



Water Supply & Sanitation Coverage in UNEP Regional Seas

November 2003

Need for Regional Wastewater Emission Targets?

Section II: Targets and Indicators for Domestic
Sanitation & Wastewater Treatment:
Discussion Paper

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The Hague – The Netherlands

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Executive Summary

The main objective of this study is to bring forth the important link between sanitation provision and environmental issues and make this relation the central theme for defining objectives, targets and indicators. This document is written as a discussion paper, which proposes a framework and raises pertinent issues with respect to setting wastewater emission targets. Through this paper, governments in a regional setting are invited to consider the usefulness and approach of setting targets at regional levels.

Chapter 1 introduces this discussion paper, which has been written to explore the use of regional targets and indicators on sanitation and wastewater treatment within the GPA Programme and the Regional Seas Programme. This chapter first elaborates the multiple critical links between water & sanitation and environmental issues relevant for livelihoods and coastal ecosystems. It then summarises the outcomes of the analysis on water and sanitation coverage in the UNEP Regional Seas (Part I of this study). It then explains how this initiative is embedded in a sequence of global policies, from Agenda 21 to the Millennium Development Targets and the recent WSSD in Johannesburg. The possible use of Wastewater Emission Targets (WET) as an effective implementation and reporting instrument supported by the GPA was launched as part of the WSSD initiative “From Hilltops to Oceans” partnership initiative launched at WSSD in 2002. This approach has been supported during the Governing Council and forms the basis of this initiative. WET can be defined at regional, national and/or local levels.

Chapter 2 introduces the holistic approach supported by frameworks that is a red line of this discussion paper. The wastewater management chain shows how wastewater emission is part of a larger system including sanitation services, domestic wastes, municipal wastewater treatment, wastewater discharge and water pollution of rivers and regional seas. The frameworks help draw conclusion and generate insights relevant to this initiative. The integrated water management framework emphasis the linkages between improper sanitation and wastewater treatment as part of the water cycle. It also discusses a definition on ‘improved’, ‘safe’ and ‘adequate’ sanitation currently in use.

Chapter 3 introduces per component of the wastewater management chain relevant issues for which WET could be defined: sanitation services at household level, domestic waste treatment, municipal wastewater treatment, and coastal sea ecosystems pollution. It also introduces some other global concerns and targets set for sanitation at different levels such as environmentally sound sanitation projects and innovative techniques.

Chapter 4 discusses targets and indicators at the regional level especially in those regions found most vulnerable or in need of support. It provides the tools and approaches (DPSIR framework) within which targets and indicators can be selected and measured. This chapter also presents an approach with examples to define relevant targets at different levels, and proposes indicators for these targets.

The final **Chapter 5** discusses and proposes a number of considerations that are relevant for the scope of this work, such as on reporting mechanisms, participatory ways to put this initiative in operation, and other process-oriented considerations. Governments in a regional setting are invited to consider the usefulness of setting targets at regional levels since at the regional level integrative policy dynamics come into play. Finally, there are some recommendations for UNEP offices.

1. Introduction

The Link between Water & Sanitation and Environment

Water supply and sanitation are topics of great importance in relation to health problems, social services, poverty alleviation, sustainable water resources management, food production and security, adequate water supply, water-related disasters and various other topics of global concern. There are important links between water & sanitation and the environmental issues within a sustainable livelihood context. This offers opportunities to address policies and targets from both the water & sanitation, and environmental perspectives, particularly in coastal areas.

Why particularly in coastal areas? Given the current rate of the world population growth, the number of people without access to water supply and sanitation will probably increase. In regions where a large proportion of the population is not served with adequate water supply and sanitation, sewage flows directly into groundwater reservoirs, lakes, streams, and rivers and eventually reaches **coastal and marine ecosystems**. Such mechanisms cause a negative effect on human health and on livelihood productivity and vulnerability. Since an increasing percentage of the global population lives close to the coasts, **coastal towns** and cities are most affected. In order to manage coastal and marine environments, sanitation must be improved and integrated with appropriate water supply and wastewater management, with a specific focus on coastal settlements.

Even in areas where adequate sanitation services are currently being provided, often inadequate attention is paid to reducing or treating the volume of wastewater entering the marine environment. Thus, innovative measures should be multi-faceted; involving integrated water management and wastewater systems within national and trans-boundary basins; increase of public awareness; building of human and institutional capacities; strengthening policy measures and so on.

This report has been written with the objective of exploring the use of regional targets and indicators on sanitation and wastewater treatment within the context of both the UNEP/GPA Programme of Work and the UNEP Regional Seas Programme. It does so by discussing the context, in which these possible targets can be defined, propose ways to assess the feasibility of working with regional WET, and eventually define indicators to monitor the progress of the targets. A sub-objective of this study is to explore the important linkages between water & sanitation and environmental dimensions and make this relation the central theme for defining objectives, targets and indicators. It thus wishes to contribute to the long-term goal i.e. to prevent environmental and coastal pollution caused by disposal of untreated wastewater resulting from households lacking adequate sanitation facilities.

Environmental dimensions need to be an integral part of policies being developed, capacity building being delivered and projects being implemented as part of national, regional or local action programmes on water and sanitation. Following the WSSD Plan of Implementation, the **UN Task Force on water and sanitation** also recognises environmental dimensions to be addressed. This Task Force focuses at household level and 'the environment' directly around the households. In addition, stepwise approaches to address wastewater collection, treatment, re-use and the environmental dimensions should be considered, certainly in longer term planning. It remains the responsibilities of governments to enhance the enabling environment in doing so and to set appropriate priorities for the various stakeholders involved.

The Governing Council Decision 22/II/7 urges governments to adopt such an approach, and requests the Executive Director to integrate into relevant components of the Programme of Work of the United Nations Environmental Programme, **a holistic environmental approach to water and sanitation** and the implementation of the WSSD sanitation target. This should incorporate not only the provision of household sanitation services, but all other components of the water management process, including wastewater collection, treatment, reuse and reallocation to the natural environment. The aim is to define targets where synergy and win-win options become apparent.

Current state of Sanitation Coverage in the UNEP Regional Seas

The cross-regional analysis on the status of water supply and sanitation coverage conducted by UNEP/ GPA (September 2002) brought forth many key conclusions. The focus of the following section is on **sanitation coverage**. Based on this regional seas analysis, it emerges that in the year 2000, out of a total regional seas population of 4.7 billion, 2.1 billion people e.g. 45% of the population did not have access to adequate sanitation. Between 1990 and 2000, there has been a marked increase in the number of people across regions having access to sanitation.

Looking at the sanitation coverage in the different regions, the analysis shows that the coastal habitats, fisheries, marine wildlife and the people of the South Asian Sea Region were the **most threatened** in the world from untreated sewage discharged into coastal waters in 2000. The South Asian Sea region contained 40% (e.g. 825 million people) of the total unserved population in the world, followed by the East Asian with 25% (515 million people), north-west Pacific with 20% (414 million people), West and Central African with 5%. The sea areas with the highest provision of sanitation, and thus the **lowest threat** to the health of coastal waters, included the North East Atlantic, Baltic and the Arctic regions where only a few people were unserved with proper sanitation services.

The analysis shows that in many developing parts of the world rising population are overwhelming all management efforts and levels of sanitation coverage. There remains a backlog of 2,4 billion without access to any sort of improved sanitation facility. For example in the South Asian Seas region, 220 million people benefited from improved access to sanitation during the period 1990 to 2000. But during that period the population grew by 222 million leaving 825 million still without access to acceptable sanitation systems and thousands of miles of coastline vulnerable to pollution. In the East African region the number of unserved population doubled in that same period to 19 million people without access to basic sanitation. **Thus the trend of the rising populations must be taken in consideration while setting targets for sanitation coverage.**

Need for Targets at Regional Level

Agenda 21, 1992 states “Governments, according to their capacities and available resources and with the cooperation of the United Nations and other relevant organisations, as appropriate, should:

By the year 2000, establish waste treatment and disposal quality criteria, objectives and standards based on the nature and assimilative capacity of the receiving environment;

By the year 2000, establish sufficient capacity to undertake waste-related pollution impact monitoring and conduct regular surveillance, including epidemiological surveillance, where appropriate;

By the year 1995, in industrialised countries, and by the year 2005, in developing countries, ensure that at least 50% of all sewage, waste waters and solid wastes are treated or disposed of in conformity with national or international environmental and health quality guidelines;

By the year 2025, dispose of all sewage, wastewater and solid wastes in conformity with national or international environmental quality guidelines.

WSSD Target on access to sanitation, 2002

The Johannesburg 2002 World Summit for Sustainable Development set the target for access to sanitation, i.e. halving, by 2015, the proportion of people who do not have access to basic sanitation, with the following elaboration on action needed:

- Develop and implement efficient household sanitation systems;
- Improve sanitation in public institutions, especially schools;
- Promote safe hygiene practices;
- Promote education and outreach focused on children, as agents of behavioural changes;
- Promote affordable and socially and culturally acceptable technologies and practices;
- Develop innovating financing and partnership mechanisms; and
- Integrate sanitation into water resources management strategies.

Subsequently, in 2000, the **Millennium Development Goals (MDG)** were developed. As a follow-up to the MDG goal on water and sanitation, in Johannesburg in 2002 the **WSSD Target on Sanitation** was agreed upon, i.e. halving, by 2015, the proportion of people who do not have access to safe water and basic sanitation services. The possible use of **Wastewater Emission Targets (WET)** as an effective implementation and reporting instrument supported by the GPA has been launched as part of the WSSD initiative “From Hilltops to Oceans” (Johannesburg, 2002). This approach has been supported during the Governing Council (GC22 see footnote¹). It was requested to cooperate with others that also recommend and work on the development of specific targets and indicators on water supply and sanitation (e.g. WSSCC, WHO, UNICEF).

This UNEP/GPA WET initiative aims to:

- facilitate consensus on internationally agreed targets for action pertaining to discharges of untreated wastewater (wastewater emissions);
- provide a sound bases for regular monitoring, evaluation and reporting;
- invite governments to consider the use of regional / national / local targets and indicators pertaining to the WSSD targets and the implementation of the GPA;
- develop these targets and indicators within the framework of the UNEP Regional Seas Programme;
- link up to existing UNEP Regional Seas Conventions and Protocols.

WET should be specific, time bound goals at regional, national and local levels, which are not excluding but certainly not restricted to pollutant specific loads or concentrations. WET also include targets in the areas of management, capacity building, education, etc.. One of the possible examples for such regional targets could be: to apply sustainable wastewater treatment in at least 20% of coastal cities by the year 2012, using alternative technological, management and financial approaches to the traditional large scale investments, paying particular attention to operation and maintenance costs and to equitable water service pricing.

UNEP/GPA will support governments and other key parties to set realistic but ambitious Wastewater Emission Targets. Governments are urged to consider the feasibility of Regional WET as instruments for prioritisation, resource allocation and progress reporting to achieve global targets of the WSSD in Johannesburg. Regional WET can also help harmonise policies, stimulate exchange and focus on priority issues.

Currently, UNEP/GPA has a programme component implementing the UNEP/WHO/HABITAT/WSSCC “**Strategic Action Plan on Municipal Wastewater (SAP Wastewater)**”. This component aims to mitigate the negative effects of domestic wastewater discharge that include threats to public health, economic losses and marine ecosystem degradation. It protects the marine environment from municipal wastewater pollution by complementing, supporting and strengthening relevant regional agreements, initiatives and programmes and by bringing governments and other stakeholders together to facilitate joint agreements and actions on sewage issues. SAP-Wastewater also directly contributes to the WSSD sanitation target.

The main **purpose of this document** is to serve as a discussion paper by raising some pertinent issues with respect to setting WET, within the context of UNEP programme of action and its implementation at Regional Seas level. Therefore, the scope of this report is not to give an ultimate solution. Setting targets and indicators is context specific. This report therefore provides general conceptual frameworks for defining targets and indicators. The actual definition of targets and indicators need to be developed within each regional context in ways that ensure those lacking adequate and safe provision may influence the solutions.

In setting up regional targets, the primary aim is not to implement the GPA programme but to achieve the WSSD target on water and sanitation by looking at the linkages with environmental targets and in line with the objectives of UNEP-GPA.

¹GC22. II/10. Requests the Executive Director to assess the feasibility of organising regional consultations concerning the development of waste water emission targets suitable for implementation at the national and sub-national level, including reference to ecological benefits, especially where human needs and high conservation values co-exist. Such consultations, if found feasible, should be organised within the framework of the Regional Seas Programme and in cooperation with the partners of the joint Strategic Action Plan on Municipal Wastewater of the Global Programme of Action for the Protection of the Marine Environment – the World Health Organisation, the Water Supply and Sanitation Collaborative Council and the United Nations Human Settlements Programme – and the Task Force on Water and Sanitation of the Millennium Project, taking into account Governing Council decisions concerning a global marine assessment.

2. Approach, Frameworks and Definitions

A Holistic approach

This discussion paper introduces a holistic approach towards water & sanitation and environment for achieving adequate sanitation and reducing health and environmental impacts. This holistic approach incorporates the household level of sanitation and the chain of water and waste management including wastewater collection, treatment, reuse and reallocation to the natural environment.² This holistic view on sanitation has been elaborated throughout this paper, as follows:

It introduces the wastewater management chain on the relations between sanitation services, wastewater, livelihoods and environmental / regional seas ecosystems.

It demonstrates how sanitation services affect livelihoods in both direct and indirect ways, through environmental changes and regional sea pollution;

It introduces the concept of Integrated Water Resources Management, which shows how sanitation, wastewater treatment and environmental pollution are intricately related.

The UNEP/GPA initiative focuses at key issues where water & sanitation and environmental objectives meet, of regional / national / local importance. Selecting appropriate targets will be done in a strategic way, implying that both direct and indirect impacts on livelihoods are tackled in an optimal sense.

Wastewater Management Chain

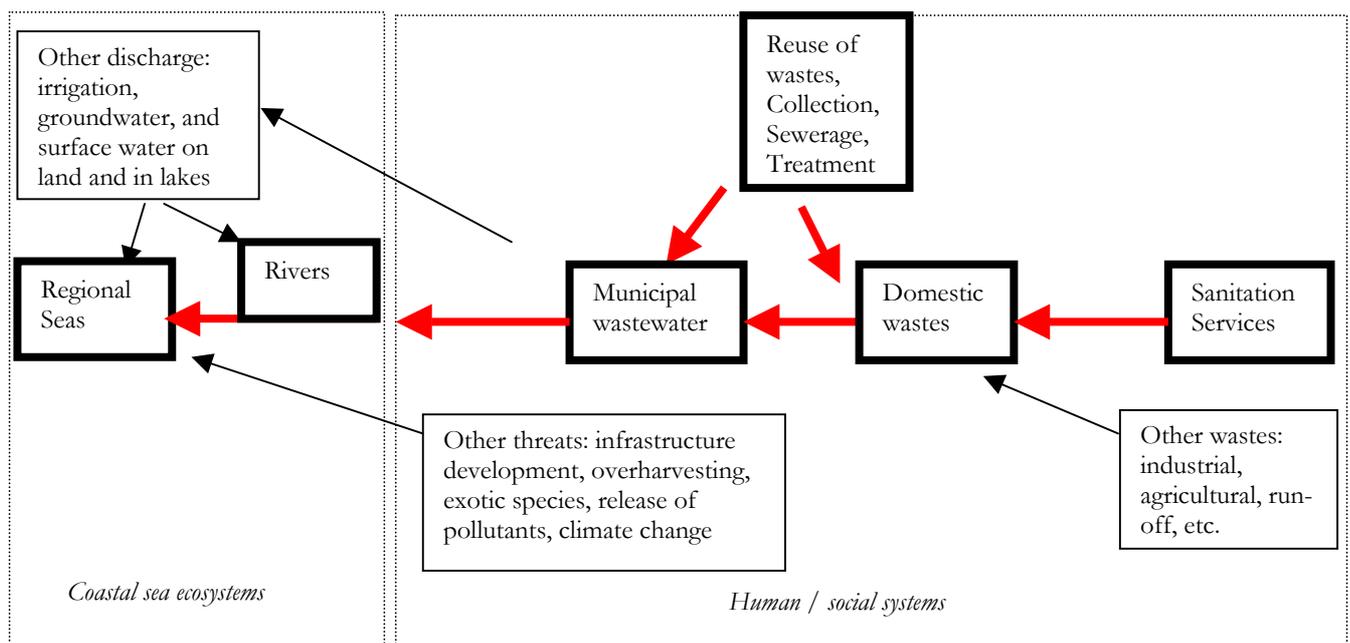


Figure 1: Wastewater management chain (AIDEnvironment 2003)

Figure 1 presents how wastewater emission is part of a larger system, and presents the focus of this report as part of this system (thick boxes and arrows). It focuses on the links between sanitation services, domestic wastes, municipal wastewater, and wastewater discharge and water pollution of rivers and regional seas. This is referred to as the 'waste water management chain'. This wastewater management chain shows the links between human/social systems and coastal ecosystems and the need for proper management along the chain.

² Also referred to in Decisions on GPA of the UNEP Governing Council at its 22nd Session (Nairobi, 2003).

There is evidence that the flow of wastewater is the most important source of pollution of regional seas. There are however, other types of wastes, types of discharges, and types of seawater pollution that play a role in the degradation of coastal seas but these will not be subject of this report. Municipal wastewater has different origins. This project concentrates on domestic wastes from urban coastal areas. This includes wastewater from urban households and from public institutions such as schools. It does not include wastewater from research institutes or hospitals, while their composition is much more variable in terms of quality and quantity. It should be noted that it is often difficult to make a distinction between urban, semi-urban and rural, particularly when a larger regional system is considered. However, previous UNEP analysis has shown that particularly urban coastal areas form the main challenge for defining wastewater emission targets, while these areas show the highest population growth and density (UNEP, 2002).

Relevant conclusions are:

The availability of adequate sanitation facilities does not always imply safe coastal environments. This is because presence of adequate wastewater treatment systems further in the wastewater management chain is crucial for protecting the coastal and marine systems from discharge of untreated polluted wastewater;

Coastal regions deserve special attention given the high density of population in those regions and the intense pressure exerted by the disposal of wastewater via rivers or directly into the coastal environment;

Just counting the number of sanitation connections to households is not an adequate measure to improve water and sanitation targets. There is need to define targets along the wastewater management chain;

In stead of looking at wastewater systems as linear end-of-pipe systems, in which drinking water is misused to transport waste into the water cycle, it is important to look for opportunities and alternative approaches along the whole wastewater management chain.

The multiple impacts of sanitation & water services

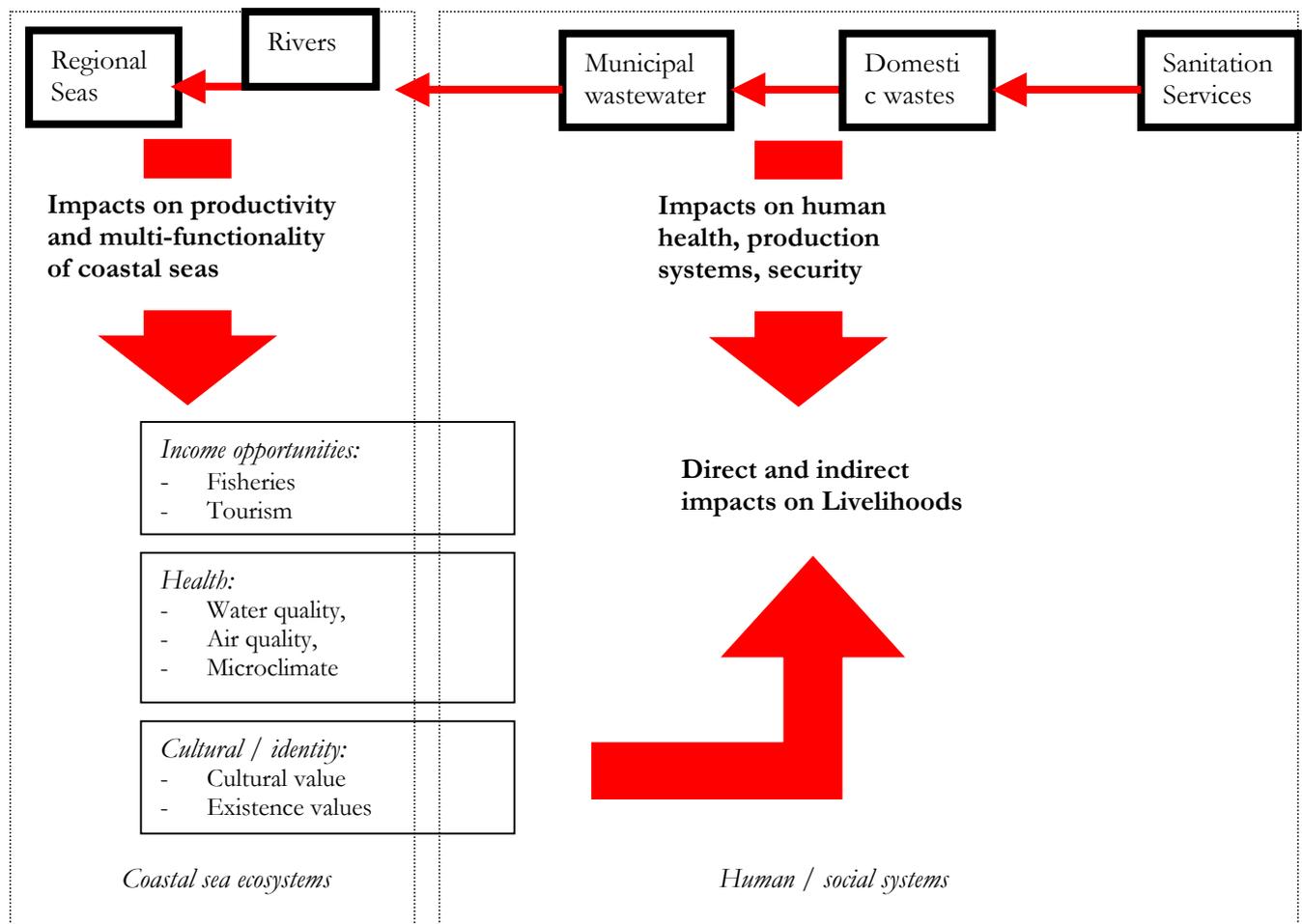


Figure 2: The multiple impacts of Water and Sanitation services (AIDEnvironment, 2003)

Figure 2 describes the direct and indirect links and relations between sanitation, livelihoods, ecosystems and the dimensions of sustainable development. Poor wastewater management in coastal zone areas has both direct (short-term) impacts on livelihoods, and indirect (long-term) impacts on livelihoods through environmental change and degradation of coastal sea ecosystems.

Relevant conclusions are:

Proper wastewater management can be justified by its close relation with income opportunities and poverty reduction, health, cultural identity and human rights including the right of access to safe water, sanitation and a safe environment;

In terms of impacts of poor sanitation on people and livelihoods, there are both direct pathways (e.g. recreation, religious bathing, etc.) or indirect pathways through environmental changes, the foodchains and biological cycles, i.e. through changes in water resources and coastal ecosystems upon which livelihoods depend. Both direct and indirect impacts have risks and economic values;

An additional benefit of sanitation is a coastal environment with a higher quality of natural resources with potentially high economic opportunities;

The need for improvements in better provision of water and sanitation is particularly important in a world where fresh water is increasingly in short supply, and where finite fresh water resources are often being over-used, depleted and polluted. City-based demands for fresh water and proper sanitation by businesses and affluent residents should not over-ride the needs of other users (as it often does).

Integrated Water Resources Management

Water has different functions. Water bodies are used for navigation, transport and trade and provide a base for recreational and commercial fishing and boating, contributing billions of dollars to the global economy each year. Water is used for other agriculture, nature, producing copper, generating electricity, watering lawns, keeping clean, sanitation and most importantly for drinking.

Figure 3 emphasises the linkages between improper sanitation and wastewater treatment as part of the water supply cycle, with impacts on human health and water sources. Many of us are aware of the cycles linking water supply, sanitation, human and environmental health. Various other aspects of Integrated Water Resources Management may influence these. The dynamics illustrated in Figure 3 can be placed within the context of the wastewater management chain as illustrated in Figure 1.

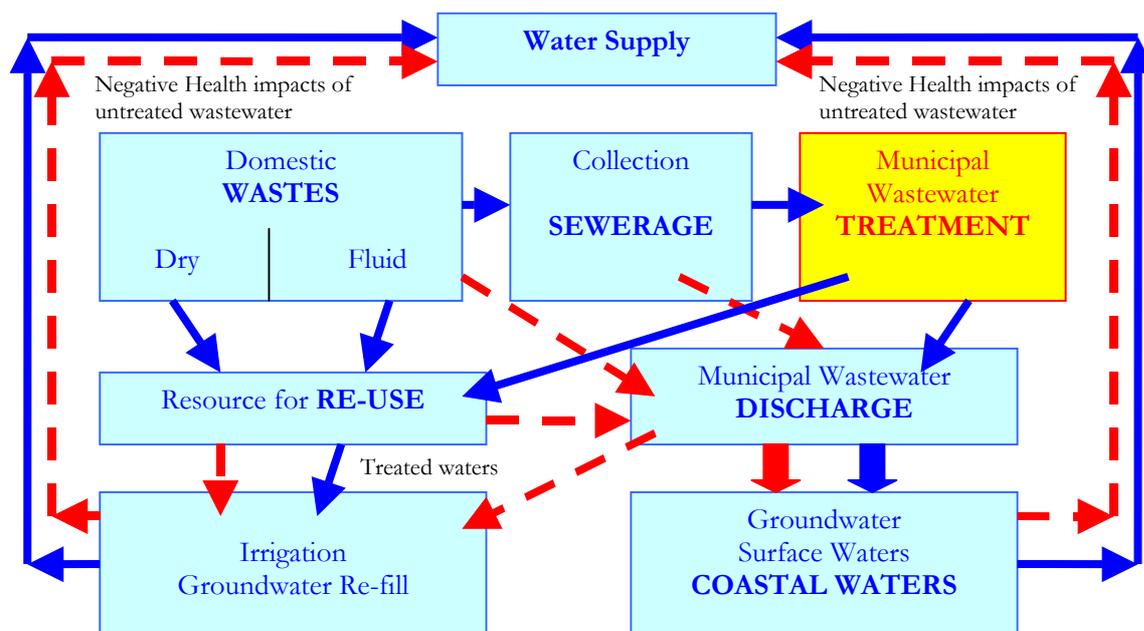


Figure 3: Sanitation and Wastewater Treatment aspects in IWRM

Defining access to water and adequate sanitation

The unequal access of sanitation in the world has led to some global targets for provision of adequate / improved sanitation to the unserved populations. However, setting up any kind of target or indicator for access to sanitation or wastewater treatment can only be done after a thorough understanding of **what is meant by adequate or improved sanitation**.

The United Nations as well as the World Bank refer to the definitions provided by Global Water Supply and Sanitation Assessment 2000 Report by WHO/ UNICEF, for their understanding of the terms 'access to improved water supply and sanitation'. This assessment report defines access to water supply and sanitation in terms of the types of technology and levels of service afforded.

For **water**, "**Reasonable access**" has been broadly defined as the availability of at least 20 litres per person per day from a source within one kilometre of the user's dwelling. Types of source that did not give reasonable and ready access to water for domestic hygiene purposes, such as tanker trucks and bottled water, have not been included. For **sanitation**, the excreta disposal system was considered adequate if it was private or shared (but not public) and if it hygienically separated human excreta from human contact.

The following technologies were included in the assessment as representing "improved" and "not improved" water supply and sanitation:

WATER SUPPLY		SANITATION	
"improved"	"not improved"	"improved"	"not improved"
Household connection	Unprotected well	Connection to a public sewer	Service or bucket latrines
Public standpipe	Unprotected spring	Connection to septic system	(where excreta are manually removed)
Borehole	Vendor-provided water	Pour-flush latrine	Public latrines
Protected dug well	Bottled water*	Simple pit latrine	Latrines with an open pit
Protected spring	Tanker truck-provided	Ventilated improved pit latrine	
Rainwater collection	water		

* Considered as "not improved" due to concerns about the quantity of supplied water, not over the water quality.
Source: http://www.who.int/water_sanitation_health/Globassessment/GlobalTOC.htm

As the new report by UN-Habitat on "Water and Sanitation in the World's Cities" brings forth, the question to be addressed here is: **"If the sanitation is improved, is it also adequate?"** Less than half of the urban population of Africa, Asia and Latin America has adequate provision for water and sanitation. Yet 85% of the urban population in these same regions has 'improved' water and 84% has 'improved' sanitation. For understanding the disparities in these statistics, it is necessary to explain the differences between 'improved' provision and 'adequate' or 'safe' provision.

World Bank Definitions

Access to an improved water source is the share of the population with reasonable access to an adequate amount of safe water (including treated surface water and untreated but uncontaminated water, such as from springs, sanitary wells, and protected boreholes). In urban areas the source may be a public fountain or standpipe located not more than 200 meters away. In rural areas the definition implies that members of the household do not have to spend a disproportionate part of the day fetching water. An adequate amount of water is that needed to satisfy metabolic, hygienic, and domestic requirements, usually about 20 litres of safe water a person per day.

Access to improved sanitation facilities refers to the share of the population with at least adequate excreta disposal facilities (private or shared, but not public) that can effectively prevent human, animal, and insect contact with excreta. Suitable facilities range from simple but protected pit latrines to flush toilets with sewerage. To be effective, all facilities must be correctly constructed and properly maintained.

Source: www.worldbank.org

Everyone has access to **water** in some form. The issue is not whether they have access to water but whether the water supplies are safe, sufficient for their needs, regular (for instance available 24 hours a day and throughout the year), convenient (for instance piped to their home or close by) and available at a price they can afford. Similarly for **sanitation**, everyone has to make some provision for defecation. The issue is not whether having provision for sanitation but having a quality of provision that is convenient for all household members (including women and children), affordable and eliminating contact with human excreta and other wastewater within the home and the wider neighbourhood.

'Improved' provision for water is often no more than a public tap shared by several hundred people with an intermittent supply of water. 'Improved' sanitation is often no more than a latrine, to which access is difficult, shared among many households.

Source: Water and Sanitation in the World's Cities, UN-Habitat

Prominent questions to ask are: If households do not have toilets in the home, do they have access to toilets close by that are well maintained and hygienic, affordable, accessible without queues, safe for women? Are these toilets connected to sewers? Is the wastewater treated adequately before being disposed off in the environment with which people come in contact with?

It should be noted that in the definitions cited above, there is no mentioning of the existence and proper functioning of **sewage treatment systems**. From the viewpoint of the protection of human health and the environment, within an integrated wastewater management, UNEP/GPA considers domestic wastewater collection and treatment to be essential elements of an adequate follow-up to the WSSD agreed target on sanitation. This is advocated in the UNEP/WHO/HABITAT/WSSCC Guidelines on Municipal Wastewater Management.

3. Wastewater Management Issues

Sanitation Services

'Sanitation services' is the first component of the wastewater management chain (see figure 1) that will be explored. It is well established that water and sanitation services improvements, in association with hygiene behaviour change, can have significant effects on population and health by reducing a variety of disease conditions such as diarrhoea, intestinal helminths, guinea worm, and skin diseases. These improvements can, in turn, lead to reduced morbidity and mortality and improved nutritional status, and they counter the **global burden of diseases**, which lead to loss of man-hours and have a very negative economic impact.

Improvements in sanitation have been shown consistently to result in better health, as measured by less diarrhoea, reductions in parasitic infections, increased child growth, and lower morbidity and mortality. The expected reductions in mortality can be substantial, particularly in areas with low levels of education.

However, improvements in water and sanitation do not automatically result in improvements in health. The addition of **hygiene education** is often required to see health impacts materialise. **The most important hygiene messages to impart concern the basic issues of hand washing, proper disposal of faeces, and protection of drinking water.** Several studies in different parts of the world, in day-care centres, and in community settings, have indicated that frequent hand washing, with and without soap, results in less diarrhoea. Proper disposal of faeces, which is not guaranteed by the mere presence of latrines, is also critical for the potential benefits of sanitation to materialise.

Medical solutions to water and sanitation-related health problems ignores the many non-physical health implications of poor sanitation provision, **affecting an individual** or a community. Examples of these implications are: time burdens and physical efforts for those who collect water, high prices paid to vendors or to those managing taps (which for most low-income households come out of funds that would otherwise have been spent on food), constraints on play for children in contaminated environments, unsafe and vulnerable environment for women who are often sexually harassed on having no choice but to defecate in the open.

Many governments and local organisations have responded to the health risks generated by presence of poor water and sanitation by improving the health care facilities available to the people. This has been very effective in many contexts. However, it might be more pertinent to look at the **causal elements of this health risk** and work towards eliminating those i.e. by providing better and safe water and sanitation facilities rather than only the solutions for the effect.

Relevant issues to discuss in setting targets at the level of household sanitation services fall within a strategy of 'preventing pollution by adequate sanitation services':

Where can we have greatest '**value for money**'? Which social groups are in need for improved sanitation services while also contributing to important sources of wastewater pollution of vulnerable regional seas ecosystems? Here, providing improved sanitation services in slums, for low-income groups or women and children might be priority targets.

What are **geographical concentration areas**, where poor sanitation services are found, with major direct and indirect impacts on livelihoods? Here, it seems that urban areas in coastal areas would qualify for priority targets.

What are **trends leading to future sanitation problems and risks** for regional seas ecosystems? Here, one should consider patterns demographic growth, migration (urbanisation), economic growth centres attracting labour forces, etc.

Are available sanitation services sufficiently **adjusted to the regional or local cultural, social and economic context**?

Are available sanitation services **safe and accessible for all gender and income groups**, particularly those in environmentally vulnerable areas?

Domestic wastes

Sanitation services strongly determine the quantities and quality of domestic wastes that will be produced, their nature (fluid or solid). It is thus the second component of the wastewater management chain (Figure 1), and different pathways can be followed to influence water resources and (further down the water management chain) influence coastal ecosystems.

At household level the aim would be to have **on-site treatment and reuse**. On-site sanitation is effective when little or no piped water is available. It consists of on-site systems for wastewater collection and treatment at the level of a household, an apartment or a community. **Package plants** are mostly used for resorts, hotels and other public buildings like schools.

On-site systems use either a septic tank or a pit for collection. Septic tanks and pit latrines are low-cost technologies that allow construction On-site systems use either a septic tank or a pit for collection (see Box). The congested nature of many peri-urban settlements restricts the space available for pit latrines and septic tanks. Furthermore, in densely populated areas, the volume of generated wastewater may exceed the capacity for ground infiltration. The additional risks of ground water pollution and soil destabilisation (affected by factors such as ground porosity, slope, and high water tables) often necessitate wastewater collection and centralised treatment. Depending on the local physical and socio-economic conditions where central wastewater collection systems are not economically feasible, on-site sanitation may therefore be feasible only for lower density towns, city districts, and rural areas

On-site wastewater treatment systems

Collection characteristics Septic tanks and pit latrines are low-cost technologies that allow construction, repair, and operation by local communities or homeowners and effectively reduce public health problems related to wastewater are. A septic tank is a watertight tank that collects wastewater from toilets, showers, sinks, and other household utilities through a pipe, solids settle on the bottom. In a pit latrine, the solids settle but the liquid seeps directly into the soil.

Treatment Characteristics The liquid flows out of the septic tank into a drainage field or overflows into a drainage system. The required effluent disposal area depends on flow rate and local soil infiltration. The effects of these flows on the quality of the ground water must be considered. Accumulating solids have to be periodically removed from the tank. In properly designed septic tanks with soil absorption of the liquid flows, the soil will remove the remaining BOD, suspended solids, bacteria, and viruses from the effluent.

Selection criteria Population density (number of people per hectare); Produced wastewater volume (in cubic meters per hectare per day); The presence of shallow water wells susceptible to wastewater pollution; Soil permeability; Unit cost of wastewater collection; socio-economic and cultural considerations.

Source: UNEP/GPA Guidelines on Municipal Wastewater Management

Some of the relevant issues that need to be discussed in setting targets at this level would be the following:

Do we need to focus upon **fluid or solid waste components**, when considering both health risks and environmental risks?

Which are **environmentally sound on-site wastewater treatment systems**, i.e. producing least pollutant emissions? Are these also appropriate, cost-effective and affordable by low-income social groups?

What are opportunities for **reuse of wastes in agricultural systems**? Possibly linkages can be made with employment generation on the one hand, and improvement of sustainable agricultural systems by providing organic manure on the other hand.

Municipal wastewater

Off-site options for treatment of municipal wastewater should be considered when on-site treatment could entail direct risks to health or to ground water or risk the faecal contamination or eutrophication of coastal waters, as in more densely populated areas. Centralised treatment systems require wastewater collection and transportation through a sewer system. Combined sewer systems carry wastewater and stormwater in the same conduit.

For both collection systems, the construction costs are relatively high, depending on slopes, soil, and ground water level. The unit costs for wastewater collection decrease with higher population densities. Gravity sewers are preferred because of their lower operation and maintenance costs compared to pumped systems. Gravity wastewater collection become economically feasible at population densities of 200 to 300 persons per hectare in developing countries, and at 50 people per hectare in industrialised countries (UNEP/GPA, 2002).

Intermediate wastewater collection technologies can be applied where conventional wastewater collection systems may be difficult and expensive to construct in densely populated, low-income areas. The use of the cleaning capacity of natural systems should be considered as the next step for the treatment of the collected wastewater. In areas with higher population densities, it is feasible to develop a local collection system and use a single facility to treat the community's waste. Lagoons and stabilisation ponds are inexpensive, common biological treatment options with low operational costs. They are being used, for example, in mid-sized communities in the wider Caribbean region (UNEP 1998). The treatment is stimulated by self-purification of the natural ecosystems and water bodies or by stimulating these natural, biological processes in effective, low-cost, engineered systems.

While considering the use of the cleaning capacity of natural systems, the reuse of wastewater and wastewater products should also be considered. A main problem with wastewater treatment is that the result obtained after treatment is not widely recognised as a valuable product. This may explain in particular why many 'low-cost' wastewater treatment systems are poorly maintained and eventually become inactive. If the treatment process itself, in addition to the purified effluent, generates valuable products, it would create an important incentive to optimise the operation and maintenance of the treatment plant. There are numerous examples of effective reuse or resource recovery from wastewater achieved in so-called integrated systems.

The long-term approach to sustainable sanitation requires a thorough re-thinking of the current concept of high quality water supply and centralised high-tech wastewater treatment. Measures could aim at the effective recovery of nutrients and energy from wastewater by re-organising the current concept of water supply and sanitation. Innovative options in environmental sanitation such as the development of (high-tech) dry or semi-dry sanitation services could provide new perspectives for energy and nutrient recovery, thus meeting both sanitation and environmental objectives.

In many urban situations, both the municipal sewage system and industrial wastewater treatment are inadequate. A municipal sewage network may be in place, but coverage is usually incomplete and the level of treatment provided is inadequate. Even where reasonable treatment facilities exist, poor maintenance and operation often result in failure to meet design effluent levels. From an environmental (as distinguished from the sanitation) point of view the focus must be on the receiving water bodies. Upgrading or extension of the wastewater collection system may reduce diffuse pollution but may produce major point discharges that must receive adequate treatment to avoid discharges into the, coastal marine, environment.

Sample checklist for cost-effective Municipal Wastewater Investments (World Bank 1998)

1. Have measures been taken to reduce domestic and industrial water consumption?
2. Has industrial wastewater been pre-treated?
3. Is it possible to reuse or recycle water?
4. Can the proposed investment be analysed in a river basin context? If so, have the merits of this investment been compared with the benefits in other parts of the river basin? Note that a least-cost strategy for achieving ambient water quality may involve different (or no) technologies at different locations
5. Has the most cost-effective technology been used to achieve the desired improvement in ambient water quality?
6. Has an economic analysis been done to assess the benefits (in terms of ambient quality) that could be achieved by phasing in investments over, say, 10 or more years?

In the perspective of defining regional WET for this UNEP/GPA initiative, the focus should be on introducing innovative techniques that are more environmentally friendly, and particularly in areas where environmental risks for regional seas are greatest. The following is a range of possible techniques:

- Composting plant
- Municipal recycling plant or depot
- Hazardous waste storage depot
- Curbside recycling programme
- Waste stabilisation ponds

- Wastewater storage and treatment reservoirs
- Constructed wetlands
- Chemically enhanced primary treatment
- Up-flow anaerobic sludge blanket reactors.

Coastal Sea Ecosystems

There are some environmental impacts related to provision or lack of sanitation or sewerage treatment, which are less directly visible and receive less attention. Examples of such environmental impacts are **coastal pollution** which is caused by dumping of untreated sewage in the marine environment, loss of bio-diversity as a result of this dumping, air pollution, unavailability of clean water etc. Many cities are short of water and subject to critical environmental degradation. Their peri-urban areas are among the worst polluted and disease ridden habitats of the world. Sewage discharges from centralised waterborne collection systems pollute surface waters and seepage from sewers, septic tanks and pit toilets pollute groundwater.

Conventional wastewater disposal systems cause direct impairment of soil fertility, because they usually prevent the valuable nutrients and trace elements contained in human excrements from being re-channelled into agriculture. And even when sewage sludge is put to agricultural use, only a small fraction of the nutrients are actually reintroduced into the bioactive topsoil. Most of the nutrients are either destroyed (e.g. by the nitrogen elimination process) or find their way into the water regime, where they pollute the environment. Frequently, the use of sewage sludge from centralised wastewater management systems must also be restricted due to the high concentrations of heavy metals and other harmful substances, often as a result of intermixing household sewage with industrial wastewater and surface runoff from contaminated streets.

Innovative Technologies

To achieve the global targets on sanitation, in some places wastewater treatment systems, mirroring those in place in Europe and the United States, might be needed. However numerous, alternative, contextual, low-cost techniques also exist. These include dry sanitation and natural sewage filtering systems, such as ponds, reed beds and mangrove swamps, and possibilities for re-use and refilling of groundwater reservoirs. This can give the environment a double-benefit: Many mangrove swamps and reed beds, important habitats for wildlife such as birds and fishes, are being cleared and drained for agriculture and other activities. When more people are made aware of their use as ‘natural’ wastewater treatment systems, then more will be conserved for their economic and health benefits as well as for their importance for nature and wildlife. There are several technologies, which have been developed and employed locally in the field of sanitation and wastewater treatment across the world. Some of these wastewater treatment technologies are³:

- Waste stabilisation ponds (WSP),
- Wastewater storage and treatment reservoirs (WSTR),
- Constructed wetlands (CW)
- Chemically enhanced primary treatment (CEPT), and
- Up-flow anaerobic sludge blanket reactors (UASBs)

An Example of Environmental Disturbance

Improvements in sanitation often mean that less and less human excreta is recycled through the soil with increasing amounts of nutrients, particularly phosphorus and nitrogen, leaching or being discharged into streams and rivers. These nutrients pass down the watercourses and where they enter a reservoir or lake become fixed usually by the algae or the waterweeds. If similar changes in sanitation practice are occurring elsewhere in the catchments, this biological productivity can interfere with the quality of the water, algal blooms releasing toxins into the water and on decomposition exerting a large demand on dissolved oxygen. Excessive growths of waterweeds can triple the loss of water from the reservoir through evapotranspiration and overall the water resource can deteriorate significantly.

Some innovative and environmental-friendly sanitation technologies include the simple pit-latrines, ventilated improved pit-latrines, the bucket-system, pour-flush latrine, septic tanks etc. Development of such locally aimed and locally adaptable systems are crucial in the achievement of sanitation targets. The following box discusses a unique and sustainable approach to wastewater systems.

³ <http://www.sanicon.net/titles/topicintro.php3?topicId=6>

Solutions offered by the ‘ecosan’ approach should be adapted to the regional context. An issue to be dwelled upon is if it is better to first apply this approach in the developed world where most sanitation systems (however environmentally efficient or inefficient) are already in place to make these systems sustainable. Or is it better to first apply this approach in the developing countries, where new systems need to come in place but where most solutions are ‘copied’ from the west. **Where will the ‘ecosan’ approach work best?**

Ecological Sanitation (‘ecosan’)

An alternative approach that avoids the disadvantages of conventional wastewater systems is ecological sanitation, ‘ecosan’ for short. This considers material flows as part of ecologically and economically sustainable wastewater management systems tailored to local needs. It does not favour a specific technology, but constitutes a new philosophy for treating substances that have so far been seen merely as wastewater and water-carried waste fit only for disposal. Systems based on this approach are used for the systematic closure of local material-flow cycles and operate along the same lines as recycling systems already in common use for solid waste.

Closed-loop wastewater management and sanitation helps restore a remarkable natural balance between the quality of nutrients excreted by one person a year and the quantity it takes to produce his food. Ideally, ecosan systems enable the almost complete recovery of nutrients and trace elements from household wastewater and their reuse in agriculture. They help preserve soil fertility and safe guard long-term food security. The technology employed can range from simple low-tech arrangements such as composting or urine-separating dry toilets to water-saving vacuum sewage systems with separate collection and subsequent treatment of urine, faeces and greywater or sophisticated high-tech systems such as membrane technology for material separation and hygienisation. Of key importance are also innovative logistics to return nutrients to farmland, marketing strategies for the recovered nutrients and directions for their safe application in agriculture. Ecosan schemes may also entail setting up service enterprises to construct and operate the installations as well as to collect, treat and market recyclates. Such measures incorporate income-generation benefits for the local population.

Source: “Ecosan – recycling beats disposal”. www.gtz.de/ecosan/, 2002.

4. Defining Regional Targets and Indicators

Monitoring sanitation targets

The MDG / WSSD target on sanitation includes ambitious targets for water supply and sanitation. The UN World Water Development Report claims to be the forum to report on indicators developed, including those on sanitation and wastewater treatment. The status of this claim mainly relates to the mandate given by the informal UN-Water group. Presently, the Joint Monitoring Programme (JMP) of WHO and UNICEF is the only one regularly making surveys on water supply and sanitation coverage worldwide. It has been proposed to have UNEP (GPA) as a future partner to (1) cover environmental dimensions (2) supply data gathered within the UNEP Regional Seas Programme. The JMP will also consider extension of the present list of indicators to serve issues like hygiene attitudes and coverage in cities and slums.

The monitoring of progress towards these targets is an immense challenge, which entails several related problems. First, given the wide array of definitions of “access to improved sanitation services”, the JMP had to decide whether and how to establish a standardised definition of these terms. Second, the use of multiple or changing definitions means that baseline data are unreliable; it is difficult to measure a moving target. Third, given an international definition of “access to improved sanitation services” that is more stringent than those used at country level, it will be challenging to build consensus around a set of indicators that are both conceptually appropriate and which can be used effectively in the developing world.

This report underlines the importance of defining appropriate objectives, targets and indicators. **Objectives, targets and indicators should all be context specific and verifiable.** This would be one step to overcome the problem of setting too stringent global targets, or working with global targets that are too vague and ambitious to stimulate on-the-ground actions. Each region defines these parameters based on specific needs, based on the general goal of “preventing environmental and coastal pollution caused by disposal of untreated wastewater resulting from households lacking adequate sanitation facilities”. Relevant WET include those on policy, infrastructural, capacity building, education, environmental issues.



The process of defining targets and indicators is as important as the targets themselves. Some general criteria for the process of setting targets are:

- Participatory, involving stakeholders from global, regional, national and local levels, and from public sector, private sector and civil society;
- Inclusive, by striving for coordination and consensus with the different countries that are part of that UNEP Regional Seas Programme, linking up to national targets or other regional targets, such as those at river-basin level, etc.
- Transparent, allowing all stakeholders to take notice of the set targets and the underlying justification, data base and sources of information.

The DPSIR Framework

The targets relating to provision of sanitation have to take into account different cultural, social, economic, institutional, political, and environmental aspects. The categories of targets and associated indicators selected could be based on the Driving Forces-Pressure-State-Impact-Response (D-P-S-I-R) framework developed by the Organisation for Economic Co-operation and Development (OECD). Table 1 gives definitions of these different categories, and gives examples relevant for this programme. The DPSIR framework can be used to set targets at different levels within the wastewater management chain, including management and institutional issues.

Variables of DPSIR framework	Examples
The driving force variable refers to issues on the macro scale broadly affecting sanitation and environmental links and processes. Driving forces might be considered as ‘root causes’.	<ul style="list-style-type: none"> ▪ Social: population growth, urban growth, and land-use changes ▪ Environmental: vulnerability of regional sea ecosystems ▪ Economical: poverty level, economic policies, subsidy levels, industrial development, agricultural development, and technology development ▪ Institutional: law enforcement, social services, and decentralization
The pressure variable describes the immediate underlying cause of the problem. It can be an existing problem or it may be the result of a new project or investment.	<ul style="list-style-type: none"> ▪ Level/standard of sanitation, access to water ▪ Efficiency of water use ▪ Amount of waste produced, hygiene ▪ Treatment of wastes, use of technologies, for reuse, collection, for treatment at source and at discharge
The state variable usually describes some physical, measurable characteristic of the environment or social livelihood system.	<ul style="list-style-type: none"> ▪ Income ▪ Health ▪ Cultural well-being ▪ Natural resources quality ▪ Environmental productivity
The impact variable monitors the long-term, or more pervasive, impacts of a project or ongoing change. There are socio-economic (livelihood) and environmental impacts	<ul style="list-style-type: none"> • Waterborne diseases • Ecosystem functions • Production systems • Natural livelihood assets • Safe water supply
The response variables are those policies, actions or investments that are introduced to solve the problem. As responses to sanitation and environmental problems they can affect the state either directly or indirectly, by acting at the pressures at work.	<ul style="list-style-type: none"> • Social: education, awareness, behavior and social change • Environmental: Natural ecological processes (e.g. ECOSAN) • Economic: Private sector initiatives • Institutional: policies, education, research, law enforcement

Approaches to define regional waste water emission targets

Considering the DPSIR framework, at any level, i.e. driving forces, pressures, states, impacts or responses, relevant waste water emission targets can be defined. Defining targets at the level of driving forces or responses has the advantage of dealing with more strategic issues, i.e. social, environmental, economic and institutional management aspects that constitute either root causes (driving forces) or important solution strategies (responses) for specific sanitation and environmental problems. Defining and achieving targets at these levels can have a great spin-off.

It should be noted however, that the objectives and targets for wastewater emission need to be set in specific regional or local context depending on demands, the availability of resources, perceptions and capabilities of people. The setting of targets also depends upon regional, national or local norms and standards that already are in place. In high-income nations, the need for all urban households to have continuous safe (drinkable) water piped to their home, and internal plumbing and their own sanitary toilet within the house is unquestioned. These expectations in high-income nations could be used as objectives or targets at a global level. However, setting too high targets can work to the disadvantage of those in the worst conditions. All available resources could go to providing a small proportion of population with high standards – generally the higher income groups and those in power. On the other hand, setting too low targets may take away the incentive or need to take appropriate action to further improve the current situation. Targets therefore are dependent on regional and national contexts, and will not be free from political considerations. This situation is illustrate in the box below. Defined targets must attain realistic levels but constitute a challenge thus stimulating innovation and prioritisation.

A dilemma

Consider a realistic situation in which a region has large disparities in its sanitation provision. With a limited amount of funding available, is it better to:

1. Provide 30% (example) of the population with a high standard of sanitation?
2. Spread the money to 100% of the population where no one has adequate sanitation.
3. Provide high standards only to areas of the city where the inhabitants are willing and able to pay the full cost and invest the money to upgrade part of the remaining population to the level of improved or adequate sanitation?
4. Focus the money at those areas where the improvement of current sanitation services has greatest added value in terms of reducing environmental impacts (e.g. slums or low-income groups near vulnerable coastal ecosystems)

From the environmental and health perspective, alternative 4 might be best, but it might be politically unacceptable. However, these choices need to be made while defining programme targets and indicators.

The challenge for this UNEP/GPA initiative is to define targets that are specific for the region in question, in terms of strategically addressing both global sanitation and environmental goals, and regional priorities. For instance, to address priority problems in a certain region could be a need to ensure more sanitation connections in households; or to ensure adequate wastewater treatment of discharged wastewater coming from the existing sanitation network before being discharged into the coastal area; or to provide education about hygiene related to sanitation for positive health impacts. The targets corresponding to the above priority problems could be: provide X% more of sanitation connections in households in X number of years; build infrastructure for wastewater treatment in a region; provide education or capacity building programmes related to hygiene / health and sanitation in a region, indicating both quantitative efforts and timeframes. Water and sanitation-related programs include improvements in facilities as well as hygiene education for behaviour change. It is well documented that such programs can bring about decreases in the rate of waterborne diseases like diarrhoea in the order of 25%.

Criteria and classification for Defining Targets

Targets should be specific for the regional, national or local context. Targets should address priority issues and in this case **be relevant for global sanitation and environmental objectives**, as well as regional and national priorities. This obviously requires insight in current situation, its dynamics as well as future trends in the region. Subsequently, targets should be sufficiently specific to lead to concrete actions. Targets that are too broad, vague or abstract will not lead to concrete actions.

Summarising the above chapters, there are now different possible classifications of wastewater emission targets (WET) that will result from this initiative. One possible classification is the following (see examples in Annex 1A):

- **Social / health targets**
- **Environmental targets**
- **Economic targets**
- **Institutional/ political targets**

However, as illustrated by the DPSIR framework the institutional and policy issues at the level of driving forces and responses can have more spin-off and thus require more emphasis. Therefore, another possible classification and related targets is more related to the policy cycle of creating an enabling environment, defining, implementing and monitoring policies on sanitation and environment, in such a way that these will contribute to reaching sanitation and environmental objectives. It thus emphasises the policy and institutional aspects, which are considered to be critical driving forces in most regions. A more policy and institutional focus could result in the following classification (see examples in Annex 1B):

- **Facilitating wastewater management / creating enabling policy context**
- **Defining policies, legal frameworks and plans**
- **Implementation of policies and targets**
- **Monitoring and learning**
- **Participation and awareness raising**

Criteria for indicators

While setting targets for a region, it is also important to take notice of how to measure the success of meeting the targets. Therefore some indicators should be identified relating to each target, which provides a checklist for the monitoring, reporting and finally assessing the success of achieving each target. Targets are thus a more real break-up of the objectives, while indicators are measurable components of targets. Indicators are generally expected to meet SMART criteria, by being:

- Specific
- Measurable
- Achievable
- Realistic
- Time-bound

The purpose of using SMART indicators is:

- to monitor, assess and compare conditions and trends on a local, regional & global scale;
- to assess the effectiveness of policy-making or targets;
- to mark progress against a stated benchmark or targets;
- to track changes in public attitude and behaviour;
- to ensure understanding, participation and transparency between interested and affected parties;
- to forecast and project trends;
- to provide early warning information.

5. Discussion issues

Common Regional Reporting Mechanism

In exploring the possible use of targets for sanitation and wastewater within the context of the UNEP Regional Seas Programme, whether regional, national or local, some aspects to consider are listed hereunder:

- Within the context of the UNEP Regional Seas Programme, **governments are requested to consider the use of regional targets on sanitation and wastewater treatment, complimentary to and also in concurrence with, the other emerging activities at the national level.** For example, a target pertaining to reduction in x% of coastline having untreated discharge of wastewater in x number of years can be dealt with more efficiently at the regional level than at national or local level. Cross-boundary issues will need to be addressed at regional level.
- Many of the UNEP Regional Seas have adopted Regional Conventions and Protocols. Notably in the Caribbean Region the Carthage Convention and its protocol have time-bound targets on eliminating the discharge of untreated wastewater and improving sanitation services in the region. National Programmes of Action (NPAs) within the GPA framework **should back up these regional targets at the national level**, while also translating the goals from a global level to a regional or national level.
- There might be a need to **set regional priorities**. This can be done using criteria that describe the current sense of urgency for each region (in an objective way), based on information collected, using 3 criteria:
 - Ecosystem vulnerability, based on biodiversity values (rare and endangered species), and resilience (fragility) – for example the Global Ecoregions 2000;
 - Current ecosystem state (being intact, degraded or severely degraded) and livelihood state (in terms of poverty, social services... - see human development index);
 - Current trends (improving, stable, declining) with respect to ecosystem state and livelihoods state.
- In the World Water Development Report (WWDR), indicators have been used as important tools to describe the state of the global freshwater resources, sanitation and water supply and the socio-economic and institutional context of their management. At the global level, various other related development targets on poverty, health or water exist. **The UNEP/GPA initiated WET-initiative is thus not a stand-alone exercise, and has to take these ongoing processes into account.**
- **The term Wastewater Emission Targets (WET) seems to be rather limiting the sanitation targets to the quantitative measurements of emissions discharged in coastal or surface waters.** As explained in Chapter 4, targets may be defined at the level of driving forces, pressures or responses, thus also including critical political or institutional aspects. These aspects are not well represented by the term 'emission'. Therefore, alternative terminology's could be used to portray the holistic nature of the targets, which UNEP/GPA endeavours to make. Some examples are stated below:
 - Wastewater Environmental Targets
 - Wastewater or Sanitation Management Targets
 - Wastewater Targets
 - Environmental Management Targets

Process-oriented Considerations

What is very important is **a clearly defined process of selecting appropriate targets and indicators**. The following points can be used for consideration while holding a discussion on potential targets and indicators. These have been segregated into selection of targets and indicators based on the Process or on the Content. Some of these selection considerations are derived from sources e.g. Kabuta & Laane, 2003; UN/ECE, 2000.

- **A participatory approach** involving a wide range of societal actors including regulatory organisations, NGO's, CBO's, the scientific community, should be taken for defining targets and indicators. These can then

be prioritised on the basis of their perceived relevancy, ease of interpretation, responsiveness, international comparability, accuracy of measurement and capacity for use within the region.

- **Depending on the interest of the stakeholders, different targets and indicators may be developed**, because for different stakeholders, different outcomes may be important. To elaborate on this, the following example can be considered. For a project that implants sanitary services and wastewater treatment, the national government could be more interested in informing the donors on achievements made in direct response to the MDG or WSSD Target on Sanitation. The same government might also wish to inform project-donors about the reduction in algal bloom reached in their region, thus contributing to environmental protection targets. The community might be more interested in knowing the % of reduction of diseases realised by this intervention, or on the increased value of their properties thanks to the services provided, while the private sector may wish to know the willingness to pay for the services.
- Similarly, **targets can be aimed at different target groups** such as community, politicians, civil engineers, municipalities etc. Few, simple and transparent targets may serve best.
- The regional seas programme should endeavour towards **transparency in the process of target selection**, by those who define and use them. Targets at the local level need to tie up with the national and regional targets and vice versa. There needs to be a strong political will and commitment from each region to achieve set targets.
- The selection of targets and indicators can be optimised with existing monitoring and data gathering steps. i.e. **links to other on-going development programmes and reporting mechanisms**. In order to prevent replication of work, collaboration between different development bodies should be promoted. For example the biennial World Water Development Report (WWDR) aims to develop indicators and monitors progress against targets for sanitation and wastewater. Regions should associate with ongoing activities and discuss if the WWDR is the right platform for reporting progress towards realisation of these targets.
- Preferably, **a reporting mechanism for the targets and indicators** should be defined and agreed upon, which can be standardised and used by the regional seas congresses to make cross-comparisons and crosslearning's with other regional or national projects. Existing Regional Platforms should be used for sharing and exchange of both technical information and advice regarding environmentally sound sewage treatment and facilities, and development and reporting on targets and indicators (e.g. RS technical meetings, GPA regional meetings on SAP Wastewater, etc.).

Recommendations

In the past, several national or global targets on sanitation and wastewater treatment have been made e.g. those in Agenda 21 (CSD, 1996) and MDG (2000). In order to achieve the WSSD target on sanitation set up in 2002 to halve the number of people without access to adequate sanitation by 2015, the implementation and operationalisation at each level needs to be accelerated substantially. This report aims to support and facilitate the possible use of regional sanitation and wastewater treatment targets, the following recommendations can be made to UNEP offices:

1. As a follow up to GC-22, there is need for **presentation and getting feedback from both the UNEP Regional Seas Secretariats and the National governments** who are parties to the regional conventions an assessment about their willingness and capacity for considering possible targets on sanitation and wastewater treatment need to be carried out.
2. In order to actively involve regional stakeholders and focal points, **a participatory process should be initiated, such as regional workshops and/or assessments through a questionnaire**. The aim is to raise awareness, generate region-specific insights and information, and stimulate commitment to define and implement realistic targets. It will be critical that regional sea focal points right from the beginning involve relevant stakeholders in the process of setting targets, by forwarding relevant information and questionnaires. Note that participation does not only mean 'information supply' or 'consultation', but requires a genuine

exchange and possibly debate on the basis of equality and access to information. Special attention will need to be given to involve:

- Representatives from civil society, private sector and public sector;
- Representatives from critical sectors that are involved, such as health, public works, environment, education, infrastructure and NGOs.
- Decision-makers right from the beginning, to build up commitment and avoid that they are suddenly confronted with certain results (targets).

3. **The purpose, the scope and the context of this project** must be made clear to everyone. To this end present discussion paper was elaborated. It is suggested that focal points organise a meeting to explain and share their views on present discussion paper and use the presented frameworks.
4. There is need to establish **linkages with existing policies and legislation**, strengthen these, avoid parallel and possibly conflicting policies. Therefore, an important part of the project is to take into account existing standards, policies and legal frameworks.
5. Measures must be taken to improve **access to and efficient use of different information sources** during the entire process, and objectivity in setting priorities and making choices. Therefore, emphasis will be given to clear criteria on how to define good WET and set priorities. The box below suggests a structure for a regional workshop or questionnaire.

- **Suggested Structure for a Regional Workshop or Questionnaire for identifying the need for regional Wastewater targets**
- **Section A:** Understanding the wastewater management chain, the institutions and stakeholders involved for the different components
- **Section B:** Characterising the current situation of the country / region / municipality for the different components of the waste water management chain, including current problems (see DPSIR framework). This will lead to insight in the urgent matters to be dealt with, possibly also a ranking of regions by the urgency to deal with problems
- **Section C:** Overview of existing policies, legal frameworks and targets (norms and standards) for the wastewater management chain components, available or functional in the region, as a basis to formulate WET. Also indication of priority gaps.
- **Section D:** Analysis of the preceding, leading to priority areas where targets are needed, and the linkages to underlying pressures, driving forces and responses. Targets will then be proposed based on SMART criteria. Targets will be set at the level of 'states', 'pressure' and 'responses', some at the 'driving forces' level. If targets for pressures, responses and driving forces are well chosen, meeting these will automatically lead to improved ecosystems and livelihoods states.
- *Indicators will only be defined when priority targets have been set. This can be done as part of a follow-up workshop or analysis.*

6. The **Regional Sea's Secretariats need to focus and strengthening their efforts** to facilitate integrative reporting at regional level following the input by respective national governments.
7. Both **capacity and finance issues** are to be considered from the beginning. As the exercise is not a stand-alone activity, links have to be made with existing programmes and institutions, while a close eye is needed on emerging processes with respect to MDG's, WWDR, etc.
8. To set up appropriate Targets and Indicators for achieving adequate sanitation for all and reduction in untreated wastewater discharge in the regions, **co-operation at regional level** needs to be promoted and enhanced. Also, priority measures for sewage treatment need to be identified, especially those having trans-boundary effects.

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Appendices

Annex 1A: Possible Wastewater Emission Targets (WET) with associated indicators, for sustainable development categories

Targets 1A	Examples of Indicators
<p>Social / health</p> <p>1. Increasing awareness of 'x'% of the population in low-income areas on community sanitation and hygiene issues.</p> <p>2. Reaching a standard of 'x' number of people per toilet in area 'y', within 'z' years, particularly accessible for women</p>	<p>1.1 % of population actively using sanitation facilities.</p> <p>1.2 Presence of water-related diseases in low-income areas (incidence per year).</p> <p>1.3 Number of people participating in awareness workshops on sanitation and hygiene issues</p> <p>2.1 Number of toilets constructed per year</p> <p>2.2 Number of people using toilets</p> <p>2.3 Number of women using toilets</p>
<p>Economic</p> <p>3. Improving the access to low-cost sanitation services for poor livelihoods, in area 'y', within 'z' years.</p> <p>4. Improving incomes and employment from fisheries in area 'y' by reducing the negative impacts by wastewater on fish populations.</p>	<p>3.1 Proportion of household incomes spent on sanitation services</p> <p>3.2 Proportion of costs of sanitation services covered by Government subsidies</p> <p>4.1 Average income from fisheries for fishery livelihoods in area 'y'</p> <p>4.2 Number of livelihoods that can make a living from fisheries in area 'y'</p> <p>4.3 Annual economic value of fisheries in area 'y' (based on annual catch and market value)</p>
<p>Environmental</p> <p>5. Decreasing the amount of pollutant load discharge into the coastal waters in area 'y' by 'x'% within 'z' years.</p> <p>6. Improving the viability of coral reefs in area 'y' by reducing the concentration of pollutants from wastewater.</p>	<p>5.1 Emissions of persistent organic pollutants in area 'y' through rivers</p> <p>5.2 Concentration of pollutants in the coastal waters in area 'y'</p> <p>5.3 Number of incidents of unacceptable high pollutant emissions</p> <p>6.1 Viability index of coral reefs in area 'y'</p> <p>6.2 Biodiversity index of fish in coral reef area 'y'</p> <p>6.3 Concentration of pollutants in the coastal waters in area 'y'</p>
<p>Political / institutional</p> <p>7. Doubling of capacity for the execution of sanitation and wastewater treatment systems by decentralised Governments.</p> <p>8. Increasing national policies and budgets specifically targeting improvement of sanitation and wastewater treatment.</p>	<p>7.1 Number of decentralised Government employees undergoing training on sanitation and wastewater treatment</p> <p>7.2 Number of sanitation and wastewater treatment projects being executed by decentralised Government</p> <p>8.1 National budget available for sanitation and wastewater treatment projects</p> <p>8.2 Number of policies mentioning sanitation and wastewater treatment as a priority</p> <p>8.3 Number of workshops organised by Government on sanitation and wastewater treatment</p>

Annex 1B: Possible Wastewater Emission Targets (WET) with associated indicators, for issues related to the policy cycle

Targets 1B	Examples of Indicators
<p>Facilitating wastewater management</p> <p>1. Installing 'x' data banks and information centres on environment and sanitation.</p> <p>2. Increasing the availability of funds available for sanitation and wastewater treatment projects by 50%.</p>	<p>1.1 Number of information centres on environment and sanitation.</p> <p>1.2 Number of people making use of established information centres.</p> <p>1.3 Number of times regional data banks are being updated</p> <p>2.1 Amount of Government funds used for sanitation and wastewater treatment projects</p> <p>2.2 Amount of private sector investments in sanitation and wastewater treatment projects</p>
<p>Defining policies, legal frameworks and plans</p> <p>3. Increasing the number of joint regional strategies for integrated coastal zone management including wastewater and sanitation aspects.</p> <p>4. Establishment of 'x' pilot projects at decentralised level on ECOSCAN approach.</p>	<p>3.1 Number of joint regional meetings on integrated coastal zone management</p> <p>3.2 Number of different countries participating</p> <p>4.1 Number of ECOSCAN pilot projects planned</p> <p>4.2 Number of ECOSCAN projects established</p> <p>4.3 Number of ECOSCAN projects finalised</p>
<p>Implementation of policies and targets</p> <p>5. Installing 'x' partnerships between public sector, private sector and civil society, on sanitation and environment activities</p> <p>6. Establishment of services for maintenance of sanitation and wastewater treatment infrastructure.</p>	<p>5.1 Number of MoU between public sector, private sector and/or civil society on sanitation and environment activities</p> <p>5.2 Number of agreements see above</p> <p>5.3 Number of joint projects on see above</p> <p>6.1 Number of people trained on maintenance of sanitation and wastewater treatment infrastructure</p> <p>6.2 Lifetime of sanitation and wastewater treatment infrastructure</p>
<p>Monitoring and learning</p> <p>7. Establishment of joint monitoring and early warning systems at regional level.</p> <p>8. Development of regional-specific manuals on sanitation and wastewater treatment.</p>	<p>7.1 Number of joint workshops to discuss monitoring results</p> <p>7.2 Number of contacts between countries to raise awareness on regional sanitation and environment issues</p> <p>8.1 Number of manuals on regional sanitation and environment issues</p> <p>8.2 Number of people and institutions using these manuals</p>
<p>Participation and awareness raising</p> <p>9. Increasing the participation by women in awareness raising and sanitation activities.</p> <p>10. Development of regional-specific manuals on sanitation and wastewater treatment.</p>	<p>9.1 Number of women participating in sanitation awareness raising workshops and meetings</p> <p>9.2 Number of women applying issues raised during above-mentioned workshops and meetings</p> <p>10.1 Number of regional sanitation manuals and publications published</p> <p>10.2 As above but targeted at women</p>

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