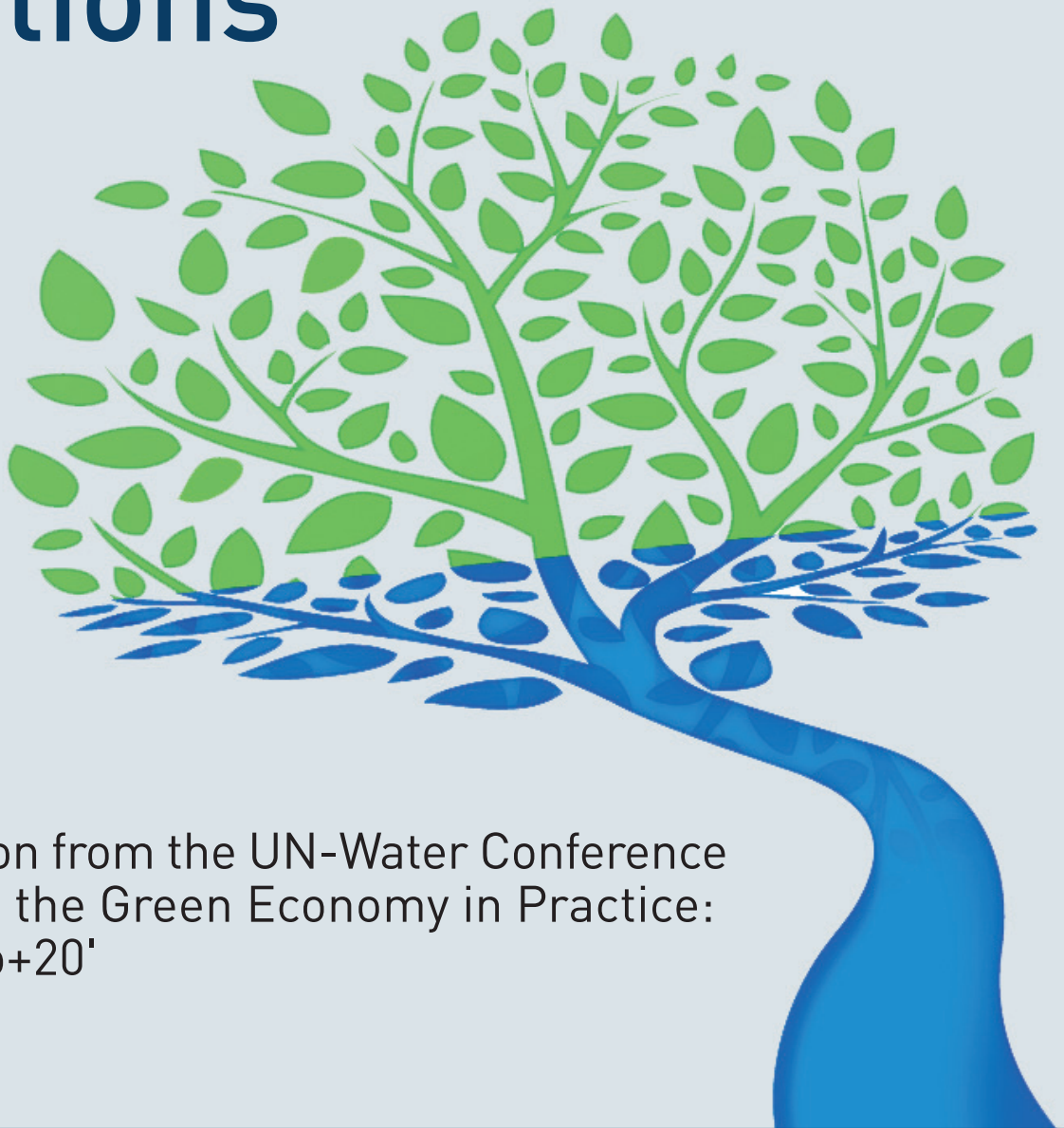
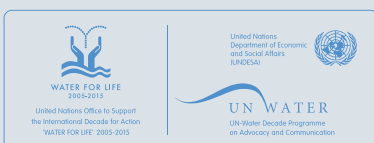


A water toolbox or best practice guide of actions



A contribution from the UN-Water Conference
on 'Water in the Green Economy in Practice:
Towards Rio+20'

Compiled by the UN-Water Decade Programme on Advocacy and Communication (UNW-DPAC)



ESCWA



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PART 1: Introduction

1. The toolbox

A green economy in the context of sustainable development and poverty eradication is one of the two key themes of the United Nations Conference on Sustainable Development (UNCSD), Rio+20. The “Synthesis report on best practices and lessons learned on the objectives and themes of the United Nations Conference on Sustainable Development” (A/CONF.216.PC/8) from January 2011 proposes that international preparations for the conference should strengthen support for sustainable development by **providing a platform for exchanging best practices and lessons learnt**.

According to the Synthesis report, it is important **to look at existing experiences** and to **consider a variety of approaches**, assessing how they contribute to sustainable development and poverty eradication. It suggests the development of a **toolbox or best practice guide of actions, instruments and policies** to advance the green economy.

This water toolbox is an output from the UN-Water conference on ‘Water in the Green Economy in Practice: Towards Rio+20’. The objective is to provide proposals based on the analysis of existing practice, reflecting specifically on lessons from implementation, scaling up and the relevance for developing and transition countries.

The toolbox has been compiled by the UN-Water Decade Programme on Advocacy and Communication (UNW-DPAC) on the basis of the documents and papers prepared for the conference by the Organization for Economic Cooperation and Development (OECD), International Labour Organization (ILO), World Bank, UN Environmental Programme (UNEP), UN-Water Decade Programme on Capacity Development (UNW-DPC), Ebro River Basin Authority (CHE), UN Economic and Social Commission for Western Asia (UN-ESCWA), and UN Economic Commission for Latin America and the Caribbean (UN-ECLAC). The documents and comments provided by a wide range of stakeholders before and during the course of the conference also contributed to the content of this toolbox.

2. The issues

Water plays a fundamental role in the green economy as it interacts with poverty, food security, health and so many other sustainable development issues. The UN-Water conference has identified four priority water-related issues where the change towards a green economy needs to take place: agriculture, industry, cities and watersheds. Information briefs were prepared for each of these issues and reviewed by the concerning UN agency. This section highlights the key points from these information briefs.

- **Agriculture** can play an essential role in achieving a green economy since it accounts for 70% of global water withdrawals and provides employment for 40% of the global population. The key objective for agriculture is to achieve food security for an expanding population, but by using fewer natural resources.

Challenges:

- Water scarcity and water quality degradation trends;
- Rising food prices;
- Vulnerability of small-scale farmers;
- Growing population, food production and dietary habits;
- Inefficient use of water;
- Non-point source pollution of water, land and coastal areas.

Approaches to address the challenges: Coping with these challenges will require adaptations in agricultural practices, food production chains, food markets, land management, water management practices –including pollution control– information and knowledge, institutional capacities and, water governance.

- **Industry** is critical for the delivery goods and services and for the creation of job opportunities to foster poverty alleviation and the improvement of living standards. As the prime manufacturer of the goods and services that societies consume, industry has a critical role to play in creating more sustainable production and consumption patterns. It can promote the green economy by decoupling the consumption of materials and energy from production, so doing 'more with less'.

Challenges:

- Excessive use and contamination of freshwater;
- Low labour productivity and a limited capacity for innovation in developing countries;
- Inefficient and unsustainable production and promotion of unnecessary consumption.

Approaches to address the challenges: Coping with these challenges requires advances in regulatory frameworks, a better normative framework focused on adapting manufacturing practices to the objectives of a green economy, voluntary agreements and proper incentives. These approaches will enable more resource efficient production and processes; improve technological innovation, transfer and diffusion; and build the adaptive capacities and skills required for the adoption of better water management practices.

- **Cities** have a central role to play in the green economy, since the majority of the world's economic activity and now over 50% of its population is concentrated in urban areas. Developments in cities have far-reaching effects upon the world's economies, energy use and climate change. As centres of social interaction and economic activity, cities are the critical spatial platform for the formulation and implementation of policies across sectors.

Challenges:

- Adequate water and sanitation facilities for growing urban population;
- Meeting basic needs in slum areas;
- Water pollution;
- Water loss in supply systems;
- Water price.

Approaches to address the challenges: Coping with these challenges requires building institutional capacities and governance to enhance the sustainability of urban development, the recognition of the importance of natural capital and ecosystem services for a more harmonic integration among urban and rural areas, awareness-raising, social involvement and leadership to make the objectives of green urban development the focus and the identity of cities, and sustainable urban water management.

- **Watersheds.** Freshwater ecosystems provide services that are crucial for human survival, supporting the economy and for the conservation of natural capital. Water ecosystems provide clean water for household use, agriculture and industry; they support fisheries; recycle nutrients; remove waste; replenish groundwater; help prevent soil erosion; protect against floods, etc. This is particularly important for the world's poor, as they often depend directly on water and other ecosystem services provided by rivers, lakes and wetlands for their livelihoods. Freshwater ecosystems are also water consumers and require water (environmental flows) to function and to ensure the ongoing supply of valuable ecosystem services.

Challenges:

- Environmental degradation and loss of freshwater ecosystems;
- Overexploitation of water resources;
- Climate change;
- Lack of information and monitoring;
- Weak participatory processes.

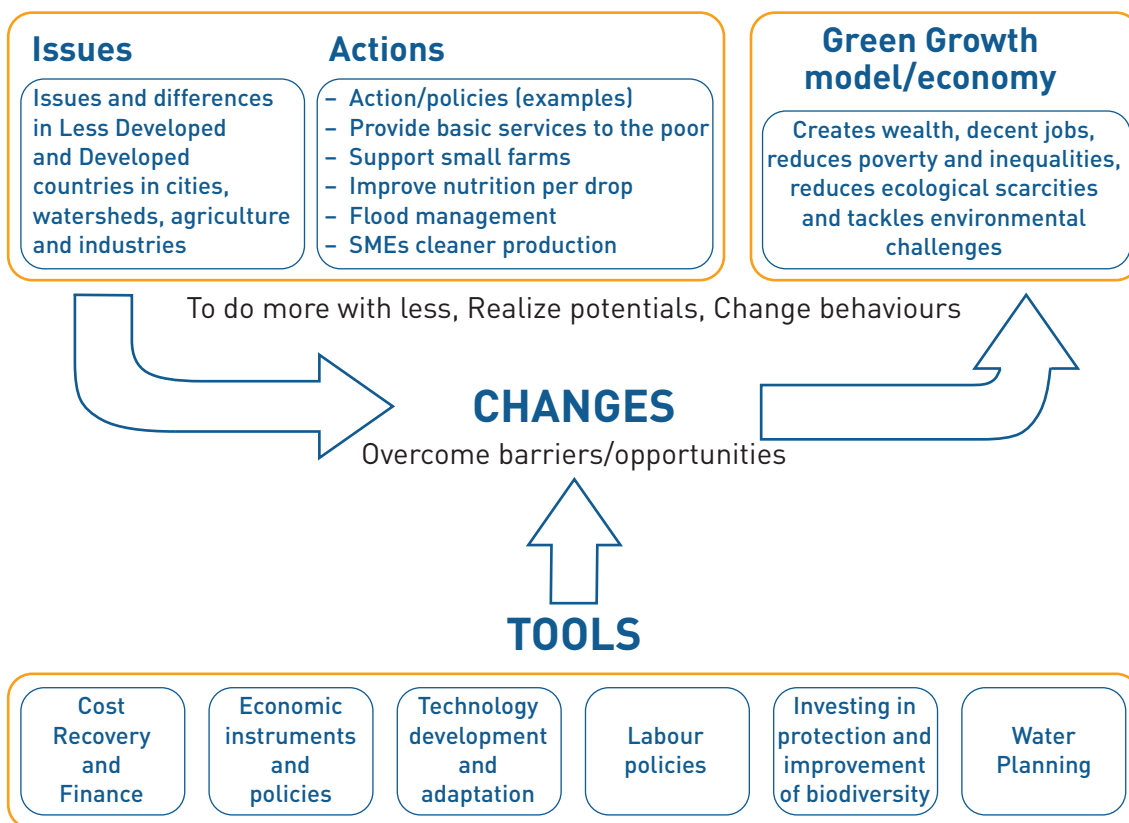
Approaches to address the challenges: Investing in the recovery and the adequate protection of natural capital and freshwater ecosystems must be a primary policy objective and coordinated with all other public policy sectors (e.g. agriculture, hydropower, manufacturing, urban development). This requires building the capacity of governing institutions to agree on precise objectives for ecosystem conservation, to implement and enforce these objectives, and to implement Integrated Water Resources Management. Water resources management requires the development of resilient and adaptive social responses to extreme events and climate change.

3. The tools

Transitioning to a green economy requires a shift from current practice. This toolbox proposes six tools which can be used to promote change and support the transition towards a green economy: (1) economic instruments; (2) sustainable financing; (3) investments in natural capital; (4) technology; (5) green jobs; and (6) water planning.

These tools are those identified in the UNEP Green Economy report as essential for overcoming the current barriers that obstruct the transition to a green economy, harnessing opportunities for economic progress and addressing the important social and equity issues of sustainable development. They enable us to 'do more with less' and change behaviours in order to achieve a green economy. Although this toolbox presents each tool separately, they should be perceived in an integrated manner. Only as a whole, these tools can ensure the transition to a green economy.

THE FRAMEWORK



4. Enabling conditions

The conference session conveners and stakeholder participants identified a set of enabling conditions, which are cross-cutting and critical for the implementation of each of the tools proposed in this toolbox: (i) institutional capacity; (ii) political will; (iii) good governance; (iv) a long-term integrated perspective; (v) consensus at all levels; and (vi) knowledge sharing.

PART 2: The tools

1. Economic instruments for water management in a green economy

Economic instruments (EIs) are all incentives to modify individuals' behaviour in a predictable way such as, for example, reducing water consumption, reducing pollution loads or adopting a modern irrigation technique. There is a need to increase the use of economic instruments, enforce them and share experiences in order to improve efficiencies in water supply and sanitation services and in water use.

Utilising economic instruments in water management has a number of advantages. They can (i) avoid costly investments and make the case for low-cost, non-technical measures (e.g. ecosystem services to secure water or protect against floods); (ii) generate revenues to fund water management and water-related infrastructure; (iii) align incentives and strengthen policy coherence across the board (water, energy, food, land use); and (iv) provide information on the costs of status quo, the benefits of reform, and the distribution of these costs and benefits.

1.1. Approaches

- Environmental or green taxes;
- Water and sanitation charges;
- Marginal pricing to incorporate the scarcity value of water;
- Fees;
- Subsidies;
- Markets and trading (of water use and pollution rights);
- Market based instruments such as payment of ecosystem services;
- Consumer driven accreditation and certification schemes;

- Arrangements to send scarcity signals (including trading of water and emission rights, and offset schemes);
- Insurance schemes;
- Buy-back of water use rights for the environment.

1.2. Lessons learnt from implementation

- Many decisions regarding water are made by households, firms, farmers and other economic agents that use water resources to satisfy individual demands. Properly designed and implemented economic instruments (EIs) have the potential to make all these individual actions coherent with the ability of water ecosystems to continue providing the services that underpin economic growth, the generation of public goods (such as security, health, recreational amenities, etc.) and the preservation of the water environment;
- EIs are not ends in themselves, but means (incentives) to the actual ends of water policy (increased efficiency in the use of water, reduce poverty, etc.);
- Water users respond to incentives. Introducing a variety of EIs can support the transition towards a green economy. A combination of subsidies, taxes and pricing may generate an optimal outcome;
- EIs are useful but only in combination with good policies and regulation. The progressive implementation of economic incentives accompanied by institutional development can enable society to respond to water security challenges (e.g. prices to reduce water consumption in Israel –especially during droughts–, markets to secure water for the environment in the Murray-Darling basin);
- For any given water issue there are many different alternative EIs available. Instruments should be selected according to the country's stage of development and institutional framework (e.g. dealing with water scarcity prices may work in Israel; markets may be more appropriate in Australia);
- Innovative EIs need to be adapted to the pre-existing institutional frameworks and to local conditions. They need to take into account other areas of public policy (e.g. agricultural policy, energy policy, climate change policy, environmental policy);
- There is no such thing as the wrong or right price for water services. The right incentive is that which allows individual decisions over water use to be compatible with the collectively agreed goals of water policy;
- Compared with behaviour change that is mandated by policy or law, EIs have the advantage of reducing information and research costs (for example users may be more able than governments to find the most efficient ways to save water or to develop innovative alternatives to reduce pollution);
- EIs can be a powerful tool for encouraging the development or adoption of new water sources, e.g. water reuse, desalination;

- Any EI offers many design options (water prices can be flat or volumetric rates, fix or variable per unit of consumption, etc.). The potential of an EI to deliver its intended environmental outcome depends on its design (e.g. flats rates do not change behaviour and progressive prices are better to discourage excess water consumption);
- Water markets can help secure water supply by allowing the trade of water from areas of surplus to areas of scarcity. Markets can reduce water demand by allowing the trade of water from low to high value uses, creating incentives to use water efficiently and reduce demand;
- The use of water markets and trading needs to be properly regulated to safeguard public, third party interests and to ensure environmental objectives are met;
- Marginal pricing can signal the optimal time to invest in water infrastructure so that supply is augmented efficiently, and can reduce demand for water during periods of scarcity;
- Good information about prices can encourage market participation and deliver more efficient transactions;
- It takes time to set up the infrastructure and enabling conditions for markets. The government can play a role in establishing these conditions and getting all stakeholders on board;
- Water markets can enable irrigators to respond more flexibly to drought;
- Buy-backs of water use rights for the environment can secure water for environmental flows and offset economic losses;
- Emission permit trading for point and non-point pollution allows pollution to be reduced from the lowest cost sources. Emission taxes create on-going incentives for all sources to reduce pollution;
- In spite of recent improvements in information and communications technology, inspection and enforcement costs are still high in many water policy contexts. The benefits and efficiencies gains achieved with EIs may be undermined by the high transaction costs resulting from implementation, monitoring, enforcement, bargaining costs, and so on;
- EIs are effective when intended behavioural changes can be properly achieved at reasonable monitoring and enforcement costs;
- Implementing EIs is more challenging when the political priority is social equity and poverty reduction rather than increasing water efficiency;
- It is necessary to demonstrate the effectiveness of implemented policies and actions.

1.3. Cases

Subsidies for water infrastructure as an engine of growth in South Africa

Subsidies for key infrastructure have been used as an important tool to realise the potential of water as an engine of growth in South Africa. Infrastructure development has enabled the management of South Africa's water resources, both by storing water during the wet season for use during the dry and by transporting it from further afield.

Water pricing and command and control for water demand management in cities and agriculture in Israel

Israel provides an example of the successful use of water pricing to manage water demand in a severely water-scarce country. The country has pioneered water-efficient technologies and practically all water consumption is metered. In recent years, the financial burden has been shifted to consumers that pay higher water tariffs. These tariffs reflect cost recovery, the scarcity of resources and the cost of rehabilitating natural assets that have been deteriorated. Increases in water prices has both reduced water use and encouraged the use of recycled and desalinated water sources for irrigation.

Water trading in the Murray-Darling Basin

In Australia an expanding market for the trading of water use rights –90% of which takes place in the Murray-Darling Basin– has enabled water to be allocated efficiently amongst users under conditions of water scarcity. Over a decade of progressive water reform has provided the framework for the country's market based approach, illustrating the lengthy process of setting up the infrastructure necessary for a market. Two key success factors were the decoupling of water rights from land rights, and making water rights proportional shares of available resources rather than fixed volumes. Environmental sustainability is ensured through the purchasing of water rights for the environment.

2. Financing water development in a green economy

In the transition to a green economy, financing means mobilising the funds required to drive sustainability and growth in parallel, alleviate global poverty, foster innovation and new green technologies, create green jobs, reduce scarcities, abate waste and greenhouse gas emissions and increase efficiencies in the production and consumption of water and energy. UNEP has estimated that under the green economy investment scenario the additional investment in the water sector that is required would be \$191 billion per year until 2030 and \$311 billion per year until 2050. The challenge is more than just attracting funding; it is also about making better use of the limited financial resources available.

Apart from providing access to water and sanitation and building water infrastructure, funding is particularly needed to increase resilience and adaptability to extreme events and climate change, reduce water scarcity, and diversify water supply sources and demand management. Financing is also essential for supporting capacity building, transparent information and enforcement mechanisms and improving water governance.

2.1. Approaches

- Improve the effectiveness of existing financing;
- Assess and increase the efficiency of government spending through Public Expenditure Reviews;
- More efficient use of water and energy and better quality services in order to improve corporate responsibility, public stewardship, social acceptance, cost recovery and the financial sustainability of water services provision;
- Improve economic returns in water utilities in order to improve access to funds and reduce financial risk premiums;
- Tariff reforms to reflect the real financial, resource and environmental costs of water services;
- Innovative funding schemes e.g. through Official Development Assistance of locally managed initiatives, results-based financing, public-private partnerships. These instruments include:
 - Social contract formulas of financing in urban areas and rural areas;
 - Enhancing investments for generating knowledge that is made available as a public good;
 - Small-scale financing;
 - Pro-poor financing;
 - Pro-The toolspoor cost recovery;
 - Results-based financing, e.g. via Output-Based Aid (OBA) schemes and social contracts and for pro-poor financing.
- Better focused financing and subsidies for poverty reduction and equity improvement, through micro-finance, and training opportunities supported by Social Safety Nets (SSNs);

- Reducing capital needs by adapting investment decisions to local resource endowments, giving priority to small scale, land- or labour-intensive options (e.g. substituting fixed capital by voluntary labour);
- Improving access to and effectiveness of capital at local and community level;
- Involvement of the private sector to improve efficiencies, e.g. through delegated management under Public Private Partnership contracts, outsourcing of non-revenue water reduction activities, and technical assistance contracts;
- Prioritisation of government investment in areas that stimulate the greening of economic sectors and the reduction of spending in areas that deplete natural capital;
- Prioritisation of financing programmes that generate strong synergies with local development.

2.2. Lessons learnt from implementation

- Public Expenditure Reviews (PERs) provide a transparent and objective means to assess the efficiency, effectiveness and equity of resource allocations. They serve to identify bottlenecks that impede appropriate and effective use of public funds. Water-focused PERs that link spending to outcomes can increase political will and help the government ministry responsible for water 'make its case' to the Ministry of Finance;
- Efficiency improvements are a key precondition to making water services financially sustainable in the long term. They serve to make cost recovery prices legitimate and socially acceptable;
- There are still significant gains to be obtained from improving the efficiency in the water sector. Inefficiencies can be technical (e.g. non-revenue water), managerial (e.g. corruption, billing, collection, pricing signals), institutional (e.g. sector governance, coordination among sectors), or related to the regulation and investment climate (macroeconomic policy, economic stability, long term confidence, etc.). Eliminating inefficiencies result in savings of more than 0.8% of GDP annually;
- There is a positive feedback between increasing the effectiveness of public funds and increasing efficiencies in service provision. Public expenditures that effectively target the poor and build vital infrastructure provide the foundation for sustainable service delivery. Improving efficiencies in service provision increases profitability, improves willingness to pay, and justifies 'green' tariffs that reflect financial and environmental costs. Creditworthy providers are able to access new funds at better terms, reducing the reliance on public funds;
- Cost recovery tariffs coupled with clear and transparent subsidies for low income families is an efficient way to rationalise water use and increase coverage of water and sanitation services; however an important precondition is public investment in the universalisation of service coverage;
- Mechanisms are needed to match the interests of potential investors with those who are most capable of applying financial funds to water investments. Small and medium

enterprises (SMEs), small holders and municipalities often have difficulty in accessing capital. Water User Associations may have similar problems;

- Revenue security is not only a way to guarantee the financial sustainability of water services but also to reduce risk and hence the cost of loans;
- There are considerable gains involved in making the best use of the scarce capital available. Reducing capital requirements or substituting capital with other inputs (e.g. voluntary labour or land), are means to reduce costs and cope with tight financial constraints;
- Significant efficiency gains can be achieved from better designed water tariffs such as separate charges for water supply, wastewater discharge, and surface water runoff;
- The severe financial constraints existing in many least developed countries translate into low levels of investments in the water sector. Well-managed projects generating financial revenues and with provisions for risk bearing are better equipped to cope with these financial constraints;
- Pricing water is still a political challenge in most of the world. Prices are important for making people aware of the importance of water, making water utilities accountable for the services they provide to their customers and for improving and guaranteeing the continuous provision and financial sustainability of water services;
- Collaboration and cooperation between governments, private, and public entities is the best way to support the expansion of water and sanitation services and invest in social welfare;
- Maintaining the MDG achievements already made in the long term depends on the ability to make the provision of basic water and sanitation services financially sustainable and also the capacity to finance water development for food security, energy provision and other critical areas of economic development;
- Generating revenue through tariffs is often difficult for some investments, particularly those with characteristics of public goods (e.g. sanitation, pollution treatment and abatement, biodiversity protection). Governments can play a proactive role in investing in water infrastructures that have relatively higher start-up costs. The benefits of these investments are longer-term with positive externalities;
- Cost recovery of water supply and sanitation services is a strong element of the financial sustainability of water utilities and allows for better service delivery to consumers (e.g. in the Western Asia region).

Lessons learnt in agriculture:

- The transaction costs of collecting revenue or making trades (in agriculture) are frequently high relative to the resource cost of the water. High income countries have been able to take advantage of investments for other reasons (i.e. GIS, remote

sensing) to cut the transaction costs of some interventions (e.g. separate charges for surface water runoff). These strategies have not been available to low income countries;

- Low cost revenue recovery mechanisms with the potential to generate secure streams of revenue are still required in the agricultural sector;
- Development of cost recovery mechanisms in agriculture can provide a constant and more secure flow of revenues independent of yield fluctuations. Drought insurances can help stabilize rural income and so secure revenues for water services.

Lessons learnt in relation to developing and least developed countries (LDCs):

- In developing countries, investments are needed to increase crop yields, for example through irrigation projects. Funds are also needed to improve the way water is used in the economy, through investments in efficient water transport, distribution and use systems;
- In spite of poverty and low saving ability, financial mechanisms for water development do exist in LDCs. For example, small scale finance can mobilise savings when they are scarce;
- In LDCs, low income levels result in low saving rates and low investment capabilities. Breaking this vicious circle is one of the main financial challenges that need to be overcome in order to begin the transition to a green economy;
- Eliminating the exchange risk premium by allowing multilateral development banks to lend in the domestic currencies of the developing countries would support the advance of domestic financial markets in these countries;
- Social contracts can foster the empowerment of rural communities to preserve their own water resources and promote development opportunities (e.g. the Naandi Foundation, India).

Lessons learnt in relation to pro-poor financing:

- Subsidies are necessary to help those who cannot afford to pay the full cost of water services. Subsidies have to be carefully designed to avoid unintended incentives to consume too much water or to favour capital intensive investments;
- Subsidies should be targeted to reach the poor and promote the efficient use of water and energy.
- Investments in water and sanitation and pro-poor financing can contribute to poverty alleviation. The most financially sustainable actions are those that reduce poverty and promote growth at the same time; they promote equality, but not at the expense of

growth and they make equity a condition for sustainable growth. These actions are easier to fund precisely because they offer better conditions for cost recovery;

- Rural poor households are willing and able to pay for water services. However, the implementation of volumetric water prices requires community awareness campaigns, especially when a cost recovery tariff is a novel concept;
- Financing programmes that target the poor must be built on a thorough analysis of the beneficiaries' local conditions in order to be flexible and custom-made. This requires interdisciplinary study of economic, social and psychology behaviour, as well as the rules, regulations and institutions that affect social behaviour;
- Credit for the poor is not the solution when it does not contribute to income generation or savings for consumers – it should be seen as a temporary measure.

Lessons learnt in relation to Output Based Aid (OBA) schemes:

- The successful implementation of OBA schemes for water services provision can generate a number of benefits:
 - A proven incentive to encourage competitiveness and efficiency;
 - Helps refocus service provision on household demand;
 - Rewards service delivery once quantity and quality are independently verified;
 - Acts as an incentive for providers to reach the poor (otherwise they risk low cost recovery);
 - Gives the poor an opportunity to connect to a network at low cost;
 - Increases accountability;
 - Provides an incentive for providers to pre-finance their work;
 - Transfers procurement and financial management-related risk to service providers and the private sector;
 - Provides incentives for the efficient use of money, materials and time;
 - Provides a simple regulatory, legal and contractual framework – including policies for setting and adjusting tariffs;
 - Makes monitoring of service delivery a priority;
 - Enhances an understanding of and willingness to work with performance-based arrangements;
 - Enables the capacity development of water authorities and social actors, e.g. to handle transaction processes such financial management and the monitoring and verification of results;
 - Develops experience in public-private cooperation, where relevant.
- OBA schemes are custom made and not easy to transfer from one context to another. Their effectiveness should be tracked through constant monitoring and evaluation;
- Governments must understand the benefits of being able to clearly monitor and measure the impact of its investments. The formulation of clearly defined incentives requires reporting systems that generate systematic and reliable information to

benchmark and monitor the efficiency with which resources are being used in terms of outputs and outcomes;

- OBA subsidies help serve the poor by filling the gap between what is affordable and actual cost of connection (e.g. water and sanitation provision to peri-urban poor in Morocco).

2.3. Cases

Pro-poor financing and tariffs in Medellin, Colombia

Empresas Públicas de Medellín, a service provider owned by the Municipality of Medellín have designed a number of programmes aimed to increase water services coverage, improve efficiencies, and target low-income households and peri-urban areas. These include a programme offering long-term credit at low rates to low income populations for construction of water and sanitation networks and connections to public utilities; a programme providing people with low payment capacity and bill debts access to low cost financing; a programme offering credit at competitive rates for home improvements and efficient appliances; contracting small community organisations for work related to water and sanitation services provision; and provision of public water services to peri-urban areas.

At the national level, a subsidies scheme offers low income users subsidies financed by an overquote in the bills of high income users, industrial and commercial users, and with municipality funds. Full cost pricing has ensured the financial sustainability of water utilities, reducing their dependence on budget allocations.

Output-based aid: extending water and sanitation services to the poor in peri-urban Morocco

In the poor suburbs of major cities in Morocco, water operators have invested in the much needed expansion of water and sanitation services in these areas through an output-based aid scheme. Operators pre-financed expansion of services and a pre-agreed output-based aid 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.

Social contract formulas in rural areas: the India Naandi Foundation water treatment plants

In India, a partnership between an NGO, a private technology provider and communities is delivering low cost drinking water treatment and provision to poor rural households with a community-driven and performance-based approach. As project manager, the Naandi Foundation secures pre-financing and contracts a private technology provider to build the UV filter water treatment plant and undertake operation and maintenance for eight 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. A performance-based donor subsidy is paid to Naandi upon the delivery of pre-agreed outputs which include three months of billed water services.

3. Investing in natural capital: Focus on Payment for Ecosystem Services

Investing in the improvement of biodiversity is critical for restoring and sustaining the water-related services provided by ecosystems. Freshwater ecosystems provide services that are crucial for human survival, for the functioning of the economy and for the maintenance of natural capital. The world's poor are particularly dependent on ecosystems, as their livelihoods often depend directly on water and other services provided by rivers, lakes and wetlands. Freshwater ecosystems also require water in order to maintain their functioning and provision of services. The quantity and timing of water flows required to are known as environmental flows.

3.1. Approaches

- Investing in biodiversity protection and in the protection of water providing ecosystems to enhance the provision of valuable environmental services and as a means to improve prospects for economic growth, provide security, sustain development and create opportunities for the poor;
- Implementing properly designed Payment for Ecosystem Services as an instrument to align individual actions with the goals of recovering and protecting valuable aquatic ecosystems;
- Implementing strategies to restore degraded river systems, guarantee environmental flows, recover floodplains, etc., not only from an environmental perspective but also as an integral part of an economic development strategy.

3.2. Lessons learnt from implementation

Payment for ecosystem services (PES) offers a real opportunity to bring the value of nature into the economic arena and thus promote improvements in natural capital. Lessons learnt from PES schemes are the following:

Public information and awareness to promote PES schemes:

- Education, public campaigns and dissemination of robust studies of the challenges faced are required to increase the public and private awareness of the importance of ecosystem services;
- Better information on the importance of ecosystems services can be important in sensitising stakeholders to upstream–downstream environmental linkages and to the economic significance of the ecosystem services provided;
- Increasing the recognition of how individuals' actions and welfare are interconnected through freshwater ecosystems is important for generating the willingness to engage in negotiations to find mutually beneficial agreements for ecosystem conservation. This is also important to gain social acceptance of PES as an instrument for water management;
- Information is essential to convince downstream water users that they should contribute financially to the protection, maintenance or restoration of ecosystem services by upstream landowners/managers. Downstream water users who already pay fees or taxes for their water consumption, may be 'forced to pay twice' by any additional levy or charge for ecosystem services;
- It is important to identify 'beneficiaries' and 'suppliers' of ecosystem services and representatives of each group who are able and willing to participate in discussions/negotiations on behalf of others. Stakeholders may include different categories of 'actors', some of whom are direct suppliers/sellers or users/buyers.

Start small and scale up:

- In most situations PES is an innovative instrument and its successful implementation requires overcoming an adaptive 'trial and error' and 'learning by doing' process. 'Starting small' and 'scaling up' is better than trying to implement a fully fledged financial mechanism from the beginning;
- PES is not a panacea. It is normal to be confronted with a range of challenges, requiring continual adaptation.

Achieving both environmental and social objectives:

- PES can support livelihoods of ecosystem service providers and therefore jointly meet social and environmental goals;

- The success of PES hinges on its ability to provide suppliers of environmental services with better economic prospects. Sustainable provision of ecosystem services can be achieved through changes in land-use practices that are *both* equitable and support existing opportunities for economic progress;
- Charges paid by water users must be set at a level that is acceptable to the water users but which still generates sufficient income to finance planned investments in environmental protection upstream;
- Payments to upstream land/water managers must be set at a level that is equitable and sufficient to act as an incentive to conserve natural resources (regardless of the stipulations of any contract or sanctions for non-compliance) rather than continue exploiting them unsustainably;
- Implementing PES is a means to convert conservation of water sources into a win-win solution for water users (e.g. FONAG, Ecuador).

PES schemes design:

- There are no one-size-fits-all solutions. Successful PES schemes may be very demanding in terms of design effort, depending on the economic and institutional/governance framework and the intended environmental outcomes they must deliver;
- To be effective PES schemes need to have predefined and easily observable objectives to provide clear indicators of success (and failure);
- Pilot projects provide a valuable means of testing and adapting internationally or nationally proven PES approaches to local conditions;
- Poorly designed PES schemes are not only ineffective, but are also associated with excessive administrative and implementation costs;
- It must be ensured that any financial mechanism proposed is in line with policy and legislation of the country where it is implemented;
- There should be a clear connection between the payment and the service being provided.
- In practice it is difficult to assign a value to a particular service or area;
- It is essential to build trust and a spirit of partnership or mutual 'buy-in' among stakeholders which can be achieved through a programme of public awareness;
- Buyers need 'progressive' thinking and long-term vision (benefits may be slow to materialise);
- Communication of the PES scheme should be simplified in order to ensure the understanding and engagement of the stakeholders;

- PES can be institutionalised as a financing mechanism for river basin management;
- Corporate and social responsibility (e.g. image, reputation) can help attract private sectors as buyers;
- The 'payment' in Payment for Ecosystem Services can be non-monetary. For example, conditional land tenure can be a pro-poor reward to upstream farmers for providing ecosystem services (e.g. Indonesia);
- Payments must be determined through transparent mechanisms with the participation and effective involvement of the community;
- Water Funds are learning-by-doing solutions that can be adapted to different circumstances in order to guarantee the preservation of critical water providing ecosystems.

The need to monitor and have a baseline scenario:

- A transparent and technically designed monitoring programme is an integral part of any PES scheme and needs to be designed and agreed upon in advance;
- The need of a proper baseline and clear monitoring provisions is easily forgotten in the midst of complex negotiations to establish workable financial mechanisms;
- Environmental outcomes can only be attributed to a PES scheme provided there is a clear baseline scenario allowing for the comparison of scenarios with and without the PES scheme. Comparing situations before and after is uninformative because of the lack of a counterfactual demonstration that the observed outcome would not have occurred in the absence of the PES scheme.

3.3. Cases

FONAG – the Fund for the Protection of Nature, Ecuador

FONAG is a private trust fund through which water users in Quito Metropolitan District can support watershed conservation and management activities to protect their supply of water. The Fund constitutes a Payment for Environmental Services scheme and local water users, including hydropower and water supply companies contribute regularly under a self-taxing arrangement. Revenues (interest and investments) derived from the equity of the fund are used to finance activities aimed at conserving the basins that supply the water resources. Activities include land purchase in critical areas to sustain ecosystem services and improvement of agricultural management practices, but no direct payments to farmers.

Payment for Environmental Services pilot project in Lake Naivasha basin, Kenya

In a pilot PES project in Lake Naivasha basin, the local water resources users association, formed mainly of flower and vegetable growers, compensates upstream small-scale landowners for managing their land to provide good quality water to downstream users. Land management changes included the rehabilitation and maintenance of riparian zones, the establishment of grass strips/terraces to reduce runoff and erosion on steep slopes, reduction in use of fertilizers and pesticides, and the planting native trees. The scheme has reduced environmental threats as well as provided income and livelihood improvements for participating communities.

Rewards for watershed services in Sumberjaya, Indonesia

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 rewards schemes in Sumberjaya. The initiative 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. 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. In all three programmes, 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 also represent an increment in household incomes.

4. Technology to facilitate the transition to a green economy

Innovative water technologies contribute to job creation and economic development. They may also help to close the increasing gap between water supply and demand. There are many water technologies that merit attention for increasing water availability and increasing the efficiency of water use.

Most of the necessary technologies for promoting the sustainable management of water resources are already tested and ready for application on larger scales. However, the implementation of these tools is lacking behind. Possible reasons for this are the economic and financial crisis, which lowered the financial capacity of many countries to implement

innovative water technologies, and the lack of knowledge dissemination. Although the know-how is readily available it might not be accessible on-site.

4.1. Approaches

- Improving technology choice in both the public and the private sector;
- Technology transfers from developed to developing countries;
- Adoption of existing water efficient technologies;
- International financing sources to support clean technology adoption;
- Use of success stories;
- Learning from other sectors;
- Expanding access to technologies;
- Reform of the global intellectual property regime;
- Improvement of skills and trainings;
- Knowledge transfer through information technology;
- Green business needs business structures (from charity to investment);
- Find compromise between high-tech and low cost technologies;
- International cooperation and collaboration on research and development.

4.2. Lessons learnt from implementation

- There are many available, tested but still not completely diffused technologies that are strong enough to tear down barriers and water governance-deficits (e.g. online monitoring of wastewater effluents with real-time data transmission to address the problem of poor law enforcement);
- Technology choices need to be adapted to local conditions and especially to existing financial constraints, availability of labour supply, management abilities, etc. Knowing these constraints helps to find the proper balance between both small-scale and large technologies that may yield optimal results. (e.g. both micro-harvesting and large water resources development projects in agriculture);
- Success stories can transfer lessons learnt from one case to another with comparable location, situation or site-conditions;
- There are important 'avenues for leapfrogging' open to least developed countries to foster the transition to sustainable production and the advance in energy and resource efficiency;
- The experience with information and communication technologies demonstrates the capacity of poor countries and poor communities to achieve a jump in the technological development process;
- Water usage is often technologically determined and changing behaviour requires replacing the current technology being employed with an alternative technology. Capital costs can often be significant;

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- International cooperation and local collaboration in research and development (e.g. through networks or clusters) can contribute to the innovation, development, adaptation and diffusion of green technologies;
- Information and Communications Technology (ICT) applications can reduce environmental impacts and also affect how other products are designed, produced, used and disposed of. ICT can also contribute to making information easily and globally accessible, to standardising problem solving approaches and avoiding repetition of failures;
- Political governance and donor finance have been able to open up opportunities to unlock greentech development potentials, for example the development of pilot projects for water loss reduction under a public-private partnership scheme (e.g. Burkina Faso);
- Advances in desalination technology have assisted some countries of the Western Asia region meet growing domestic water demand by using desalinated water;
- The lack of knowledge dissemination may hinder the application of water technologies;
- Wise technology transfer in LDCs means adapting technology to green development needs and contexts, avoiding lock in. Technology adoption should guarantee sustainable resource use and innovation within the chosen technical options;
- The best technology options are those selected in a participatory and transparent manner to implement the collective goals of water policy;
- Water governance is an integral part of technical choice and progress;
- Even in LDCs there is scope for finding adaptive solutions to water management problems within the range of available technologies;
- Technology transfers are not necessarily one way from developed to developing countries. Technological innovation can occur in developing countries;
- It is not always clear whether technologies are 'green'. Any technology has an impact, and these outcomes need to be understood in terms of growth, resource conservation and poverty reduction;
- Choosing the appropriate technology for the context is crucial: transferring the technology is one matter, but sustaining it is another (local capacity for operation and maintenance is an important consideration, and training may be required, e.g. Burkina Faso);
- Water technology researchers and project developers can learn from other more sectors of industry that are more technologically developed than the water sector;
- Industrial wastewater reuse can generate economic and environmental benefits by making more water available for development and reducing pressure on the environment (e.g. wastewater treatment plant);

- Consensus on sometimes controversial sustainability challenges (e.g. hydropower) can be achieved, with some persistence and willingness to engage on the part of all (e.g. Hydropower Sustainability Assessment Tool of the International Hydropower Association);
- Co-management of water and energy can promote innovative technology to boost the rural economy and promote food security and safe drinking water while improving water quality sources (e.g. in Gujarat, India);
- Subsidies may be required, but:
 - Good technology choices minimise the need for subsidies;
 - Subsidies can be an impediment to technology innovation and adoption;
 - Subsidies are acceptable as a transitional solution provided side counterproductive effects are avoided and sustainability is protected.

4.3. Cases

Improvement in water supply through a GIS-based monitoring and control system for water loss reduction

In Ouagadougou, Burkina Faso, a GIS-based monitoring and control system has enabled significant reductions in water losses within the distribution of a municipal utility. The technical components include leak detection devices, pressure and flow control sensors with real-time and online data transmission, automated pressure valves, and an intelligent GIS-based computerised system to steer the whole process. Local jobs were created through the investment in and continuous operations of the water loss reduction programme. The programme also improved water efficiency, water supply and customer awareness of the importance of protecting water resources and caring for public water supply property. Training was essential to build the capacity of local staff to operate and maintain the system.

Web-based system for water and environmental studies in the Middle East and North Africa (MENA) region

A web-based system for interdisciplinary water and environmental studies initiated by a partnership of institutions from Germany and Egypt demonstrates how specially designed eLearning tools and knowledge transfer can support an evolving market for green jobs. The learning management system used a 'blending learning technique' and covered topics which ranged from water loss reduction and environmental impact assessment, to modelling and IWRM. The initiative promotes technology innovation in universities, builds capacity and knowledge on environmental issues, and fosters green entrepreneurship.

Industrial wastewater reclamation technology for urban irrigation in Namibia

A wastewater reclamation plant used was developed to treat industrial water for reuse in agriculture. 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 instrumentation for remote control, automation and easy operations onsite, compact final settlement tank and post-disinfection through UV (with additional chlorination on request). Economic benefits derived from the project include an increase in land value (from 2,500 to 20,000 EUR per ha) due to increased availability of water for agricultural use. It also resulted in the creation of new jobs and businesses. Water reuse has resulted in significant benefits for the environment due to the reduction of fresh water withdrawals and the elimination of contaminated wastewater discharge.

The role of water technology in development: a case study of Gujarat State, India

A number of technological initiatives – both large and small scale – have enabled Gujarat State to address severe water scarcity challenges. For example, the construction of the 'State Wide Water Grid' and water filtration treatment plants have provided drinking water to 10,501 villages and 127 towns in Gujarat suffering from water scarcity or water quality problems. In another project 353,937 check dams and village tanks/ponds were constructed, enabling small-scale and marginal farmers to use rainwater harvesting as a water source. Subsidy loans have encouraged the adoption of drip irrigation technologies. Another scheme pioneered real-time co-management of electricity and groundwater for agriculture, increasing efficiency of water and power utilisation for agriculture, and also freeing up these resources for the rural nonfarm economy to grow.

5. Green jobs

The promotion of green jobs is central in the transition towards a greener economy. Green jobs result in the reduction of the environmental impact of industries, companies and economies; promote the efficient use of local resources; and result in the generation of income and progress opportunities for individuals and their communities. Green jobs can play a key role in socially inclusive development if they provide adequate incomes, social protection, respect the rights of workers, and give workers and employers' organisations a say in decisions that affect their lives. The shift towards a greener economy means the creation of new jobs, such as skilled jobs in emerging green industries and services. However, other jobs will be redundant and will disappear, so active labour policies and social reforms will be needed to facilitate the re-allocation of workers from contracting to expanding sectors and firms, such as those that replace polluting activities with cleaner alternatives or those that provide environmental services.

5.1 Approaches

- The design and implementation of active labour policies and actions in order to:
 - Maximise the labour creation potential of green activities and practices;
 - Meet the demand of new skills in green sectors;
 - Foster labour market dynamism in order to facilitate the transition in the labour market, reduce unemployment in the interim and reduce social conflicts;
 - Promote an inclusive labour market;
 - Create opportunities for productive employment and decent jobs for all;
 - Use local labour, knowledge, industry and resources.
- Active education and human capital policies in order to:
 - Adapt workforce skills in advance to the emerging green job market;
 - Promote investments in human capital and in particular in the acquisition of 'green skills';
 - Increase effectiveness and reduce the costs of building competences in green technologies;
 - Focus on younger professionals as they yield better outcomes, and have higher potential to propel permanent changes in mindsets (e.g. Egypt eLearning).
- Provide social protection during the transition:
 - Protect the poor unskilled workers already in the traditional sectors and facilitate their inclusion in the emerging green sectors;
 - Use education and training public policies as a mean to favour the inclusion of the poor in the green economy.
- Improvements of governance/institutional arrangements in order to:
 - Enhance social dialogue and collaboration;
 - Improve management practices;
 - Promote participatory approaches and empowerment for managing change.

5.2. Lessons learnt from implementation

- When the supportive measures and policies are in place, the transition to green practices and the promotion of green products and production processes can result in the creation of numerous job opportunities that can facilitate social inclusion and poverty reduction;
- The green economy is a critical opportunity to advance in all the social aspects of sustainable development through adequate: education, health, social protection, gender equity and labour policies and measures;
- Labour market and training policies can play an important role in achieving a socially fair transition to a green economy. They can help facilitate the structural adjustments associated with the green economy, while minimising the associated social costs;
- For this transition to be smooth, labour market institutions need to be reshaped. Many social impacts of the transition towards a green economy depend critically on the coordination (or the lack of it) between the decline of some jobs and the creation of new green jobs. By helping workers move from jobs in contracting sectors (e.g. polluting activities) to expanding sectors (e.g. in environmental services), active labour policies can help to ensure the costs of the transition are shared fairly. Workers of declining sectors should be properly protected and assisted to find alternative job opportunities;
- Jobs are 'green' if they provide adequate incomes, social protection, respect workers' rights, and give workers a say in decisions that affect their lives;
- Green economy policies and measures that affect employment must take into account the needs of the vulnerable;
- Potential conflicts and social contest can be effectively prevented if the unavoidable disruption of the labour market is anticipated by workers and firms, so they are able to find the way to reconvert their skills and production processes in advance;
- The social or labour impacts of any 'green economy' policies or measures should be analysed in advance. Sectoral policies should take into account their potential to leverage job creation.
- Social dialogue is more effective than leaving individuals to respond to conflicts. It can help build a social safety network and provide a coordinated and anticipated response rather than a competitive, individual and reactive answer to labour market disruption;
- Most of the negative effects of the unavoidable destruction of some employment opportunities can be avoided, minimised or managed, for example through labour market reform, programmes to help firms to adapt, and education and training programmes to adapt the labour supply in advance;

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- True dialogue must be continuous and should include all issues, from those of common interest to those that concern only particular groups most affected by the change. The agenda must be flexible to incorporate the communities' concerns;
- Engaging a wide cross section of society requires different approaches and ways of working;
- Well-designed green education and training programmes will have an important role to play in helping workers to exploit the potentials of the emerging green economy;
- Project managers need to respect cultural differences, including preferred consultation mechanisms and the time needed to make decisions;
- Local workers and water users have resources which can be harnessed to promote sustainability, e.g. their common interest, collective memory and knowledge of the terrain;
- Traditional community leaders must take part in conservancy committees in order to find more adapted solutions as well as to avoid conflict and delays;
- Sharing the benefits from increasing the efficiency of water provision between workers and service providers is an effective means to enhance cooperation, reduce conflicts and ensure the achievement of environmental goals;
- Making local people aware of their rights enables them to challenge elitist and self-serving behaviour within committees;
- Consensus is needed to implement environmental activities within the project framework, particularly when party staff and politicians want to control projects in order to reach their own goals and to secure votes;
- Improving responsible management practices at and around the workplace can greatly contribute to cleaner, greener and safer practices, reducing emissions and preventing health care costs of occupationally related accidents and illness;
- Organisational change or reforms which are undertaken from the bottom to the top – by empowering workers and employers through consensus-development and participatory approaches – are more likely to change the culture of the organisation and result in better designed and adapted capacity development programmes;
- De-privatisation is not an end in itself, but can in some contexts serve to recover collective objectives and values of water management leading to quality improvements and participative decision-making;
- Differences of culture and idiosyncrasies of each region, province and district must be observed. A more focused and localised approach may provide reform processes more flexibility to evolve.

5.3. Cases

Maynilad Water District, the Philippines

In the Maynilad Water District, the management, unions and workers have successfully worked together to reduce the high rate of non-revenue water. Social dialogue has enabled workers to take active role in a strategy to reduce non-revenue water, thereby increasing water productivity. The implementation of the strategy was converted into a mutually beneficial arrangement for both workers and the utility, and also resulted in significant environmental and social benefits. Social dialogue served to smooth potential conflicts during the privatisation of the water utility and continues to provide a platform for the discussion and resolution of disputes between the management and the unions. The utility has ensured ongoing employment for workers and has also offered workers with new skills and training to implement leak detection strategies.

Employment Intensive Investment Programme, Panama

The programme in Panama has empowered indigenous rural communities to take an active role in water and sanitation services provision. The programme harnessed opportunities for water provision to generate labour opportunities and entrepreneurship in the local population. The programme supported the development of expertise, skills, and knowledge – not only for the provision of basic water services, but also for monitoring the ecological status of the water resources and the promotion of good sanitation and hygiene practice. Critical factors underlying the success of water user participation scheme were comprehensive planning and coordination, the involvement of all stakeholders by giving everyone a role, and a strong education component to raise awareness about the importance of water.

Capacity development in the Arab Region: The role of ACWUA in promoting the exchange of experiences and expertise

The Arab region is the most water scarce region in the world and suffers chronic problems including weak environmental policies, lack of investment and regional conflicts over water. Arab Countries Water Utilities Association was founded in 2009 by key water sector representatives in the Arab region and serves as a platform for water utilities to communicate and exchange experiences. The initiative uses a range of capacity building tools to improve regional cooperation and promote best practice with the overall objective of improving the efficiency and levels of service of water supply and sanitation provision.

6. Water planning

Green growth requires that welfare improvement and economic growth are made compatible with the conservation of water related ecosystems. Water planning is a powerful social tool for identifying how to allocate and use the available water resources to meet the competing needs of different users and sectors, including environmental requirements. Planned and anticipated responses are needed to ensure the provision of water services which underpin the economic system. Water planning is also necessary to cope with environmental challenges such as water scarcity, water quality degradation and climate change risks. It is essential to build governance and institutional capabilities to agree on, design and effectively implement long-term integrated water management plans in order to support the transition towards a green economy.

6.1. Approaches

- Agreement on the desired balance between water use and water resource conservation;
- Harnessing development opportunities and addressing environmental and development challenges;
- Building governance and institutional capabilities;
- Coordinating public policies;
- Stakeholder engagement and public participation;
- Aligning private decisions with collectively agreed goals;
- Establishing collective responses to scarcity and risk.

6.2. Lessons learnt from implementation

- In Europe, setting the objective of reaching a good or fair ecological status of the water bodies as the main objective of River Basin Management Plans has proved to be key means to make economic development compatible with the chosen environmental objectives;
- Adopting a set of international commitments regarding the environmental status of international rivers has enabled the coordination of national development policies with water planning;
- Clear objectives for freshwater ecosystems restoration have been a critical for gaining social acceptance and approval for investments in infrastructure and natural capital in many developed and underdeveloped countries;
- Water planning has played an essential role in:
 - The development of the agro food and energy complex that now represents a competitive advantage and is a defining characteristic of the Ebro River Basin in Spain;
 - The setting of clear, ambitious and measurable water environment objectives in the Ebro River Basin in Spain;

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- The success of the Lao PDR regarding the Millennium Development Goals and in the ongoing transition from a rural to an urban economy;
 - The overall economic transition in Korea. Water planning has helped develop an anticipatory strategy to foster economic growth, maintain the welfare gains already obtained and achieve water security for the future.
- Building transparent governance systems and institutional capacity is essential for successful water planning;
 - Water planning can be a powerful instrument for coordinating development in many areas (such as agriculture, energy, manufacturing, tourism, land settlements, population growth, etc.), ensuring that combined activities do not exceed the capacity of the limited water resources available. Green growth requires considering water management at the heart of economic public policy;
 - Agreed water commitments in international river basins can significantly shape national development plans and contribute to the coherence between economic and water policy objectives in the region;
 - Active participatory mechanisms have made real and verifiable contributions to the design, implementation and assessment of water management plans in many countries. Public involvement can reduce social conflict and ensure the long-term future of the planned initiatives or projects;
 - Both the European Union's Water Framework Directive and the Mekong Agreement are promising examples of developing collective and systematic responses to water challenges at national and local level;
 - The development of technical capacity, information systems, and monitoring strategies are all elements that have contributed to the reputation and credibility of river basin authorities;
 - In LDCs enhancing the national and local capacity for water management can give credibility to their commitments in international cooperation agreements and improve their position with respect to other national partners;
 - Early investment in sustainable river management is better than costly efforts to correct accumulated problems later on;
 - It is critical to cultivate an awareness of the value of water and the need to pay for proper management;
 - Well planned and robust interventions are a precondition for benefit sharing agreements (Philippines);
 - River basin planning is the foundation for designing water policy that reconciles economic growth, the enhancement of freshwater ecosystems and the creation of jobs linked to the green economy. For this reason it is a priority that all river basins throughout the world develop a River Basin Management Plan.

6.3. Cases

Water planning in Lao PDR

River basin planning in Lao PDR has been a key instrument for addressing pressures on water resources. The framework focuses on participatory planning and involves cooperation between neighbouring countries that share the Mekong River Basin. Basin-wide planning has facilitated coordination between sectors, increasing communication and the joint development of projects. The implementation of well devised plans has led to improvements in water quality and the reduction in flood risk.

The four major rivers restoration project, Korea

In Korea, multiple ministries have joined efforts to design and implement a comprehensive river restoration plan for four major rivers in the country. The plan has multiple objectives, including tackling water scarcity, providing flood control, restoring ecosystems, and fostering regional development through cultural and historical tourism. The project includes dredging and building infrastructure for water storage and flood control, expanding sewage treatment and green algae reduction facilities to improve water quality, ecological restoration, and river-oriented community development.

Water planning towards a green economy in the Ebro River Basin

In the Ebro River Basin, water planning has been a key tool for fostering economic development. Water planning has responded to many challenges in different ways, including: the setting of an institutional framework for transparent stakeholder involvement and public participation; establishing ambitious environmental objectives; creating opportunities for productive uses respecting environmental standards; the development of a strategy to manage uncertainty including drought management and flood control; and the identification, assessment and selection of projects to restore the water environment. Public participation needs to be considered a 'learning by doing' process and substantial advances are expected as information and participation skills improve through time. The coordination of agricultural, land use, energy and other sectoral policies with the water policy framework still needs to be achieved.

Water's potential role in supporting a green economy in Barbados

Barbados is a water scarce and densely populated Small Island Developing State. In 2009 the then Prime Minister announced his vision for Barbados to become "the most environmentally advanced green country in Latin America and the Caribbean". Following this, the government initiated a Scoping Study to map out how this vision could be achieved. This initiative continues the trend of Barbadian governments promoting environmentally responsible development through national plans, policies and projects. The study has identified opportunities as well as barriers as a first step to addressing how change can be brought about and the resources necessary. It is clear from the Scoping Study that the legal and especially the regulatory institutions have to be adapted to be supportive of green initiatives and that a higher priority needs to be assigned to such changes to enable them to become part of an engine for growth. At the same time there is a need to be more inclusive of the private sector in areas that have previously been the preserve of government in service provision and this will need a change in mindset on the part of both government and private sector. A key challenge is the creation of a supportive set of financial instruments that lowers the cost of adoption and implementation for all parties. Policy coherence and coordination emerged as an area where more attention is required.

Design and approval of the Multi-annual Sectoral Plan for Water and the Environment of the Republic of Guatemala and the creation of the Water Advisory Group (Gabinete Específico del Agua GEA)

The Multi-annual Sectoral Plan for Water and the Environment was designed to reorganise the development of the environment and water sector and to provide a strategic path in order to achieve results by improving organisational performance within the goods and services framework entitled by law. The Water Advisory Group was created to enable the efficient management of water resources and to ensure it promotes the economic and social development of the country. Improvements in the provision of water and sanitation services enhance the social and economic conditions of communities.

Reform of the urban water supply and sanitation sector in Yemen

In Yemen, the urban water and sanitation sector was characterised by poor quality services provision and low financial viability, largely due to badly kept infrastructure, weak technical capacity and very high unaccounted-for-water rates. An ongoing reform has dramatically reshaped the sector, shifting power away from a central authority to local agencies. Better customer services, more financial stability, and better protection of the least advantaged groups are some of the most positive outcomes of the reform initiative. As a result, water supply coverage rates increased from 47% in 2002 to 71% in 2007, and sanitation coverage rates increased from 25% to 52%.

PART 3: Messages on Green Economy from the UN-Water Conference

Rio+20 needs to demonstrate that a green economy is possible; that there are opportunities to advance in social justice, economic progress and conservation of the environment within the range of available resources and technology. **A green economy is for everyone** and developing countries can take a leading role through adopting innovative initiatives that generate economic, social and environmental benefits. **We all have a joint responsibility to progress to a different economic model. We must not miss this opportunity.**

- 1. Achieving a green economy is not possible without ensuring everyone has access to basic water and sanitation services.** Across the world, access to these services has proved to be a critical step for lifting people out of the vicious cycle of poverty and environmental degradation.
- 2. Transitioning to a green economy in water requires a shift from current practice.** Some key tools to promote the necessary change and support the transition: (1) economic instruments; (2) green jobs; (3) cost recovery and financing; (4) investments in biodiversity; (5) technology; and (6) water planning. These tools enable us to overcome barriers, do more with less, to harness opportunities and to change behaviours in order to achieve a green economy.
- 3. Creating incentives for improving efficiency is appropriate where basic water and sanitation services are already being provided.** Incentives can modify individuals' behaviour in a predictable way in order to achieve desired policy goals, for example: reducing water consumption, reducing pollution loads, or adopting a modern irrigation technique. Using economic instruments has a number of advantages. They can (i) avoid costly investments and make the case for low-cost, non-technical measures (e.g. ecosystem services to secure water or protect against floods); (ii) generate revenues to fund water management and infrastructure; (iii) align incentives and strengthen policy coherence across sectors; and (iv) provide information on the costs of status quo, the benefits of reform, and the distribution of these costs and benefits.

- 4. There is an important role for social dialogue and for communities in the provision of water services. Community initiatives are vital in places where government action does not reach.** The pro-poor approach adopted by many governments and international organizations is paying off, with a greater focus on outcomes, social dialogue, social contracts and community participation. Social dialogue is a powerful means to improve effectiveness in service delivery for a socially inclusive development that provides adequate incomes, social protection, respect for the rights of workers, and give workers a say in decisions which will affect their lives.
- 5. The transition to a green economy requires mobilising more funds, but also requires increasing efficiencies to make better use of the limited financial resources available.** Funds are required to drive sustainability and growth; invest in water and sanitation services and infrastructures; alleviate global poverty; foster innovative green technologies; create new 'green' job opportunities; reduce scarcities; reduce waste and greenhouse gas emissions; and increase efficiencies in the production and consumption of water and energy. Pro-poor tariffs systems are essential for ensuring the provision of water services to the poorest.
- 6. Investing in the improvement of biodiversity is critical for sustaining or restoring the water-related services provided by ecosystems.** Healthy freshwater ecosystems provide services that are crucial for human survival. The poor particularly often depend directly on water and other ecosystem services provided by rivers, lakes and wetlands for their livelihoods. There are real opportunities for **Payment for Ecosystem Services** schemes, which are proving a successful instrument for financing environmental protection throughout Latin America, but also in Africa and Asia. They are instruments to improve nature by rewarding its conservation and guaranteeing the continuous provision of the welfare benefits produced by ecosystems.
- 7. Governments need to facilitate innovation and adoption of greener water provision and water use technologies, contributing to job creation and structural transformation towards greener economies.** Technologies help to close the increasing gap between water supply and demand by increasing water availability or increasing the efficiency of water use. Most of the necessary water technologies for promoting the sustainable water management are already proved and ready for application on larger scales. However, barriers to adoption –such as lack of access to finance, knowledge and patents– must be addressed. There are opportunities for developing countries to 'leapfrog' with information technology.
- 8. Water planning is a powerful social tool for identifying the best way to use water resources to meet the competing needs of different users.** Green growth requires that social improvement and economic growth are made compatible with the conservation of ecosystems. Participatory planning is a key instrument for this proposing measures and infrastructures needed for economic and social growth, and the protection of long term ecosystem services. Participatory planning enables the consideration of trade offs and the alignment of these goals. It is essential to build governance and institutional capabilities to design and effectively implement long-term integrated water management plans in order to support the transition towards a green economy.

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