

shrinking water resources and need for water conservation and reduction in water pollution via lectures, seminars, workshops and extracurricular activities.

- WASA Faisalabad should allocate separate budget line for major repair and upgradation of existing water supply schemes to reduce water loss and pollution of water supplies.
- Faisalabad has an average annual rainfall of 350-400 mm. Rainwater harvesting should be promoted to harness this gift of nature. Moreover, reuse and recycle of wastewater should be encouraged at industrial and domestic levels.
- Monitoring of critical effluent discharge points on the drainage system of the city should be introduced as a guiding tool to find out the major sources of contamination in the surface drains.
- Economically feasible treatment options such as Floating Treatment Wetlands should be propagated at larger scale for better pollution management.
- Paharang drain should be protected from pollution, first through management strategies as it discharges into Chenab River. Madhuana drain should be the second priority as it meets Ravi River which is already being polluted upstream.
- A consortium of different stakeholders should meet regularly to discuss and resolve water related issues of the city. WWF-Pakistan's city-wide partnership is a platform that provides opportunity for such dialogues.
- It is encouraging that WASA Faisalabad with the help of Japan International Cooperation Agency (JICA), French Development Agency (AFD) and Danish government is working on the Sustainable Development Goal target of access to water for all and reduction of untreated water to half by 2030. Water and Sanitation Agency Faisalabad is the only agency taking aquifer charges from industries. It is also planning to take supply of surface water from canal to reduce the pressure on groundwater. Moreover, it is collaborating on a wastewater treatment plant with the Danish government. Wastewater from the plant will be treated to a level suitable for irrigation purpose which will compensate the supply need from the Irrigation Department.



SITUATION ANALYSIS OF WATER RESOURCES OF FAISALABAD

Introduction:

According to an estimate, Pakistan extracts 74 per cent of its freshwater annually, stressing water resources. About 27 million people do not have safe drinking water, while 47 million people lack access to adequate sanitation¹.

Consolidated baseline information on water resources for a city is crucial in making policy guidelines to govern and regulate the water sector in the city through proper implementation. This brief is a compilation of extensive data from multiple sources on the situation of water resources in Faisalabad, the second largest industrial hub of the country.

Faisalabad at a Glance:

Faisalabad is the third largest city in Pakistan with a population of about 3.2 million². It is famous for its textiles and is also known as Manchester of Pakistan. Exports from Faisalabad are one of the major sources of foreign exchange earnings in the country. The average monthly income of an average household in Faisalabad is approximately PKR 5,500³. Its economic significance is apparent from the fact that the city houses 512 large industrial units, out of which 328 are textile units⁴. In 2017 alone, Faisalabad contributed US\$ 20.5 billion to Pakistan's Gross Domestic Product (GDP)³.

Faisalabad is located in Rechna Doab, the land between Chenab and Ravi rivers. The water supply of Faisalabad is dependent on groundwater and surface water sources. Groundwater sources include Chiniot well-field, Jhang Branch Canal well-field, tubewells around the Rakh Branch Canal, Jhal Khanuana, Millat Town (MT) and Gulfishan Colony Water Works and French Water Project Phase-I.

Surface water sources include River Chenab, Jhang Branch Canal, Rakh Branch Canal, Gugera Branch Canal and River Ravi.

¹UNDP Pakistan. (2016). Development Advocate Pakistan: Water Security in Pakistan: Issues and Challenges. 3(4)

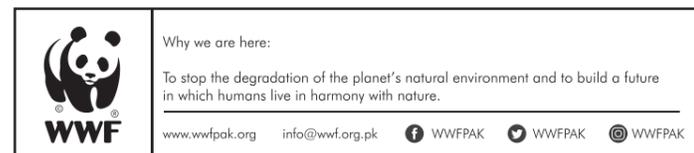
²Pakistan Bureau of Statistics. (2017). Province Wise Provisional Results of Census

³The Faisalabad Chamber of Commerce and Industry. (2017). The Economy of Faisalabad (Origins, Transformation and Prospects)

⁴Punjab Portal. (2019). Faisalabad Industry. Retrieved from https://www.punjab.gov.pk/faisalabad_industry

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Major Water Related Issues:

- Water supply provided by Water and Sanitation Agency, Faisalabad (WASA Faisalabad) to the domestic users of the city is 110 million gallons per day (MGD) against a demand of 142 MGD resulting in a shortfall of 32 MGD⁵.
- Water abstraction is monitored or estimated within the industrial processes but relevant data by industrial and commercial sectors in Faisalabad is not available.
- Faisalabad's groundwater table is dropping by 2 feet per year.
- Non-revenue water is estimated to be about 33 per cent of the total water supplied and only 5 per cent of the water supplied is metered⁵.
- Approximately 797 MGD of wastewater is generated in Faisalabad which ends up in Chenab and Ravi rivers through Paharang drain and Madhuana drain respectively. It is estimated that around 20 per cent of the total wastewater generated is treated at Chokera Wastewater Stabilization ponds before its disposal into Chenab River⁶.
- Floating Treatment Wetlands installed at Chokera to treat wastewater have improved the effluent quality. Regrettably, disposal from Chokera is later mixed again with untreated industrial effluent in Paharang drain⁷. Recently, under its Freshwater Programme, WWF-Pakistan conducted a performance analysis of the stabilization ponds at Chokera and the results were promising which indicate that such economically feasible wastewater treatment methods should be promoted.
- Water quality of Chenab River and Ravi River is seriously deteriorated due to the untreated effluent discharge from Lahore and Faisalabad.
- Seepage of wastewater from Madhuana and Paharang drains has severely contaminated groundwater as well⁸.
- Pakistan Council of Research in Water Resources (PCRWR) reports that 42 per cent of the drinking water (groundwater) sources in Faisalabad are polluted with E. coli, coliforms and has high levels of total dissolved solids (TDS), fluoride and sulphates⁹.
- Concentration of cadmium in sewage of Faisalabad is three times higher as compared to permissible limit of 0.01 mg/L (Punjab Environmental Quality Standards and World Health Organization guidelines). All four major sewerage channels in Faisalabad have chromium levels 2 to 10 times higher than the values recommended by the Punjab Engineering Academy (PEA-Lahore) and Environment Protection Department, Punjab¹⁰.
- Like other cities, Faisalabad does not have a regular water and wastewater quality monitoring system.

Significance of the Issues:

- The population of Faisalabad has increased from 2.0 million in 1998 to 3.2 million in 2017, which is estimated to double by 2030. This will put tremendous pressure on water and sanitation facilities².
- About 22 billion cubic meter (BCM) of water is required to meet the future demands¹¹. By 2025, the storage capacity of reservoirs in Pakistan is likely to decrease by 57 per cent due to high siltation in dams which will further decrease water availability.

- Faisalabad's ground water contamination is causing health issues such as hepatitis-A, diarrhea, other gastrointestinal illnesses and eyes/nose irritation etc^{12,13}.
- Excessive pumping of groundwater is decreasing the water table. Moreover, domestic water supply quality is deteriorating due to cross-contamination from the sewage pipelines.
- Water scarcity will certainly affect the industrial sector of Faisalabad, which mainly comprises of textile and leather industries. It can lead to decreased access to water and increased investments to improve water quality. The future water risks of the city will need to be mitigated through specific policies and rigorous implementation.

Recommendations:

WWF-Pakistan recommends the following steps to be taken in order to protect and conserve the water resources of Faisalabad:

- There is a need to develop an adequately resourced Water Quality Monitoring Plan to effectively regulate and monitor the quality of water supplied. In this regard, capability of institutions such as laboratories, related staff and technology should be improved.
- Before approving new water supply schemes, thorough investigations of water quantity and quality should be conducted.
- Detailed groundwater recharge vs discharge assessment should be conducted.
- Government departments should extend financial support to promote research and innovation for the development of low cost, improved, and environment friendly water and sanitation projects.
- Policy for enforcement of metering system must be formulated and immediately applied on water usage to reduce non-revenue water consumption. This will help in addressing the issue.
- Formulate Sustainable Pollution Control Strategy to reduce wastewater generation of the industrial sector.
- The main impediments in implementing end of pipe wastewater treatment by the Small and Medium Enterprises (SMEs) are high capital cost and area requirement. No stakeholder either from public or private sector can alone fix the issue of wastewater. Instead, a mechanism needs to be developed by public and private sectors to implement the cost-effective treatment of industrial wastewater through synergizing the efforts. Industry should be encouraged to reduce the pollution load at the source which is the most cost-effective solution. At the same time, government can play its role for secondary and tertiary treatment at larger scale. Thus, there is dire need of a coordinated effort from public and private sectors.
- Environmental rules and regulations related to water quality (PEQS-2016) must be enforced by WASA Faisalabad and EPA Faisalabad to prevent the direct disposal of untreated wastewater from industrial and municipal sectors.
- Environment Protection Agency Faisalabad and WASA Faisalabad should promote smart environmental management practices in the textile sector of Faisalabad.
- Review and revise existing Punjab Environmental Quality Standards (PEQS) particularly for domestic and industrial effluents. For textile industry, compliance with Zero Discharge of Hazardous Chemicals (ZDHC) by 2020 should be considered as international buyers will begin to actively pursue their suppliers in Pakistan for the implementation of ZDHC.
- Awareness campaigns must be launched to highlight the importance of water resources, their quality and adequate sanitation by involving non-governmental organizations (NGOs) and community based organizations through electronic, print and social media. Civil society and NGOs should take initiatives to develop and implement water related projects which could be upscaled by WASA Faisalabad to improve water condition in Faisalabad.
- Institutions at all levels (schools, colleges and universities) should educate students about

⁵Water and Sanitation Authority. (2017). Water Supply, Sewerage and Drainage Master Plan of Faisalabad, Interim Report.

⁶Qureshi, D., & Syed, H. (2014). Situation Analysis of the Water Resources of Lahore Establishing a Case for Water Stewardship. WWF-Pakistan and Cleaner Production Institute (CPI).

⁷Dawn. (2015). Floating wetlands: a new approach to wastewater remediation.

Retrieved from https://epaper.dawn.com/print-textview.php?StoryImage=01_10_2015_706_002

⁸Rehman, K., Ashraf, S., Rashid, U., Ibrahim, M., Hina, S., Iftikhar, T., & Ramzan, S. (2013). Comparison of proximate and heavy metal contents of vegetables grown with fresh and wastewater. Pak. J. Bot, 391-400.

⁹PCRWR. (2016). Water Quality status of major cities of Pakistan (2015-16).

¹⁰Hussain, S. I., A. G., Ahmad, S., Murtaza, G., & Sabir, M. (2006). Irrigation of crops with raw sewage: hazard assessment of effluent, soil and vegetables. Pakistan Journal of Agricultural Sciences, 43(3-4), 97-101.

¹¹Ministry of Water Resources Government of Pakistan. (2018). National Water Policy.

¹²Planning & Development Department, Government of Punjab. (2019). Public Private Partnership Cell. Retrieved from https://ppp.punjab.gov.pk/SURFACE_WATER_FAISALABAD

¹³Japan International Cooperation Agency. (2010). Implementing review study report on the project for the expansion of water supply system in Faisalabad in Islamic republic of Pakistan.