility study on the use of solar energy for pumping completed; two farmers associations trained on irrigation technologies.</p>		<p>Expected: Increased investments through scaling-up of the new technologies in water harvesting at the country level.</p>	
<p><b>(8)</b> Improved Sanitation and Water Supply Service Delivery to the Urban Poor in Ghana through</p>	<p>Cities</p>	<p>Water technology</p>	<p>Test a range of different innovative management models, approaches and technologies for providing WASH services to the urban poor.</p> <p>Innovative technologies and approaches tested, including: multi-purpose water / sanitation / washing facilities, EcoSan, biogas; micro-financing for household latrines; social marketing for sanitation;</p>	<p>Demonstration of more cost effective approaches will lead to increased output from available funds. Improved financial management and effective cost recovery. The project will learn from the community water and sanitation sector in Ghana which has a long history of</p>	<p>Three pilot project target towns / slums provided with improved infrastructure for sanitation, solid waste and water supply (including public, institutional and household</p>	<p>Baseline surveys conducted, designs prepared and WSS infrastructure put in place in the 3 pilot zones, impacting 15,000 people in an urban slum and 30,000 in two small towns.</p>	<p>The study was sponsored by the NGO Platform of the Netherlands Water Partnership (NWP) and conducted by a Team of institutions comprising the Training, Research and Networking for Development Group</p>	<p>Enabling environment improved for replication and scaling up of pro-poor WASH service delivery in Ghana.</p>	<p>There is a risk that replication and up-scaling may be hampered due to attrition and turnover of local Government staff. The TPP approach will widen the available pool of skilled support staff from Community Based Organisations (CBOs) or NGOs that could be recruited into MMDAs so</p>



<p>Tripartite Partnerships</p> <p><b>Africa</b></p> <p>Source:  <a href="http://www.africanwaterfacility.org/fileadmin/uploads/awf/projects-activities/Appraisal%20Report%20TPP%20Ghana%20v5%2041.pdf">http://www.africanwaterfacility.org/fileadmin/uploads/awf/projects-activities/Appraisal%20Report%20TPP%20Ghana%20v5%2041.pdf</a></p>			<p>intensive hygiene education, franchised management of public facilities; private sector entrepreneurs and facility operators, re-use of treated excreta by farmers; Capacity developed for sustained management of the facilities.</p> <p>Provide infrastructure in three pilot areas (two small towns and one urban slum) under the new management models. Support development of a more enabling environment by undertaking knowledge and advocacy activities.</p>	<p>applying policies for sustainable cost recovery.</p>	<p>latrines; improved drainage and waste disposal facilities; new waste containers and collection points).</p>	<p>The projects will impact the transient population, farmers who will make use of the by-products from EcoSan facilities and conservancy labourers.</p>	<p>(TREND), a local NGO, WaterAid and the Private Utility Service Providers Association (PRUSPA).</p>		<p>that experience gained will not be lost.</p>
<p><b>(9)</b> Kisumu District primary schools water and sanitation project.</p> <p><b>Africa</b></p> <p>Source:  <a href="http://www.africanwaterfacility.org/fileadmin/uploads/awf/publications-reports/Kisumu%20Case%20Study.pdf">http://www.africanwaterfacility.org/fileadmin/uploads/awf/publications-reports/Kisumu%20Case%20Study.pdf</a></p>		<p>Water technology</p>	<p>Construct rainwater harvesting systems, EcoSan toilets and solid waste management systems in the 6 selected schools          Train pupils, teachers and parents in hygiene and environmental sanitation;          Increase the capacity of the schools, local Governments, artisans and other stakeholders to manage and maintain the facilities.</p>	<p>Savings in medical bills due to reduced incidences of diseases especially those related to water and sanitation.</p> <p>Reduced burden of frequent constructions of pit latrines at school.</p>	<p>Contribute towards improved health and better environment, and at the same time contribute to meeting the water supply and sanitation needs of the schools in a sustainable manner</p>	<p>Improvement in the quality of life in the community, where the drudgery of fetching water of doubtful quality daily from long distances (mostly by women) is replaced by easily accessible water sources, even if available to only children and teachers in some of the communities.</p> <p>In respect of sanitation, the near absent open defaecation not only raises the dignity of the beneficiaries but more importantly reduces the incidence of sanitation-related diseases within the communities.</p>	<p>The presence of several actors in Kenya's WASH sector means that small interventions must be implemented through partnerships with other senior actors and the key ministries if they are to be visible in a way that will inform national policy. The Kisumu Project's lessons had a better chance of informing policy if key national level ministries and agencies had been brought on board at its inception.</p>	<p>Serve as a demonstration for scaling up of the project model in nearby districts and throughout the country.</p> <p>One of the international NGOs working in the Kisumu area planned to use the ECOSAN designs in their interventions.</p>	<p>Challenges posed by natural characteristics such as swamps, floods and rocky conditions makes reliance on traditional pit latrines unsatisfactory. Adaptations for more appropriate technologies for household level toilets need to be explored. The toilets are suitable for school going children of about 10 years and above. They are unsuitable for very young pupils, physically and mentally challenged and the elderly.</p>
<p><b>(10)</b> Pilot project for the introduction of water</p>	<p>Agriculture</p>	<p>Water technology</p>	<p>Introduction of appropriate low cost systems for the collection of rainwater for irrigation and drinking water.          Increase productivity of the land</p>	<p>Productive use of rainwater for vegetable gardening (small scale</p>	<p>Direct and indirect environmental benefits include runoff management,</p>	<p>Direct and indirect capacity building (skill development, knowledge building,</p>	<p>The project intervention areas were specified to be in Bugesera and</p>	<p>Beneficiaries from CUEP project in Bugesera District are now well informed on</p>	<p>The quality of rainwater harvested from rooftop does not usually meet the WHO guidelines for drinking water quality,</p>



<p>harvesting techniques in Bugesera</p> <p><b>Africa</b></p> <p>Source:  <a href="http://www.rema.gov.rw">www.rema.gov.rw</a></p>			<p>through proper management and sustainable conservation. Reinforce the capacities of local farmers and support agencies to implement and manage techniques for RWH and protection of natural resources.</p>	<p>irrigation).</p> <p>Productive use of rainwater for home-based economic activities such as livestock, beer brewing, brick making etc.</p> <p>Money saving for concerned schools and households due to water availability by the pilot CUEP project in Bugesera District.</p> <p>Income generating activities may also be the result of the utilisation of time saved in collection of domestic water.</p> <p>Improvement of vegetables cultivation through irrigation by harvested rainwater.</p>	<p>soil and water conservation and agro-forestry trees planting.</p>	<p>organisational development), reduction of vulnerability, strengthening of social and physical infrastructure, all have helped to alleviate poverty in CUEP project intervention zone. Children and particularly young girls may be deprived of education due to the need to assist their parents in collecting water from far-away sources. The time saving in collection from the close to home source will allow them to attend school.</p>	<p>Rwamagana Districts of the East Province and Nyaruguru in the South Province for activities supported by FAO-MINITERE agreement while only Bugesera District was covered by ADB-MINIECOFIN Agreement.</p>	<p>the practice of rainwater, water harvesting and environmental protection, it is highly recommended that these practices are up scaled and replicated throughout Rwanda, in particular in the Eastern province where water scarcity problems mainly are encountered.</p>	<p>particularly for bacteriological quality. One adverse social impact concerns the risk of accident for children, domestic animals and livestock if the ponds are not properly fenced to keep them off. The potential serious environmental problem is the erosion of catchments leading to increased sedimentation, which reduces the storage capacity of the reservoirs and periodical excavation is becoming necessary.</p>
<p><b>(11)</b>          Ecological sanitation in Central Asia</p> <p><b>Asia</b></p> <p>Sources:  <a href="http://www.unece.org/env/documents/2011/ece/cep/ece.cep.s.2.011.1.2.e.pdf">http://www.unece.org/env/documents/2011/ece/cep/ece.cep.s.2.011.1.2.e.pdf</a>  <a href="http://www.afghanweb.com/environment/sanitation.html">http://www.afghanweb.com/environment/sanitation.html</a></p>	<p>Water technology</p>	<p>Ecological sanitation uses recycled human waste as fertilizer for agriculture. Ecological sanitation implemented in form of dry toilets in 5 schools in villages of Kostanai and South Kazakhstan oblasts and under the program 'empowerment and local action' carried out by Women in Europe for a Common Future.</p>	<p>Supply of cheap fertilizer (mainly among farming-orientated households).</p>	<p>Prevent of groundwater pollution with nitrates and bacteria from use of pit latrines.</p>	<p>Access to adequate sanitation for populations in remote areas.</p>	<p>Kazakhstan still receives foreign aid, while 55% of the population are supplied with drinking water through a central water and sanitation system (CWSS). The rural population in particular suffers from poor access to safe drinking water and sanitation.</p>	<p>Experience in Kazakhstan has shown that dry latrines are especially useful for rural schools and in the recovery of destroyed housing after disasters.</p>	<p>The successful introduction of such a new technology requires a change in behavior and must be accompanied with awareness raising, training and motivated local partners</p>	



<p><a href="http://www.wecf.eu/english/about-wecf/issues-projects/countries/kazakhstan.php">http://www.wecf.eu/english/about-wecf/issues-projects/countries/kazakhstan.php</a></p>									
<p><b>(12) Drip irrigation technology in Israel</b></p> <p><b>MENA</b></p> <p>Sources:  <a href="http://www.worldwatch.org/node/6544">http://www.worldwatch.org/node/6544</a>  <a href="http://www.nesc.wvu.edu/pdf/WW/publications/pipeline/PL_WI199.pdf">http://www.nesc.wvu.edu/pdf/WW/publications/pipeline/PL_WI199.pdf</a>  <a href="http://www.biu.ac.il/Besa/waterarticle7.html">http://www.biu.ac.il/Besa/waterarticle7.html</a></p>	<p>Agriculture</p>	<p>Water technology</p>	<p>Over half irrigated area is now under drip irrigation in Israel. Modern drip technology includes computerized systems, fertigation by applying fertilizers directly to plant roots, and pressurised drippers enabling stable distribution of water.</p>	<p>Drip irrigation has played a major role in improving water use efficiency. Drip irrigation technology forms a major part of Israeli water technology exports (estimated that by 2017, Israeli companies will control about 50% of the global market).</p>	<p>SDI allows manipulation of root distribution and soil conditions in arid climates to better manage environmental variables, e.g. nutrients, salinity, oxygen and temperature. conserves water, controls weeds, ; minimizes runoff and evaporation, increases longevity of piping and emitters.</p>	<p>Sub-surface drip irrigation (SDI) accounts for 5-10% of irrigated area, and eases use of heavy equipment in the field, prevents human contact with low-quality water.</p>	<p>In the future, the amount of water consumed for the irrigation of agricultural crops will be first and foremost affected by the government's policy on agriculture. A policy of an unsubsidized market economy, which does not protect agriculture, will result in a decline in the area of farmed agricultural land and a clear decrease in the amount of water for irrigation of agricultural crops. The government can decide upon extensive agriculture, which will be supported by water prices that are lower than production costs.</p>	<p>Israeli institutions are leading the way by showing that sharing expertise and replicating innovative strategies can be a powerful tool in helping to sustain livelihoods of small farmers in dry areas.</p>	<p>Emitters can potentially clog, affecting the uniformity of application.</p> <p>Temporary use of sprinklers or other surface irrigation may be necessary during plant germination period.</p> <p>It is difficult to monitor and correct potential emitter clogging.</p> <p>Effects of freezing temperatures on drip systems and applying wastewater to frozen ground is still the subject of study and debate.</p>
<p><b>(13) Sustainable water management in Singapore</b></p> <p><b>Southeast Asia</b></p> <p>Sources:  <a href="http://www.workingwithwater.net/view/934/water">http://www.workingwithwater.net/view/934/water</a></p>	<p>Industry</p>	<p>Water technology</p>	<p>Historically, Singapore has been dependent on external sources of water because it has a limited amount of land area to store rainfall. In order to reduce its dependence on external sources of water, Singapore has developed and implemented extremely efficient demand and supply water management practices. Singapore's approach involves integrating a water demand management program that emphasizes the proper handling of the transmission and distribution network, with water conservation measures. This strategy is a combination of rainfall storage,</p>	<p>Federal investment in desalination, reuse of wastewater, catchment management, public education programs, water-related recreational activities. Supply and demand water management policies. Water conservation fees Water conservation tax for domestic and non-domestic water users Water-Borne Fee is levied to offset the cost of treating used water and finance the</p>	<p>Improvements in water quality.</p>	<p>Improvements in water security. Education/training in water conservation for Singapore's citizens. Decreased reliance on foreign water supplies. Increase in recreational water activities.</p>	<p>It is very important to have correct policies and good leadership, otherwise the policies won't be consistent or last long.</p>	<p>PUB has initiated numerous innovative approaches to manage the total water cycle in Singapore. Many of these approaches can be adopted by developed and developing countries to improve their water management systems. If the MDGs that relate to water are to be reached, the example of Singapore needs to be seriously considered for adoption by developing countries concerned</p>	<p>Alternative sources of water such as seawater desalination have a high energy footprint.</p> <p>Future water supplies and treatment will probably be more energy intensive.</p>



<p>- management- learning- from- singapores- water- success-/   <a href="http://www.cost.esf.org/download/5350">http://www.cost.esf.org/download/5350</a>   <a href="http://english.peopledaily.com.cn/90001/90781/6247476.html">http://english.peopledaily.com.cn/90001/90781/6247476.html</a>   <a href="http://hdr.undp.org/en/reports/global/hdr2006/papers/cecilia_to_rtajada_singapore_casestudy.pdf">http://hdr.undp.org/en/reports/global/hdr2006/papers/cecilia_to_rtajada_singapore_casestudy.pdf</a></p>			<p>desalination and very sophisticated technology for recycling used water.</p>	<p>maintenance and extension of the public sewerage system. Sanitary Appliance Fee (SAF) is also levied per sanitary fitting per month.</p>				<p>and the donor community, after appropriate modifications.</p>	
<p><b>(14)</b> ZINNAE: Zaragoza Urban Cluster for Efficient Water Use  <b>Europe</b></p>	<p>Cities</p>	<p>Water technology</p>	<p>The city of Zaragoza has made important collective efforts for the efficient use of water to all social sectors. The combined process of institutional and technological change and adoption has lead to the creation of specialised companies and to accumulating important experience.          The city has become a space of permanent demonstration and innovation from the creation of projects related to the use of urban water.          Two external global trends guarantee the timeliness of this initiative: 1. The water market is one of the first five markets of the world, with a turnover reaching US\$400 billion and an annual growth rate of 7%, according to data disseminated by Watertech Online. 2. The amount of water demanded in the world will have an ongoing increase, largely due to the</p>	<p>Allow economic resource savings both to the citizens, the public administrations, big companies and consumers.</p>	<p>Expected:          To boost efficiency and sustainability in water use and management as well as in the associated energy consumption of the city of Saragossa.</p>	<p>Expected:          To turn the efficient use of water into a driver of quality employment for the city.</p>	<p>ZINNAE integrates in 2011 twenty six public and private entities which take part of the hydrological cycle management in the urban area. They are all part of the Water efficiency Sector in Zaragoza.</p>	<p>Both the cluster development and Waterlabs project increase the innovation potential of business sector, and identify RTD projects for Research Centers. This is relevant for developing countries in two ways:          Launching Research and Technology Development projects for water solutions.          Favouring the cluster working methodology which involves joining efforts between Research sector, business sector and local and regional authorities.</p>	



			growth of urban population (in 2020 "over 50% of the population in developing countries will be urban").					
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<b>Tool 6: Water planning</b>									
Case and region	Issue	Type of tool	Description	Economic impacts	Benefits for the environment	Social /poverty alleviation impacts	Governance issues	Scaling up and relevance for developing/ transition countries	Constraints
<b>(1) Water planning for IWRM in Lao PDR</b>  <b>South-east Asia</b>  <i>Source: Zaragoza conference case study paper</i>	Watershed	Water planning	Water planning within the framework of IWRM is a key instrument for tackling pressures on water resources (industrial pollution, urbanization, fertilizers, deforestation etc.) Focus on participatory planning Cooperation between riparian countries for management of the Mekong River Basin	Rapid growth with increased demands of water services. Diversification of crops, and opening opportunities for rural development. Significant improvements in health conditions and education. Coordination of actions to share the benefits of river conservation along the different countries in the river basin.	Guarantee of maintenance and recovery of water quality through better enforcement of regulations. Maintenance of the water quality and quantity flowing to the Mekong delta. Reduction in floods risks.	Security over the attainment of MDG and continuous effort to provide development options for rural people.	Construction of an institutional set up to reinforce cooperation among the countries sharing the Mekong river basin.  Development of institutional capabilities to deal with complex water management issues at a national and local scale.  Improvements in transparency, involvement of local actors and stakeholders.	Coordinated response to increasing demands and water management conflicts as the economy speeds up.	Financial resources required to invest in water.  Increased costs of reaching scattered rural populations.  Lack of water management skills and need to develop institutional strengths.
<b>(2) The Four Major Rivers Restoration Project, Korea</b>  <b>Asia</b>  <i>Source: Zaragoza conference case study paper</i>	Watersheds	Water planning	A program intended to the restoration of the Four Major Rivers of South Korea in order to provide water security, flood control and ecosystem vitality.  The project will also prevent natural disasters such as floods and droughts, protect the environment and promote historical and cultural tourism.	Securing the water resources for continuous economic growth. Increased security in the case of extreme events and climate change. In addition, Korean government is expecting that there are more new jobs will be created in leisure, tourism, cultural industries, etc by this project.	Recovery of basic ecological functions of the rivers due to improvements in quality, insurance of ecological flows, and bank restoration. Enhanced biological potential of river ecosystems. Substitution of artificial river banks by improved river beds as the main elements to provide flood control.	Securing of previous growth gains and insurance of water provision services in the long term. Significant gains in terms of avoided extreme events damages.	Reinforce of river oriented community developments.  Promotion of innovative technologies and information systems to support water management effectiveness and transparency.	Example of a long term anticipatory planned response to tackle with current and prospective water scarcity and increased drought and flood risks due to climate change.	Some potential for conflict with particular local stakeholders and persistent political opposition that was overcome by extended communication and social participation.
<b>(3) The Ebro River Water Plan and the green</b>	Watershed	Water Planning	The Ebro Water Plan is an opportunity to build an ethical, efficient and sustainable water management system for the Ebro	Contributes to sustainable growth, strengthening the agro-food complex in the Ebro valley	Recovery of the good ecological status of more than 80% of the surface and ground water bodies	56% of investments considered in the Ebro Water Plan are for improving the environmental status of	Public participation and stakeholder involvement in the whole decision process		



economy, Spain <b>Europe</b> <i>Source: Zaragoza conference case study paper</i>			River Basin Plan developed under IWRM principles Includes commitments to reduce pollution and increase water efficiency Modernization of irrigation key to reducing diffuse pollution, increasing water efficiency, increasing productivity and ensuring a better water footprint balance in Spain	Strengthens role of water as a renewable energy source Encourages the inclusion of new water uses such as for recreation Reducing pollution from point sources implies creation of green jobs. Multiplied effects over the economy and significant direct, indirect and induced effects on employment.	(only two of them being in fair condition after 2015). Notable increases in water flows and chemical quality of water, insurance of ecological flows, and river restoration.	water Ambitious environmental objectives, with at least 85.3% of river water bodies to achieve good status by 2015. Opportunities for local and rural development based on the potential of improved water ecosystems for rural tourism, angling, and other recreational services.	and in the following of the IWRM Plan.  Improvements in communication and transparency of water policy decisions		
<b>(4)</b> Development of a IWRM plan in Namibia <b>Africa</b>	Watersheds	Water planning	A National Water Resources Development Strategy and Action Plan; better understanding of water use and allocation, water demand management options; A framework for integrated water and land resources; development of institutional capacity and human resources; A provision for funding mechanisms for implementation;	The Plan is expected to improve economic efficiency in the country in the long term, with benefits to the agricultural sector from improved land and water management, reduced risk of floods and droughts, as well as from insured coverage of urban water demands. Especially to the industrial centers.	Significant benefits expected from improved sanitation and effluent control.  Important contributions to the recovery of the rivers as water sources are optimized for water supply.	Project expected to contribute towards social equity in the long term, improving health and sanitary condition of communities, enhancing water-related livelihoods in particular in arid southern areas.	Advances in international cooperation and coordination of national policies in the Okavango and the Zambezi river basins.  Need to develop local and regional abilities for water management in order to decentralize water policy decisions and facilitate public participation.  Lack of information, monitoring and enforcement capabilities.		Finance constraints and still low entrepreneurial capacity to take advantage of development opportunities.
<b>(5)</b> Preparation of an IWRM action plan for Niger <b>Africa</b>	Watersheds	Water planning	Project, launched in November 2010, will develop and implement a national IWRM action plan for long-term development of and investment in the water sector, with informed collaboration with stakeholders, and support from financial partners Activities to include: study of water resources situation; development of IWRM action plan and investment program; development of financing strategy; stakeholder and beneficiary awareness raising	Expected coordination of national plans towards the development of the Niger basin's resources notably in the fields of energy, water resources, agriculture, forestry, exploitation, transport and communication, industry.	Cooperation among the countries in the Niger River Basin to share the benefits of conserving the Niger River. Basic agreement of water flows, quality standards and decision procedures of water development projects.	Assurance of the MDG in the long term is expected as well as significant contributions for food security, and energy production.	Need to reinforce regulation capabilities at a local and national scale, as well as information technology and monitoring and enforcement capabilities of the public authority	Coordination of national development plans in order to avoid race to the bottom strategies and to preserve the water resources. Development of interbasin cooperative institutions to agree on policy priorities and water development projects.	Lack of financial funds at a national level.  Involvement of national authorities but not enough of local actors and stakeholders.  No tradition of participation y public decision processes.  High perceived financial risks from potential lenders.
<b>(6)</b> Implementation of the IWRM action plan in	Watersheds	Water planning	Project aims to strengthen the capacity of the Water Resources Directorate (DGPPE) to implement the national IWRM plan, including systematic water resources licensing,	The expected stabilization of the economy by the decoupling of income and production from	Recovery of basic ecosystems services resulting from restoration of river banks and improved	Project will contribute to the Government's poverty reduction strategy give momentum to the	Need to reinforce public water management skills and institutions strength to manage water during	Example of water planning at a river scale as a mean to mak water an integral part od the development strategy.	Lack of expertise and basic information about the water resources.  Weak implication of users



<p>Senegal <b>Africa</b></p>			<p>planning and integration of national IWRM into Senegal's transboundary water management activities          Activities include: improving water information and knowledge; strengthening investment planning for IWRM; strengthening DGPRE's institutional capacity, regulatory operations and economic recovery; awareness raising of stakeholders and decision-makers</p>	<p>the wide variations of water flows along time.           Significant reductions in drought and flood vulnerability and improved prospect for investments in agriculture and hydropower development.</p>	<p>quality as a consequence of controlling anthropic pollution.</p>	<p>achievement of the MDGs and the Africa Water Vision for 2025.           Significant reduction is expected in exposure of the poor to water pollution in particular in crowded and marginal areas on the main cities.</p>	<p>the economic transition.           Need to develop basic information Systems.</p>		<p>and stakeholders in policy decision taking processes.           Reduced ability to mobilize financial resources.           Lack of campaigns and education strategies about the importance of using and preserving water.           Lack of coordination of water with other development policies.</p>
<p>(7) Green growth policies in the food and agriculture sector, Korea <b>Asia</b></p>	<p>Agriculture</p>	<p>Water planning</p>	<p>Korea has been a pioneer in implementing green growth policies and has established a regular policy review process through Five Year Plans on Environment-Friendly Agricultural Industry          Initiatives include: reduction in use of chemical fertilizers, energy savings, promotion of organic agriculture, expansion of financial investment in agricultural green technology          Since 2010, the Government has been managing 27 regional environmentally-friendly agricultural enterprises of 1000 ha in rural areas</p>	<p>Many jobs to be created (about 5% of total employment in agriculture and food) through significant investments (US\$1.04 billion) promoting green growth in agriculture and fisheries</p>	<p>Reduction in fertilizer use of 8.8% in 2009-2010 through better use of bulk blending fertilizers matched to soil characteristics          Significant energy savings (and GHG emissions reductions) planned by increasing geothermal heating in greenhouses</p>		<p>A division dedicated to environmentally friendly agriculture was created in the Ministry of Agriculture and Forestry in 1994</p>		
<p>(8) City-wide sustainability plan: PlaNYC in United States of America <b>North America</b></p>	<p>Cities</p>	<p>Water planning</p>	<p>On Earth Day, April 22, 2007, New York City released PlaNYC, its far-reaching sustainability plan including 127 policy initiatives to achieve ten overarching goals to improve the infrastructure, environment, and quality of life in the city.          The plan aims to double the number of green jobs in 10 years, improve access to education, information, and coordination needed by workers and businesses to facilitate growth in the green economy, promote skill development to ensure New Yorkers meet requirements for green jobs, and increase demand for green products and services.          Various portions of the plan involve cleaning up brownfields (heavily polluted former industrial sites), encouraging public transportation, ferries and bicycling; creating more parks and playgrounds; planting one million trees within the five boroughs; reducing emissions in public buildings; and retrofitting or</p>	<p>Education and skills training for green jobs.           Increased market opportunities for green industries.</p>	<p>Project improvements in outdoor and indoor air quality and associated human health benefits.           Expected reductions in greenhouse gas emissions from reduced vehicle traffic, support for biking and walking paths, improved buildings emissions standards, and creation of more green space.</p>		<p>Adjustments to city planning and zoning codes.           Establishment of congestion pricing           Establishment of efficiency standards for buildings</p>		



			<p>replacing diesel trucks. Additionally, the plan also calls for enhancement of public transportation and water infrastructure security. Since the release of the plan, the City has made great strides towards implementing the plan – passing groundbreaking green buildings legislation, creating miles of bike lanes, opening acres of open space, cleaning the air, and reducing greenhouse gas emissions.</p>						
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