



PAKISTAN INSTITUTE FOR PARLIAMENTARY SERVICES

# Pakistan and Sustainable Development Goals

## *Data Book of Challenges and Achievements*

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## 6 CLEAN WATER AND SANITATION



### Sustainable management of Water and Sanitation in Pakistan: Issues, challenges and the way forward

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#### 1. Introduction

Pakistan's national security is directly linked with food security, which requires meeting the cherished goal of achieving water security for now and the future. Agriculture sector (production of food and fiber) alone uses over 92% of the total fresh water withdrawals; the rest less than 8% is left to cater to the needs of domestic, industrial and environmental sectors. Continued increasing demand due to population growth is threatening the sustained availability of fresh water. The annual agriculture and food production is adversely affected by sudden climatic hazards such as droughts, and floods. It further worsens due to other issues including inefficient water use for irrigation, encroachment of fertile lands by urban development, deforestation and continued erosion of top soils, salinization of soils, poor logistics between farming infrastructure and food processing industries.

The challenge today is to increase crop productivity per unit of land and per unit of water through healthy soils, efficient farming and irrigation practices/ technologies to improve agribusiness in a sustainable way. It is anticipated that almost 90% increase in food production will have to come from the existing cultivated lands; the rest from new agricultural areas. Innovative and advanced technologies along with efficient water and crop management are vital for upgrading rural water management systems to increase efficiency and production. In deltaic, regions exposed to seawater intrusion, efforts are needed to promote saline agriculture.

Irrigated agriculture is the backbone of the economy of the country. For this, Pakistan depends on waters from the Indus Basin. The Indus Basin Irrigation System (IBIS) has one of the World's largest irrigation systems comprising three major reservoirs with a design capacity of about 20 billion cubic meters (BCM), 23 barrages, head works and siphons, 45 main irrigation canals commanding an area of about 17 million hectares (Mha). Irrigation is used on 80% of all arable land and produces almost 90% of all food and fiber requirements. It is one of the largest sectors of economy, accounting for around a quarter of the country's Gross Domestic Product (GDP) with Agriculture Sector contributing around 19%. The Sector employs 44% of the labor force, supports 75% of the population, and accounts for 60% of foreign exchange earnings.<sup>1</sup>

However, there is great pressure on the existing water resources mainly due to increased population, urbanization, industrialization, and horizontal and vertical expansion of agricultural activities. Moreover, climate change and variability are also exerting great pressure in the form

<sup>1</sup> A.S. Qureshi, *Water management in the Indus Basin in Pakistan: challenges and opportunities*, Mountain Research and Development 31(3) (2011); Also see J. Briscoe and Qamar, *Pakistan's water economy running dry*. (Karachi: The World Bank. Oxford University Press, 2006).



of recurrent floods and droughts. Any decline in water quantity and quality would have serious impacts on the food security.

Lack of access to proper sanitation facilities affects negatively the health and wellbeing of the people, particularly the children. In this respect, Pakistan has made significant progress in improving access to sanitation, however, around 25 million people still practice open defecation. Children suffering from repeated episodes of diarrhea are likely to fall behind in school or drop out altogether. Furthermore, it can also cause stunting that currently affects almost 44% of children in Pakistan. Sustainable access to water, sanitation and hygiene in health centers and schools also remains a challenge especially for girls who lack adequate facilities to manage their menstruation. The effects of climate change and rapid urbanization also contribute to challenges of improving access to safe water and sanitation.

This article intends to address the three key questions:

- (i) what are the current status and challenges in water and sanitation?
- (ii) how to manage the available water on sustainable basis? and
- (iii) what are Pakistan's obligations for achieving Sustainable Development Goals (SDGs), particularly in terms of water and sanitation (Goal 6) and where we stand?

## 2. Current status and challenges in the Water Sector

By all indicators, Pakistan is fast becoming a water scarce country. If the population continues to grow at the current pace, the country will be touching absolute water scarcity threshold of 500 m<sup>3</sup>/capita.<sup>2</sup> The water shortfall that was 11% in 2004 will increase to 31% by 2025.<sup>3</sup> It means Pakistan would need a storage of about 22-25 BCM (3-4 large dams) to fill the gap between water supply and demand.

### Sustainable Water Resources Management

Sustainable management of water resources requires that the water needs of the current generation are met without compromising the needs of the future generation. In order to sustainably manage the water, there are some hard and soft paths which are equally important. These include:

- (i) Developing new water resources
- (ii) Managing existing water resources and
- (iii) Improving water governance.

- i) **Development of Water Resources:** Continuous development and augmentation of water resources is very important to cater the needs of the growing population. It

<sup>2</sup> M. Ashraf, *Managing Water Scarcity in Pakistan: Moving Beyond Rhetoric*. Proc. AASSA- PAS Workshop on Challenges in Water Security to Meet the Growing Food Requirement, (Islamabad: Pakistan Academy of Sciences, 2016).

<sup>3</sup> Government of Pakistan, *Ten years Perspective Development Plan 2001-2011- and three-year development program 2001-2004* (Islamabad: Planning Commission, Govt. of Pakistan, 2001).





becomes more important in countries like Pakistan where seasonal variability in flow is very high – on an average 82% of water is received during Kharif (Summer) season, the rest during the Rabi (Winter) season. <sup>4</sup>Therefore, water development is also required to transfer water from Kharif to Rabi season. Moreover, storage is required to transfer water from wet to dry years. Examples of recent wet years are the floods of 2010, 2012 and 2014 where, over 110 BCM of floodwater was lost from the system besides having devastating impacts on infrastructure, agriculture, livestock and humans. <sup>5</sup>

Storage capacity can be increased through construction of small, medium and large dams, rainwater harvesting through ponds and mini dams and recharging aquifers using engineering and biological approaches. The National Water Policy (NWP) approved in 2018 has set milestones for developing storage reservoirs in the country for which the requisite political will and commitment is now available.

- ii) **Management of Water Resources:** Maximum losses (60%) occur in agriculture sector, the major user of water and as such the sector offers a great potential for water savings. Small water saving at the farm level may transform into huge water saving at the basin level. For example, if overall system efficiency is improved by 10%, it could result in overall annual water saving of over 7.5 BCM.

The NWP places a great emphasis on improving system efficiency. Clause 28.4 (iii) of the policy sets the target as *“Increase of at least 30 percent in the efficiency of water use by producing more crop per drop. This will require use of new technologies like drip and sprinkler irrigation and more realistic water pricing policy”*.

- iii) **Improving Water Governance:** One of the major reasons for water scarcity is poor water governance. Canal water is being provided almost free of cost and the cost of collection of water charges (*abiana*) from the farmers is much higher than the *abiana* itself. Therefore, in the absence of proper pricing mechanism, there is no incentive for farmers to save water.

Similarly, groundwater, another potential water resource, provides over 60% water for agriculture, over 90% for domestic and almost 100% for industries. Under riparian system aquifers are common resource and, in the absence of regulatory framework, anyone can install any number of tube wells, anywhere and at any depth and can pump any quantity of water at any time. <sup>6</sup> They can even sell water to his fellow farmers from the same common resource. The water provided to the domestic and industrial sectors is also almost free. This practice has led to the depletion of groundwater in many canal commands and in almost all urban sectors. Therefore, regulatory framework should be developed for the sustainable management of the groundwater resources.

<sup>4</sup> R.A Qureshi and M. Ashraf, *Water Security Issues of Agriculture in Pakistan* (Islamabad: Pakistan Academy of Sciences, 2019), pp. 41.

<sup>5</sup> Qureshi and Ashraf, *Water Security Issues*.

<sup>6</sup> M Ashraf and A. Bhatti Zeeshan, "Diagnostic analysis and fine tuning of skimming well design and operational strategies for sustainable groundwater management-indus basin of Pakistan," *Irrigation and Drainage* 61, no. 2 (2012).





Lack of crop zoning is another issue requiring attention. High delta crops such as rice and sugarcane are grown in areas where surface water is insufficient and groundwater is deep and saline. Cultivation of these crops in such areas puts huge pressure on groundwater, resulting in depletion and secondary salinization of the productive lands. Rice and sugarcane should be restricted to those areas where sufficient water is available and there is minimum dependence on stored water reserves. Moreover, these crops should only be grown to fulfil country's needs and their export should be banned as the export of sugar and rice means export of huge amount of fresh water.<sup>7</sup>

Water use can be reduced through appropriate water pricing in all sectors, capacity building of the stakeholders, adoption of high efficiency irrigation systems, and educating the stakeholders regarding the efficient use of water.

### 3. Challenges in Sanitation

In Pakistan, water supply and sanitation sector has always been neglected compared to other sectors, both in terms of allocations of financial resources and implementation strategies. Improved sanitation means access to proper sanitary sewerage system through household connections, proper drainage system and safe disposal of wastewater. It is responsibility of the state to provide safe drinking water and sanitation facilities to all citizens. Pakistan has also committed nationally and internationally to provide safe water, sanitation and hygiene services and facilities to all. These commitments have been reflected in Pakistan Vision 2025, National Sanitation Policy 2006 and SDG 6 (targets 6.1 to 6.3).

Government initiatives in the previous decade included the development and promotion of Pakistan Approach to Total Sanitation (PATs) and the concept of Sanitation Marts (SanMart). These proved useful to a certain extent in achieving open defecation free (ODF) status. A significant reduction in the prevalence of Open Defecation (OD) from 40% of population in year 2000 to about 12% in 2016,<sup>8</sup> shows the growth and future potential of sanitation products in the country. Though Pakistan has improved access to basic sanitation services with 58% population, still the wider availability of sanitation to its remaining 42% of the population is a key structural challenge. Following this, Pakistan is placed at 5<sup>th</sup> place, where 22 million people are still practicing open defecation.<sup>9</sup>

The National Environment Policy (2005) and the National Sanitation Policy (2006) are the key sanitation policies guiding the implementation of proper sanitation coverage in Pakistan. The National Sanitation Policy is the overarching framework that provides policy guidelines aimed to improve sanitation coverage, while National Environment Policy focuses on prevention of environmental degradation in the country. However, poorly managed, old, inadequate and leaking sewer systems with insufficient coverage, inappropriate solid waste disposal, untreated

<sup>7</sup> R.A Qureshi and M. Ashraf, *Water Security Issues of Agriculture in Pakistan*. (Islamabad: Pakistan Academy of Sciences, 2019). pp. 41.

<sup>8</sup> WHO and UNICEF (2017). *Progress on drinking water, sanitation and hygiene: 2017 update and SDG baselines*. World Health Organization.

<sup>9</sup> WHO and UNICEF, *Progress on drinking water*.



wastewater disposal and absence of long-term sanitation planning at the local level are the main obstacles in achieving the milestones set under these two policy frameworks.

#### 4. Challenges in Achieving SDG 6

After the 18<sup>th</sup> amendment in the constitution of Pakistan, water and sanitation sectors have come under the purview of provincial and local governments rather than federal government. However, governance structure remains complex due to numerous overlaps in responsibilities. This structure on one hand could be helpful in improving the accountability and responsibility, however, on the other hand imposes challenges for the federal government to set and implement uniform and common policy standards across the country.

SDG 6.0 deals with the water and sanitation with six targets. Exclusively dealing with water use and scarcity, Target 6.4 states “*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*”.

Earlier Pakistan along with many other developing countries failed to achieve the Millennium Development Goals (MDGs) mainly due to: (i) lack of understanding about the MDGs; (ii) lack of institutional capacity; and (iii) lack of political will and commitment. The same is true for the SDGs where Pakistan is far away from setting appropriate baselines, setting realistic targets and allocating appropriate resources. Therefore, concerted efforts are required to achieve the SDG 6.0 by 2030.

#### Pathways for Achieving SDGs

Target 6.4 is based upon the reflections against two indicators:

6.4.1. Change in water use efficiency over time

6.4.2. Level of water stress – freshwater withdrawal in percentage of available fresh water resources.

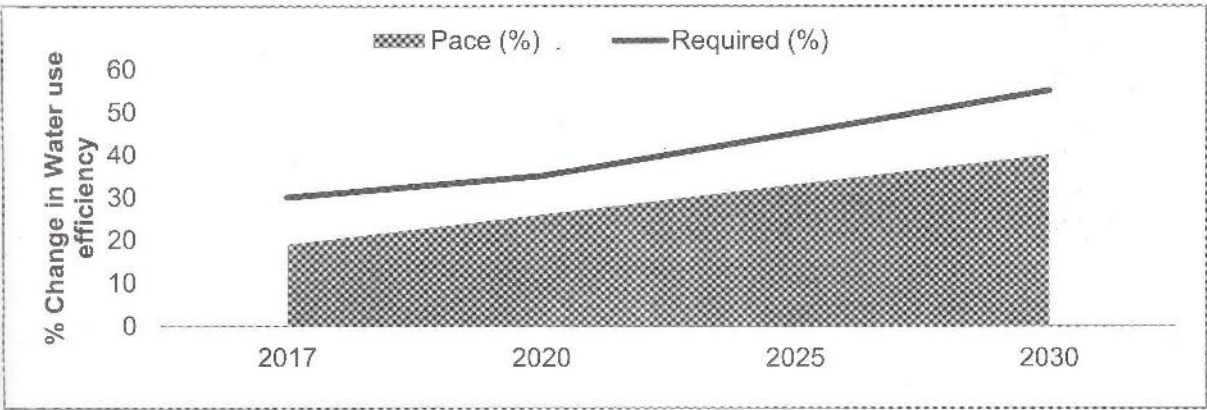
Stepwise guidelines of UN-Water for estimating changing in water use efficiency over time emphasize that the indicator 6.4.1 should assess the impact of utilization of water resources on the economic progress of a country. Water use efficiency completely differs from the term water productivity, as the later only provides a measure of output of a particular activity in terms of production per unit of water used. Water use efficiency on the other hand is the measure of all economic activity generated by the use of water. Indicator 6.4.2 is the estimation of broader picture of total freshwater resources availability in terms of river flows, groundwater aquifers flowing within the country or flown into a territory while crossing the border. Total fresh water withdrawal also includes the estimates of environmental flows.





Pakistan Council of Research in Water Resources (PCRWR) used the *SDG 6.0-Policy Support System (PSS)* to estimate the status of SDG 6.4 target.<sup>10</sup> This tool is developed according to the specific guidelines and methodology provided by UN-Water for each indicator of SDG 6.0. PSS is developed by United Nations University, Canada in its Institute of Water Environment and Health (INWEH). This tool has been developed and tested in five countries of the world including Pakistan under a project “Water in the World We Want- SDG 6.0 Policy Support System” - a freely available tool that helps in understanding each indicator of SDG 6.0. It also helps defining required capacity, financial and institutional support to achieve these aspirations by 2030.

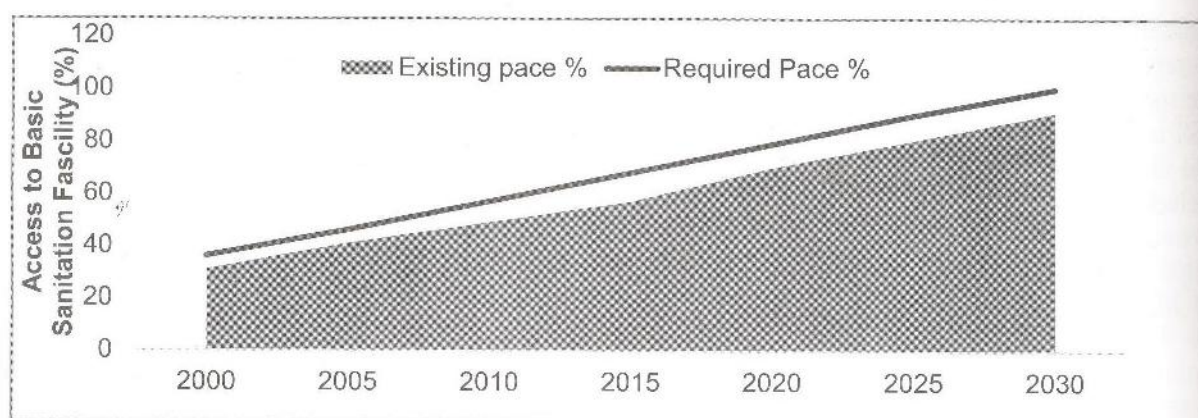
Unfortunately, Pakistan has not set baselines for most of the targets. PCRWR has used the PSS to set the baseline and targets. The estimation of water use efficiency includes the estimate of economic growth as a result of a unit water utilized by each sector that is measured in US\$/m<sup>3</sup> and proportion of water utilized in each sector in comparison to total water use in all of these sectors. The expected pace for year 2020 and 2025 is estimated on the basis of earlier trends, financial allocation for this indicator, availability of human resource, quality of policy and institutional system and provision of losses in case of disasters (Figure 1). When these values are incorporated into PSS, it computes a status of 30% in the year 2030, which can be termed as “Inadequate”, even against a very realistic and humble target of 55%. Therefore, it is paramount that Pakistan needs to divert all its focus towards setting appropriate baseline and aspirational targets. Otherwise, like the MDGs, it would not be possible to achieve these goals by 2030, which is fast approaching.



**Figure 1** Changes in water use efficiency over time

The SDG targets 6.2.1 and 6.3.1 deal with safely managed sanitation and hygiene services and safe wastewater treatment, respectively. Pakistan Social and Living Standard Measurement Survey (PSLM) is an instrument for monitoring of SDGs and providing the baseline of sanitation coverage in the country. Figure 2 shows that Pakistan has been making gradual progress in achieving basic sanitation facilities. However, tremendous efforts would be required to provide 100% sanitation facilities by 2030.

<sup>10</sup> United Nations Institute for Water, Environment and Health, (Canada) “SDG 6.0- Policy Support System,” <https://sdgpss.net/en/>, accessed on July 20, 2021.



**Figure 2** Trend in achieving the sanitation facilities in Pakistan

(Source: WHO and UNICEF, 2017 and author's calculations)

## 5. Way Forward

Pakistan water resources are under great stress. All the stakeholders – from users to the policy makers – should realize the situation and take all possible measures for its sustainable management. It includes: development of new water resources by constructing small, medium and large dams where possible; managing existing water resources; increasing productivity; better governance of the water resources like proper pricing, developing and implementing groundwater regulatory framework; developing and identifying appropriate crop zones in accordance with water availability in specific regions. Another important aspect is the review of export policy of agricultural commodities to better understand the requirements of Pakistan and subsequently growing such crops which are essential for the national food security with minimal export of virtual water.

Pakistan's Approach to Total Sanitation (PATS) should be promoted in the country through improving the quality and safety of WASH infrastructure and the safe management of human waste. Provincial and local governments following the guidelines of the National Sanitation Policy should develop awareness, education and training programs to promote sustainable sanitation.

Federal and provincial governments should allocate sufficient resources to achieve the targets set forth in SDG 6. The Policy Support System (PSS), developed by the United Nations University, which is freely available online, can be used to monitor and track the progress.

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