WATER SUPPLY IN PAKISTAN

By

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Background

Almost every City in Pakistan has experienced a severe shortage of drinking water. The water supply is intermittent and erratic. Lack of pressure in the pipes allows contaminants to enter the pipes through any leaking points. Several cases of gastroadenitis have been reported resulting in several deaths. The water supply to each house is not metered and each consumer pays a flat charge based on the area of the plot and square footage of the house.

In order to ensure adequate supply of water almost each house constructs an underground tank and an overhead tank along with a pump and motor to transfer water from the underground tank to the overhead tank costing lakhs of rupees. The wastage of water caused by leaking faucets and water closet is about 60% - 75% . A visit to any house in Pakistan will show that almost each and every fixture is leaking.

Objective

The objective is to plan a water system, which will provide adequate pressure (40 – 75 pounds per square inch) 24 hours a day.

Work Plan

The work plan would involve the following :

1. Public Education
2. Installation of Water Meters
3. Leak Detection
4. Meter reading, Billing and Collection
5. Fiscal Planning and Operator Training

Public Education

The public is unaware of the amount of water lost by leaking faucets and closes. The public education will involve.

1. Preparation and dissemination of brochure containing information of water lost by leaking faucets.
2. Preparation public service announcements in television and newspapers.
3. Arranging of service of lectures and presentations in classrooms to educate the children.
4. Arrange for plays and dramas showing the affect of lack of clean water.

Installation of Water Meters

Most of the wells do not have a water meter to show the amount of water pumped. For greater accountability meter on the wells will be installed. There are no water meters to record water supplied to residences and businesses. Meters will be installed to record water consumption of each residence and business and will be the basis for monthly billing.

Leak Detection

The purpose of leak detection is to reduce the leakage from 60% - 70% to less than 10%. This will involve developing an inventory of the fixtures and purchasing washers and seals to repair the leak. Other steps will include hiring a plumber to detect leaks. He will inject a dye in the tank. Any dye showing up in the bottom of the water closet will indicate that the water closet is

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1. Consulting Water Supply Engineer Minneapolis U.S.A.

leaking. The plumber will fix leaking faucets and other fixtures. The plumber will charge a fee of 20 for the service.

The plumber will also check the decrease in water level in the elevated tank between 2 : 30 A.M. and 3 : 30 A.M. Excessive drop in water level show a leak in the system. The plumber will check for any water surfacing at any leaking joints.

Meter Reading Billing and Collecting
Cards will be provided to the plumber to record the meter readings from the 1st to 5th of the month. The meters will have remote reading capability so that the plumber does not have to enter the house. A bill will be generated after the data is input into the computer. A bill will be mailed by the 10th of the month and also sent electronically by email. Payment could be made over the Internet or personally. Water will be shut off for any delinquent bills over 60 days.

Fiscal Planning and Operate Training
A budget will be developed to fund operation and maintenance and any capital improvements. Water rates will be developed to found the operations of the water system including feeding of chemicals such as chlorine. The supply will be augmented by drilling new wells if necessary. One important aspects will be operator training to improve the skills of the plumber and the operator. The operator will be provided with material and instruction on repairing and operating valves, operating and calibrating chemical feeding equipment. Periodic tests will be conducted to determine operator competency and rewards. A reputable laboratory will be selected for monthly testing of water samples and results published and included with the water bills. The results will also be posted on the website.

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TABLE 1
Dripping Faucets (water wasted in 24 hours)

60 drops a minute	24 litres
90 drops a minutes	39 litres
120 drops a minute	54 litres
A pin sized stream	265 litres
A match sized stream	3,666 litres
A pencil sized stream	13,610 litres

TABLE 2
Cost Estimate (based on 500 houses development)

Water meter with remote readers 500 @ Rs. 6,000		Rs. 3,000,000
Actual Prices are :		
1. WASA	Rs. 1032	
2. SOCUM, France	Rs. 2000	
3. ZEINER, Germany	Rs. 3000	
Meter Chamber 500 @ Rs. 1,000		
Actual Prices Varies from Rs. 400 to 600		Rs. 500,000
Billing and collection computer program		Rs. 25,000
	Total capital cost	Rs. 3,525,000

O & M Costs (Annual)

Plumber Salary Rs. 10,000/mo. @ 12 months.		Rs. 120,000
Inventory parts	Lump Sum	Rs. 20,000
Computer operator – billing clerk Rs. 8,000/mo @ 12 months		Rs. 96,000
Public education Brochures	(Its OK for small Community)	Rs. 5,000
Coordinator (honorarium volunteer)	(Its OK)	Rs. 5,000
School presentation incentives	(Its OK)	Rs. 5,000
Public service announcement (TV)		Rs. 50,000
	Total Cost	Rs. 310,000

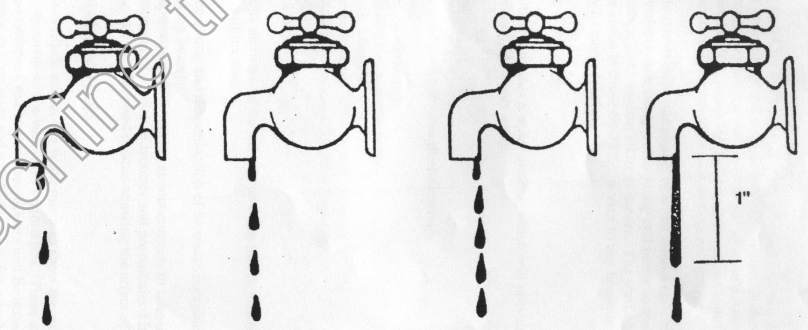
$ LEAKAGE CAN BE COSTLY $

LEAK THIS SIZE	WATER LOSS IN GALLONS Average Per Day	Average Per Month	ANNUAL LOSS IN DOLLARS @ $2.50 per 1,000 Gal. Rate
•	185	5,550	167
●	735	22,050	662
●	1,655	49,650	1,490
●	2,945	88,350	2,651
●	6,620	198,600	5,958
●	11,770	353,100	10,593
●	18,395	551,850	16,556
●	26,485	794,550	23,837
●	36,050	1,081,500	32,445
●	47,090	1,412,700	42,381

Leakage estimates based on 50psi pressure and 365 days per year

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AVERAGE LOSS OF WATER LEAKING FAUCETS OVER A PERIOD OF ONE MONTH



50 DROPS PER MINUTE	80 DROPS PER MINUTE	184 DROPS PER MINUTE	1" STREAM
86 GALLONS PER MONTH	160 GALLONS PER MONTH	302 GALLONS PER MONTH	866 GALLONS PER MONTH

SMALL, CONTINUOUS LEAKS WILL WASTE LARGE AMOUNTS OF WATER. IN ADDITION, LEAKS IN HOT-WATER LINES WILL WASTE HEAT. KEEP ALL VALVES AND FAUCETS TIGHT. WHEN A LEAK DEVELOPS, REPLACE FAUCET WASHERS. IF VALVES OR FAUCETS ARE DAMAGED, REPLACE FAUCET OR VALVE ASSEMBLY.

RURAL WATER