

# sustainable sanitation alliance

## Sustainable sanitation and the SDGs: interlinkages and opportunities

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The 2030 Agenda for Sustainable Development puts sustainability at the forefront of global development. Since 2008, the Sustainable Sanitation Alliance (SuSanA) has been engaged in advocating for sustainability issues in sanitation. This background document describes how sustainable sanitation links to all SDGs and outlines challenges and opportunities this represents. It complements the revised SuSanA Vision Document “Contribution of Sustainable Sanitation to the Agenda 2030 for Sustainable Development”.

### 1. Introduction: From the MDGs to the SDGs

In September 2015, at the United Nations Sustainable Development Summit in New York, the heads of state and government of the UN Member States adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs). These succeeded the eight Millennium Development Goals (MDGs) launched by world leaders during the UN General Assembly in 2000 [1] and which expired in 2015. Although significant achievements were made on many of the MDGs worldwide, progress was uneven between goals and across regions and countries. The MDG missed by the largest margin was for sanitation, which aimed at halving, by 2015, the proportion of the population without sustainable access to basic sanitation [2].

- **The SDG goals are universal and more comprehensive, complex and ambitious:** The MDG targets were limited in scope and ambition, set largely in the context of “rich donor countries aiding poor recipient countries” [3]. During the Rio+20 conference on Sustainable Development, it was recognized that the post-2015 era required a new vision and responsive framework and that sustainable development of the entire planet must become the global guiding principle. This should be enabled by the integration of economic growth, social justice and environmental stewardship and recognise planetary boundaries [4] [5]. Consequently, a universal 2030 Agenda for Sustainable Development was developed defining a set of SDGs applicable to all countries [6]. Compared to the eight MDGs, the 17 SDGs are not only more comprehensive and complex, the 169 targets of the SDGs are also more ambitious. Whilst the MDGs were set to get us “half way” to the goal of ending hunger and poverty, with similar proportional targets in other fields such as access to improved water supply and sanitation, the SDGs have been conceived to finish the job. In the case of sanitation, this means achieving access to adequate sanitation for all. This will require very different strategies: getting “halfway there” encouraged countries to concentrate on the quick gains, the “low hanging fruit”. The new approach will require a real focus on the poorest and most difficult to reach so that nobody is left behind.
- **There is a goal dedicated to Water & Sanitation:** The SDGs are also more comprehensive and ambitious regarding water and sanitation. In the MDGs there was only a target under Goal #7 (Ensure environmental sustainability) to “halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation”. As a result of the influential work of international water and sanitation experts and sector organisations during the SDG negotiations, sustainable management of water and sanitation has been placed at the core of the 2030 Agenda and is directly addressed by SDG #6 to “ensure availability and sustainable management of water and sanitation for all” [7]. The targets of SDG #6 address the issue of achieving access to safe drinking water, adequate sanitation and hygiene for all (WASH) by 2030. They also call for sustainable



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wastewater management, including the reduction of the proportion of untreated wastewater by half and increasing recycling and safe reuse to substantially increase water-use efficiency, to implement integrated water resources management at all levels, and to protect and restore water-related ecosystems. Two specific targets on the means of implementation also form part of SDG #6 (see Box 1).

**Box 1: GOAL 6**

**Ensure availability and sustainable management of water and sanitation for all**

- 6.1** By 2030, achieve universal and equitable access to safe and affordable drinking water for all.
- 6.2** By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.
- 6.3** By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.
- 6.4** By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.
- 6.5** By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.
- 6.6** By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands rivers, aquifers and lakes.
- 6.a** By 2030, expand international cooperation and capacity-building support to developing countries in water-and-sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.
- 6.b** Support and strengthen the participation of local communities in improving water and sanitation management.

Source: United Nations

**2. (Sustainable) Sanitation and SuSanA in the MDG period (2000 – 2015)**

The MDG sanitation target was to halve the proportion of people without access to basic sanitation by 2015, with basic sanitation being defined by UNICEF as “the lowest-cost technology ensuring hygienic excreta and sillage disposal and a clean and healthful living environment both at home and in the neighbourhood of users” [8]. The MDGs focused on increasing sanitation access. They did not focus on hygiene nor did they account for inequity, affordability, safe management of sanitation systems or the protection of the environment and natural resources. Additionally, “improved” and “basic” sanitation was defined by a list of “approved” toilet technologies rather than by the functionality and use of the sanitation system as a whole [9].

Over the MDG period, the profile of sanitation rose steadily as communities, local authorities, governments and donor organisations recognised the crucial role sanitation could play in overall development. Links to health, environmental protection, equity issues and resource efficiency were all being made with increased attention on linking water supply to sanitation and hygiene (WASH) and developing strategic sanitation plans.





Indeed, the term WASH entered popular usage amongst major actors (e.g. WSSCC, IRC, UNICEF) and sector professionals around this time, although the term itself had been around since the mid-1980's. The Global WASH Cluster (GWC), with UNICEF as the lead agency, was formed in 2006 [10], and aimed to build upon the successes of an existing Water, Sanitation and Hygiene (WASH) humanitarian sector working group.

Following the UN's decision to declare 2008 the International Year of Sanitation [11], a core group of organisations formed the "Sustainable Sanitation Alliance (SuSanA)" in 2007 to promote sustainability within sanitation. This alliance defined sustainability in sanitation around five criteria: (1) health and hygiene; (2) environment and natural resources; (3) technology and operation; (4) financial and economic issues; and (5) socio-cultural and institutional aspects [12]. These sustainability criteria, particularly in relation to the protection of the environment and natural resources, are congruent with the underlying philosophy of the SDGs and are largely reflected in many of the SDG targets (see section 3 below).

To better focus efforts and interventions in sanitation in the context of the 2030 Agenda, SuSanA has recently agreed upon operational definitions of sustainable sanitation (see Box 2).

## Box 2: Operational definitions for sustainable sanitation

The term "Sanitation" is used differently by different people/organisations and in different circumstances. In the SDGs there is no explicit definition of sanitation but there is a semantic separation between sanitation (target 6.2) and wastewater management (target 6.3). For SuSanA, to better focus attention in the context of the 2030 Agenda, the following operational definitions for sanitation will be adopted:

- (1)** Sanitation is the act or process of making sanitary and the promotion of hygiene and prevention of disease by maintenance of sanitary conditions [Merriam Webster Definition]
- (2)** A sanitation system protects and promotes human health by providing a clean environment and breaking the cycle of disease. It encompasses the institutions regulating the system, the organisations and management, the users, the entire technical infrastructure, as well as all services required for the collection, transport, treatment and management of end products of human excreta, wastewater, solid waste and stormwater.
- (3)** To be a sustainable sanitation system it must not only protect and promote human health by providing a clean environment and breaking the cycle of disease, but also be economically viable, socially acceptable, and technically and institutionally appropriate while protecting the environment and the natural resource base.

SuSanA's initial role was advocacy, highlighting the importance of sustainability in sanitation particularly in the context of the MDGs. The Alliance has contributed to sector development and sector actors today increasingly focus on the sustainability of services. Through the Shit Flow Diagram project [13], SuSanA has provided an important platform for major donor and implementing actors such as the World Bank's WSP and the Bill & Melinda Gates Foundation (BMGF). The Alliance has also helped refine the concept of the sanitation ladder. It advocates a performance-based (rather than technology-based) sanitation ladder [14] and has served as a sounding board in the preparation of important sector publications such as the Compendium of Sanitation Systems and Technologies [15]. The SuSanA website and Forum [16] provide knowledge management and capacity development services that remain in high demand. For example, the BMGF uses the SuSanA Forum to introduce and discuss their sanitation research grants and to share research results with a wider sanitation community. SuSanA has thus moved beyond its original advocacy role to become a broad community of practice and sector resource for project implementation.





SuSanA has made thematic contributions to the sector through its 13 Working Groups, which focus on a spectrum of sanitation issues (see Box 2) [17], and through the SuSanA secretariat, located at GIZ in Germany.

### Box 3: Sustainable Sanitation Alliance's Working Groups

- ➔ **WG 1:** Capacity Development
- ➔ **WG 2:** Market Development
- ➔ **WG 3:** Renewable Energies & Climate Change
- ➔ **WG 4:** Sanitation Systems, Hygiene and Health
- ➔ **WG 5:** Food Security & Productive Sanitation Systems
- ➔ **WG 6:** Cities
- ➔ **WG 7:** Community, Rural and Schools
- ➔ **WG 8:** Emergency & Reconstruction Situations
- ➔ **WG 9:** Public Awareness, Advocacy & Civil Society Engagement
- ➔ **WG 10:** Operation and Maintenance
- ➔ **WG 11:** Groundwater Protection
- ➔ **WG 12:** WASH and Nutrition
- ➔ **WG 13:** Behaviour Change (since 2017)

### 3. The importance of (Sustainable) Sanitation in achieving the SDG targets

Sanitation is directly addressed by SDG #6: Ensure availability and sustainable management of water and sanitation for all. However, improved sanitation in general, and the implementation of sustainable sanitation systems in particular, is of relevance beyond the specific targets of SDG #6, impacting upon many of the other 16 SDGs and their targets. For example, the specific sustainable sanitation criteria related to the protection of the environment and natural resources is of obvious relevance to targets in SDGs #2, #6, #11, #14 and #15, whilst further positive results of implementing sustainable sanitation systems can have a broad impact on almost all the SDGs. A summarised overview of the relevance and linkages of sustainable sanitation to the other SDGs can be seen below in Figure 1.

In the following pages the links between sustainable sanitation and all SDG targets are presented in some detail in a series of tables. Firstly, the targets of SDG #6 are presented and the main challenges and opportunities foreseen are briefly highlighted. In the subsequent tables, this is repeated for the other SDGs. The opportunities and challenges column should serve as a possible source of inspiration for the work of sanitation sector professionals in the context of Agenda 2030.



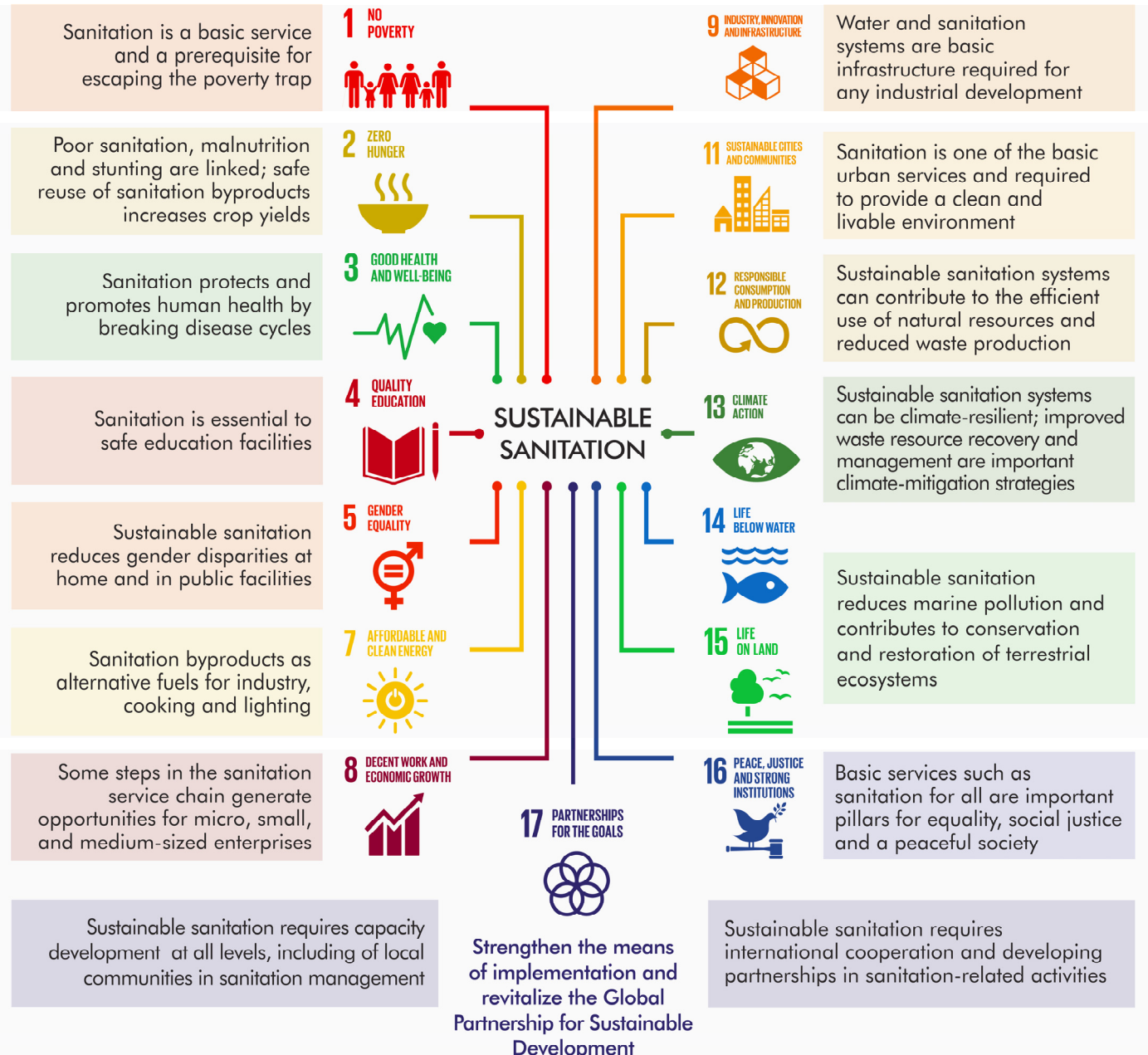


Figure 1: The linkages of sustainable sanitation to the SDGs beyond SDG 6





Link between Sanitation and specific targets of SDG #6: “Ensure availability and sustainable management of water and sanitation for all”

SDG Target:

Link to sustainable sanitation:

Challenges and opportunities:

**6.1** By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

Universal access to safe drinking water requires the protection and efficient use of water resources. Preserving water quality is an important objective of sustainable sanitation. Sanitation systems that minimize water use or recycle water reduce the demand on fresh water resources.

- Continue stressing the importance of groundwater protection through the appropriate management of sanitation systems
- Continued risk that water supply and sanitation sectors do not coordinate, with a loss of potential synergies and improved risk management.
- Promotion of alternative approaches and leap-frog technologies, such as waterless or low-water use installations and reuse systems.

**6.2** By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

This target seeks to finish the job started by the MDGs for access to sanitation [18]: it includes hygiene and calls for an end to open defecation. An important shift is that the language of “basic” and “improved” sanitation has been dropped. These were defined in the MDGs in terms of specific technologies and focused on the toilet rather than the sanitation system [9].  
 “Percentage of population using safely managed sanitation services, including a hand-washing facility with water and soap” is the global core indicator suggested for this target [19,20]. Since differentiation and adaptation according to national circumstances is a cornerstone of the SDGs, there is flexibility to define locally appropriate priorities, indicators and ways to achieve them. The added gender and equity dimensions are crucial elements to improve the sanitation situation for the most vulnerable groups.

- The term ‘adequate sanitation’ opens up possibilities performance-based systems and monitoring.
- ‘Adequate’ also opens the possibility for comprehensive sustainability considerations (e.g. institutional, social, cultural, and financial aspects) to achieve long-term use and sustained function
- Guidance and orientation will be needed on how to progress on behaviour change, gender and equity
- Guidance will be needed in responding to the challenges faced by people in vulnerable situations
- Continued risk that ‘access to improved sanitation [facilities]’, as defined by the MDGs, continues to be an operational goal for new sanitation development, without systems thinking and with limited sustainability in mind.

**6.3** By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

A target directly linked to wastewater management that includes recycling and safe reuse represents an improvement over the MDGs. Only two global indicators have been proposed for this target [19,20]:  
 “6.3.1 Proportion of wastewater safely treated”  
 “6.3.2 Proportion of bodies of water with good ambient water quality.”  
 No indicator has been suggested at the global level in relation to the recycling and reuse. On one hand this is regrettable; on the other hand, this leaves room to define national targets and indicators for recycling and reuse and for specifications of what is to be recycled beyond water, such as resources that enter or are contained in wastewater.

- Guidance is needed on how to achieve sanitation systems that protect the environment and conserve natural resources in a comprehensive manner
- Need to encourage the development of indicators for reuse on water, energy and nutrients on country-level with important links to SDGs related to energy and food.
- The WASH sector is marked by gutter thinking (for example on-site sanitation considered separately from centralized sanitation considered separately from hygiene etc.) and sectors are fragmented which can make reuse complicated (e.g. in the energy and agricultural sectors). This complication has interlinkages with other SDGs and should be addressed head on.
- Reuse targets for water need to be carefully considered in combination with water demand management at production to avoid water wastage. There should always be targets on non-revenue water reduction, reduction in water consumption, etc. in combination with wastewater reuse targets.





**SDG Target:**

**Link to sustainable sanitation:**

**Challenges and opportunities:**

**6.4** *By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.*

Water demand in relation to sanitation largely depends on the type of sanitation system used [21]. Recycling and safe reuse of wastewater are two ways to increase the overall water-use efficiency and can contribute to the reduction of water scarcity [22].

- There needs to be a strong link between 6.3 and 6.4 especially in terms of wastewater recycling and demand management. The solution to water-use efficiency is not only to reuse wastewater, it is to curb demand in combination with wastewater reuse.
- There is a need to promote alternative approaches and technologies, such as waterless or low-water consuming installations, and reuse systems.
- Efforts for reduction of non-revenue water and water wastage are needed. Hence, it is important to remember that, while utilities will be interested in reducing the non-revenue water, they may not be interested in demand reduction for water that is paid for. Lowered water demand with more efficient technologies in homes etc. must therefore be championed at a political level in most cases.
- Improving water-efficiency and recycling will require cross-sectoral collaboration.

**6.5** *By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.*

Implementing Integrated Water Resources Management (IWRM) at all levels provides a framework to address synergies and potential conflicts among the targets within Goal 6 [23]. Sustainable sanitation systems have an important role to play in IWRM, preserving both the quality and quantity of the available water resources [22].

- The importance and potential role of sanitation systems, in particular sustainable sanitation systems, in IWRM is often only marginally recognised.
- There is a need to promote systems that minimize water use, enable water and nutrient recycling, and that protect and conserve natural water resources
- A generally improved waste resource management is required to protect water resources

**6.6** *By 2030, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.*

The prevention of pollution through sustainable sanitation systems is essential for maintaining the integrity of ecosystems [24, 25, 26].

- The importance and potential role of sanitation systems in ecosystem conservation may be neglected.
- There is a need to improve the design and function of systems, to minimize pressure on ecosystems, both related to resource use and waste disposal

**6.a** *By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.*

It's clear that capacity development is crucial to sustainable sanitation and SDG 6 [27]. Important lessons learned around the globe on how to achieve more sustainable sanitation systems demonstrate that international cooperation is key to efficient progress towards SDG 6.

- There is an acute need for professionals and decision-makers across the globe to better understand the existing technical options available to meet SDG 6 and their implications on important sustainability criteria relating to environment, health, economy, institutions and people.
- There is a need to respond to diverse capacity needs in different regions around the world, while also being responsive to specific needs (e.g. cultural, institutional, language).





**SDG Target:**

**6.b Support and strengthen the participation of local communities in improving water and sanitation management.**

**Link to sustainable sanitation:**

Many existing methodologies (e.g. CLUES and CLTS) put local communities at the centre of planning and implementation of improved sanitation systems [28, 29].

**Challenges and opportunities:**

- There is an opportunity to achieve stronger community involvement and ownership.
- For service delivery in urban areas to vulnerable groups more government/utility participation is needed in coordination with community participation.
- Changes to community-based models may be needed for improved system functionality and resource management.

**Link between sanitation and specific targets of SDG #1: “End poverty in all its forms everywhere”**

**SDG Target:**

**1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$ 1.25 a day.**

**1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions.**

**1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance.**

**1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.**

**Link to sustainable sanitation:**

Poverty is partly defined as not having access to basic services such as water supply and sanitation. Of the 2.5 billion people who have no access to improved sanitation, hundreds of millions live on less than \$1.25 a day. The poorest also suffer most from environmental pollution that results from inadequate sanitation and wastewater management. The prevention of pollution through adequate sanitation and wastewater management is essential to combat waterborne diseases and those linked to poor hygiene. It also helps guarantee the availability of good quality drinking water if water is to be sourced near at hand, and maintains the integrity of aquatic ecosystems. A clean environment is critical for the safety of activities such as fishing, grazing and fuelwood gathering on which many poor people depend. [30,31]

Leaving no one behind (an essential requirement of the SDGs), means sustainable sanitation systems must address for the situation of the poorest and the underprivileged and include safe sanitation options that are affordable for those who are often hardest to reach.

An important strategy for the protection of vulnerable populations is to improve the resilience of sanitation systems in the face of climate changes (droughts and floods). Waterless and recycling systems can enhance resilience. Strategies such as the construction of elevated structures and capacity development linked to emergency response, may also be crucial.

**Challenges and opportunities:**

- There is a need for evidence of how behaviour change and improved services along the entire sanitation service chain can generate well-being, livelihoods and other benefits to poor communities.
- Resource recovery and reuse can create additional opportunities, e.g. for food security or business generation. The potential to complement or substitute chemical fertilizers, may be critical for small-scale farms
- Costs of sustainable sanitation services may be prohibitive. Citizens outside urban wastewater provision range may not be able to access subsidies at levels supporting urban wastewater systems.
- There is a need for improved understanding of how sanitation systems serve climate adaptation when made more resilient to extreme events.







Link between sanitation and specific targets of SDG #2: “End hunger, achieve food security and improved nutrition and promote sustainable agriculture”

**SDG Target:**

- 2.1** By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.
- 2.2** By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons.
- 2.3** By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.

**Link to sustainable sanitation:**

Treated urine, faecal sludge and wastewater provide quick-acting nitrogen fertilizers, soil conditioners and sources of water and nutrients. Their safe use can significantly increase poor people’s access to safe, nutritious and sufficient food, reduce malnutrition for small-holder farmers lacking access to chemical fertilizers and result in more resilient and sustainable agricultural practices in food production systems [22]. Recent studies show clear evidence that poor sanitation and hygiene cause stunting and wasting in children under 5 years of age [32].

**Challenges and opportunities:**

- There is a need to highlight that there is a close link between sanitation and food security, through resource recovery and reuse in agriculture
- The links between water-related diseases and nutrient assimilation in humans should be highlighted and brought to greater attention. Understanding of potential synergies of integrating WASH-Nutrition should be strengthened.
- Agricultural use may require cultural acceptance, cross-sectoral collaboration, and additional investments.
- Fertilizer subsidies for chemical fertilizers skew the market for organic-based fertilizers.

Link between sanitation and specific targets of SDG #3: “Ensure healthy lives and promote well-being for all at all ages”

**SDG Target:**

- 3.2** By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births.
- 3.3** By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.

**Link to sustainable sanitation:**

The main objective of sanitation systems is to protect and promote human health by breaking the cycle of disease. Ensuring access to safe water and sanitation is the most effective way to improve health and prevent communicable diseases. Poor sanitation and hygiene is the leading cause of diarrhoea, the second largest cause of death in children under 5 in developing countries, and contribute to huge burdens of communicable diseases and preventable deaths [33,34].

The entire sanitation system must be considered and not simply the provision of toilets. The adequate treatment of fecal sludge, wastewater and other flowstreams from sanitation systems needs further attention to protect riparian communities that may be exposed to pathogens from untreated waste.

**Challenges and opportunities:**

- Raise awareness amongst health professionals of the crucial role of sanitation in meeting the SDG 3 targets.
- Highlight the need for health risk management throughout the entire sanitation system.
- Highlight the importance of personal hygiene as a crucial contributing factor to achieving the targeted health benefits.
- Stress the importance of WASH approaches that integrate with water supply, sanitation systems and hygiene behaviour for optimal disease prevention.





**Link between sanitation and specific targets of SDG #3: “Ensure healthy lives and promote well-being for all at all ages”**

**SDG Target:**

**3.9** By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

**Link to sustainable sanitation:**

The appropriate management of industrial wastewater will protect the environment and reduce the number of deaths and illnesses from environmental and water pollution.

**Challenges and opportunities:**

- There is a need for source control of hazardous chemicals and for source separation of waste to reduce pollution and contamination.
- The separation of contaminated industrial waste from municipal wastewater and other sanitation flowstreams is generally a prerequisite for agricultural reuse.

**Link between sanitation and specific targets of SDG #4: “Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all”**

**SDG Target:**

**4.1** By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.

**4.5** By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations.

**4.a** Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all.

**Link to sustainable sanitation:**

Lower incidence of sanitation related diseases means fewer lost school days. Currently, the lack of sanitation leading to diarrhoea in children is attributed to 272 million school days lost each year [35].

The lack of sanitation and hygiene facilities suitable for girls and women leads to their exclusion from schools and vocational training, especially during menstruation [36].

Improved health through the prevention of diseases linked to poor sanitation and hygiene is reflected in improved cognitive ability and physical condition among school age children.[36].

*Indicator 4.a.1 counts the proportion of schools with i,a, basic handwashing facilities*

**Challenges and opportunities:**

- Mainstreaming gender inclusive participatory approaches for new sanitation development and hygiene programmes
- Gender-inclusive (e.g. MHM), disability-appropriate designs needed for facilities and services should be promoted as a basic requirement in educational facilities
- Strategies for O&M in poorest schools and to provide affordable menstrual hygiene products are needed.





**Link between sanitation and specific targets of SDG #5: “Achieve gender equality and empower all women and girls”**

**SDG Target:**

- 5.1 End all forms of discrimination against all women and girls everywhere.**
- 5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation.**
- 5.5 Ensure women’s full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.**
- 5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws**

**Link to sustainable sanitation:**

For many reasons sanitation is largely a women’s and girls’ issue [37, 40, 41]:

Adolescent girls and women menstruate which poses different, and often ignored, demands on sanitation systems and approaches;

Existing qualitative studies concludes that the full participation of girls in education, once they have reached puberty, is negatively affected by a number of factors related to poor menstrual hygiene management in schools and at home, which in the worst of cases lead to girls missing school days on a monthly basis to dropping out of school all together;

Women bear and rear children. Child rearing involves caring for the sanitation needs of infants and toddlers;

As a result of their frequently subordinate position in society, women and girls are at higher risk of rape and violence if they do not have access to safe sanitation facilities near or in their homes;

The disadvantaged in society are the ones least likely to have access to good hygiene and sanitation, and often that means women and girls.

**Challenges and opportunities:**

- Cultural elements (e.g. patriarchy and male dominated professions) may hinder gender-inclusive approaches and limit the participation of women and girls in decision making processes.
- Mainstream gender-inclusive participatory approaches in sanitation development and hygiene programmes.
- Call for requirements in gender-inclusive (e.g. MHM), disability-appropriate design for educational and public facilities and services.
- Promote and advocate the availability of menstrual hygiene products in public facilities.

**Link between sanitation and specific targets of SDG #7: “Ensure access to affordable, reliable, sustainable and modern energy for all”**

**SDG Target:**

- 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services.**
- 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.**

**Link to sustainable sanitation:**

Recovering the energy from excreta, wastewater and other waste flow streams can provide affordable renewable energy. For example, biogas can be generated as part of sanitation systems to generate electrical or mechanical power, including fuel for vehicles [38]. Biogas can provide low-cost domestic cooking and heating fuel as an alternative to wood and other biomass typically used by poor households. Biogas generation from wastewater, excreta and other organic waste improves access to modern energy services [22].

The recovery of fertilizing nutrients from faeces, urine and wastewater contributes to reduced dependency on fossil fuels and reduces the demand for chemical fertilizer, the production of which is very energy intensive. Safe reuse of the nutrients in wastewater also reduces the energy WWTPs require to remove nutrients before the treated water is discharged into receiving water bodies.

**Challenges and opportunities:**

- Establishing cross-sectoral cooperation is needed between the sanitation and energy sectors.
- Integrated waste management systems are needed to facilitate the appropriate handling of different waste streams, e.g. human faeces, faecal sludge, septage, sewage sludge, animal manure, solid organic waste, by processing it for energy recovery.





**Link between sanitation and specific targets of SDG #8:**

***“Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all”***

**SDG Target:**

**8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services**

**8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead**

**Link to sustainable sanitation:**

Service delivery chains for sustainable sanitation and wastewater management provide wide opportunities for micro-, small-, and medium-sized businesses at links in the chain that may prove profitable. Examples include emptying services for on-site systems and the treatment and transformation of collected flow streams for fuel, building material or fertilizer production. Reuse and recycling of products from sanitation systems contributes to resource use efficiency.

**Challenges and opportunities:**

- Cross-sectoral collaboration and additional investments are needed to achieve full services along the sanitation chain, including resource recovery and use.
- Successful examples from practice are needed to demonstrate how improved management along the sanitation chain combined with resource recovery strategies can generate green business opportunities.

**Link between sanitation and specific targets of SDG #9:**

***“Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation”***

**SDG Target:**

**9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all**

**9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities**

**Link to sustainable sanitation:**

Sustainable sanitation systems require reliable, sustainable and resilient infrastructure along the service delivery chain with a focus on affordable and equitable access for all.

Introduction of ‘clean’ sanitation technologies call for innovation and can contribute to sustainable industrialization.

**Challenges and opportunities:**

- The sanitation sector is extremely conservative and resistant to innovations. Conventional systems and service delivery relying on large quantities of water, high investment costs, stable institutions as well as long planning horizons are still considered by many sector professionals to be a model for the entire world, irrespective of local contexts.





**Link between sanitation and specific targets of SDG #11: “Make cities and human settlements inclusive, safe, resilient and sustainable”**

**SDG Target:**

**11.1** By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums

**11.5** By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations

**11.6** By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

**11.7** By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities

**Link to sustainable sanitation:**

Sustainable sanitation is one of the most important basic services to make cities and human settlements safe, resilient and sustainable.

Sustainable sanitation systems can reduce the number of people affected and decrease the economic losses of water-related disasters (floods and droughts) and reduces the adverse per capita environmental impact of a city [25,39].

Adequate sanitation and wastewater management helps keep public spaces clean and safe. The safe reuse of treated wastewater and other sanitation-related flow streams can be valuable resources in keeping urban areas green and flourishing.

**Challenges and opportunities:**

- Highlight how resource recovery from sanitation systems and new business along the sanitation chain can improve conditions in urban areas
- Stress the need to make sanitation systems more resilient to disasters such as earthquakes, tsunamis, droughts, extreme weather and sea level rise.
- Showcase how sustainable sanitation services can reduce the adverse per capita environmental impact of a city, for example by (i) efficiently using stormwater for green and public spaces, (ii) combating heat island effects, (iii) closing nutrient loops within cities through use of recovered nutrients in parks and plantations, (iv) provide space for allotment gardens and demonstrate local nutrient reuse.
- Highlight the need for more comprehensive sustainability comparison in sanitation planning processes where e.g. (i) water use, (ii) pollution loads to recipients, (iii) efficient use of resources, costs, subsidy levels etc. of different sanitation management systems are thoroughly assessed for different options before investment decisions are taken;
- Highlight equity issues regarding access to different services: sewer services are often subsidized far more than on-site services. This is inherently unfair but even more inequitable from the perspective that sewer areas are generally more affluent areas.

**Link between sanitation and specific targets of SDG #12: “Ensure sustainable consumption and production patterns”**

**SDG Target:**

**12.2** By 2030, achieve the sustainable management and efficient use of natural resources

**12.4** By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

**12.5** By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse

**Link to sustainable sanitation:**

Sustainable management of sanitation systems significantly reduces the release of pollutants to water and soil and minimizes their adverse impacts on human health and the environment.

The safe reuse of wastewater and other sanitation flowstreams reduces waste generation in sustainable sanitation systems and contributes significantly to the efficient use of natural resources such as water, organic matter, nitrogen, phosphorus.

**Challenges and opportunities:**

- The promising role of sanitation systems and improved waste management is often neglected in the production-consumption chain.
- Highlight that the sustainability of the consumption and production chain is depends on the management of sanitation waste resources. Without resource recovery and reuse, it will be difficult to conserve natural resources and achieve long-term sustainability.





**Link between sanitation and specific targets of SDG #13: “Take urgent action to combat climate change and its impacts”**

**SDG Target:**

**13.1 Strengthen resilience and adaptive capacity to climate related hazards and natural disasters in all countries**

**13.2 Integrate climate change measures into national policies, strategies, and planning**

**13.3 Improve education, awareness raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning**

**Link to sustainable sanitation:**

Sustainable sanitation is among the most important basic services that make cities and human settlements safer and more resilient.

Improved waste resource management, treatment and recovery technologies are important sanitation sector contributions to climate change mitigation . These include technologies to replace chemical fertilisers thereby improving the carbon content of soils, and to generate energy.

**Challenges and opportunities:**

- The potential role of sanitation systems to combat climate change may be neglected.
- The potential of climate mitigation through improved sanitation waste management and resource recovery remains little known.
- Need for strengthening disaster resilience of sanitation systems

**Link between sanitation and specific target of SDG #14:**

**“Conserve and sustainably use the oceans, seas and marine resources for sustainable development”**

**SDG Target:**

**14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution**

**Link to sustainable sanitation:**

The discharge of inadequately treated wastewater is an important source of marine pollution from land-based activities [25,26].

**Challenges and opportunities:**

- Cross-sector cooperation needed.
- Source control and source separation are important strategies to minimize contaminant discharges to water; awareness raising and capacity development are needed.
- Along with improved wastewater management, the general need for improved nutrient management through the application of treated waste products In agriculture needs emphasis.
- There is a need for more evidence demonstrating how much NPK can be kept out of the ocean by retaining blackwater/ urine in land-based loops. This can be done through the study of mass nutrient balances using analytical methods similar to those for Excreta Flow Diagram (or SFDs).





**Link between sanitation and specific targets of SDG #15:**

**“Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss”**

**SDG Target:**

**15.1** By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

**15.3** By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

**Link to sustainable sanitation:**

Sustainable management and treatment of sanitation flow streams is crucial to protect and restore freshwater ecosystems.

The safe reuse of sanitation flow streams from treatment plants can contribute to slowing or stopping the degradation of land due to agricultural depletion of soil nutrients through poor farming practices.

**Challenges and opportunities:**

- Generally, a stronger focus is needed on improved management of wastewater, faecal sludge and other flow streams.
- The benefits of resource recovery and reuse include both productivity and a role in conserving natural ecosystems.

**Link between sanitation and specific target of SDG #16:**

**“Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels”**

**SDG Target:**

**16.)** *Gi VghUbjU nifYXi WY Wffii dljcb UbX'fjYVfijb U'' h Yf Zfa g*

**16.6** *8 Yj Ycd'YZZVWj YZ UWti bIUV'YUbX'fUbgdUFYbhi jbgjhi hcbg UhiU''Yj Yg'*

**Link to sustainable sanitation:**

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**Challenges and opportunities:**

- Large and complex sanitation infrastructure projects, in combination with weak public financial management systems and lack of oversight, create opportunities for corruption and resource leakages
- Indicators for 16.5 can be difficult to apply to specific sectors, as they are limited to address only one form of corruption, and intended for monitoring progress at a national level
- Development of sector specific indicators, regular risk assessments at organizational and sector levels in the sanitation sector can help overcome this shortcoming
- Tailored tools and approaches that help build an “integrity wall” [43] by enhancing transparency, accountability, participation, and anticorruption mechanisms can help prevent or reduce corruption risks
- Existing governance structures and accountability mechanisms make it difficult for the poor and vulnerable to hold governments and service providers accountable
- There is a need for innovative and citizen-driven accountability measures to be institutionalized that can complement conventional, top-down accountability mechanisms. Also, the power of new information and communication technologies needs to be leveraged to enhance the transparency of institutions, increase awareness and participation among users in the sanitation sector.





**SDG Target:**

**16.7** *Ensure responsive, inclusive, participatory and representative decision-making at all levels*

**Link to sustainable sanitation:**

Responsive, inclusive, participatory and representative decision-making at all levels, which is typified by the CLUES methodology [15], is at the core of planning and implementing a sustainable system.

**Challenges and opportunities:**

- Conventional sanitation developments, especially those in wastewater management, commonly have very limited participation from communities and there is thus a need to introduce or improve participatory methods in all types of sanitation development
- Comprehensive monitoring of follow-up on participation, functionality and ownership is required.

**Link between sanitation and specific targets of SDG #17:**

**“Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development”**

**SDG Target:**

**17.6** *Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism*

**17.7** *Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed*

**17.8** *Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology*

**17.16** *Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries*

**Link to sustainable sanitation:**

For sanitation to be sustainable it needs to be adapted to local contexts. Hence, to allow for knowledge transfer and upscaling of sustainable sanitation will require international cooperation and knowledge exchange that allow sharing lessons and experience from different contexts.

**Challenges and opportunities:**

- Need to overcome cultural and language barriers for knowledge exchange and international cooperation.
- A stronger involvement of research and academia from the Global South.
- Improve channels to facilitate South-South knowledge exchange







#### 4. Concluding remarks

The 2030 Agenda for Sustainable Development represents a clear reorientation in the global development paradigm. The agenda addresses all nations, putting sustainability at the centre of the global principle guiding development. Whilst offering an ambitious vision of a sustainable future for all, and opening new opportunities for intra and inter sectoral cooperation, achieving the targets of the 17 goals poses significant challenges.

The successful implementation of sustainable sanitation systems does not only contribute to achieving the targets of SDG 6, but also to many targets of the other SDGs through the interlinkages outlined in this document. If these benefits are to be realised, however, this will require a redoubling of efforts within the sanitation sector and effective outreach for intersectoral cooperation. This document aims at stimulating and supporting the initiation of these processes.





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