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Sustainable Management of Water and Sanitation

Introduction

The phrase ‘Water is life’ is no cliché. The total volume of water on earth is about 1.4 billion cubic kilometers, of which freshwater is 2.5 per cent. One of every five people on earth faces water scarcity. As of 2012, 450 million people in 29 countries suffer from water shortages.¹ Water is essential for socio-economic development and for sustaining the ecology. Equity in access to water can be an issue within and across national boundaries and can be used as a tool for exercising power and control. The UN recognises access to safe drinking water and sanitation as human rights. Lack of access to water and sanitation especially impinges on the rights of children and women. Safe drinking water and sanitation are linked to good health and are key contributory factors behind under-nutrition and anemia in women.

Progress towards global food security continues to be slow, with around 800 million remaining undernourished² and around half of the world population suffering from different forms of malnutrition.³ Food production requires critical inputs of water and agriculture already accounts for around 70 per cent of global freshwater withdrawals, in a world where some 0.9 billion people lack access to safe water⁴ and where demand for water is expected to grow by 40 per cent till 2030.⁵ Water demand for irrigation is expected to grow by 6 per cent in 2050 and is perceived as one of the main factors behind the increasing global scarcity of freshwater. Under the current circumstances, the water future appears bleak (see Box 1).

Global Call for Action

In 2000 the Member States of the United Nations signed the Millennium Declaration which subsequently rolled

the Millennium Development Goals (MDGs). Goal 7, to ensure environmental sustainability, included a target – Target 10 – that challenged the global community to halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.

The WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP), which began monitoring the sector in 1990, has provided regular estimates of progress towards the MDG targets, tracking changes over the 25 years to 2015. In 1990, global coverage of the use of improved drinking water sources and sanitation facilities stood at 76 per cent and 54 per cent, with respective MDG targets of 88 per cent and 77 per cent by 2015 (see Annex 1 for definitions). The challenges were huge: Global figures hid vast disparities in coverage between countries and within, many of which were battling poverty, instability and rapid population growth. Sanitation was also not high on the political agenda.⁶

Monitoring of progress helped identify future priorities to be addressed in the Agenda 2030. What is abundantly clear is that despite significant progress in water and sanitation, much remains to be done, and groups working on water and sanitation were greatly relieved when Goal 6 was proposed as an independent SDG.

Over the years the importance of providing focussed attention to water and sanitation from a larger perspective, including, and way beyond drinking water and sanitation was increasingly becoming imperative. Eventually Goal 6 suggests to ensure availability and sustainable management of water and sanitation for all.

Making the Case

The Rio+20 processes for developing the SDGs recognised the importance of water and sanitation. The linkages between water and a green economy, and provisioning of safe drinking water supplies and adequate sanitation services for poverty eradication were spelt out. The need to address inequities in access to water, which is closely linked to food and energy security, was stressed. The water thematic consultations set a new course for concerted action and global direction, capturing water's importance to the post-2015 development framework, recognising: (a) Water as a key determinant of social, economic and environmental development, requiring a central focus of any post-2015 framework for poverty eradication and global sustainable development; (b) Water, sanitation and hygiene, water resources management and wastewater management and water quality as indispensable elements for building a water secure world; (c) Global importance of water security; (d) Key roles of governments and cooperation at different levels and with different stakeholders; and, (f) Need for implementation of innovative, inclusive and sustainable financing.⁷ The intrinsic linkage between women and girls and water and sanitation could also no longer be ignored.

MDG 7, Target 10: Global Progress Update

The progress on achievements relating to Target 10 of MDG 7 has been mixed:

- 1. There have been huge gains in access to drinking water:** Some 2.6 billion people have gained access to an improved drinking water source since 1990, and 91 per cent of the global population now uses an improved drinking water source compared to 76 per cent in 1990. These gains happened as the world's population increased by 2 billion people from 5.3 billion in 1990 to 7.3 billion in 2015. An improved drinking water source is defined as one that is protected from outside contamination.
- 2. Progress on sanitation has been slow:** One third of the world's population (2.4 billion people) still does not have access to an improved sanitation facility, one that separates human waste from human contact. Almost a billion people (946 million) do not use any sanitation facility and defecate in the open. Open defecation contaminates the environment affecting entire communities and has been linked to childhood stunting. While 147 countries met the drinking water target, only 95 were able to meet the sanitation target.
- 3. Progress has been uneven:** Where you live makes a difference, as do income levels. Nine out of ten people practicing open defecation and eight out of ten people without an improved drinking-water source live in rural areas. People living in sub-Saharan Africa and Southern Asia are particularly disadvantaged, even more so if they are poor. Meanwhile, almost all developed countries have universal access to drinking water and sanitation.

Box 1: Our Water Future

By 2025, 1.8 billion people will be living in regions or countries with absolute water scarcity. Given the trans-boundary nature of water, this has implications for world peace and equitable socio-economic development. With 263 trans-boundary river basins in the world, the potential for cooperation – or conflict – is tremendous.

While food output must grow by 60 per cent to feed 9 billion by 2050, by 2030, the world will confront a water supply shortage of 40 per cent.

India's demand for food is estimated to be 578 metric tonnes (Mt) in 2025 and 713 Mt in 2050. By 2050, India will need to feed 1.6 billion, with increasing resource constraints, in a more unpredictable climate. The water demand across various sectors in 2010 was pegged at 813 billion cubic metres (BCM) and estimated to increase to 1,093 BCM in 2025 and 1,447 BCM in 2050. Agriculture accounts for 80 per cent of water consumption, 70 per cent of which comes from groundwater. Estimates indicate that by 2050 under the business as usual scenario, India will be staring at a 50 per cent gap between demand and supply.

In early 2015, the World Economic Forum recognised the water crisis as one of the top three global risks.

Source: Barthakur, R. and I. Khurana (eds). 2015. *Reflections on Managing Water: Earth's Greatest Natural Resource*, Balipara Foundation.

4. Data have been crucial to measuring advances and revealing insights: The WHO and UNICEF Joint Monitoring Programme (JMP) has monitored progress on access to water and sanitation since 1990. It also presented data that brought to light inequalities between various groups, including urban and rural residents, the gender burden of water collection, and the persistent exclusion of the poor from water and sanitation services. Robust and disaggregated data, insightful analysis and compelling presentation will be crucial as we transit to the SDGs and work towards a future where no one is left behind.⁸

Key Messages

- The global target for drinking water was met by 2010, but 665 million people still lack access to improved drinking water sources.
- The global MDG target for sanitation has been missed by almost 700 million people. In 2015, 2.4 billion people still lack improved sanitation facilities.
- The least developed countries did not meet the sanitation target, and only 27 per cent of their current population has gained access to improved sanitation since 1990.
- The 31 per cent reduction in open defecation in India alone represents 394 million people, and significantly influences regional and global estimates.

MDG 7, Target 10: Achievements in India

The sheer size of India and its diversities are serious challenges to contend with while securing affordable, equitable and sustainable access to safe drinking water and sanitation. The sheer number of people who benefit even with a percent increase is significant.

Based on the Millennium Development Goals, India Country Report 2015, highlights include:

Drinking Water

During 2012, 87.8 per cent households had access to improved source of drinking water: 86.9 per cent households in rural and 90.1 per cent households in urban areas had access to improved source of

drinking water. The target of halving the proportion of households without access to safe drinking water sources from its 1990 level to be reached by 2015, was thus already achieved in rural areas and was likely to be achieved in urban areas.

Sanitation

The 31 per cent reduction in open defecation in India alone represents 394 million people, and significantly influences regional and global estimates. But, over 770 million people do not have access to sanitation.

At all India level, the MDG target is unlikely to be met. The percentage of households without sanitation facility is likely to be 47.31 per cent vis-a-vis the target of 38.09 per cent.⁹ India has large gaps in relation to sanitation coverage and economic status.¹⁰

For drinking water, the concerns are centered on the following:

a) Definition of coverage and water quality:

The category 'improved drinking water sources' under the MDG definition (see Annex 1 for definitions) includes sources that, by nature of their construction or through active intervention, are protected from outside contamination, particularly faecal matter. It comprises piped water on premises such as piped household water connection located inside the user's dwelling, plot or yard. Other improved drinking water sources include public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs and rainwater collection.

Thus, the definition of coverage as per the MDGs focusses on some anthropogenic causes of water contamination 'external water quality issues,' such as microbial contamination and use of agrochemicals and not 'internal.' For example, chemical contaminants such as fluoride, arsenic and nitrate are not covered. This raises questions about the safety of these sources. In August 2015, the Union Minister for Water Resources provided the following information to a question in the Lok Sabha on drinking water quality (see Table 1), which indicates that some 3.8 crore people are affected by chemical water quality issues. These contaminants will need to be taken into account to achieve target 6.1.

b) Sustainability of drinking water sources and systems: Drinking water supply schemes are developed and funded only to be rendered useless due to drying

up of sources or lack of operation and maintenance. Thus, in spite of considerable investment over the years, covered habitations continue to 'slip back' and need reinvestment. Reasons behind this include over-dependency on groundwater for multiple uses which deplete drinking water sources and inadequate efforts at recharging these sources.

Table 1: Number of Habitations Affected by Drinking Water Quality Issues

Parameter	Habitations	Population
Fluoride	12,727	97,07,658
Arsenic	1,800	22,32,818
Iron	34,096	19,452,362
Salinity	15,617	47,66,801
Nitrate	2,521	27,07,287
Total	66,761	38,866,926

Source: Question raised in Lok Sabha on contaminated drinking water, 23 July 2015, available at: <http://admin.indiaenvironmentportal.org.in/data-statistics/question-raised-lok-sabha-contaminated-drinking-water-23072015>.

While drinking water supply is accorded priority in terms of allocation, this is seldom the case, especially when demand exceeds supply. Given that securing domestic water is largely a women's responsibility, the search for arranging domestic water has gender implications and increases the work burden on women and the girl child.

c) Effects of climate change: Ample evidence indicates the impact of climate change on the water cycle and increased episodes of drinking water crises. Droughts and floods take their toll on quantity and quality of drinking water available, and on the people. In 2009, migration from Bundelkhand region increased due to shortage of drinking water as a result of three successive droughts.¹¹ Between 1801-2002, India experienced 42 droughts.¹² Access to safe drinking water is a challenge during floods and efforts to meet the needs come at a cost. Locally available solutions can be found to address this in keeping with Target 6.b.

From MDGs to SDGs: The Challenges

Ahead

Goal 6 of the SDGs is much broader and more ambitious than the MDG 7, Target 10. While the latter was more focussed on drinking water and sanitation, SDG 6 is overarching and more holistic. This is an essential requirement from the equity and sustainability point of view.

The other challenge is going to be around defining and building consensus around the indicators for monitoring progress. This is work in progress and will involve harmonising these indicators with national indicators. Monitoring will have financial implications as well. As a signatory to the SDGs, India must achieve this Goal. A well-defined strategy is imperative. India needs to take a comprehensive view of water, to get the complete picture, acknowledge it and own it (see Box 2).

Programmes in India

Several Acts, policies, programmes and guidelines under various Ministries relate to Goal 6 and can play a major role in its achievement. Table 2, though not comprehensive, gives an idea of these programmes.

Sanitation Programmes

Provisioning of drinking water and sanitation services are constitutionally recognised as the responsibility of the states. Union Government programmes have played a significant role in increasing access to sanitation facilities, especially in rural areas where the dependence on public provisioning of essential services is relatively higher than that in urban areas.

The introduction of the Central Rural Sanitation Programme in 1986 and its revamping as Total Sanitation Campaign (TSC) in 1999, helped increase the coverage of household toilets in rural areas from 1 per cent in 1981 (Census 1981) to 22 per cent in 2001 (Census 2001) and 32.7 per cent in 2011 (Census 2011).

Subsequently, the Nirmal Bharat Abhiyan (NBA) in 2012, which succeeded TSC, aimed to accelerate sanitation coverage in rural areas to achieve the vision of 'Nirmal' Bharat by 2022 with all Village Panchayats in the country attaining 'Nirmal' status.

The Swachh Bharat Abhiyan (SBA), launched on

Box 2: Water Snapshot – the Gaps in India

If India plans to achieve the SDGs, then the points mentioned below give an indication of the challenges and the areas requiring concerted action.

- A complete database on India's water resources does not exist and consensus on utilisable resources available is lacking. The volume of utilisable water available annually needs to be agreed upon for subsequent allocation.
- Water is required for food production, domestic use, industrial purposes, energy production, and to maintain ecological flows. Allocations must be based on the principles outlined in the SDG framework and the commitments agreed upon under SDG 6.
- India may soon move to a water stressed state despite being home to the perennial Himalayan and Peninsular rivers. Increasing demand across various sectors and a rapidly changing climate has exacerbated the problem. Serious efforts are required for water management that can help alleviate the effects of climate change.
- Agricultural sector gets the lion's share of freshwater allocation - around 80 per cent. Efficiency of water use in India is lower than several other countries and provides an opportunity to reduce use. Such reduction measures will contribute towards achieving Target 6.4.
- Groundwater is a major source of water, leading to its over-exploitation, even in mining. India is the largest extractor of groundwater in the world.
- Estimates indicate that by 2050 ten of the major river basins will see a groundwater abstraction of more than 75 per cent. This depletion leading to water scarcity will need to be addressed to achieve Target 6.5.
- Pollution from the discharge of untreated waste water threatens freshwater safety. Biological, organic and inorganic pollutants contaminate almost 70 per cent of surface water resources and a growing percentage of groundwater reserves. Only 21 per cent of the municipal sewage is treated in India. The remaining is disposed into waterbodies untreated resulting in pollution of rivers. Achieving Target 6.3 will require a serious relook at the current causes of water pollution and practical measures that can prevent and address this.
- As many as 19 states face groundwater contamination. Geogenic contaminants have affected groundwater in over 200 districts, and have emerged as a problem due to excessive withdrawal of groundwater.
- Floods affect over 3 million Indians annually. India is the second most flood-prone country in the world. Increased frequency of urban flooding, primarily due to rapid and unplanned urbanisation is an emerging problem, further putting pressure on drainage systems.
- Between 1801-2002, India experienced 42 droughts. A large part of the country (68 per cent) is prone to drought. The situation is exacerbated due to deforestation, groundwater extraction and poor land and water management. Droughts take an economical, social and environmental toll.
- The diverse ecology of India is replete with examples of successful improved land and water management with the involvement of the local population. Such efforts need to be upscaled within the country to achieve Target 6.4. Knowledge of these practices can be shared with other countries in the spirit of achieving Target 6.a.

Source: Barthakur, R. and I. Khurana (eds). 2015. *Reflections on Managing Water: Earth's Greatest Natural Resource*, Balipara Foundation.

2 October 2014, aims to ensure access to sanitation facilities (including toilets, solid and liquid waste disposal systems and village cleanliness) and safe and adequate drinking water supply to every person by 2019, three years ahead of the deadline set by NBA (though NBA focussed only on sanitation with the National Rural Drinking Water Programme covering drinking water in rural areas).

Under the Swachh Bharat Abhiyan there are two

missions, the Swachh Bharat Mission (Rural) and the Swachh Bharat Mission (Urban). The sanitation programmes aim to address sanitation issues beyond toilet and include solid and liquid waste management as well.

Financial Implication of SDG 6 for India

It is difficult to arrive at a complete figure relating to achieving SDG 6, since it includes aspects of: (a)

Table 2: Linking SDG 6 with Ongoing Water and Sanitation Programmes in India

Targets	Description	Act/Programme/Policy/Guideline
6.1	By 2030, achieve universal and equitable access to safe and affordable drinking water for all.	National Rural Drinking Water Programme; Accelerated Urban Water Supply Programme
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.	Swachh Bharat Abhiyan, Swachh Bharat Mission (Swachh Bharat Mission - Rural and Swachh Bharat Mission - Urban); Solid and Liquid Waste Management (SWM) Guidelines (rural); SWM (urban); Guidelines for household toilets, community toilets, public toilets
6.3	By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.	Namame-Gange, The Water (Prevention and Control of Pollution) Act, 1974
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.	Guidelines for improving use efficiency in irrigation, domestic and industrial sectors
6.5	By 2030, implement integrated water resources management at all levels, including through trans-boundary cooperation as appropriate.	National Water Policy; international water treaties and signing of 11 MoUs (Australia, Bahrain, Cambodia, China, Fiji, Iran, Iraq, Rwanda; Bilateral cooperation with Bangladesh, Bhutan, China, Nepal, Pakistan)
6.6	By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	Namame-Gange, Desert Development Programme, Drought Prone Areas Programme
6.6a	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.	SAARC; Africa-India Framework for Cooperation, SACOSAN (South Asia Conference on Sanitation)
6.6b	Support and strengthen the participation of local communities in improving water and sanitation management.	Water policy, National Rural Drinking Water Programme

Note: As on December 2015.

Source: Compiled by author.

Sustaining water and its ecosystems, (b) Sustaining water supply for different sectors in rural and urban areas, (c) Managing transboundary issues, (d) Addressing drought and floods, (e) Climate change mitigation, and (f) Sanitation, including safe disposal of human waste and solid and liquid waste management.

As an implementation strategy it is important to arrive at this figure and identify sources of funding.

The allocation for rural drinking water in central Budget 2015-16 was Rs 2,611 crore, down from Rs. 9,250 crore allocated in 2014-15.¹³ According to the

Minister of Drinking Water and Sanitation under the devolution of funds as per the recommendations of the 14th Finance Commission, “Rs. 2 lakh crore-plus would be going to gram panchayats. These funds should also be utilised at least for drinking water purposes”.¹⁴

The unit costs for toilets have been enhanced for Individual Household Latrines (IHHLs) (from Rs. 10,000 to Rs. 12,000), school toilets (from Rs. 35,000 to Rs. 54,000), anganwadi toilets (from Rs. 8,000 to Rs. 20,000) and Community Sanitary Complexes (CSCs) (from Rs. 2,00,000 to Rs. 6,00,000). Funding for these new initiatives will be through budgetary allocations, contributions to the Swachh Bharat Kosh and through commitments under Corporate Social Responsibility (CSR) and will come with 100 per cent tax exemptions for construction of toilets and for cleaning up of the Ganga.¹⁵

Union Urban Development Minister stated that the government proposes to spend Rs. 1.34 lakh crore to construct toilets (11.11 crore toilets in rural areas) and about Rs. 62,000 crore will be spent in 4,041 cities. In addition, 2.47 lakh panchayats will be given Rs. 20 lakh each for the next five years to keep their villages clean.¹⁶

Challenges for effective implementation of the programme include the reduction in the budget of the Information Education and Communication (IEC) component (from 15 per cent to 8 per cent), critical to trigger behavioural change to ensure usage of toilets and the lack of resources for maintenance of school toilets and community sanitary complexes could result in rapid deterioration and subsequent non-usage of these over time, severely impacting the sustainability of the programme.¹⁷

From Intention Towards Implementation

The SDGs offer a historical opportunity for sustainable and equitable water and sanitation management. However, challenges need to be recognised, acknowledged and then worked upon for finding sustainable solutions for achieving SDGs. Some of these include:

- Taking a realistic stock of resources (water for example),

- Defining and harmonising coverage definitions,
- Developing an implementation strategy and action plan,
- Building good robust monitoring frameworks that capture outcomes and build in transparency and accountability,
- Financing the Goal and its operation and maintenance, and
- Stakeholder engagement.

Water

In terms of water resources per se, one of the biggest challenges is that consensus on the actual water available in India continues to elude us. There are differences in estimates regarding the total utilisable water available, and future demand projections. The Ministry of Water Resources (MoWR) states the total utilisable water to be 1,123 Billion Cubic Meters (BCM). Other estimates put it at 634 BCM. Unless there is scientific consensus on the extent of the resources available, their appropriate management will be next to impossible.¹⁸

The country is rapidly drying up as groundwater and surface waters are being mined to unsustainable levels and the per capita availability of water is declining. Per capita availability declined from 2,209 cubic meters in 1991 to 1,820 in 2001 and 1,545 in 2011. Trends indicate that India will move into water stressed state by 2025, when the per capita availability will further decline to 1,341 cubic meters.¹⁹

The opportunity could not be more favourable, and the time more right. Some of the options that could help in achieving SDG 6 are given below:

a) Know the water resources: Effective planning and allocation of water across various sectors is possible only if the resources available are known with a fair degree of accuracy. The first step towards implementing the SDG 6 is to arrive at a consensus figure on the water resources available.

b) Inform and involve people and celebrate water: Re-establish the relationship between people and water. An integral part of religion, culture, art, tourism and celebrations, restoring the connection between people and water can work wonders. To quote a Chinese proverb, ‘When you drink the water,

remember the spring and this can only happen if you involve the people.’

c) Uphold principles of equity and sustainability: Lack of water creates an environment of unrest and conflict. To quote a Turkish proverb, ‘When one man drinks while the other can only watch, dooms day follows.’ Act on the equity principles calls for a mix of raising awareness, financial allocations, specific programmes, monitoring and evaluation of access and prudent water resource allocations. Above all it calls for a change in mindset and commitment towards water and its access for all.

d) Create water banks: In spite of increasing instances of erratic monsoon, capturing rain where and when it falls helps replenish depleted resources, address drought and also reduce episodes, duration and intensity of floods. Rainwater harvesting and artificial groundwater recharge serve dual purposes: absorbing excess water and releasing it when required. India has rich heritage of water harvesting systems that are being revived with suitable adaptations to the contemporary environment and a huge scale up of these could bridge the water gap.²⁰

e) Achieve breakthroughs through technology and innovation: While technological solutions alone often lead to a new set of problems, technological breakthroughs can work wonders. For this, innovation is key. India can learn lessons from Israel which is known as the water startup capital. Innovation in India needs to be nurtured and awarded.

f) Bring efficiency in water use across all sectors: In Israel, every drop of fresh water is used twice. While India is known for its innovation in agriculture, much more can be done. Drip irrigation has not really caught on in spite of government incentives. A relook at how to promote drip irrigation to bridge gaps is required. Scaling up of water saving technologies such as sustainable rice intensification (SRI), appropriate crop planning and use of soil sensors to gauge soil moisture prior to irrigation are but few examples of how water use in agriculture can be reduced. A water responsive industry is also required. While some industrial houses are exhibiting water responsive behaviour

by undertaking water audits and finding solutions to reduce the water footprint along the production line, the practice needs to amplify. Approaches such as cradle to cradle approach, and a supply chain water strategy need to be scaled up.

g) Use wastewater: While this has been on the agenda for decades now, the examples remain in isolated pockets. This needs to change and water needs to be recycled and reused wherever possible. To do this appropriate incentives are required.

Sanitation

Sanitation no longer lacks political determination. Sanitation has been an integral part of the Prime Minister’s election campaign and addresses to the nation. In a bid to invite corporate funds, the Government through the budget announced in 2015 that corporate contributions under this initiative will be counted as CSR expenditure.

While working towards the sanitation-related targets, it is important to focus on not only numbers but usage. Though crores of toilets need to be constructed, coverage is not the end of the story. Sanitation is about usage and research reveals that the two have rarely matched. Diving deeper to understand poor usage has revealed the complexity of issues involved. Some of the factors that emerged include the following:

- a) Behaviour aspects around sanitation and bringing about change,
- b) Construction quality,
- c) Availability of water,
- d) Absence of end-to-end total solutions,
- e) Poor supply chains,
- f) Leaving out to the last person, and
- g) Poor flood resilience of infrastructure.

Finally, the SDGs offer a tremendous opportunity for India to accelerate its determination towards being water secure, clean and a healthy nation. India is known for its innovation and programmes that address specific challenges. It also offers India a platform to emerge as a powerful player on the international stage, to share its knowledge and experience as a learning partner.

Clearly, an opportunity not to be missed.

Endnotes

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Annex 1: Definitions of Coverage (MDG)

1. Improved drinking water sources include sources that, by nature of their construction or through active intervention, are protected from outside contamination, particularly faecal matter. It comprises piped water on premises such as piped household water connection located inside the user's dwelling, plot or yard. Other improved drinking water sources include public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs and rainwater collection.
2. Unimproved drinking water sources include unprotected dug wells, unprotected spring, cart with small tank/drum, tanker truck, and surface water (river, dam, lake, pond, stream, canal, irrigation channels), bottled water.
3. Open defecation include defecation in fields, forests, bushes, bodies of water or other open spaces, or disposal of human faeces with solid waste.
4. Unimproved sanitation facilities include facilities that do not ensure hygienic separation of human excreta from human contact. Unimproved facilities include pit latrines without a slab or platform, hanging latrines and bucket latrines.
5. Shared sanitation facilities include sanitation facilities of an otherwise acceptable type shared between two or more households. Shared facilities include public toilets.
6. Improved sanitation facilities include facilities that ensure hygienic separation of human excreta from human contact. They include:
 - Flush or pour-flush toilet/latrine to piped sewer system, septic tank, pit latrine,
 - Ventilated improved pit (VIP) latrine,
 - Pit latrine with slab, and
 - Composting toilet.

Source: Indicators and a Monitoring Framework for the Sustainable Development Goals: Launching a data revolution for the SDGs. Sustainable Development Solutions Network. Available at: <http://unsdsn.org/wp-content/uploads/2015/03/150320-SDSN-Indicator-Report.pdf>

Annex 2: Linking SDG 6 to the Principles of the SDG framework

People: We are determined to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment.

Drinking water and sanitation are the foundation of socio-economic development. Involvement of people in the planning, implementation, usage and monitoring of policies and programmes can address challenges based by different stakeholders.

Planet: We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.

Steps must be taken to ensure that we leave adequate water for the natural resources on the planet, including water; its ecosystem and biodiversity.

Prosperity: We are determined to ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature.

Ample evidence is available on the linkage between access to water and sanitation and socio-economic growth. Mismanagement of water can result in drought and flooding, perpetuating poverty, imposing huge burden on the State's resources and destroying nature.

Peace: We are determined to foster peaceful, just and inclusive societies which are free from fear and violence. There can be no sustainable development without peace and no peace without sustainable development.

Water has been the driver of several conflicts and this situation needs to change as water being the driver of peace.

Partnership: We are determined to mobilise the means required to implement this Agenda through a revitalised Global Partnership for Sustainable Development, based on a spirit of strengthened global solidarity, focussed in particular on the needs of the poorest and most vulnerable and with the participation of all countries, all stakeholders and all people. The interlinkages and integrated nature of the Sustainable Development Goals are of crucial importance in ensuring that the purpose of the new Agenda is realised

Partnerships based on the principles of equity can facilitate knowledge exchange, foster innovation and build capacity in the water and sanitation sector.

Source: Author's perspectives.

Annex 3: Linkage of SDG 6 with Other Goals

Goal No	Goal	Linkage with Water and Sanitation
1	End poverty in all its forms everywhere	Access to safe drinking water and sanitation exacerbates poverty. Water poverty has a direct linkage with economic poverty since water is an essential input into livelihood option.
2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Globally more than 70 per cent of water use is for agriculture. Efficiency in use enhance sustainability of agricultural options. Hidden hunger and nutrition depend on safe drinking water and adequate sanitation so that the food ingested is absorbed.
3	Ensure healthy lives and promote well-being for all at all ages	Lack of access to safe drinking water and sanitation has morbidity and mortality implications and are responsible for a high percentage of the death of children under five.
4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	A lack of safe drinking water and sanitation facilities in schools and other learning institutions affects attendance and the health of the students, specially of the girl child, women and persons with disabilities.
5	Achieve gender equality and empower all women and girls	Enabling easy access to water facilities and sanitation facilities reduces the work burden of girls and women. Women face risk of sexual violence while defecating in the open and access can reduce risk.
7	Ensure access to affordable, reliable, sustainable and modern energy for all	Energy and water are dependent on each other. Water is required for modern energy production (micro hydels for example) and energy is required for water extraction, storage, treatment and distribution.
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Economic growth for all is dependent on the availability of adequate water required for economic opportunities. Drought often leads to migration and compulsion for working in less than adequate work environments.
9	Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation	Water supply assets and systems created should be resilient to natural disasters. Sustainable and inclusive industrialisation is depended on a water responsible industry.
10	Reduce inequality within and among countries	Sharing of trans-boundary waters – surface and groundwater should be on principles of equity and sustainability. Countries should also control pollution of these resources.
11	Make cities and human settlements inclusive, safe, resilient and sustainable	Inclusive water distribution, effective water and sewerage management, safe and adequate drinking water and sanitation facilities.
12	Ensure sustainable consumption and production patterns	Reducing water footprint in production processes and reuse of water facilitates sustainability.
13	Take urgent action to combat climate change and its impacts*	Effective water management for flood and drought mitigation.
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	Controlling pollution due to agriculture , industry and domestic wastewater helps conserve marine resources.
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	Natural resources are interdependent on each other.
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	Water for peace should be the new mantra. The accountability of institutions responsible for facilitating and providing water and sanitation for all promotes peace and justice
17	Strengthen the means of implementation and revitalise the global partnership for sustainable development	Cross learning of knowledge and innovation, supporting capacity enhancement and technology transfer in the water and sanitation sector can accelerate access and enhance sustainability

Note: * Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

Source: Compiled by author.

Goal 6: Ensure availability and sustainable management of water and sanitation for all: Targets and Indicators	
6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.	6.1.1 Proportion of population using safely managed drinking water services
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.	6.2.1 Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water
6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.	6.3.1 Proportion of wastewater safely treated 6.3.2 Proportion of bodies of water with good ambient water quality
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.	6.4.1 Change in water-use efficiency over time 6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.	6.5.1 Degree of integrated water resources management implementation (0-100) 6.5.2 Proportion of transboundary basin area with an operational arrangement for water cooperation
6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.	6.6.1 Change in the extent of water-related ecosystems over time
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.a.1 Amount of water-and sanitation-related official development assistance that is part of a government-coordinated spending plan
6.b Support and strengthen the participation of local communities in improving water and sanitation management.	6.b.1 Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management