



The Post 2015 Water Thematic Consultation

Wastewater Management & Water Quality

FRAMING PAPER





Introduction

This paper has been prepared to contribute to the overall debate on the inclusion of water-related targets and goals in the formulation of the future SDGs in respect of wastewater management and water quality. The paper aims to present a balanced argument, and to consider the various sectors where wastewater is a key issue. In summary, the key messages (which are expanded further in the paper) are as follows:

- There is a need to understanding the scale and urgency of the problem in light of demographic changes (particularly urbanization and climate change);
- Future goals and targets should build on the existing successes of the MDGs, outcomes of Rio+20 and other relevant initiatives (such as the Nexus approach) and give cognizance to emerging issues, in particular, the human rights perspective;
- A key contribution is the development of effective and practical pollution control policies;
- A shift in thinking to promote wastewater collection, treatment and reuse from the resource recovery perspective is needed; and
- The need to fully embracing other sectors, to fully realize the opportunities that exist for wastewater from the health, environment (both from the resource use and biodiversity perspectives) and livelihood development

Since the establishment of the MDGs process and the ratification by Governments, the landscape has changed. There are several factors which now influence the follow-up goal setting which must be addressed. It is now widely recognized that access to water and sanitation is central to the attainment of MDGs in other sectors, the education and health goals could not have been met without improved access to basic services. In reviewing the MDG process, many other groups have recognized this. Recently, the human rights issue relating to access has been a key driver to further promoting the cause. This can arguably be extended to the enhanced health and economic status which is currently being denied to marginalized communities.

Without doubt, water and sanitation in the widest sense must figure clearly in the SDGs. Within this sphere, wastewater management provides a clear opportunity to combine resource conservation and protection, with livelihood development, creation of economic opportunity and promotion of health practices.



Current Status

Water and development

Improving and safeguarding wastewater management and water quality are vital for all three dimensions of sustainable development. Demand for water is growing at twice the rate of population growth. Without effective strategies to manage wastewater production, its treatment and reuse, development will be constrained and the resulting negative impacts, particularly on water-scarce economies, will arrive sooner than predicted by current approaches.

Reducing unaccounted-for-water, or making beneficial use of water which is reused or recycled, are the most readily available ways to preserve water resources and to reduce the demand on finite freshwater resources. Preventing and removing pollution is essential to maintain the renew-ability of a renewable resource. For most uses of water, quality is as important as quantity. Many water resources are rapidly degraded by poor disposal of wastewater and in some case the economic cost of treatment makes them unsuitable as a source downstream.

Water from agricultural and industrial activities also contributes significantly to wastewater production. Ever-expanding urban areas will need increased food production, which is also governed by water availability and underscores the critical importance of reuse. Development of industries and their economic impact on local markets will also be governed by water availability.

Aside from its use by humans and in productive uses, water makes an important contribution to improved lifestyles from the recreational point of view. Most economies rely on protecting water resources and many rely in turn on other natural resources such as wildlife, habitats and fisheries.

There is a view that unsustainable or restrictive policies for wastewater will negatively impact on economic development and job security. In reality, the converse is more likely true. Providing effective management for wastewater can create many jobs in the context of a green economy. For example, wastewater collected and treated to reduce its harmful impacts, can be reused to reduce the operational costs of industrial processes and agricultural production. In addition, the recovery of energy can contribute to reducing emission of greenhouse gasses.

The political landscape

Within the framework of water, wastewater has a very low political priority. In fact, it is often forgotten in discussions concerning water and sanitation. The Millennium Development Goals (MDGs) did not include any targets or goals related to wastewater management. In short there is no coherent global consensus on what constitutes wastewater and how it can be managed. In addition, the institutional home or responsibility for wastewater management strategies is unclear.



There can be no political opportunity or will to act if the magnitude of the problem and the costs of its impacts and benefits of solutions are unknown or un-quantified in economic terms. Although some excellent work has been done, the evidence base for justifying increased investments in wastewater management and treatment is not exhaustive enough to provide clear guidelines for action. A recent desk review of the impacts of wastewater collection on enteric disease (Norman et al. 2010) has indicated that between a 30 to 60 % reduction of these diseases can be expected depending on the local conditions.

There are clearly economic incentives to reduce damage caused by water pollution, and, in many cases, wastewater can be a useful resource. The costs associated with remediation far outweigh the costs of prevention and treatment.

The contribution that other actors can make, especially civil society and water operators, in realizing the opportunities in a holistic approach to wastewater management is recognized.

Quantifying the problem

Nearly all human activity results in the production of wastewater. It is difficult to quantify, but has been estimated that, globally, about 80% of wastewater from human settlements and industrial sources is discharged to the environment without treatment (UNEP & UN-Habitat, 2010). The current worldwide levels of wastewater production are unknown and are just estimated from water production figures. The fact that statistics are lacking and no satisfactory methodology for producing them has been devised, makes indicators and goal setting difficult.

Water is traditionally considered wastewater if it is contaminated to a level where it presents a risk or hazard for use. This includes pathogenic material or certain organic or inorganic contaminants which can present a risk to human or animal health or damage natural ecosystems. Wastewater emanates from many different sources and the division between “black water”, “grey water” and surface runoff is often unclear. In reality, water in the environment becomes easily contaminated and frequently results in disease outbreaks and other very negative impacts. Wastewater should include faecal sludges and septage, as they frequently have similar reuse and disposal requirements. A concise definition is given in Box 1

Box 1 Defining Wastewater

“a combination of one or more of: domestic effluent consisting of blackwater (excreta, urine and faecal sludge) and greywater (kitchen and bathing wastewater); water from commercial establishments and institutions, including hospitals; industrial effluent, stormwater and other urban run-off; agricultural, horticultural and aquaculture effluent, either dissolved or as suspended matter” (UNEP & UN-Habitat 2010)



The perception of wastewater as waste is definitely an impediment to its recognition as a useful resource. Changing the perception of waste in this respect has been a key element in other areas such as solid waste management and recycling. In both the developed and developing world, the fact that some proportion of wastes are collected and recycled (albeit by different actors), and final disposal limited, gives a good model that can be applied to wastewater reuse. In highly developed economies some closed disposal sites have been mined to reclaim valuable wastes.

Key Issues

Urbanization and Resource Management

Urbanization is one of the most critical issues governing the production and use of wastewater. It will need more attention than climate change up until 2050 (OECD, 2012). Large urban areas, but particularly unplanned smaller urban centers present the biggest threat, but also the biggest opportunity for introduction of sustainable approaches to managing resources. Understanding the process of urbanization and the patterns that exist can give a good insight to the likely impact of production and treatment. Critical to many elements of the water cycle is the juxtaposition of human settlements, agricultural and industrial activity. This implies that urban planning and the design of efficient and effective urban space needs much more attention. This includes developing and operating systems that collect and channel used water flows and enable these to be treated to restore their potential as a resource.

The missing health & environmental perspectives

The negative health impacts of poor wastewater management are somewhat empirical and are not quantified to the level where they can provide meaningful economic arguments. There have been many catastrophic impacts of poor wastewater management, but by and large they are unseen or, as is often the case, occur downstream from the places where the pollution originated. In many high-density urban settings, inadequate wastewater and surface water management results in significant intra-urban differences in relation to environmental health impacts.

The impacts on health affect both on the wealthy and the poor. In many large cities, the market crops irrigated with untreated wastewater and the fish from polluted coastal sites are consumed by rich and poor alike.

Wastewater, including polluted surface water, is one of the main causes of water-borne disease. These include both communicable disease, non-communicable disease (such as those related to long-term chronic exposure to toxic substances) and vector-borne diseases.



The current approach to curative rather than preventative strategies is not only more resource intensive but also woefully inadequate. It is a paradox that a child who lives in a dense urban slum, may be vaccinated against a specific disease, but will be exposed to other diseases whilst spending most of their day playing in an environment which is highly polluted with human and animal excreta.

It is admirable that sanitation practitioners have embraced the concepts of hygiene promotion and recognized its importance in delivering effective sanitation systems, however there is no equivalent philosophy for wastewater. The existing MDG Target for sanitation addresses only access to basic sanitation which has been de facto restricted to access to toilets. The debate on the relative benefits of on-site sanitation as compared to water-borne sewerage continues unabated. In reality, both can co-exist in the majority of human settlements. There have been marked improvements in faecal sludge management but it still represents a huge challenge.

Industrial wastewater as a source of health-related risks needs attention beyond issues such as the release of heavy metals such as Mercury and Cadmium. For example, many so-called biological wastes, from e.g. food processing, are equally damaging. These wastes exert a significant oxygen demand on receiving waters; damaging aquatic habitats leading to loss of biodiversity, and damaged ecosystems. The risk from industries is not only restricted to the larger companies and multi-nationals (who often comply with strict global codes of conduct), but also extends to the informal, small-scale industries who are responsible for many uncontrolled, point-source discharges in urban environments.

The missing reuse opportunities

Wastewater is an under-utilized resource. Reuse or recycling can combine an effective environmental and health protection strategy with the recovery of water, nutrients and energy

The term “resource” is used based on the presence of certain substances which often have value in their own right. The only reason they are not reclaimed is the cost or practicality of recovery. Domestic wastewater is a good example. It contains the nutrients required for agriculture in correct proportions. The only problem is the cross contamination with pathogens or traces of toxic chemicals. The same consideration applies to industrial wastes. Even toxic substances such as cadmium or mercury have a value. Good examples of resource recovery include the extraction of precious metals from mining wastewater and Struvite from urine.

Technologies are advancing and there are increasing examples of where resource recovery becomes financially viable.

The key to effective reuse therefore lies in minimizing the costs associated with its carriage and treatment. In some settings the use of domestic or “black water”, is constrained by the taboos associated by some cultures with the reuse of faecal material. This is sometimes related to the health aspects but also embedded in social customs and norms. These issues need to be addressed by supporting communities to overcome these fears and embrace reuse, through awareness creation and behavior change.



In many cases, opportunities exist for localized reuse of wastewater from industries. For example, the wash-down water from a food or beverage industry can be readily recycled, or used by a neighbouring industry. Drainage water from roofs and surface runoff can be reused to flush toilets and for other non-potable applications. In many countries, rainwater is used as a principal source of water for domestic purposes, with some level of on-site treatment, including disinfection. Increasingly, the use of runoff from airport runways has gained popularity in this regard.

In addition to opportunities for recovery of organic and inorganic chemicals, many wastewaters offer the opportunity to recover energy. This may be through physical separation of solid fractions or the production of energy through biogasification or the recovery of heat.

Key Messages

Understanding the scale and urgency of the problem in light of demographic changes

Wastewater production and its management and disposal remain un-quantified despite the fact that it is such a significant component of the water cycle. Understanding the importance of wastewater and its opportunities is woefully lacking in any of the current development goals.

Global changes impacting on the use of water resources are the reality and recognizing that urbanization will exert a greater impact on human activity compared to climate change, at least up until 2050, requires urgent action. Wastewater pollution has the potential to contaminate scarce water resources, thus exacerbating the problem and bringing a potential crisis to water-short economies, far sooner than currently envisaged. The inclusion of a wastewater management and pollution control target is therefore an essential component of any future water Sustainable Development Goal. Such a goal should monitor and stimulate national actions on progress towards collection, treatment, reuse and disposal of wastewaters on a collective and individual basis. The importance of minimizing the generation of wastewater, through low-volume flush toilets, water saving faucets and also through improved industrial and agricultural water-use efficiency should also be part of the strategy.

Targets should be applicable and adaptable to all countries and cover the main sources including domestic, industrial and agricultural. There is a need to set up monitoring systems at national and sub-national level to understand the problems and inform clear policy decisions on action.

Build on existing successes of the MDGs

Any proposal for a goal related to wastewater should build on existing or planned goals for water and sanitation, but should be recognized as warranting action in its own right. This is justified by the fact that wastewater has always been subsumed into the water and sanitation debate and never recognized as one of the most cross-cutting issues of integrated water resources management.



The aim should be to introduce or strengthen laws and other forms of regulation to support the reduction of pollutants and make water reuse possible, including the recovery of positive substances. The existing MDG targets for sanitation need to be maintained and reinforced with better indicators and monitoring processes.

Develop effective and practical pollution control policies

Wastewater pollutes not only the natural environment but also the immediate living environment, and as such has a huge impact in health related illness, particularly in the developing world. A key aim should be to establish or strengthen national policies and regulations for wastewater collection, treatment and discharge in order to ensure that individual and collective practices and systems are sufficient to protect the health of individuals against contaminants from human activities and to protect natural ecosystems against harmful pollution.

Promote wastewater collection, treatment and reuse from the resource recovery perspective

In order to meet the growing demand for water from the finite resources available, it is sensible to ensure the successive uses of water by different users in the same catchment. This can be done by reducing pollution and by collecting and treating used water to enable its subsequent use by others. Formalizing reuse should be a first priority above disposal, so as to conserve the available water resources. Managing water pollution and treating used water is essential to reduce freshwater abstraction and use globally.

Embracing other sectors to fully realize the opportunities that exist for wastewater from the health, environment and livelihood development

Managing water pollution and treating used water are vital activities for sustainable development, poverty alleviation, human well-being and healthy environments. Global goals will stimulate harmonization of national policies, facilitate harmonization of respective policies of riparian countries and will be the starting point for building the common vision. Wastewater collection and treatment must be integrated in land use planning processes.



Communicating the messages and implementing the actions

The need to build global consensus coupled with local level action

In order to implement effective wastewater management strategies, there is a need for clear guidance. A set of standards is needed for both rich and poor countries which provide a blueprint for national policy formulation. However, the level of uptake of policy and good practice will however require a clear implementation strategy at local level. The importance of capitalizing on existing systems of governance and the vast resources of civil society and recognized stakeholder groups should not be underestimated. Coordination of these resources is vital if we are to achieve the quantum leap in implementation needed to have a significant impact. There are currently many actors who are not fully engaged.

Key to making a difference is the identification of champions in society to spearhead action. There are good examples where, a mayor or a city manager has provided the critical catalytic role in developing local action plans for wastewater, drawing on their resources such as their health officer, water utility manager, urban planner or others. These examples offer good incentives to elevate the political importance of wastewater, by demonstrating the progress that can be made and by showing the value of monitoring and benchmarking.

Promoting communication links beyond the water & sanitation sector

Integrating concepts and good practice for wastewater management will require broad-based campaign-type approaches. Most importantly, there is a need to reach outside the traditional water and sanitation community, to health, educational and agricultural sectors. The communication strategies need to be clear, concise and understood. Much of the expertise from the product marketing sector can be harnessed. At the local level those involved in planning and finance also need sensitization. The approach for the development of the key messages on the International Year of Sanitation is a good example which can be followed.

Formulating an Overarching SD Goal for water

There is clearly a need to consider an overarching goal for water/wastewater in development goals. Wastewater is such a key component of the water cycle and its understanding is critical to future water management strategies.

It is without doubt that a goal associated with wastewater will further unify the debate on water, sanitation, solid waste and wastewater management. However, an integrated approach is necessary, which although existing on paper, often finds very little practical application in reality. In this respect the goal must be politically attractive and inspirational and capable of being easily understood and communicated. A specific target for managing pollution and treating wastewater is called for, but must be measurable and time-bound. In addition, it must have applicability to countries at all levels of economic development and be easily adaptable in a way that does not impact negatively on economic development. The target should not be perceived as standalone and must be coherent with other proposed development goals.



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The Cure for Cholera - Improving Access to Safe Water and Sanitation

The best intervention for long-term cholera control and, for that matter, for the control of the great majority of diarrheal diseases is the strategy that eliminated epidemic cholera from the United States and Northern Europe long before either marketed antibiotics or effective vaccines existed. The development and maintenance of water and sewage treatment systems assured safe drinking water and safe disposal of sewage for all, keeping contaminated sewage out of water, foods, and the environment. The strategy not only eliminated cholera but also dramatically reduced mortality related to diarrheal diseases of all causes.