Water Issues: Contributing to the Success of the eighteenth and nineteenth sessions of the Commission on Sustainable Development

An input from UN-Water and the United Nations Secretary-General's Advisory Board on Water and Sanitation to the fourth implementation cycle of the Commission on Sustainable Development

The United Nations Secretary-General's
Advisory Board on Water and Sanitation

UN WATER

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An input from UN-Water and the United Nations Secretary-General's Advisory Board on Water and Sanitation to the fourth implementation cycle of the Commission on Sustainable Development[1]

KEY MESSAGES:

- Water should be considered in any policy response or decision taken in relation to the CSD thematic issues of mining, sustainable production and consumption, chemicals, transport and waste management.

- Linking water-related issues to decisions made outside the water domain is critical. A global water crisis will not be averted, and sustainable development will not be advanced, if water managers and experts in other fields do not communicate, plan, find joint solutions and work in a participatory manner with planners, policy makers and users.[2]

- Decision-making in all sectors has a significant impact on water resources issues. At the same time, the management of increasingly stressed water resources will have direct impacts on the themes of CSD-18/19. The contribution of water in areas such as mining and waste management, the impact on water resources of consumption and production patterns and the linkages to broad development goals must be articulated and understood at the political, policy and decision-making levels.

[1] For more information on UN-Water, please visit: www.unwater.org; for more information on the United Nations Secretary-General's Advisory Board on Water and Sanitation, please visit: www.unsgab.org

[2] "Getting out of the box – linking water to decisions for sustainable development" is the title of the first key message in the the United Nations World Water Development Report 3 "Water in a Changing World" (Paris, United Nations Educational, Scientific and Cultural Organization; and London, Earthscan; 2009) pg. xix.

Introduction

Water-wise, the world is in a state of crisis. More people die and suffer from the lack of access to safe drinking water and to basic sanitation than from war. There are 884 million people in the world, almost all of them in developing regions, who still do not obtain their drinking water from improved sources[3]. A growing population, increasing water pollution and changing consumption patterns, in particular related to food, provide the basis for the concern that water scarcity and diminishing water quality will become a main constraint on economic and social development and environmental sustainability.

It is increasingly evident that many water challenges can be averted only if water management issues are considered and acted upon by decision makers whose primary focus may not be on water management. On their own, water resources managers are not always in a position to design the type of cost-effective, sustainable solutions needed to meet the increasing water demands resulting from economic and population growth. It is therefore critical that water managers be part of a larger dialogue and movement aimed towards realizing sustainable development. This will require the explicit integration of water issues into the policy frameworks of all sectors, taking into account opportunities for the introduction of policy options with a bearing on water quantity and quality, and the strengthening of effective institutional arrangements.

Since water is essential for all social, environmental and economic activities, sectoral approaches will not be sufficient to manage water properly. As such water is a resource that demands a sustainable development lens; and this being the case the participation of users, planners and policymakers at all levels is crucial. This approach described in the Plan of Implementation of the World Summit on Sustainable Development as Integrated Water Resources Management (IWRM)[4]. The summary of the discussions held at the sixteenth session of the CSD, it was recognized that IWRM was the framework for the entire water sector and an essential tool for effectively managing water resources and water-related issues[5]. While IWRM approaches have provided good policy tools and advanced our understanding of water's relevance to all other sectors, there is still room for making clearer and more explicit connections between water and the thematic areas within the CSD process such as those currently under consideration: sustainable consumption and production, mining, chemicals, waste management and transport. In an effort to support the work of the representatives participating in the sessions of the CSD, UN-Water and the United Nations Secretary-General's Advisory Board on Water and Sanitation have prepared the present document, which highlights the connection of water issues with the thematic issues currently being discussed in the CSD and the importance of considering water issues during these discussion.

[3] World Health Organization (WHO)/ United Nations Children Fund (UNICEF) Joint Monitoring Programme (JMP) for Water Supply and Sanitation (2010)

[4] See Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August - 4 September 2002 (United Nations publication, Sales No. E.03.II.A.1)

[5] See Official Records of the Economic and Social Council, 2008, Supplement No.9 (E/2008/29)

Sustainable Consumption and Production

Key aspects to consider:

- Water is an essential factor in the production of any good
- Consumption and production patterns have considerable impacts on overall water resources availability, quality and use.
- Global trends point towards increasing water consumption due to population growth and changes in consumption patterns, in particular related to food and energy.
- Water recycles through the hydrologic cycle; however, at any given time and place, there is a finite amount of good-quality water available. With increasing demand, this amount of readily available water is significantly diminishing.

Some possible solutions:

- Provide incentives for efficient water-use decisions and educate consumers and producers about the linkages between water and goods and services.
- Support the development and use of technologies and management approaches aimed at conserving water in production processes within water-scarce regions.
- Ensure that there is agreement on priorities and equity in distributing the limited amount of water resources available.

Water is an essential factor in the production of any good. Globally about 70 per cent of the water resources withdrawn are used in agriculture for both food and products such as biofuels. The concept of virtual or embedded water has been used to depict the amount of water consumed in the production of an agricultural or industrial good. It demonstrates the central role of water in sustaining economies and highlight the fact that the wasting of food or industrial goods in reality constitutes a loss of water. The concept of virtual water can also illustrate the fact that consumption patterns have a direct effect on the world's water supplies. For example, a diet rich in meat is much more water-intensive than a vegetarian diet. Large amounts of water are lost owing to the waste of food that occurs along the chain from harvesting to actual consumption. Improving the food chain efficiency through improved storage, transport and marketing arrangements as well as relying on local food processing will save water while conferring other benefits. This applies not only to the food chain, for in general a less consumption oriented and less wasteful society, which uses more efficient production systems can reduce pressure on water resources.

Considering impacts along with other sustainability issues (for example, greenhouse gas emissions, energy use, social well-being, gender equity, ecosystem degradation, etc.) might help consumers and producers in the future to better understand their relationship with the watershed, to make informed management decisions and to raise awareness of the challenges. Along with economic incentives, the use of impact assessment tools can help producers become better stewards of their environment.

Improving agricultural and industrial productivity per drop of water is key to providing the goods for a growing population. Upgrading the technology and management of irrigation systems can play an important role in improving agricultural production, producing more goods with less water and preventing the overexploitation of groundwater resources. The economic efficiency of such interventions needs to be carefully considered. In this regard it is the poor who can benefit most from water productivity gains in crop, fishery and mixed systems through targeted interventions. Water management can thus help to ensure food security, reduce poverty and conserve ecosystems.

The concept of virtual water also links water to trade issues: by purchasing food through international trade, water-scarce countries obtain the water embedded in the goods. It emphasizes that water issues are not solely regional: they have an intrinsic global dimension. Water embedded in goods is much easier to transport than the actual water needed elsewhere to produce the same good. Trade in virtual water can help alleviate a nation's pressure on its own water resources. However, there are very real issues that need to be factored into the equation, such as greenhouse gas emissions resulting from transporting goods and national food security concerns.

Water recycles through the hydrologic cycle; however, at any given time and place, there is a finite amount of good-quality water available. With increasing demand, this amount of readily available water is significantly diminishing. When discussing the topic of sustainable production it is important to consider the local water context where impacts are felt, as well as the fact that water is part of the life cycle of each product. Water experts have developed technologies and management approaches that can offer solutions needed in the move towards sustainable production processes. To apply these solutions adequately, however, improving the monitoring and reporting of water use must be strengthened.

Mining

Key aspects to consider:

- In using large quantities of water, mining impacts on both water quality and water quantity; therefore, a strong focus on water management is needed to ensure that water is used efficiently and that discharges are managed.
- By-products of mining transported through water, such as through acid mine drainage (AMD), can have negative long-term impacts on the environment.
- Mining, compared with agriculture, is a relatively small water user, but at a watershed scale, it can be the largest water user.

Some possible solutions:

- Plan, regulate and control water use and discharge in mining operations through an effective and enforceable legislative framework, which also provides incentives for water-use efficiency.
- Devise site-specific pollution prevention plans supported by ground- and surface water monitoring.
- Ensure that national policy frameworks for environmental and health impact assessments are strengthened so mining projects' implications for water resources and their indirect impacts can be considered at the planning stage.

Mining can be the largest user of water in a given watershed. Water use in mining is essential in all mining categories, ranging from hard rock, sand and gravel mining, to industrial mineral mining and coal mining. Three major water-use categories can be identified: mining operations; downstream processing; and product conveyance. Usually, water is imported for operating purposes from locations remote from the mine. In most cases it has to be pumped to the mine from the original location, which requires energy inputs. Hard rock mining typically requires water for drilling and size-reduction operations. One example of water use in drilling is provided by hydraulic mining, where a series of water jets are used to excavate rock material or sediments. If not managed carefully and efficiently, water supply for mining operations can deplete surface and groundwater resources. When water is pumped at a withdrawal rate that exceeds the natural recharge rate, the water table can drop, with negative ecological and environmental impacts, including land subsidence.

Water quality can be impacted by mining's toxic by-products, and pumping can deplete water availability. Some of these impacts can be immediate, while others may manifest themselves years, or even decades, after mining ends. Mine water, acid mine drainage and mine tailings can all have negative environmental impacts, in terms of both the quality and quantity of surface water and groundwater. The outflow of acidic mine water from coal or metal mines is one of the most serious long-term environmental problems associated with mining activities. Mine tailings, the non-marketable mining materials, often contain trace quantities of hazardous minerals and added compounds used in the extraction process. Proper disposal of tailings, for example, in the form of pond storage, is critical.

The issues of water quality degradation and water allocation associated with mining need to be addressed through enforceable regulations. In order that negative impacts on the population and ecosystems may be prevented, it is important that all environmental impacts be taken into account and actions be taken to mitigate those impacts. Site-specific conditions have to be carefully evaluated when designing a management and regulatory framework. When because of the demands of mining operations excessive amounts of water from the local supply are diverted, a potential threat is posed to the health and livelihood of poor and vulnerable groups. Also, food security can be compromised by mining activities owing to loss of agricultural land, water pollution and the decrease in available water resources for irrigation. Pollution prevention plans aiming at the minimization of land disturbances, coupled with ground- and surface-water monitoring, are examples of good practices in mining operations.

Many of the measures that can be incorporated into the quality and quantiy of water resources can be effectively deployed only if the nature and magnitude of impacts are assessed at early planning stages. Therefore, sound impact assessment policies, regulations, procedures and methods need to be deployed. Utilizing these planning tools will also allow for the early detection of opportunities for improvements in any project, which enables industries to assume a form of social responsibility that places them in a positive light. To manage water properly, mines need to manage it as an asset that has value across environmental, social and economic dimensions.

Chemicals

Key aspects to consider:

- Chemicals are introduced into water in every dimension of modern life, by agriculture, industries and households, and have a detrimental effect on human health and ecosystems.
- Human health and the functioning of ecosystem services, on which humans depend, can be threatened even by low concentrations of chemical pollutants.

Some possible solutions:

- Apply management approaches, such as integrated pest management (IPM) and integrated vector management (IVM), and technologies designed to reduce pollution of water by chemicals.
- Involve all user groups so as to ensure that cost-effective and equitable use of water is achieved and the cost of water pollution is accounted for.
- Use existing cost-effective technologies and management approaches to prevent pollution in the first instance, and move towards a "zero discharge" approach.

Major sources of water pollution by chemicals include agricultural land run off, which can introduce excessive nutrient loads, as well as untreated industrial, agricultural and municipal waste water, uncontrolled solid waste disposal, and mining-related activities. Pollution from toxic chemicals contaminates salt- and freshwater bodies on the planet. Pollutants can be hazardous even at very low concentrations and cause long-term damage to humans and natural ecosystems.

Water pollution control regulations make a distinction between point sources of pollution, which release the pollutant from specific locations, and non-point sources, which are more diffuse. Chemical water pollution may be derived from both a point and a non-point source. Examples of point sources of chemical water pollution include pipes and oil spills, while a typical example of non-point source of chemical water pollution include nutrient run off from agricultural land.

Pesticides are a particularly important group of chemicals in this context. Agriculture and livestock operations are the main area of application of pesticides. Pesticides also find a wide range of applications in the control of disease vectors to protect human health. If used or disposed of improperly the pesticides used in the public-health domain may also cause water pollution. The promotion of integrated pest management in agriculture and integrated vector management in public health can make a major contribution to the reduction of the pollution of water by pesticides.

Water pollution is increasing, particularly in developing countries, which face major water quality and quantity challenges, owing to incompatibilities between industrial and urban expansion and environmental policies. This trend is expected to increase, since the world population is projected to reach 8.3 billion by 2025 with the main share of the growth in urban areas in developing countries, where waste water treatment facilities are often lacking. There is ample evidence that the degradation of water quality directly impacts human and ecosystem health and leads to greater social inequity.

The technology and know-how needed to greatly reduce and eliminate water pollution do exist. Pollution prevention is always more economical than restoring contaminated waterways. Cost-benefit analysis and impact assessments, which factor in water pollution, are important tools and can be used to make a strong case for chemical pollution control. In addition, decision support systems, buttressed by effective collection of the data from various sources needed to inform a decision, can help assess the impact of economic incentives for pollution control. These tools should be used in advance of any action that could chemically contaminate water. Zero discharge approaches, which treat, recycle and reuse effluents instead of discharging them, are being pioneered and implemented by certain industries, leading to sustainable reductions both in pollution impact and in water consumption.

Transport

Key aspects to consider:

- Waterways transport the largest share of goods.
- Shipping emissions and accidents, as well as construction on rivers, have negative impacts on ecosystems.

Some possible solutions:

- Continually improve and implement maritime safety and security standards to safeguard humans and ecosystems that depend on waterways.

Societies have always settled near water for ease of access and since waterways are critically important to the transportation of people and goods. Waterways, carrying 80 per cent of the world's total transport, are essential for domestic and international trade. The negative impacts of maritime transportation range from pollution associated with accidents such as oil spills, to the environmental disturbances associated with the removal of sediment from the channel bed and river reconstruction undertaken to allow navigation.

The rapidly increasing global demand for transportation will put extra pressure on shipping to reduce the impact of water-related environmental disturbances associated with navigation. Existing maritime safety and security standards are important in controlling and mitigating the effects of pollutants on the marine environment.

Waste management
(solid and hazardous waste)[6]

Key aspects to consider:

- Pollution of surface- and groundwater resources by solid and hazardous wastes constitutes a long term threat to human health and ecosystems.

Some possible solutions:

- Apply leachate control measures at landfill sites to protect groundwater quality.
- Treat waste water to render it suitable for productive uses.

Solid and hazardous wastes, if not properly treated, are sources of water pollution and can represent a threat for human health, owing to their high content of toxic substances. Economic growth, urbanization and industrialization have led to an increase in solid and hazardous waste in many parts of the world.

The main water-related issue associated with waste landfills is that the leakage of toxic substances into surrounding groundwater in the form of "leachate". This term refers to the liquid that either already exists in the landfill or enters the landfill from external sources, through rainfall and surface drainage, and percolates through the ground, thereby affecting the quality of groundwater. Water experts have developed three main approaches to leachate control: preventing the precipitation from entering the refuse through use of an appropriate cover; collecting and treating the leachate produced by the site, which generally is more expensive; and isolating, the waste from the environment until it has been transferred safely to sanitary landfills, which in many cases is the most expensive solution.

A major concern with respect to groundwater pollution is the fact that it may persist underground for many years after it has been introduced. Moreover, the polluted water in the ground can be forced back into the atmosphere though evapotranspiration or drain to the nearest stream or river. Underground pollution control is achieved primarily by regulating the pollution source and secondarily by physically entrapping and, when feasible, removing the polluted water. In all cases, the focus in the first instance should be on reducing and safely disposing of solid and hazardous wastes and thereby reducing water pollution.

Wastes are also transported through water; and thanks to advanced technology, the reuse of waste water is now possible. Wastewater, particularly in urban and surrounding areas, must be considered an asset. For many growing cities in developing countries, a large portion of the fresh produce consumed by urban-dwellers is grown within city limits with reused water. While this practice should be encouraged, it is important that the reused water meet appropriate standards[7]. In the industrial sector, for example, treated waste water is being used for cooling purposes; other applications include artificial aquifer recharge, recreational uses and rehabilitation of natural ecosystems.

[6] Agenda 21, the United Nations Programme of Action from Rio (1992) Chapter 21 stressed the linkage between solid waste and waste water management, sewage treatment and sanitation, however CSD-18 is specifically focused on solid and hazardous waste.

[7] World Health Organization, Guidelines for the safe use of wastewater, excreta and graywater. Third edition (Geneva, 2006)

Conclusion

Water features prominently in all topics to be considered at the CSD-18/19 and it is critically important to incorporate water-related issues within the discussions and negotiations also as a means of tackling the world's water crisis. Considering that water is the primary medium through which climate change influences the Earth's ecosystem its linkages to the themes of CSD-18/19 become even stronger. Water managers can provide important insights into the issues under consideration by the CSD and thus potential solutions as well to challenges related to these issues. If sustainable solutions are to be devised it is vital that water managers and experts on the themes currently considered by the CSD agree on joint strategies. There is a growing recognition that most of the decisions on how water resources are managed and used are made outside the water domain. Water managers are therefore keen to interact with decision makers from other disciplines and economic sectors. They have developed the means to tackle the water challenges underlying many of our sustainable development problems; however, the implementation of their solutions requires cooperation with others.

Water is an essential factor in the production of any good: production and consumption patterns have a direct effect on the world's water supplies. Water experts have developed technologies and management approaches that can both offer solutions to challenges that may arise in moving towards sustainable production processes and raise awareness of consumers. Waterways carry the largest share of transport of goods. Maritime safety and security standards are important for safeguarding waterways and the humans and ecosystems that depend on them. Mining impacts water quality and quantity. It is therefore important to continue to enforce legislative frameworks, and plan and control water use and discharge in mining operations. While the technology and know-how do exist to prevent the degradation of water resources, toxic chemicals and waste products continue to contaminate saltwater and freshwater bodies. Preventing pollution and using existing treatment technologies along with the know-how available in ecosystem conservation will be central in devising solutions along the path towards sustainable development.

The integrated water resources management and water efficiency plans that were called for at the 2002 World Summit on Sustainable Development triggered a process of linking water management to national planning, budgeting and priority-setting in many countries. These plans were the first step in a process to illuminate how water management contributes to achieving national development goals and the importance for water managers to clearly link their efforts to national development priorities. Now it is essential to move beyond this first step to ensure that water managers participate alongside finance and planning managers in national development planning processes to enable comprehensive solutions to be devised that can provide long-term benefits. Water is integral to life, growth and development and is our planet´s greatest asset. Hence inter sectoral solutions need to be found to the challenges that arise in the course of building a sustainable future.

UN-Water

UN-Water is a mechanism to strengthen coordination and coherence among all United Nations (UN) bodies dealing with a variety of water-related issues, such as health, farming, environment, energy, food, climate, sanitation and disasters. UN-Water was set up in 2003 through a decision by the High Level Committee on Programmes of the UN Chief Executive Board for Coordination. The Chair of UN-Water is chosen from one of the UN agencies for a two- to three-year term (the current chair is with the UN University), whereas the Secretariat is hosted by the UN Department of Economic and Social Affairs. UN-Water evolved from many years of close collaboration among UN agencies and a firm belief that still more can be done to strengthen the UN system in its efforts to work more effectively on water and sanitation issues, which are among the most urgent challenges of our time. UN-Water is not another UN agency. Instead, UN-Water adds value to existing UN programmes and projects and fosters more cooperation and information sharing among UN agencies and their partners.

UN-Water web site: **http://www.unwater.org**

The United Nations Secretary-General's Advisory Board on Water and Sanitation (UNSGAB)

The United Nations Secretary-General's Advisory Board on Water and Sanitation (UNSGAB) is an independent body established in 2004 by United Nations Secretary-General, Mr. Kofi Annan, to give advice as well as to galvanize action on water and sanitation Millennium Development Goal target. Chaired by His Royal Highness the Prince of the Netherlands, the Board is composed of a wide range of dignitaries, technical experts, and individuals with proven experience in providing inspiration, moving the machinery of government, as well as working with the media, the private sector and civil society.

UNSGAB web site: **http://unsgab.org**