Plenary: Multistakeholder dialogue on tools for implementation of the water related Sustainable Development Goals

Session: Technology: Key tools and lessons learnt from implementation

Session report, 17 January 2015

Introduction

The 'The future we want' Rio+20 outcome document emphasizes the importance of technology transfer to developing countries and recalls the provisions on technology transfer, finance, access to information and intellectual property rights as agreed in the Johannesburg Plan of Implementation. Technology development has been internationally recognized as an essential tool to achieve water SDGs, as well as to enhance overall poverty reduction and socio-economic development.

The session was chaired by Elisa Tonda, Acting Head at the Division of Technology, Industry and Economics, UNEP, who highlighted three main messages emerging from the discussion on technologies for the SDGs. First, currently there is a wealth of tools available that opens many windows for finding right solutions. However, what is still missing is the widener of this technology and its adaptation to a wider range of contexts i.e. built solutions based on fostering the integration of local knowledge and technology transfer. Second, technology has a very important social dimension that gets very often neglected. For instance, indigenous knowledge can provide valuable solutions and it is so far an undervalued asset. Third, innovation requires thinking outside the water box. In this respect, some of the solutions to the water problems might lie in technologies belonging to other domains.

The panellists of the session were:

- Government: Roger Falconer, President of the International Association for Hydro-Environment Engineering and Research (IAHR)
- Civil Society: Bart Devos, President of the World Youth Parliament for Water (WYPW)
- Business: Hans Goossens, Vice president and Downstream New Business Director, Yara
- Academia: Richard Lawford, Senior Scientist at Morgan State University, US

Discussion panel: from left to right Richard Lawford, Hans Goossens, Bart Devos, Roger Falconer and Elisa Tonda.

1. Lessons on Technology: Stakeholder Perspectives

The panel discussion spin around three main issues: 1) What technological tools were presented in the different stakeholder sessions that can contributed to the successful implementation of the SDGs; 2) what role can each stakeholder play in the implementation of the SDGs; and 3) what main barriers need to be overcome.

1. Lessons from Business

Hans Goossens commented on the four different sets of tools and the main messages that were presented in the business parallel session.

Sets of technological tools

The first set of tools presented referred to the development of web based tools, and specifically internet platforms publicly available and developed by a wide range of stakeholders including NGOs, governments, firms, etc. These internet platforms, like the CEO water mandate action hub, are especially important for knowledge exchange among the business sector and the public in general within basins, but most importantly to promote cooperation and built the collective action feeling to address the different water challenges.

Other successful initiatives included the implementation of drip irrigation technologies in sugar cane farms in Jamaica, project funded by the IDB. The successful implementation of this tool relied in the fact that it did not only contributed to improve water use efficiency, but overall crop productivity, since this irrigation technology also helped improving efficiency in the use of other inputs like nutrients.

The third set of tools included the development of wastewater treatment plants by VEOLIA, whose added value is not just the technology development and its transfer/upscale to other regions, but as important is the local capacity development to ensure effective implementation beyond the project phase.

Finally, ABENGOA presented a project on desalination for urban water supply in Ghana, also emphasizing the need to develop local capacity building to ensure the long term sustainability of the project, but highlighting also the financial constrains linked to the use of this technology.

The value of tools' non-physical dimensions

The value of the tools doesn't rely so much in the development of physical equipment, but on the efforts placed in promoting their non-physical dimensions, i.e. local capacity building as well as knowledge sharing.

The role of the business sector for implementation

The business sector can play a threefold role in promoting a more effective implementation. On one hand, business needs to assume responsibility in water management, and acknowledge that it is time to move forward and rather than just being water user it has to take an active role and become a water steward. On the other hand, business has to promote more its role as a technology provider. And lastly, business has a big role to play as an operator to ensure the supply of water services.

Barriers for technology availability and implementation

Barriers that need to be overcome do basically not relate to the availability of suitable technology, since there are many tools available and plenty of room to innovate and develope new ones. The

problem is that even the existing technologies have not been spread and implemented as required. Underlying reasons: 1) lack of funding because the capabilities and the 'business case' certain tools can deliver have not been properly emphasized and unsufficiently known. It was stated by Goossens that *'if it is shown that there is a good business case, funding will arrive and should not be the constraining factor'.* Good example is the Public-Private partnership for the desalination plant in Ghana. It often requires also to think out of the water box, as demonstrated by the irrigation case. 2) Lack of appropriate incentives (e.g. adequate and fair water pricing) and prevalence of wrong incentives, which invite companies to avoid implementing sustainable solutions and support sometimes the investment in non-sustainable solutions. And 3) Lack of adequate regulatory pressure, which could be a good driving force for companies to move towards more sustainable practices e.g. global business solutions like the certification schemes are very efficient tools to motivate business to act in the right direction.

2. Lessons from Governments

Roger Falconer outlined the main messages form the governments' session.

The role and potential of technologies to achieve the SDGs

There was a general agreement that technology has a big role to play in the implementation of water SDG. There still exists a great potential to raise the profile of water use efficiency in agriculture. Meanwhile, there are plenty of opportunities to develop new technologies as well as implement existing ones in developing countries to achieve improvements agricultural water use. The challenge here is to attract the best talent to develop and implement these new technologies faster. In other areas like aeronautics or car industry in a very short period of time, efficiency has improved dramatically. Similar opportunities should be promoted in the water field.

Capacity building in the use of technologies is critical

Capacity building, particularly in developing countries, is critical to achieve the SDGs. Often, the technology and the data are available but what constrains the successful implementation in these countries is the lack of local expertise. This knowledge gap can be easily addressed by providing the adequate training and bringing to these countries the best available expertise.

Oversimplification of models as a 'risk' for Risk Assessment

The importance of risk assessment was also extensively discussed during the government session. It was outlined that despite its great potential *'very often risk assessment is used weakly as a tool to simplify models, where we must have a simple model, it needs to run in real time and time again because it has to satisfy the requirements of government´s risk assessment'.* The tendency to oversimplifying these models can therefore be a major constraint to evaluate the risks associated with different targets, and this is particularly relevant in less developed countries.

The role of governments in facilitating tools promotion

There is plenty of room to introduce tools that can support the achievement of water goals, and particularly tools that can help consumers to make better choices. In particular, he remarked the water footprint as a very useful tool to inform consumers about the water impacts underneath their activities. In his view, globally there has been a big discussion of carbon footprints, but much less is known in relation to water footprints. Governments have the capacity to use this tool to inform consumers in order to make better decisions, for instance by encouraging the implementation of a

traffic light system, analogous to the ones that have been developed in the fields on energy footprints and food health.

Challenges and barriers for implementation

Data is one of the biggest challenges. On the one hand, the exchange of data between countries is largely impeded by the existing intellectual property rights, and this is a major obstacle for advancing in the modelling and monitoring of SDGs. There is need to change the culture of data exchange and acquisition to facilitate cooperation across countries. Meanwhile, better data and specially improved monitoring are also required. In advanced countries like the UK, monitoring of water quality is limited in most cases to check-ups once a week, and this is insufficient to detect for sanitation risk elements like coliforms, which tend to be very episodic. Addressing this monitoring gap requires further investments. In those countries where water supply is managed privately, the best option will be to increase the competence to enhance further investments.

3. Lessons from Civil Society

Bart Devos emphasized that during the civil society parallel session most of the attention was place in understanding the enabling conditions that facilitate the successful implementation of technological tools, rather than in the tools themselves.

'Technology is just 50% of the solution'

Understanding the local context and adapting the technology to it is key for succeeding in reaching the SDGs goals. Local wisdom is a tool in itself and has an unlock potential to be used for developing new technologies, not just adapting existing ones to the local context.

Successful technology tools from civil society

Two successful tools where technology played a significant role in reducing water risks were presented. One case referred to the early warning system developed in Bangladesh to inform local communities avoid negative impacts of floods. In this case the technology did work but to a large extend because the local context was well understood. The warning system developed took into account the local context and efforts were placed in informing local communities about the risks, as well as in communicating and disseminating warning and alerts through a wide range of channels (phone calls, sms, etc.).

Another successful case was the development of drip irrigation systems in the Salamieh District (Syria). The introduction of this modern irrigation system responded to the increasing water shortages farmers where facing. Lots of efforts were placed from a social point of view, to make farmers aware about the groundwater problem, the increasing risk of water shortages and the need to adopt water conservation measures. Such efforts have contributed to make farmers understand the nature of the problem, adapt their agricultural practices and consequently reduce the risk to water shortages.

Conditions for success: including the social aspects and public participation

In the same way that physical and institutional conditions are often assessed prior to the transfer of technologies in a given context, more importance should be given to assess and compare as well the social conditions. Very often the failure of technological implementation relies on poor management. Therefore it becomes very important when replicating technologies to look carefully at the management capacity of the communities.

Meanwhile, civil society has a big role to play in facilitating the successful implementation of technologies for instance by promoting public participation. Most local and national governments agree that participation is a key condition for success, but often they don't act accordingly and they don't provide the enabling conditions to make this participation possible.

Main barriers and possible solutions

Three main barriers and possible solutions were highlighted:

- **Poor technological management capacity by local communities.** Very often the failure of projects is closely related to the poor capacity of local communities to manage the adopted technology, which turns the technological solution into unsustainable and ineffective in the long run. To address this barrier, it is important to involve local communities in the design and the implementation of technological solutions to make sure they remain effective in the long run.
- **The price of technology.** Very often technological solutions are very costly for local communities, which prevents them from adopting it. The solution to this problem is not simple, since technology cannot and perhaps should not always be delivered for free. Engaging the community with the financing of the technology is also a way to ensure their maintenance in the long run, but obviously the price needs to be affordable.
- **Deficient adaptation of technologies to the local context.** Few efforts that are often made to adapt the implemented technologies to the local contexts. The solution to address this problem requires avoiding the top-down approaches of technology adoption, a common practice among donors and governments, but also among NGOs. Successful solutions will require thus engaging local communities, attend their demands and needs and implement technological solutions accordingly.

3. Lessons from Academia

Richard Lawford presented a summary of the tools that were discussed during the Academia session.

The MDGs' heritage on WASH tools

Today there is a wide range of tools developed to support the implementation of WASH goals, thanks to the heritage from of the MDGs. These technologies are reaching a certain level of maturity and therefore are playing a major role in supporting some of the water goals. Presented tools included urban water quality monitoring systems, manual drilling tools, as well as earth observation technologies to identify suitable areas for groundwater extraction. However, despite the existence of this rich toolbox, some of these technologies are facing maintenance problems short time after their implementation, which represents a threat for the long term functioning.

In the fields of water quality, water or wastewater management, nice and effective tools are also being developed. Substantial progress has been made in the development of sophisticated tools to detect emerging contaminants and viruses concentration on water.

Conditions for success in technology implementation

- **Addressing the issue of the scale.** The issue of scale was identified to need be better addressed. Most of the solutions are local but the data and information required to drive those solutions is often national or even global. We need to find ways to upscale and downscale information with a certain level of confidence in order to reduce uncertainty and facilitate the right information to adopt local solutions.

- **Taking the local context into account when replicating technologies.** Taking into account the social, economic and environmental context is critical in order to succeed with the implementation of technological solutions.
- **Building the appropriate capacities** to manage the implemented technologies.
- **Upscaling and popularizing successful solutions** that have worked effectively in some areas and can be potentially transferred elsewhere.

Main barriers and obstacles for technology implementation

- **Funds and funding priorities.** Governments are facing important challenges in getting development funds to go forward with their activities and the challenge increases when trying to bring in as well the SDGs. Despite the limited funds, the Academia often feels that some of these funds are not always spent in the wisest way. In fact, the Academia can support governments and donor agencies in conducting preliminary assessments to determine what is the most cost-effective way to allocate the funds achieve the targets set.
- **The need to promote further collaboration** within the Academia and with other sectors like business or governments. By strengthening cooperation across different academic sectors and with the business or governments, the Academia can play a meaningful role in developing technologies and facilitate the transition of new ideas into reality.
- **A prevailing evaluation system within science.** Yet, academics are mostly rewarded and evaluated based on their publications and little or no weight is given to their merits in developing tools with a high social impact.

Contributions from the open discussion

There is need for adapting technology to the local conditions: but always?

A person from the audience noted that there is no need to develop or adapt new technologies for every single context. What is important is to have a wide range of options, and allow local communities to choose those technologies that they consider most appropriate.

The potential to raise water use efficiency in agriculture beyond on-farm

Options to improve water use efficiency go far beyond on-farm activities. Along the post harvest, for instance during processing, distribution, and even consumption there are many options to save water and promote a more efficient use. As an example, it was mentioned that today over 40% of the food produced globally is wasted, implying that 40% of the total water used in food production is also wasted. Promoting healthy diets is also an effective mean of saving water resources.

Meanwhile, currently the technology of desalinization is developing fast, and it is likely that in a time horizon of 20 years the amount of energy consumed in the production of water will decrease significantly. Reducing the energy consumption will drop the price as well, but the important question here is whether this technological innovation can be accelerated and made happen in a shorter period of time.

Ways for small organizations and networks to support the implementation of the SDGs

While UN recognizes that effective technological facilitation mechanism relies in building and expanding international networks of collaboration, research and development, the construction of such networks is not always easy. There are many organizations that have the knowledge and the tools to support the implementation of the SDGs but often, these organizations are weak and spread across the territory, making difficult their contribution to the overall process.

Final messages emerging…

There is a large number of technologies and knowledge available that can support the process of implementing the SDGs. However, what seems to be still missing in the widening application, adaptation and dissemination of these tools. Further efforts are required upon this front.

Creating the 'business case' can contribute to foster the expansion and implementation of many technologies that are available to support many water targets.

Water footprint, certification and labelling can be important drivers for promoting more technological uptake, particularly for the business sector

Technology has a social dimension that needs to be taken into account. Successful implementation of technological solutions requires taking into account the local context and built the necessary capacities in order to ensure their long term functioning. Moreover, traditional knowledge also needs to be taken into account because of its unlock potential in shaping new solutions and technologies.

Annex I: Overview of lessons learnt for Technology

Technology solutions and choices

- **Periodic assessments of progress** in technology needs, gaps and achievements are instrumental to orient decision makers.
- Technology solutions require a good understanding of the context in which they are applied. Understanding of and access to **reliable context information** is essential to inform choices both in the public and private sectors.
- **Access to water technologies** is still very unevenly spread, both within and between countries, with developing countries frequently not having access to basic water technologies.
- Industry and business play an important role as technology provider in global value chains, both for the physical equipment (e.g. water treatment plant, irrigation infrastructure, etc.) as well as in the **dissemination of the knowledge, innovation, techniques and skills** (best practices).
- Effective technology solutions need to be based on a **holistic approach** which goes beyond the identification of "quick fixes" and looks at cost-effectiveness along a lifecycle perspective.
- The adoption of **Information and Communications Technology (ICT)** and satellite remote sensing data has great potential for improving transparency in monitoring.

Technology Transfer

- **Access to reliable information on technologies**, with proven impact, can help overcome the concern of local communities and the risk of failure in technology adoption or adaptation.
- **Sharing lessons learned** during technologies implementation, as well as the impact achieved through technology transfer is critical for replication and dissemination. The **assimilation of big data and social media** does provide a good platform for replicating technologies and transferring solutions.
- **Global technology facilitation platform**. Having taken into account the recommendations of the structured dialogues of the General Assembly, the proposal to establish an online, global platform building on and complementing existing initiatives, and with the participation of all relevant stakeholders was raised (paragraph 125).

Technology adoption and adaptation - Access to information on technologies

- Academia and civil society can play a key role **adapting technology to the local reality**, empowering people and providing a combination of technical skills with local and traditional knowledge on the local conditions. Both academia and civil society deserve to be trusted, especially those of the South.
- **Local capacity development** needs to include the strengthening of skills to operate and maintain technologies. Promoting sustainable patterns of consumption and production along supply chains is key for an effective and sustainable embracing and accommodation of technologies in the long term.
- '**Social technology**' enables out-of-the-box communication required to deal with social and environmental impact of major infrastructures.

Incentives and regulation

- The **right regulatory framework and pressure from international buying groups** requiring sustainable certified products are identified examples of the right type of incentives for investments in sustainable technology. Cases of perverse incentives however do also exist, where for example, sustainable development projects are missing deadlines for investment decision due to stricter and more time-consuming review and compliance rules compared to traditional projects.
- **Demonstrating the business case** through a proper risk assessment (understanding of total business value at risk) and a total life cycle cost approach (capital expenditures plus operating expenses) is key to secure financial assistance and implement the technology available.
- Business cases for investment are often suffering from the fact that the price of water is seldom reflecting the true cost. A **fairer water pricing** for use in household, agriculture and industry is recommended, without putting at stake the human rights to food and water.
- The existence of a reliable **Water Governance Index** is identified as a potential facilitator for quicker and easier investment decisions, as existing indices as developed by OECD or World Bank are of a too coarse granulometry.

Annex II: Water Footprint Assessment in Support of Sustainable Development

Side event report, 14 January 2015

Facing the world's water crisis: how Water Footprint Assessment can help achieve sustainable development goals

Considering the growing multiple water demands, ensuring sustainable, efficient and equitable water use is more than ever a challenge. New tools and methods are therefore required to inspire, inform and broaden cooperation in river basins, across sectors and between countries. Water Footprint Assessment (WFA) provides a common language, which builds a shared understanding for informed decision making and strategic action at local, regional and global scales. WFA opens up new insight and contributes to successful action.

Water footprint as an indicator can integrate water quantity and water quality; elaborate water use across the entire value chain; demonstrate relationships between producers and consumers through virtual water; compare the allocation of water footprint between users and between consumers; elucidate the interactions between water management for quantity and quality, surface and groundwater; and measure the cumulative impact of water consumption and pollution.

Lessons learnt

1) WFA unifies both quantity and quality aspects in water resources assessment, planning and management.

2) WFA finds the links between water use, water management and water scarcity and pollution levels, thus helping better identify cause-effect relationships among these elements.

3) WFA looks at the water quality issue from the pollution load perspective rather than only the pollutant concentration using the waste assimilation approach. This highlights where the assimilation capacity has been exceeded even when the pollutant concentrations meet quality standards.

4) WFA is an innovative approach able to support in reforming the current regulatory system for water abstraction license and discharge permit, and therefore useful for formulating effective response strategies to mitigate blue water scarcity and water pollution levels.

Annex III: The role of the Conference of Water Directors in LAC and innovation in water and energy in Ibero-America

Side event report, 14 January 2015

Management and Innovation of Water and Energy in Latin America: Needs R&D&I

In the analysis of the main research needs in the Water and Energy sector in Latin America, three points were highlighted as fundamental:

1) The importance of the Water Energy Nexus advised to study the value and prospects of water within the energy transition with depth and rigor, from a broader perspective and medium term scope (2030).

2) It encourages the authorities of both sectors, water and energy, to initiate a process of reflection on this issue involving corporate actors and the professional community

3) There are at least five subjects that should be studied and deliberation to lead to proposals for consensual action:

- Hydropower in the future generation plant: Hydropower (HP) should be taken into account explicitly in the scenarios of evolution of the power plant, considering a wider than national market potential. The replacement of equipment for generation (coal and nuclear) can provide new opportunities for HP in countries like Spain. The energy, environmental and tax regulations should consider the value of HP during the transition and adapt accordingly. The link between hydraulic and technical operation of the system is undoubtedly one of the important factors to consider.
- Large scale hydraulic storage: Renewable Energy Sources cause penetration energy storage requirements and hence the opportunity for additional capacity in CHR developments. Prospects for international connectivity of the Spanish electricity system and the advance provided inward energy market should be taken into account in the same direction. The change in the electrical system to a logistic model (generation, storage, transport, distribution and international connectivity) involves changes that are likely to benefit our country. Hydraulic large-scale storage can play a role in both domains multipurpose, energy and hydrological.
- Water in other non-energy use of hydropower: At least two issues should be considered: the water requirements for cooling thermoelectric groups and the possible exploitation of unconventional hydrocarbon reservoirs (shale and other variants). In the thermoelectric use must consider the impact of climate change on the hydrological cycle and the changing needs of the power plant medium term. As for shale gas, hydraulic needs will have to be estimated according to the volume of water required for the fracking process and subsequent treatments depending on the size of the deposits, their prospects for holding, the number and geographical location of the extraction points.
- Energy management in the water (urban cycle and irrigation agricultural): Technological advances in intelligent control, generation networks and enable integrated management models more efficient from an economic point of view. The regulatory framework for the electricity sector can contribute or frustrate that opportunity. Moreover, scenarios should be considered medium-term development of electricity markets, spot and bilateral.
- The R+D+I on the above topics: Hydropower is currently delayed in terms of R & D compared to other generation technologies and energy storage. Hydroelectricity is nonetheless (and continue further) an essential part in the functioning of the electrical system and the evolution of this

leads to improvements and new approaches should find reflection in the strategies of public and business R & D. The opportunities for innovation in this field affect the very HE technology and applications and resource management models. The energy transition is an excellent opportunity for the internationalization of R & D in this field.

Final conclusions

An overall analysis of the water-energy Nexus permits to assess the significant cost that requires the integrated management of the water cycle. Lifecycles costs and the energy footprint of the analyzed solutions should be included in studies. In Spain, the total electricity consumption linked to water in Spain comes to mean more than 9% of total electricity consumption. The adjustment and optimization of water consumption can capture and transport less water, increase supply security, reduce energy consumption and therefore the impact on the environment. The trend is growing, as both the needs of increasing unconventional resource (desalination or feedback for use) and improved efficiency (modernization of irrigation, introducing pressurized irrigation systems), and improving water quality (debugging) representing an increase of energy demand.

R+D+i needs to be encouraged for the modernization of management systems that would not only save water, but also save energy: for zoning and energy optimization of networks under pressure, for improving energy efficiency in managing rainwater in urban environments, etc. On our intelligence and well doing our future depends. Let's act.