

Political and Legal Frame Work and Supply of Clean Drinking Water with Special Reference to Lahore, Istanbul and Karnataka

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Abstract

The supply of clean drinking water is vital for human health and existence. The world community is facing a challenge of guaranteed availability of quality water to the masses. Waterborne diseases are taking heavy toll of human life especially the children. The issue of supply of clean drinking water is totally ignored by the successive political governments by disregarding their constitutional obligations. The quality of available drinking water is very deplorable in Pakistan and it ranks at 80th out of 122 nations. Moreover, on the other hand the government is also spending Rs. 120 billion, every year on water borne diseases medication (Qudrat Ullah: 2010). The present political government has accepted the reality that the human life and health is directly linked with provision of clean drinking water and it has also evolved a mega project of supply of clean drinking water in the country. However, the government has not succeeded, so far to fulfil its legal obligations as per UN Conventions, National and local laws, which are presently in field to ensure the adequate supply of clean drinking water to the citizens (Nation: October 06, 2014). The resolve of government to involve the local MPAs and MNAs in policy making process will support the government machinery in equal and judicious supply of clean drinking water to the citizens (Yasir Habib: 2011).

Key Words: European Community, Environmental Protection Agency, Lahore Improvement Trust, National Drinking Water Policy, National Environment Policy, National Environmental Quality Standards, World Health Organization,

Introduction and Background

Al-mighty Allah has blessed Pakistan with abundance of water resources, with water flowing down the Himalayas and Karakorum heights, from the world's largest glaciers, a free and unique bounty of nature for this land of alluvial plains. As a result of this natural resource, today we have the world's marvelous and the largest irrigation system. Despite this very fact that 68 years have passed after independence of Pakistan and still half of the country population has been denied the access of clean drinking water. Without any prejudice, the experts are of the view that the situation in Lahore is more or less similar in nature (Faizan Bangish: 2015). Presently, the world needs uninterrupted supply of clean drinking water and the supply of safe and clean drinking water will further worsen in future. It is estimated that there will be one billion population of the world lacking access to clean drinking water by 2050.

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According to a research report entitled "*Pakistan's Water at Risk*", it is pointed out that in Pakistan the per capita availability of water to the citizens of Pakistan has been reduced over period from 5,000 cubic meters per annum to 1,100 cubic meters per annum in 2007 and the same has been reduced further (Suhail Yusuf:2012).

It is emphasized that in Pakistan and Lahore majority of the citizens are facing problem regarding better access to safe drinking water due to weak political structure, non- continuity of local governments system and weak implementation of local rules, regulations and provisions of the Constitution of Pakistan. This right is guaranteed under UNO conventions and International Law. Moreover, presently water which is being used is causing diseases like diarrhea, typhoid, jaundice and cholera. It is imperative to mention here that the water people are drinking is not clean and safe for health (Abdul Rasid: 2012). Indus water treaty was signed by Pakistan with India in 1960 due to which major changes took place in the sources of water for Pakistan. As a result of this agreement Pakistan is receiving annually 141.67 Million Acre Feet (MAF) of water which is required to be managed on urgent basis. Presently, no waste water treatment plant exists in the city of Lahore and the raw sewage water is directly discharged into the River Ravi which creates environmental problems especially when significant dilution is not available in the river. There is failure on the part of the political system and institutions like WASA, LDA, Registrar Co-operatives Societies and Local Government in Lahore. These departments are required to keep up their pace with the development of the district and not carry out piecemeal extensions in the present system. The result is that capacity of the system is inadequate which is leading to overflowing of water on the surface and drainage to low lying (ponded) areas which result into contamination of near surface and groundwater.

Political/ Legal Frame Work and Issues with regard to Supply of Clean Drinking Water

The supply of clean drinking water is mainly considered a manmade problem in Pakistan. Non implementation of laws, mismanagement, industrial and human waste and government corruption have actually caused a clean drinking water supply crunch and reduced the availability of water which is practically useless due to a huge quantity of pollution. Water demand of citizens of the country is growing rapidly and on the other hand water supply infrastructure is crumbling due to which the government is in difficult situation to supply drinking water to its citizens. The local government and institutions are needed to take water supply issue as a national priority. If the political

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government continues with this business with typical attitude/ mind set, the consequences of the same will be severe in future (Nina Brooks: 2007).

This an accepted reality that the health is considered as directly related to the provision of safe/ clean water. The chlorination of drinking water eliminates molds, algae and slime bacteria that commonly grow on walls of water main, in water supply reservoirs and in storage tanks. The World Health Organization (WHO) research reveals that chlorine is highly effective against all waterborne pathogens (*Aoun Sahi:2008*).

The survey report issued by Pakistan Council of Research in Water Resources (PCWR) revealed that the microbiological pollution remained from 37 per cent to 63 per cent in Lahore and 3200 water supply schemes also remained non-operational in Lahore (Express Tribune, February 5th, 2011). The experts have warned that Lahore may face the scarcity of clean drinking water in a near future like Karachi. The pumping of groundwater is in larger quantities than dumping of water. There is trend of decreasing of water level every year in Lahore in addition to pollution of water (Ihsan Qadir: 2013).

The survey conducted by the Environmental Protection Department (EPD) revealed that a considerable number of tube wells is pumping out, arsenic-contaminated water in Lahore which poses a great danger to human health and life. The arsenic is hard to detect in water being odorless, colorless and tasteless and it is considered a silent killer. The arsenic level in drinking water in Lahore is observed at high level up to 120 ppb (parts per billion) as compared to the levels set by the World Health Organisation (WHO) as 10 ppb (Mian Muhammad Nadeem :2011).

In Lahore Water and Sanitation Authority (WASA) is mainly responsible for the uninterrupted supply of clean drinking water. The water in Lahore has to be pumped from 700 feet below ground level which is fit for human consumption. The total groundwater extraction by WASA tube wells and private housing societies is about 3 million cubic meters per day (MCM/day). The total generation of waste water is about 8.0 MCM/day and almost all polluted water is disposed of into the River Ravi without any treatment (JICA: 2010). Despite having existing laws to regulate the groundwater however, its excessive pumping continues throughout the city. Lahore Development Authority (LDA) Lahore Water and Sanitation Authority (WASA) and Environmental Protection Agency (EPA) being the regulatory bodies are required to regulate and monitor the excessive extraction of groundwater and further introduce the proper legislation and organizational infrastructural changes to solve the issues of pricing, entitlement, regulatory issues, enforcement of environmental laws, water pollution, etc (Dr. Asad Sarwar Qureshi: 2014).

The appropriate water usage charges are required to be introduced by the political government to curtail the misuse of the blue gold so that at the same time the product (water) will not ultimately erode. Moreover, the water may be treated as precious property by the consumers (Tribune: March 09, 2015). The recent research has revealed that the contamination of drinking water accounts for 20 to 40 per cent of all diseases in the country, which directly becomes cause of losses of Rs 25-58 billion annually of national income in the country (Farhat Nabeela: 2014). The source of supply of clean drinking water has a close relationship with health aspect of poverty. The citizens who have access to clean drinking water would have lesser chances of waterborne diseases as compared to deprived people (Report Lahore School of Economics: 2014).

About 50 per cent of population is consuming bacteria -contaminated water in Punjab. In some areas of Lahore, water is contaminated by *hazardous industrial wastes including heavy metals, persistent toxic synthetic organic chemicals, pesticides, municipal wastes and untreated sewage water into natural water bodies*. In light of Punjab Water Drinking Policy, the regulatory bodies in Lahore and Punjab, the government is supposed to regulate the quality and quantity of clean drinking water by overcoming the social, fiscal, legal, regulatory, administrative, institutional and environmental issues (Yasir Habib: 2011).

The institutions linked with provision of clean drinking water are politically controlled/ governed and these have inherent inclination towards the prevailing country's power structure/ politics. The Major reasons for an inequitable and inadequate supply of clean drinking water are political involvement, corruption, mismanagement of financial resources and waste watering due to which increasing demand is not meted out in an efficient manner. The unholy pact of politicians, service providers and vested groups have brought the entire Management System in a deplorable condition which is not meeting out the daily demand of city of safe water and management of natural resource (Daily Dawn: 2002).

The equitable access of clean drinking water is a basic human right and essential for sustainable development and poverty alleviation of society and 18 per cent of world population access to safe drinking water. (International Water Institute: 2005). A method of rainwater harvesting to provide clean drinking water is important because the building of a huge infrastructure is very costly in this modern era to supply water in mega cities. The rainwater harvesting system is low cost method for cities like Lahore to increase the water supplies, likewise the Indian mega city Bangalore (circleofblue.org/water news: 2010).

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As mentioned earlier, safe water scarcity has caused adverse and serious effects on health of public in Pakistan as well as in Lahore. Moreover, in hospitals about more than 40 per cent of patients are suffering from water-borne diseases (Amna Razzag: 2013). In Pakistan when the political parties came into power, every time renewed their pledges that they would provide safe drinking water to all citizens and set out ambitious targets both at national and provincial levels to meet-out the Millennium Water Goals and act upon Drinking Water Policies (S. Akbar Zaidi: 1999).

The safe drinking water is the essence of life therefore, access to safe drinking water is required to be added as a basic fundamental human right to the Universal Declaration of Human Rights (water the essence of life itself.wordpress.com: 2010). Due to the inefficiency and bad policies of the government institutions, water distribution is being shifted to private companies, often with disastrous consequences and abnormal profits by private companies. In reality, the government and service providers are responsible under the provisions of Constitution of Pakistan for providing a safe/ clean and affordable water supply, particularly if the alternative is an unreliable and unaffordable (Water in Conflict: 2011).

The increasing value of safe water in Lahore, the great concern about quantity and quality and issues of access and denial have given rise to political involvement (water politics) of the public representatives in official matters. The responsible departments are in practice to make uncoordinated efforts/ decisions by only reflecting/ taking individual agency responsibilities that are usually independent of each other (Water Resource Issues and Agriculture: 2010). The safe and clean drinking water is very comparable to oil and is becoming a very valuable commodity in future. The scarcity of provision of clean drinking water has triggered desperation at national global level (Abigail Ofori-Amoah: oforiaa@uwec.edu).

Mr. Anders Berntell, Executive Director of the Stockholm International Water Institute, expressed that polluted water kills more persons than earthquakes or wars. Shrinking supplies of clean drinking water has endangered the population and health. The political governments are actually helping the private companies with political motivated designs by putting this natural resource at their disposal/ hands with no public accountability. The institutions shall make sure that the blue gold (safe drinking water) remained in public hands/ domain on affordable prices/ costs (Blue Summit Declaration: 2011).

Facts/ Issues of Supply of Clean Drinking Water in Lahore

Brief History of Water Supply System of Lahore

In 1967 Lahore Improvement Trust (LIT) was created. After establishment of LIT the water supply system was shifted to Water Wing of LIT. A development package was executed with the help of The World Bank, under which four (04) well centers were constructed along the periphery of River Ravi i.e. Bhogiwal near Mehmood Booti, Salamatpura, old Ravi Bridge and New Ravi Bridge (National Ravi Park). Water from these well centers was supplied to the city through dia ductile iron main grid ranging from size 300 mm to 800 mm. The first ever Master Plan for Greater Lahore Water Supply, Sewerage and Drainage system was also prepared during this period, first by Nihon Saidu, a Japanese consultant (1969) and then finalized by Camp Dresser & Macke (CDM) in 1975. Lahore WASA, the second largest water utility of Pakistan and a regulated monopoly for water supply & sewerage services in the City, operating in the area of more than 350-Sq.Km. through about 5300-Km Water Supply and about 4000-Km Sewerage Network with the sanctioned budget strength of Rs. 6,343 Million (Abdul Qadeer: 2014).

National Drinking Water Policy

The Ministry of Environment, the Government of Pakistan, has formulated the National Drinking Water Policy, in context with provisions of the National Environment Policy (NEP) 2005, Vision 2030, National Water Policy 2004, National Sanitation Policy 2006 through a countrywide consultation process to make such arrangements to address the key issues and challenges as are being faced by citizens of Pakistan regarding provision of clean drinking water. As per National Drinking Water Policy, the Government of Punjab and other concerned departments are supposed to provide access to clean drinking water supply to the population of Lahore by 2025 (NEP Drinking Water Policy: 2009).

Punjab Drinking Water Policy

In line with the National Drinking Water Policy, the Government of Punjab was the first which prepared the first Provincial Drinking Water Policy namely as "Punjab Drinking Water Policy". Water Supply in Lahore is mostly dependent on ground water. The use of surface water is very scarce. The Vision of Punjab Drinking Water Policy is the supply of safe and clean drinking water to all the citizens in both rural and urban areas (Initiative PHED:2014).

Source of Drinking Water in Lahore

When we analyze the supply of water to the citizens of Pakistan, it is revealed that the Lahore, Gujranwala, Multan, Peshawar and Quetta are relying 100% on ground water, whereas CDA, Rawalpindi and Faisalabad are relying partially on ground water. Moreover, Lahore and its surrounding areas are located over an extensive water aquifer. The water supply in the city is purely based on the ground water. The water is abstracted through a number of tube wells installed in all parts of the city which is generally pumped directly into the distribution system. Due to over increasing number of tube wells, the water table is depleting rapidly in Lahore. Although the quality of ground water of Lahore remained alarming in past yet, now it is facing serious threats, firstly, internally from Arsenic and secondly, externally polluted water from River Ravi and brackish water from Kasur.

Background & Existing System – in Lahore Perspective

The average elevation of the city of Lahore is 700 ft. above sea level. The city is situated on the flood plain of River Ravi which has a gradual slope towards South West. After independence in 1947, the growth of city further accelerated. The population of Lahore at present has gone above 10.00 million and city area is about 600 square kilometers including 100 square kilometer covered by Lahore & Walton Cantonment Boards (www.ask.com/question: 2014).

Projected Water Demand for Lahore District

Year	Population (In million)	@ 80 GPCD	@ 60 GPCD	@ 50 GPCD
2013 (Current Population Service Level 89%)	8.49	763 MGD GW: 600 mgd SW :163 mgd (304 Cusec)	573 MGD GW: 573 mgd SW :0 mgd (0 Cusec)	477 MGD GW: 477 MGD SW :0 mgd (0 Cusec)
2020 (With 95% served Population)	11.568	925 MGD GW: 600 mgd SW :325 mgd (606 Cusec)	694 MGD GW: 600 mgd SW :94 mgd (175 Cusec)	578 MGD GW: 578 mgd SW :0 mgd (0 Cusec)
2025 (With 100% served Population)	13.411	1073 GW :600 mgd SW :473 mgd (881 Cusec)	805 GW :600 mgd SW :205 mgd (381 Cusec)	671 GW :600 mgd SW :71 mgd (131 Cusec)
2050 (With 100% served Population)	28.078	2246 GW :600 mgd SW :1646 mgd (3066 Cusec)	1685 GW :600 mgd SW :1085 mgd (2020 Cusec)	1404 GW :600 mgd SW :804 mgd (1497 Cusec)

Table No. 1: Source Person: Mr. Abdul Qadeer Khan, Director Water and Sanitation Authority, Lahore, interview held with him on 11-03-14.

Challenges regarding Supply of Clean Drinking Water in Lahore

Currently Lahore WASA is facing many challenges, the intensity of whom varies from moderate to serious. These challenges are listed as below:

Currently No Master Plan/ Depleting Water Resources

Master Plan for water supply, sewerage and storm drainage services was last prepared by M/s Camp, Dresser & Mckee (CDM) in 1975. The city has since grown many times in size and population. Previous Master Plan expired in 2000. Since that time new Master Plan is required. Fortunately this is included in the last year ADP and TORs of this Master Plan are being finalized by LDA, WASA and P&D Department, Government of the Punjab. Ground Water is the only source of water supply. Although the question regarding its quality has arisen but at the same time water table is also declining rapidly. Need of induction of surface water exists and it should be added.

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Deteriorating Ground Water Quality

Quality of ground water is deteriorating very rapidly. The following are the threats for the ground water quality:

- Arsenic content is increasing
- Polluted water is moving from the beds of River Ravi toward city

Deteriorating Water Quality in Pipelines

Water quality through pipelines is also deteriorating. The reasons are:

- Old & outlived pipes
- Major part of distribution system consists of AC pipes which have very weak tensile strength.
- Intermittent Supply
- Use of suction motors

Arising Arsenic Issue/ Non Metering

Due to over exploitation of water the clay layers are breaking, Arsenic present in the clay layers is becoming part of ground water, thus resulting the increase of Arsenic concentration in water. Currently WASA has 634,000 water connections. Out of these only 40,000 connections have working / functional meters. All the connections should be equipped with functional meters.

Insufficient & Aging Network in Central Parts of the City

Sewerage system is inadequate. Due to inadequacy of the sewerage system the open drains which were originally meant for storm water / rain-water are being used as sullage carriers (waste water carriers). Rehabilitation of Sewerage & drainage system in central areas of Lahore is required which has outlived its life. In South Lahore no trunk sewerage infrastructure exists. This requires huge investment.

Waste Water Treatment Plant

Presently the wastewater is being disposed of into water bodies without any treatment as no wastewater treatment plant exists. This is creating serious environmental problems in the city (Master Plan PC-II: 2014). The World Health Organization has provided the permissible limits for safe and clean drinking water and the same are supposed to be followed by the member countries in order to supply the safe drinking water to their citizens (law.epa.gov.tw/en/laws: 2014).

In the Socio Economic survey conducted by Japan International Corporation Agency (JICA) it was observed that any member of 74% households in the slum area, 54% in areas outside WASA and 37.2% in WASA areas suffered by water borne disease once in a year. Expenditures incurred by families' ranges from Rs.702 to Rs.871(JICA:2010).

Indicators from 2010-2013	2010	2011	2012	2013	Total Patients
TB Suspects	18854	18464	10826	27003	75147
Diarrhea/Dysentery in <5 yrs	73374	77945	86584	145717	383620
Diarrhea/Dysentery in >5 yrs	52451	54695	65799	104292	277237
Enteric/Typhoid Fever	11624	9784	9473	38384	69265
Worm infestation	18315	14807	20454	30728	84304
Suspected Malaria	11523	6987	8746	205394	47850
Suspected viral Hepatitis	3359	2100	2840	21439	29738
Scabies	83493	62349	80963	106039	332844
Total	272993	247131	285685	494196	1300005

Table No.2: Cases of Water Borne Diseases Reported in DHIS Lahore

The data of water borne diseases reveals that there is sharp increase in water borne diseases from 2010 to 2013; this situation requires that immediate steps should be taken by the concerned departments for provision of clean drinking water to the citizens of Lahore(Dr. Muhammad Nasser: 2014).

Water Supply Survey conducted in Union Council No. 200 and 201 of Lahore

A survey was conducted in order to the get the feedback of the citizens of Lahore regarding the supply of clean drinking water in Lahore. For this purpose two union councils No 200 and 201 were selected. About 400 persons provided their feedback through water Survey Performa comprising of different questions which are about the quality of supply of safe drinking water, usage of different kinds of drinking water, present condition of water supply system in this area, efforts of public representatives for provision of safe water and incidence of contaminated water with regard to water borne diseases. The people had shown their dissatisfaction over the condition of present water supply system in Lahore and the quality of clean drinking water. They have also shown their dissatisfaction over the performance of their political representatives regarding supply of clean drinking water in the city.

Projects carried out by WASA Department in Lahore

Gastro Enteritis - (Phase-I)

Existing water supply lines in some areas have reportedly outlived their useful life and deteriorated. At some places, these lines have become deeper due to the raising of road level / plinth area of houses due to which, the consumers are not getting drinking water with suitable pressure. Contamination is, therefore, being observed in different areas of the towns leading to water borne diseases. In this regard, a project costing Rs.1369.523 million was earlier undertaken by WASA Lahore during the year 2007 to replace the outlived rusted water supply lines of Lahore City and completed during the year 2011-12.

Arsenic Removal Filtration Plants - (Phase-I)

Arsenic is naturally present in Water, Earth and Air. In Aquifer under Lahore Arsenic Concentration is increasing with the over exploitation of water. Arsenic Limit in water as per WHO is 10ppb and as per India and Bangladeshi Standards is 50ppb. Arsenic investigations were carried out in Lahore by WASA in the year 2007 and afterwards. To remove the Arsenic from the ground water for the drinking purposes, the project of Filtration Plant is started (Abdul Qadeer Khan: 2014).

Water Supply Models

Karnataka Urban Water Supply & Drainage Board (India)

In order to supply the safe drinking water, in the year 1973, Karnataka Urban Water Supply & Drainage Board Act was promulgated by the Karnataka Government. Therefore, under this Act Karnataka Water Supply and Drainage Board was established. The Board is liable for 213 Urban Localities of Karnataka except the Bangalore city. The board's aim is to provide adequate and safe water supply and proper sanitation services to all urban areas as mentioned above. The Vision of Karnataka Urban Water Supply & Drainage Board (KUWSDB) is to become among the best in the Country in providing potable water and good sanitation systems. It is operating in an area of 3886 Sq. Km and serving 13.6 million population.

In 2003, none of the 5161 urban water bodies were providing water supply on 24x7 basis. Karnataka achieved these first in three cities with the help of World Bank. The 24x7 goal was achieved by 100% metering. The following other goals and benefits were also achieved:

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- i. Better quality of water for public health.
- ii. Maintaining full pressure.
- iii. Removes the risk of high contamination common during intermittent water supply.
- v. Better service to the poor.
- vi. Reduction in burden on water resources.
- vii. Water conservation encouraged through metering and price.
- viii. Improved efficiency of service.
- ix. 10% pumping hours reduced. This resulted in energy saving, less wear & tear/ less cost (wsp.org/sites/wsp.org/files/publications/WSP: 2014).

Istanbul (Turkey)

ISKI (Istanbul Su ve Kanalizasyon Idaresi), a public utility created in 1981 is responsible for Water supply and sanitation in Istanbul. The water problem of the city was solved with the reasonable investments and dynamic works within few years and determined all targets by preparing a master plan for the water supply and waste water discharging up to 2040, for which the information regarding population, water requirements, water resources, water purification, sewerage works was gathered as well as recycling potentials of treated wastewater has been organized.

Water supply is depending almost 100% on surface water. Capacity of drinking water treatment plant is 3,675,600 m³/day (809 mgd). 95% of waste water is being treated through 34 No. waste water treatment plants. Out of these 9 are pre-treatment, 19 biological, 5 advance biological and one natural waste water treatment plant.

ISKI's gained after creation

- Institutional Reforms.
- Surface water Management.
- Rainwater Harvesting.
- Surface Water Treatment.
- Disinfection of Surface Water (Ozone Units, etc).
- Conductance of Raw & Treated Drinking Water far from distance.
- Best Water Sampling Facilities (350-400 samples of water from various parts of Istanbul are taken every day and chemical and bacteriological tests are made. Compare it with WASA where 20-25 samples are taken daily) By making water treatment plants and renewing distribution network drinking water has come up to a standard above World Health Organization (WHO), European

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Community (EC), USA Environmental Protection Agency (EPA) and Turkish Standards Institution (TSE).

- Construction of Tunnels for Waste Water carrying from city to treatment plants
- Waste Water Treatment (Construction and Operation).
- Treated waste water quality is good for re-use as irrigation water in parks and gardens and agricultural lands.
- Generation of Power from Waste Water Treatment Plants.
- Generation of Bio-gas from Waste Water Treatment Plants.
- Operation of Waste Water Treatment Plants on Natural and Bio-gas (wsp.org/sites/wsp.org/files/publications/WSP: 2013).

Service Levels – Water Supply in Lahore and Istanbul (2013)(Abdul Qadeer Khan: 2014).

Description	Unit	ISKI	Lahore WASA
Topography	-	Hilly	Flat
Service Area	Sq. Km	5,461	350
Population Served	Million	13.9	8.49
Population Coverage	%	100	89
Water Production	Mgd	816	425
	Million Cubic Meter / day	2.420	1.932
Annual Water Production Capacity	Million Cubic Meter / year	1,353	705
Water Supply Per Person	Gpcd	38.32	73.63
	Lpcd	174	335
Length of Water Supply Network	Km	17,540	5,300
Source of Water	-	Surface Water	Ground Water

Table No. 3

Conclusion

The successive Governments have declared time and again to provide clean and safe drinking water to every citizen of this country being regarded as their fundamental right however, the same political slogan has been excessively abused by them during the last many years. The basic issues regarding supply of clean drinking water are low amounts of water flowing through river basins, excessive ground water pumping, weak regulation, consumer's water meters, lack of water demand management tools and highly inadequate tariffs. Therefore, there is dire need to get arsenic free drinking water. The water filtration plants are in a very poor condition, while bacterial contamination is common. The most of the present supply lines for supply of water in country are causing massive contamination of water which is playing havoc with the health of the citizens by contributing dangerous diseases including Hepatitis. The death rate has been increased due to the presence of extraordinary quantity of arsenic in ground water. Moreover, one of the dangerous issues which is confronting to citizens right is groundwater contamination and pollution. The exploding population, expanding/ unplanned urbanization, dumping of wastes, irrational policies, loose governance and lax law enforcement have polluted ground water quality and quantity very severely. To meet the challenges of supply of clean drinking water as per demand and requirements of the population, the Government must first formulate a comprehensive policy dealing with preservation, supply, demand, and contamination of water by providing effective mechanism to monitor the industrial sector, so as to compel them to treat waste water. Investment in treatment of polluted water, industrial / human waste over many years has remained at very low level which is well below that needed for sustainability of the system. As a result, the infrastructure cannot meet the standards needed to achieve in compliance with the environmental standards, service delivery and health requirements. The standards of service have declined to a point where a large proportion of the population receives water on an intermittent basis and of a quality which is not up to the standards of portability. Wastewater is discharged without treatment thus causing significant environmental risks. Therefore, with the solution of problem of provision of safe drinking water to the citizens of this country, the health, housing and other related issues should be solved. There is need of investment in improvement of water supply system by public as well as private sector on priority basis as by doing this there will be a sharp decrease in budget which is being presently allocated to health sector due to decrease in water borne diseases. In Lahore Six year Business Plan prepared by WASA, after drop of JICA loan project, may be revised and its implementation may be ensured. 100% metering at the source (tube wells) and at consumer's ends be ensured. Rain water harvesting may be explored on the periphery of the cities, in parks and Gardens.

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