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IMPROVED RESOURCE EFFICIENCY THROUGH INCREASED COMPLIANCE TO ENVIRONMENTAL STANDARDS-AN INITIATIVE TOWARDS SUSTAINABILITY IN THE INDUSTRIAL SECTOR OF PAKISTAN

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Abstract

Pakistan's probable link-up to the water scarce countries around the globe, with its water availability decreasing significantly to about 964 m^3/capita, has cropped up as an alarming situation for the survival of the fragile economy. Due to over abstraction and misuse of finite water resources, the annual wastewater production is increasing gradually. Domestic and industrial wastewater is either discharged directly to a sewer system, a natural drain or water body, a nearby field or an internal septic tank. Water intensive industries, in particular, are significant contributors of wastewater generated and discharged into drain, which eventually falls into rivers. Most of the industries are consuming water exceeding their perceived requirements further intensifying the wastewater production. Untreated wastewater contains heavy metals posing grave risks to not just the communities but also the environment at large. Taking that into consideration, addressing wastewater issues interlinked with industrial domain now remains a need of time before it spirals out of control. In view of the current social and environmental scenario of Pakistan, WWF-Pakistan has joined hands with the European Union and International Labor Organization (ILO) to implement international labor and environmental standards in Pakistan in order to improve the competitiveness of the industrial sector of Pakistan. Within the project scope, Smart Environmental Management Practices (SEMPs) would be devised aimed at not just improving the water consumption within the common industrial procedures but also emphasizing upon an overall reduction in the wastewater generation stream. This paper highlights the practices mentioned above, as well as their suitability with respect to the cost benefit analysis of the ones that would be adopted.

Overview

Pakistan, a water deficit country owing to not just the depleting groundwater and surface water resources, but also shortage of storage capacity not surpassing 30 days, puts the country on the whole on a pitiful front with its rapidly decreasing water tables further aggravated by the exacerbating climatic changes. Additionally, grave risks surfacing with sprawling urban versus rural population trends accompanied by booming urbanization (outburst of industrial units) and extensive agricultural practices to cope up with the rising demands, further jeopardize the freshwater resource base of the country. Amid such conditions, freshwater resources that were once utilized primarily in the agriculture

sector now remain an essential backbone of the domestic as well as industrial sectors.[1] Unabated pollution and augmented ratios of untreated wastewater discharged from the industrial domain has caught attention at the national level, however lack of current policy enforcement measures leaves little incentive for the active entities in the sector to proactively uptake environmental responsibility. Therefore, a required transition in the industrial sector by pivoting the current norms towards sustainable development alongside ensuring an effective management of the natural resource remains fundamental.

Wastewater Production

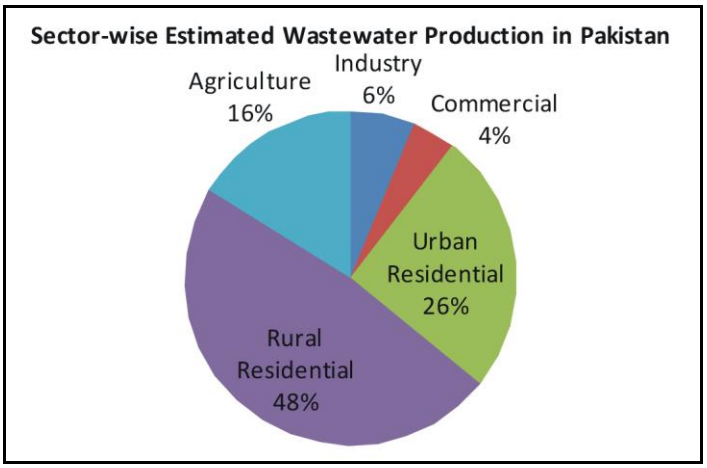


Fig.1: Sector-wise wastewater production in Pakistan
Source: Pakistan's Wetlands Action Plan, 2000, proposed by NNCW and WWF

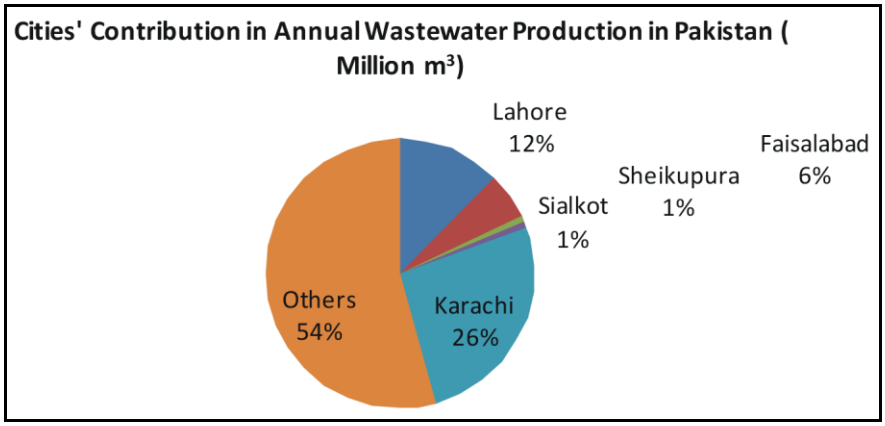


Fig.2: Cities contribution in Annual wastewater production in Pakistan
Source: Master Plan for Urban Wastewater (Municipal and Industrial) Treatment Facilities in Pakistan. Final Report, Lahore: Engineering, Planning and Management Consultants, 2002

[1] Ensink et al., 2004. A nationwide assessment of wastewater use in Pakistan: an obscure activity or a vitally important one? Water Policy 6: 197-206.

According to the 1998 Population Census, total discharge of wastewater for 14 major cities of Pakistan is estimated at a ballpark figure of 18.3 Milllion m^3/ h.[1] Latest estimates reveal that the total quantity of wastewater produced in Pakistan is 962,335 million gallons (4.369 Billion m^3/year) including 674,009 million gallons (3.06 Billion m^3/year) from municipal and 288,326 million gallons (1.309 Billion m^3/year) from industrial use.[2] The net amount of wastewater discharged into the major rivers is 392,511 million gallons (1.782 Billionm^3/year; 1/3rd of the all wastewater), comprising of 316,740 million gallons (1.438 Billion m^3/year) of municipal and 75,771 million gallons (0.344 Billion m^3/year) of industrial effluents. Petrochemicals, paper and pulp, food processing, tanneries, refineries, textile and sugar industries are major industrial contributors to wastewater pollution in Pakistan.[3] Furthermore, it is estimated that around 2000 million gallons of sewage is being discharged to local surface water bodies every day.[4] The industrial subsectors of paper and board, sugar, textile, cement, polyester yarn and fertilizer produce more than 80 percent of the total industrial effluents.[5]

Non-Compliance of Environmental Standards

In 1993, under Section 6 of the Pakistan Environmental Protection Ordinance (1983), a Pakistan Environmental Protection Agency (Pak-EPA) was formulated entrusted with the initial notification of National Environmental Quality Standards (NEQS) for municipal and liquid industrial effluents and industrial gaseous emissions, motor vehicle exhaust and noise. Within a short duration of time, the Pakistan Environmental Protection Act (PEPA) was launched in 1997 saliently covering a) pre-development environmental impact assessments prior to attaining the Federal permit (Section 12), b) restricting imports and flows of hazardous waste within the country (Section 13) and c) regulation of motor vehicles (Section 15) whereby motor operation with gaseous emissions or noise exceeding the NEQS, or other standards established by Pak-EPA were prohibited. To ascertain an overall compliance with the NEQS, the Pak-EPA has been empowered to either direct that pollution control devices be installed in motor vehicles or fuels specified by Pak-EPA be used in them or specified maintenance or testing be carried out on them.[6] After the 18th amendment, the provincial EPAs/EPDs were responsible for the implementation of local laws and standards in the industries. Although EPD Punjab has formulated the Punjab Environmental Quality Standards, but still there is a challenging situation to implement in the industries because of a number of constraints.

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1 Food and Agriculture Organization of the United Nations (FAO) 2002. Investment in Land and Water; Proceedings of the regional consultation Bangkok, Thailand 3-5 October, 2001.

2 Pakistan Water Sector Strategy (PWSS) 2002. National Water Sector Profile, Volume 5, October 2002, Ministry of Water and Power- Office of the Chief Engineering Advisor. Available at http://waterinfo.net.pk/cms/pdf/vol5.pdf

3 United Nations Industrial Development Organization (UNIDO) 2000. Industrial Policy and the Environment in Pakistan. UNIDO, Vienna, Austria.

4 Pak-SCEA 2006. Pakistan: Strategic Country Environmental Assessment Report: Rising to the Challenges, May, 2006

5 WB-CWRAS Paper 3, 2005

6 Brief on Pakistan Environmental Protection Act (PEPA), 1997; Available at: http://www.environment.gov.pk/act-rules/Brief-PEPA-Act1997.pdf

However, owing to an overall regulatory lag and with a bare minimum of incentives for the industries to treat their effluents, industrial water pollution has been mounting over the recent years.[1] This thus leaves the industrial approach towards environment throughout Pakistan on a questionable front; Lahore in itself has a mix cluster of industries using different chemicals in their production processes, likewise in Sindh the situation is even worse apparent by the fact that two of the well-established setups in Karachi, Sindh Industrial Trading Estate (SITE) and Korangi Industrial and Trading Estate (KITE), have no mechanism in place for treating the discharged effluents. Karachi, a dense cluster of Pakistan's industry, discharges about 70 percent of the wastewater produced into the Arabian Sea without any prior treatment. Whereby 16 percent of the industries within Karachi's industrial zone have been categorized as highly polluting, 59 percent also to an extent befall the polluting category[2].



Fig.3: Industrial Wastewater discharge into storm water drain



Fig.4: Wastewater usage for irrigation purposes

Thus, keeping in view the significant contribution of the industrial domain in catalyzing the environmental menace triggering from the wastewater discharged into nearby canals, drains and perhaps the sea, the primary focus of this paper revolves around the booming textile and leather industrial hubs, two of the major contaminant releasers, within the 5 major metropolis i.e. Lahore, Karachi, Faisalabad, Sialkot and Sheikhupura and aims at aligning their current procedures with the environmental standards of Pakistan through an efficient implementation of the Smart Environmental Management Practices (SEMPs).

Textile and Leather Sector in Pakistan

Textile and leather sectors, two of the most water and energy intensive sectors in Pakistan, contribute roughly about 8.5 and 5 percent of the country's GDP, respectively. At present, there are about 1545 textile processing Small and Medium Enterprises (SMEs) and 850 leather tanneries in Pakistan, with a majority of the stated figure situated within Punjab. Textile is the largest industrial sector of Pakistan with respect to

[1] Worldwide Fund for Nature (WWF). 2007. Pakistan's waters at risk: Water & health related issues in Pakistan & key recommendations, Available at http://www.wwfpak.org/pdf/waterreport.pdf

[2] United Nations Industrial Development Organization (UNIDO). 2000. Industrial Policy and the Environment in Pakistan. UNIDO, Vienna, Austria.

production, export and labour force employment; leather on the contrary, is the third largest in terms of export. Pakistan ranks as the 8th largest textile products' exporter from Asia and 12th globally. Similarly, Pakistan's leather industry is the second largest foreign exchange earner amongst the manufacturing sector. Currently about 90 percent of the leather is exported in finished refined form with major export items varying across tanned leather, leather garments, sports goods, leather gloves and footwear. Leather sector, all in all, contributes 4.41 percent of the overall export earnings of the country.

Unsustainable water use and poor water management and governance practices are deteriorating water quantity and quality, thus creating serious social and economic repercussions. Rapid industrialization and urbanization has also fastened the pace of air, water and land pollution, compounded by inadequate or improper waste management. Textile and leather sectors, combined, are the highest contaminant contributors of bio-chemical oxygen demand (BOD), COD, TDS, TSS, Copper and Chromium. When viewed from the worsening poverty ratios, this undeniably poses an enormous threat to sustainable development.

Low process efficiency, wastage of resources, water pollution due to discharge of untreated effluents, air emissions notably Volatile Organic Compounds (VOCs), excessive noise or odor, as well as workplace safety are some of the main environmental issues associated with the target sectors.

As revealed from the findings of the business case prepared under WWF-Pakistan's SWITCH-Asia Water Stewardship Project (WSP) in 2013-15, a textile processing SME and a leather tannery consumes on average about 169m^3 of water per ton of fabric and 89m^3 of water per ton of leather, respectively, and most of this water is discharged into nearby water bodies without treatment. Another study from WSP project also showed that these two sectors have blue and grey water footprints of about 22,000 million cubic meters per annum. Owing to their resource intensiveness, water pollution and energy footprints, and significant contribution towards trade and GDP for the country, support is urgently needed to strengthen global image in the multilateral trade system, and to contribute to the GSP+ related obligations. The Water Stewardship project aimed that by 2025 water efficient production and consumption would predominate in the industrial hubs of Pakistan as part of a broad engagement of businesses in water management, contributing to improved environmental sustainability and poverty reduction within the context of sustainable development. Pakistan has ratified 14 legally binding international conventions; Multilateral Environmental Agreements (MEAs). Additionally, Pakistan is also committed to the global Ten Year Framework of Programmes (10YFP) on sustainable consumption and production adopted by UNCSD. However, Pakistan's efforts on the implementation front have been inadequate.



Fig.5: Counter Current or solomatic washing



Fig.6: Wastewater treatment system for leather tanneries

WWF-Pakistan's Initiative at Industrial Compliance with ILES[1]

Keeping in perspective the current social and environmental scenario of Pakistan, WWF-Pakistan has started a project with International Labor Organization (ILO) funded by European Union (EU) to implement international labor and environmental standards in Pakistan in order to improve the competitiveness of the industrial sectors of Pakistan and to strengthen the capacity of the public sector to implement Multi-environmental Agreements (MEAs) and national environmental laws and standards in Pakistan. Compliance with international and national standards promote enterprise efficiency, supports competitiveness in international trade and protects workers and consumers' health and safety. This in turn leads to more sustainable socio-economic development of the country.

The project ILES aims at contributing to improved environmental sustainability and livelihoods in Pakistan by supporting sustainable economic growth and development. Considering the alarming levels of pollution being discharged from industries, the project would focus upon an overall improvement in the sustainability of production and consumption practices, with a particular focus on water use and management in water intensive, Small and Medium Enterprises (SMEs). The project will also contribute in enhancing the capacities of the textile and leather sector SMEs to adopt SEMPs (Smart Environmental Management Practices) to reduce water and energy use by 15-20 per cent as well as pollution reduction in addition to addressing other relevant environmental issues such as air and noise pollution, and solid waste management. These SEMPs will be identified and adopted in the textile and leather sectors in four regions (Faisalabad, Lahore, Sialkot and Karachi).

Recommendations

On the basis of above discussion, following are the key recommendations for the sustainable management of resources by SEMPs for reducing the wastewater in the industrial sector.

[1] International Labour and Environmental Standards (ILES)

- The SEMPs will be a tool for the implementation of National environmental quality standards and translating the MEAs which will not only impact the environmental conditions of the industry but will also contribute to the improvement of economy and export of the country.
- The existing laws/standards could be dealt in a way that these could be encouraging for industries to be adopted for reducing the pollution level.
- The industries should adopt sustainable practices for resources efficiency. These practices have business case in terms of cost-benefit analysis.
- The capacity building of government implementing agencies is needed for the implementation of local standards after 18th amendment.