WATER SUPPLY MASTER PLAN

(DETERMINING BASIC HOUSEHOLD WATER CONSUMPTION PATTERN AND ESTIMATION OF PIPED WATER COVERAGE OF RAWAL TOWN)

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DEDICATION

I dedicate this thesis to my parents, my family and my teachers. Without their love, patience, understanding, and support, the completion of this

ABSTRACT

The aim of this study was to find out the per capita basic water consumption, total household water usage and piped water coverage of 46 Union Councils of Rawal Town. One hundred and thirty eight households were selected and questions were asked from each household pertaining to water usage in activities such as drinking, toilet used, bathing, teeth brushing, ablution, hand and face washing. From each UC, three houses were selected. Data was collected randomly. Data related to piped water coverage was provided by WASA. Data was processed and analyzed using Microsoft Excel 2007 and SPSS 12.

The study was carried out in summer period when the water consumption was on peak. Results of study revealed that the average per capita water consumption was 228.42 liters, while minimum and maximum per capita consumption was found to be 70.25 and 683.5 liters/capita/day respectively.

The total average values extracted from all UCs data was: drinking 3.0 l/c/d, bucket bath 61.6 l/c/d, teeth brushing 20.8 l/c/d, shaving 24.6 l/c/d, hand & face washing 23.3 l/c/d, ablution, 28.6 l/c/d, toilet used 22.1and flush tank 28.4 l/c/d.

Similarly total minimum values extracted from all UCs data was found to be: drinking 0.25 l/c/d, bucket bath 12.5 l/c/d, teeth brushing 4 l/c/d, shaving 8 l/c/d, hand & face washing 4 l/c/d, ablution, 4 l/c/d, toilet used 3 l/c/d and flush tank 28.4 l/c/d.

The results revealed that only very small fraction of water was used for drinking. Even the average value was not fulfilling the basic human right requirement. It was also observed that water used for toilet sanitation was also low in many UCs.

From the calculations of piped water coverage in 2009, it was found that WASA coverage in 2009 was less than the estimated ideal piped water coverage. By correlating the basic water consumption pattern with the piped water coverage, it was found that the UCs having more piped water coverage showed relatively high consumption pattern as compared to other UCs in which piped water coverage was low. Some other issues like leakages of main distribution pipes, illegal water connection was also observed during the study.

The government should play a positive role in this regard and should aim to provide all household with basic water requirement which is essential for maintaining human survival and health. This information could also help government in water sector's decision making.

The recommendations include: water should be treated as a basic human right, raising awareness among the people of how to use water in sustainable manner, maintenance of water supply lines, equitable supply of water, separate water supply piped network at the household level for the provision of consumption water and participatory decision making mechanism.

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CHAPTER 1

INTRODUCTION

Water, a fundamental building block of life, is essential for the survival of mankind. For the common good of all people and ecosystems on earth, water should be preserved and used sensibly. In urban areas, water resources are depleted by the excessive use of existing limited resources so, for the mega cities, efficient and equitable provision of water is becoming an increasingly complex task.

Access to adequate supplies of water and water resources is essential to sustain life; it is important for ensuring a life in human dignity. The human right to water could be defined as "The right of everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use" (UN General Comment 15, 2002). Today more than 1.2 billion people do not have access to an adequate supply of water (Human development Report, 2006).

1.1 Water Consumption

In an area, water consumption is categorized into several types of demand, including water demand for domestic, public, commercial and industrial purposes.

Categories of Water Consumption

It is useful to divide the water consumption of a city into following categories for easy understanding of water consumption.

1. **Domestic**

- **In-house** includes the water consumption for drinking, cooking, ablution, sanitation, etc.
- **Out house** includes the water consumption for garden, lawn and yard watering, etc.

2. **Trade & Industrial**

- **Industrial:** It includes the water consumed for industries, power stations, etc.
- **Commercial:** It includes water consumption for shops, offices, restaurants, hotels, stations and workshops.
- **Institutional:** It includes the water consumption for hospitals, schools, universities, government offices, etc.

3. **Agriculture:** Agricultural usage includes the water consumption for crops, livestock, horticulture, etc.

4. **Public:** Public use includes the water demand for parks, green areas, street watering, etc.

5. **Losses**

- **Distribution losses:** It includes water leakages from mains, leaks from valves, leakages and overflows from service reservoirs.
- **Consumer wastage:** It includes the unnecessary usage of water at consumers' end, leakages and wastage on consumers' premises and from their supply lines.
- **Metering and other losses:** It includes the un-recorded and un-authorized consumption of water.

1.2 Domestic Water Consumption

Domestic water consumption could be defined as "Water used for all usual domestic purposes including drinking, bathing, cooking, etc." (WHO, 1993). It is important to distinguish quantities of water required for domestic purposes, although it constitutes a very minor fraction of the total water withdrawals but it is fundamental for human health and for its survival.

The sub division of uses of domestic water is useful to understand the minimum quantities of domestic water required.

White *et al.*, (1972) recommended three types of uses of domestic water.

1 Consumption includes the water for drinking and cooking.
2 Hygiene includes the basic need of water for personal and domestic cleanliness.
3 Amenity uses of water include water for car washing, lawn watering, etc.

Consumption

Water is a basic nutrient for human body. A minimum intake of water is required by human body to sustain life. Adverse health effects could occur due to severe dehydration

which could later be fatal. According to White *et* al., 1972 and Gleick, 1996, in developing countries, a minimum of 3 liters of water per capita per day is required for adults in most of the situations.

The drinking water right could be defined as "the right of every individual to have access to the amount of water required to meet his or her basic needs. This right covers access by households to drinking water supplies managed by public or organizations" (Assaf *et al.*, 2004).

Drinking Water Requirements

The human drinking water need could not be found out exactly, because it depends on number of conditions, such as type of diet intake by individual, type and amount of physical work done and temperature of a particular area. According to various studies, the daily intake of water is 3.7 liters per day for males greater than 18 years, and 2.7 liters for females greater than 18 years, this includes water contained in food, beverages and drinking water.

For all domestic uses e.g. bathing, cooking, washing, etc. approximately 30 gallons of water per day is required by a person (1 gallon=4.5 liters) (Hafeez, 2008). According to several studies, the minimum water consumption for survival is 2.5 l/c/d. This figure is for drinking need only.

Table 1.2.1 Average Daily Water Requirement for Survival

DATA SOURCE	DAILY INTAKE (liters/capita/day)
White, et al., (1972)	1.8-3.0
US EPA (1976), NAS (1977)	2
Vinograd (1966), Roth a (1968), WHO (1971)	2.5
UBFHOA (1996)	3.15
NRC-NAS (1989)	2.0-4.5
Saunders & Warford (1976), Gleick (1996)	5

(Inocencio, A.B., Padilla, J.E., and Javier, E.P., 1999)

Hygiene

The water used for hygienic purposes exceeds consumption requirements because additional volume is required for maintaining personal hygiene through face and hand washing, bathing, teeth brushing, shaving and toilet/sanitation.

Water Requirement for Sanitation

There is a direct link between adequate provision of clean water, sanitation services and improved health. Sanitation requirement also depends upon type of technology installed in houses.

Toilet flushing per use can consume from 15 to 26 l/c/d. In studies for U.S, toilet flushing for Metro Manila is estimated to comprise the biggest percentage of actual water usage requiring about 60 l/c/d or 28 percent of daily consumption per capita. Pit latrine requires the least amount of water of one to two liter per capita per day while pour and flush toilets consume 6 to 10 l/c/d. Thus overall sanitation requirements differ by

technology and can even exceed to 75 l/c/d (Inocencio, A.B., Padilla, J.E., and Javier, E.P., 1999).

Table 1.2.2 Estimated Water Requirement for Sanitation

TYPE/SOURCE	REQUIREMENT (l/c/d)
By Technology	
Vault toilets, Pit latrine, Pour/Flush toilets/septic tank	1-7.5
Small-bore sewerage	>50
In efficient Conventional sewerage	>75
By Type & Source	
Hand Flush	
Private wells	8
Piped connection	17.5
Standpipe	2.5
Cistern Flush	
Private wells	15
Piped connection	45

Source: Gleick, 1996, Dangerfield, 1983

Bathing Requirements

Bathing is on the top of sanitation requirements. It is also considered to be the main activity contributing in major wastage of water. Water consumption varies greatly, depending on the technology used in houses and on various household activities. Developed countries generally use 27 to 99 l/c/d averaging between 60 and 70 l/c/d for bathing. According to some studies, the minimum water needed for adequate bathing is 5 to 15 l/c/d and that required for showering is 15 to 25 l/c/d (Gleick, 1996). An average American household spends about 15 to over 150 liters per capita depending on whether a regular or a navy shower or a full tub is used.

A review of studies in North America and Europe suggest average water used in industrialized nations for bathing to be about 70 per person per day with a range from 45 to 100 l/c/d (Gleick, 1996).

Table 1.2.3 Estimated Water Requirement for Bathing

LOCATION/SOURCE	REQUIREMENTS (liter/capita/day)
By Region	
Developed Countries	27-99
Developing Countries	5-25
By Source	
Private Wells	20-40
Piped Connection	44.5
Stand Pipes	17.5

Source: Gleick, 1996, Dangerfield, 1983

1.3 Per Capita Water Consumption

"Per capita domestic water consumption is the amount of water consumed per person for the purpose of ingestion, hygiene, cooking, washing of utensils and other household purposes including garden uses" (UN, 2003).

Basic Water Consumption Per Capita Per day

It is the amount of water consumed per day in basic human activities such as drinking, toilet sanitation, bathing, teeth brushing, shaving, ablution, hand and face washing.

Factors Affecting Per Capita Water Consumption

Following are the factors which could affect the per capita water consumption of a city or area:

- Size of the city
- Presence of industries
- Climatic conditions
- Habits of people and their economic conditions
- Quality of water
- Pressure in the distribution system
- Efficiency of water works and administrations
- Policy of metering and charging methods

Level of Total Consumption

The measure of total consumption is the amount of water supplied per head of population but it is usually observed that in many cases the population served is not known accurately. In large cities, there may be thousands of commuters which daily come from outside areas for many purposes like health facilities, employment, education, and other purposes. Hence, it is not possible to estimate the water consumption for each and every individual of the city. However it can be estimated through sampling for the better management of water supply.

1.4 Domestic Water Supply

Basically there are two ways through which people get water to their homes.

- Public Supply of water
- Self Supplied water

If water is delivered by a city/country/water department (or may be from a private company), then such water is called as "public supplied water", and if people supply their own water through well or ground bore then such water is called "self supplied water".

Distribution System:

The public supplied water is distributed through distribution network. The pipelines of a distribution system can be divided into three functional categories:

- **Trunk mains** convey water from the source to a service reservoir in bulk quantities.
- **Principal Feeder** conveys relatively large quantities of water from a service reservoir to the demand area.
- **Distribution main** supplies water to the consumer end. Generally it is designed to meet the hourly variations in the consumers' demand.

Domestic water demand is affected by number of factors including population, household type and size, social and demographic factors, cultural values, education level in a society, gender, economic conditions and different age groups within that society, but water and water facilities should be accessible to every person living within that area or society without any kind of discrimination.

Service Level

Service level is the standard according to which authorities supply water to the customers. It is basically the target for achievement set by the responsible authorities or some other external authorities. The levels of service related to the performance of distribution system are:

Hydraulic Performance: It defines the minimum pressure and flow domestic consumers could experience.

Continuity of supply: is measured by the duration, circumstances and duration related to interruption or deficiencies in supply.

Water quality standards: It involves the standards for the supplied water which also include that the water reaching the consumer tap should be safe and of good quality.

1.5 Situation In Pakistan

Pakistan, an arid country, is blessed with ground and surface water resources and depends heavily on moon soon rains and glacier melts, from where water flows down the rivers and then to the sea. Aquifers absorb water from the seepages into the ground and store it. Immense stress on the quantity of water resources in Pakistan has been placed by rapid population growth, urbanization, and unsustainable water consumption practices.

Pakistan Water Partnership (PWP) states that in Pakistan, the total surface water available is about 153 million acre feet (MAF) and the total ground water reserves are approximately 24 MAF. From the estimates, it was found that the population of Pakistan is going to be doubled in 2.5 decades. This means that the per capita availability of water is also going to decrease in the near future (PCRWR, 2008).

According to the Pakistan Strategic Country Environmental Assessment Report, 2006 (SCEA, 2006), per capita availability of water is decreasing at an alarming rate and it has been decreased from about 5,000 cubic meters per capita in 1951 to about 1100 cubic meters, which is just above the internationally recognized scarcity rate. The increasing gap between water supply and demand has led to severe water shortage in all sectors. As per Ministry of Environment, State of the Environment Report 2005 (Draft) (SOE 2005), in 2004 Pakistan stated a growth rate of 1.9%. The projected figures for 2010 and 2025 are 173 million and 221 million, respectively. These estimates suggest that from 2010 onwards the country will slip below the limit of 1000 cubic meters of water per capita per year. It is projected that water availability will be less than 700 cubic meters per capita by 2025 (Pak-SCEA 2006).

In 1995, Pakistan was categorized as country having the highest water potential per person out of 130 countries that should improve its water situation to overcome the current water crisis and prevent future ones, but Pakistan failed to make any improvement. In 2003, the United Nations dropped Pakistan's ranking, because it's per year total renewable water resources per capita have been estimated as 114th out of 180 countries (Rosemann, 2005). Only three percent of Pakistan's sweet water resources are used for household purposes and drinking.

Table 1.5.1 Per Capita Water Availability

Year	Population (million)	Per Capita Availability (m3)
1951	34	5300
1961	46	3950
1971	65	2700
1981	84	2100
1991	115	1600
2000	148	1200
2013	207	850
2025	267	659

Source: State of Environment Report (Draft), 2005

It is also observed that increasing imbalance between supply and demand not only results in water shortage but it is also responsible for an unhealthy competition among end users which ultimately results in environmental degradation.

With regard to availability of safe and sufficient water, Pakistan lacks reliable statistics. Fewer field studies have been carried out for the availability of water at household levels. Data about availability of water and water quality exists, but sufficient data which takes both water quantity and quality into account does not exists. In Pakistan, having access to water is not similar with having access to safe and sufficient water supply because piped water is contaminated with different types of bacteria due to leakages. The Pakistan Council for Research on Water Resources (PCRWR) estimates that almost 50 percent of urban water supply is insufficient for personal and drinking use.

1.6 Water Supply Situation in Rawalpindi

Area Specification

Rawalpindi is the head quarter of Rawalpindi district. The city district has two towns and 52 unions:

- Rawal Town
- Potohar Town

The area chosen for the research is Rawal town which has 46 union councils in it. Rawalpindi Water and Sanitation Agency (RWASA) is responsible for the provision of water supply and sanitation services. At present, the area served has a population of approximately 11,28316 inhabitants and extends over an area of 6,080 hectares. The urban population is increasing at a rate of 3.39% per anum. According to RWASA information, approximately 75% of the total population in the service area is provided with the water either by piped water connections, from stand posts or regular tanker deliveries of drinking water (Status Quo Report RAWALPINDI, 2006).

Sources Of Water In Rawal Town

Currently, RWASA sources surface water from Rawal and Khanpur reservoirs, and ground water from tube wells. The current shares of RWSA are:

- Rawal Dam→ 12 MGD
- Khanpur Dam→ 6 MGD
- Tube wells→ 24 MGD

Total WASA supply is 42 MGD. RWASA has 200 tube wells, out of which about 130 are in the service area. These tube wells are connected to around 4 stand posts each. RWASA has 11 tankers with a capacity of 1,000 gallons each. According to the Status Quo report, one tanker makes 4 trips per day, i.e. distributing 4,000 gallons or 18,000 liters per day. The consumers get an average of 10 gallons per household (Status Quo Report RAWALPINDI, 2006).

Calculation of Water Supply Coverage

According to consultant's calculation in Status Quo Report, RWASA serves approximately 65% of the population in the service area with water supply. However RWASA says that it serves approximately 75% of the inhabitants with water supply. The data provided by WASA is given below.

Table 1.6.1 Water Supply Coverage

Total population in the service area 2005:	1,050,000
Number of HH connections (end of 2005):	83,243
Average number of persons per HH:	6.64
Number of persons served with household connections:	552,734
Number of persons using a neighbor's connection (10% of HH):	55,674
Persons served with Convenient Stand post services:	52,000
4400 HH served with regular tanker service:	29,216
Total:	689,624
In percent of total population in service area	66%

(Status Quo Report RAWALPINDI, 2006)

Consumer Statistics

The connection ratio of the WASA Rawalpindi for water is relatively low. The table given below shows the total households and the households having water connections.

Table 1.6.2 Connection Ratio

	2001/02	2002/03	2003/04	2004/05
Total Households	104,642	108,231	111,943	115,783
Connected Households (Water)	74,955	77,402	79,052	86,200
Connection Ratio (Water)	72%	72%	71%	71%

Source: WASA

There are approximately 85,000 consumers including both domestic and commercial consumers. The details of consumer statistics are given below:

Table 1.6.3 Consumer Statistics

Total Billed Consumers	
Domestic	77489
Commercial	7019
Total	84508
Total Paid Consumers	
Domestic	50112
Commercial	2813
Total	52925
Un-Paid Consumers	
Domestic	27377
Commercial	4206
Total	31583

(Status Quo Report RAWALPINDI, 2006)

This data is provided by WASA, however according to Rawalpindi Environmental Improvement Project (2004); only 35% population was being served through piped water supply system. Most of the water is lost due to old deteriorated and leaked water distribution lines.

Problem Statement

The proper, satisfactory and reliable data regarding per capita water consumption in different Union Councils was totally lacking. Although some bulk meters have been installed but there was no data available about water provision and its consumption. Per capita water consumption was calculated while sitting in a room and estimating that how much water could be used by a person. No survey was made to know how much water was available and how much was demanded per day. There was no proper monitoring and maintenance of pipes. There is no hydraulic model of the network and records of pipe locations, size and condition. Authorities do not take into account public complaints regarding water shortage, inequal water pressure for different consumers, inequal water coverage for different Union Councils and deteriorated water supply even by the filtration plants.

The solutions and proper actions against these complaints could solve many problems and could bring improvement in the domestic water supply system.

Significance of Study

A consumption survey is necessary when losses appear to be large and consumers in

some areas cannot get an adequate supply of water; when metering and billing system appear to be insufficient. It has been noticed that such situations mostly occur in areas where leakages and consumer wastage are high, and records of consumption are not reliable. In such situations, the total supply seems to be adequate when expressed as per head availability of water but, this may conceal the fact that due to excessive wastage and leakages, some consumers do not get the sufficient water they need. So this research study was carried out to highlight the problem areas despite claim of WASA that sufficient water supply is ensured.

This research study was aimed to explore new information that may be added to already existing insufficient knowledge. It will provide information about average per capita water consumption in all 46 UCs of Rawal Town. It will also provide information that how much piped water coverage was available in each UC. This research work will be useful in planning, managing and evaluating water supply system. As UC wise information was gathered so it will help decision makers to easily identify the areas having low water consumption for basic activities and to identify the gaps in piped water coverage. It is also expected that this study will be helpful in recognizing the problems and in initiating appropriate actions.

Objectives

1. To find out per capita water consumption by activities based on household water usage such as drinking and hygienic requirements for Rawal town.
2. To find out UC wise average, maximum, and minimum water consumption for

each household activities.

3. To estimate the total piped water coverage in Rawal Town.
4. To work out if people of Rawal town are getting water as a basic human right.

CHAPTER 2

LITERATURE REVIEW

(Sullivan, C., 2002). Water is essential for life and an adequate water supply is pre-requisite for the human development. It has been recognized that human behavior can have impact both on water and on ecosystem. There is a need to regulate this behavior in order to sustain and stabilize our future. Global water resources are limited and only through a sustainable approach to water management, and more equitable and ecological strategies of water allocation, the international development targets for poverty reduction could be achieved. Today demand management is one of the real challenges faced by policy makers.

(Arbues, F., Garcia, M.A., Martinez, R., 2003). Water has been identified as one of the most important natural resources and somewhat different from other resources because it is important for the prosperity and wealth of a nation. Water has played a crucial role in the location, function and growth of communities. Water demand fluctuates with the weather, the day of week o the hour of the day, so a seasonal or peak price tariff may be used to promote conservation and efficiency. Peak pricing is regarded as fair, because user is responsible for capacity addition. Water price, income, and household composition are the crucial determinants of residential consumption. Conflicts over water always involve competition among alternative users and among geographical regions. Careful analysis pertaining allocation of water resources is essential.

(Rawalpindi Environment improvement Project, 2004). Unplanned urban growth has occurred in Rawalpindi, particularly in areas where basic infrastructure is available. During the past few decades the authorities have attempted to prepare a master plan of the city, the basic aim was to control and plan urban sprawl. However these could not be implemented due to ineffective control mechanism. In Rawalpindi, the traditional water sources are depleting or getting contaminated and need to be managed through better water management and water conservation strategies. The drinking water of the city is also contaminated due to leaked pipe lines and installation of tube wells along Lai Nullah.

(Hadjer, K., Klein, T., Schopp, M., 2005). Water is the originating principle of all things; everything is made out of water and to water everything returns. Water is the basis for human existence but today it is becoming scarcer. Domestic consumption of water per capita is the amount of water consumed per person for in-house and outhouse purposes. As there is a great heterogeneity of the population, there are also diverse types of access to water due to settlement patterns, ground quality and economic situation. In the urban households the dominant sources of accessible water are public wells and private wells. Despite the broad range of sources, access is problematic in dry season because some of the wells dry out.

(Rosemann, N., 2005). Access to improved drinking water supply is not only a basic need, it is also a basic human right. Improved water supply technologies includes the household connection, public stand pipe, borehole, protected dug well, protected spring, and rain water collection. Access to an improved source entails that the source is able to

area qualifies as water scarce depends on: how people needs are defined and whether the needs of the environment, the water for nature, are taken into account and fraction of the resources are available and could be made available to satisfy these needs.

(Dungumaro, E.W., 2007). In the past few decades, massive effort to increase provision of domestic water has been seen. However, water is still unavailable to many people. The availability of water varies greatly both spatially and temporary. Accessibility and affordability of domestic water and sanitation is determined by a great variety of factors including socio-economic status of households. There is a strong relationship between availability of domestic water and socio economic conditions. Economic conditions, household size are the strong indicators for domestic consumption calculations. Needs and priorities for interventions in water provision should take into account socioeconomic status of households.

(Punjab Urban water and Sanitation Policy, 2007). The Punjab's total population is 86 million, out of which 27 million people are living in the cities. Ground water is the main source of water supply which is depleting due to excessive pumping in comparison to poor recharge. Access to piped water in Punjab's cities is estimated to be only 55%. Access to piped service through direct connection to distribution network exceeds 75% in Lahore, Sialkot and Rawalpindi, but is below 30% in Gujranwala, Bahawalpur, Multan and DG Khan. Most households or industries tap ground water without any permission. In addition to ground water, Rawalpindi and town on Potohar Palteau get a large share of their supplies from surface sources or reservoir.

(Haq, I., Durez, S., 2008). Water is the source of life creation, if it is managed efficiently in a fixed time and space dimension, the water utility could be transform into a sustainable and efficient consumer's and environmental friendly entity. The success of any water business management depends on the efficient delivery of the services, qualitatively and quantitatively with highest level of customer's satisfaction. The key elements which contribute towards the efficiency of the water and sanitation services are shared vision, values and mission. Water business and management depends on an efficient, dedicated and committed hierarchy of management. The responsibility and the accountability of the management increase many times as any looseness or weakness in water service delivery is observed in a short span of time.

(Portnov a, B.A., Meir, I., 2008). Urban water consumption is always on rise in all of the countries. On the demand side, urban water consumption may be affected by several factors, including population growth rates, building patterns and the level of population welfare. If the rates of population growth differ substantially across localities, the rate of change in water consumption may also divert geographically. These rates may be higher in localities with a rapidly growing population and large number of small children than in cities and towns which grow slowly due to aging and out-migration. In domestic sector, per capita water use trend grow faster in 'thinly' consuming places than in localities having higher per capita consumption. It means that water consumption is rates also tend to converge over time.

(Schleicha, J., Hillenbranda,T., 2008). The social and economic factors affect the demand for fresh water for residential usage. Demographic changes such as shrinking

population, aging of a society and changing of life styles such as the trends towards smaller household sizes and single family housing also affect the future water demand. From an economic perspective, the household demand for water is a composite demand which further consist of direct demand for drinking purposes and indirect demand for water to different household activities such as cooking, cleaning, washing, personal hygiene and gardening.

(Wang, X., Sun b, Y., Song c, L., Mei, C., 2009). Water demand sectors include eco-environment, domestic, industry, agriculture. Generally development takes place at the expense of over exploitation of water resources. Water demand has many forecasting models which generally assume a continuation of past trends. The water demand by domestic, industrial and agriculture sector have direct affect on environment. There is a need for the resolution of water problems such as equitable allocation of resources according to the demand pattern. This then can be used for the decision making and management.

CHAPTER 3

MATERIALS AND METHODS

3.1 Study Area

For *"Water Supply Master Plan (Determining Basic Household Water Consumption Pattern and Estimation of Piped Water Coverage of Rawal Town)"* 138 households were selected. In Rawalpindi city, Rawal town was chosen as a research area because most of the urban population lives here. According to 1998 Census the estimated population of this area was approximately 781,927 while total housing units were 115,748.

3.2 Strategy Used For Sampling

Random sampling based on statistical criteria was used for data collection. Following figures were taken for calculating the sample size based on statistical criteria.

P = 90% - 10% = 0.1
A = 5% = 0.05
Z = 1.96 for 95%
R = 100%

Where
P →Variance,
A → desired precision,
Z →confidence level, and
R →response Level
N→ Population of Rawal Town

Using standard formula

$$n = \frac{\left(\frac{P[1-P]}{\frac{A^2}{Z^2} + \frac{P[1-P]}{N}} \right)}{R}$$

(Blalock, Hurbert M., 1972)

The required sample size comes out through this formula was 138. To find out no of houses to be surveyed in each UC, the sample size was divided by total no of UC.

= 138 / 46 = 3

Three houses were surveyed in each UC. The number of possible convenient starting points was selected and the houses were interviewed randomly. This method was easy because no household was pre-selected for sampling but finding UCs in highly urbanized area was difficult and time taken task. Rawalpindi map was collected through WASA to separate Rawal Town area from cantonment board area and to identify different areas covered in one UC.

3.3 Data Collection

Primary data for Rawalpindi city was collected from Census Department by interviewing the statistical officer. The data was collected in the form of booklet. The specific data related to Rawal Town was then extracted from it. Data for year 2009 regarding piped water coverage data was collected from Water and Sanitation Agency Rawalpindi which was then used for the estimation of 2009 piped water coverage.

3.4 Questionnaire

A semi-structured questionnaire was designed to collect the data regarding per capita daily water usage at household level. The following variables were included in the questionnaire

- No of water glasses consumed per day.
- Frequency of toilet use.
- Bathing strategy (Bucket or shower bath).
- If bucket bath then no of buckets consumed in one bath.
- If shower bath then total time consumed in one bath.
- Frequency of hand and face washing.
- Frequency of ablution

Questions about different utensils such as glass, bucket, ewer, flush tank, shower, and internal plumbing size were asked for calculating the domestic water consumption. Through shower size and internal plumbing size, flow per minute was determined and water was calculated by multiplying it with time consumed. Market survey was also conducted for water apprentices used in Rawalpindi. Observations are given below:

3.5 Market Survey for Water Apprentices Used In Rawal Town

1. **Bucket:** Average size of buckets available in market was 30 liters with lid and 25 liters without lid.

2. **Ewer:** Average size of Ewer available in market was 3 liters

3. **Cup/Bowl:** Average size of cup was 1.5 liters.

4. **Flush Tanks:** Western flush tank stored up to 13 liters of water. Eastern flush tank stored up to 15 liters of water

5. **Taps:**

a) **Brass**

Inlet	Outlet
1.45 cm	1.35 cm

b) **Stainless Steel**

Inlet	Outlet
1.45 cm or 1.45 * 0.39 = 0.5 inch	1.45 cm =0.5 inch (20 to 30% area reduced with mesh)

6. **Bathing Shower:**

Inlet	Outlet
1.45 cm=0.5 inch	7.56 cm =2.94 inch with 50 pores average

7. **Muslim Shower:**

Inlet	Outlet
1.45 cm	3.45 cm with 70 pores average

3.6 Observations:

Some of the information was collected on the basis of personal observation particularly for internal plumbing size and shower head size. Some of the house members had no idea about the sizes of their apprentices, so in this case market survey

data was used. Averages were taken for washbasin tap flow/min and shower flow/min and then it was applied to whole data for analysis.

AREAS NAME	Internal Plumbing Size	Liters/Min	Shower Head Size	Liters/min
Fauji Colony, peerwadhai	0.5	3.5	3	6
Zia-ul-Haq Colony	0.5	3.75	2.5	6.5
Alim abad, Dhok Hassu	1	4	3.5	5.5
Mazhar Abad Hazara Colony	0.75	3.5	2.75	6
Dhok Najju	1	4	3.2	7
Dhok Mangtal	0.75	3	2.5	6
AmarPura	2	6	4	8
Khurram Colony	1.5	5	3.5	7.5
New Katarian	1	4	2.5	6.5
Mohalla Muslim abad	1	4	2	6
AVG	1	4.075	2.945	6.5

3.7 Method Used For Calculating Per Capita Basic Water Consumption

Bucket size = 20 liters

Flush tank size = 13 liters

Bucket bowl size = 1 liter

Ewer Size = 2.5 liter

Drinking glass size = 0.25 liter

Hand Shower for bath = 6 liters in 1 minute

Internal plumbing pipe size = 1 inch

Tap Flow/min = 4.11 liters

TH-8901

Data Collected for a single female on Sunday (for whole day)

- **Water drunk** = 9 glasses= **2.25 liters**
- **Toilet used in a day:** 7 times

Water used in toilet in liters for each time= 2.5 + 7.5 + 2.5 + 2.5 + 2.5 + 2.5 + 2.5

Total water used in a toilet = **22.5 liters**

- **Flush Tank used in a day**: 2 times

Total water flushed = **26 liters**

- **No of times hand washing was done in a day:** 8 times

Water used for hand washing in liters in a day for each time = 0.5 + 1 + 1 + 1 + 0.5 + 1.5 + 2 + 1

Total water used for hand washing = **8.5 liters**

- **No of times teeth brushing was done**= 1 time

Water used for teeth brushing = **2 liters**

- **No of times face washing was done**: 3 times

Water used for face washing = 5 + 5 + 6 = **16 liters**

- **No of times bath was taken in a day**=1 time

No of buckets used = 3

Water used for bath = 20 + 20 + 20 = **60 liters**

- **No of times ablution was done:** 4 times

Water used for ablution = 5.5 + 5 + 3.5 + 6 = **20 liters**

Per Capita water consumption in a day = 2.25 + 22.5 + 26 + 8.5 + 2 + 16 + 60 + 20 = **157.25 liters**

3.8 Data Processing and Analysis

MS Word 2007, MS Excel 2007, Smardraw and SPSS 12 were used for the organization and processing of data. All the information gathered was tabulated as per the nature of data. Smardraw was used for designing a questionnaire.

For data organization, its tabulations, analysis, chart and graph generation, MS Excel 2007 was used. SPSS 12 was used for further analysis and testing of obtained results.

CHAPTER 4

RESULTS AND DISCUSSIONS

This chapter describes the overall results extracted from the collected data. The results shown below describe the estimated population and housing units of Rawal Town in year 2009, Per capita basic water consumption pattern in different UCs, the per capita water consumption trend among males and females calculated by statistical analysis, average water consumption pattern for different basic household purposes such as drinking, toilet use, shower bath, bucket bath, teeth brushing, hand & face washing, shaving and ablution in 46 UCs of Rawal Town, minimum and maximum basic water consumption trends among households and their total water consumption pattern in 46 UCs, estimation of piped water coverage for Rawal town in year 2009, comparison of WASA piped water coverage in year 2009 with piped water coverage in year 1998 and estimated required ideal piped water coverage for year 2009, percentage improvement required in WASA coverage, statistical analysis for finding the correlation between WASA coverage and average per capita consumption.

4.1 Estimated Population and Housing Units of Rawal Town in year 2009

Table 4.1.1 Estimated Population and Housing Units of Rawal Town in year 2009

UCs	1998 POPULATION	1998 Total Housing Units	2009 ESTIMATED POPULATION	Total Houses 2009
RATTA AMRAL UC NO.01	18445	2799	26616	3123
DHOK RATTA UC NO.02	18277	2666	26374	2974

HAZARA COLONY UC NO.03	13959	1780	20143	1986
DHOK MANGTAL UC NO.04	20128	2834	29045	3162
DHOK HASSU (NORTH) UC NO.05	13000	1803	18759	2012
DHOK HASSU (SOUTH) UC NO.06	12643	1924	18244	2147
PIRWADHAI UC NO.07	17294	2473	24955	2759
FAUJI COLONY UC NO.08	18155	2326	26198	2595
BANGISH COLONY UC NO.09	18880	2803	27244	3127
KHYBAN SIR SYED(NORTH)UC N0.10	14456	2100	20860	2343
KHYBAN SIR SYED(SOUTH)UC NO.11	15962	2294	23033	2559
DHOK NAJJU UC NO.12	17814	2607	25705	2909
NEW KATARIAN UC NO.13	16929	2597	24428	2897
F-BLOCK (ST.TOWN) NO.14	15677	2255	22622	2516
SAIDPUR SCHEME UC NO.15	16635	2545	24004	2839
MOHALLA EIDGAH UC NO.16	14557	2070	21006	2309
DHOK BABU IRFAN UC NO.17	19261	3041	27793	3393
PINDORA UC NO.18	18482	2817	26669	3143
SATELLITE TOWN UC NO.19	18242	2861	26323	3192
ASGHAR MALL SCHEME UC NO.20	19681	3135	28400	3498
DHOK KALA KHAN UC NO.21	16530	2620	23853	2923
QAYYUMABAD UC NO.22	16318	2474	23547	5768
DHOK KASHMIRIAN UC NO.23	17193	2768	24809	3088
DHOK ALI AKBAR UC NO.24	16398	2319	23662	2587
SADIQABAD UC NO.25	16931	2750	24431	3068
AFANDI COLONY UC NO.26	14964	2261	21593	2523
MUSLIM TOWN (EAST) UC NO.27	14597	2194	21063	2448
MUSLIM TOWN (WEST) UC NO.28	17993	2804	25964	3128
KHURRAM COLONY UC NO.29	17185	2628	24798	4046
CHAH SULTAN UC NO.30	19320	2842	27879	3171
DHOK HUKAM DAD UC NO.31	19615	2924	28304	3262
AMAR PURA UC NO.32	18285	2841	26385	3170
KARTAR PURA UC NO.33	15961	2352	23032	2624
BANNI UC NO.34	16152	2399	23307	2676
MOHALLA IMAMBARA UC NO.35	16988	2373	24514	2647
MOHANPURA UC NO.36	17579	2500	25366	2789
DHOK DADAL UC NO.37	15383	2172	22198	2423
GANJ MANDI UC NO.38	16119	2232	23260	2490
WARIS KHAN UC NO.39	14184	2060	20467	2298
PURANA QILLA UC NO.40	14440	2048	20837	2285
SHAH CHAN CHARAGH UC NO.41	13835	1846	19964	2060
MILLAT COLONY UC NO.42	17437	2622	25161	2925
DHOK KHABBA UC NO.43	17914	2713	25850	3027
DHOK FARMAN ALI UC NO.44	20836	3086	30066	3443
CHAMANZAR COLONY UC NO.45	22041	3280	31805	3659
CITY UC NO.46	19252	2910	27780	3247
Total	781927	115748	1128316	133258

Table 4.1.1 shows the names, population and housing units according to census report of year 1998 and projections for year 2009 for 46 Union Councils of Rawal Town. The population in year 2009 was estimated by applying formula F=1998 population*(1+i) ^n. Where F= future population, i= annual growth rate and n= designed period in years.

According to census report of year 1998, the annual growth rate for urban population was 3.39% per anum. Similarly the housing units were estimated by applying the same formula but instead of 3.39%, 1% growth rate was applied for it. This table shows that in year 1998 the population was 78,1927 but in year 2009 it increased to 112,8316 inhabitants, similarly the housing units were 115,748 in 1998 and in 2009 they became 133,258. One of the factors behind this was the migration of people from adjacent localities for various purposes like employment, health facilities, education, etc.

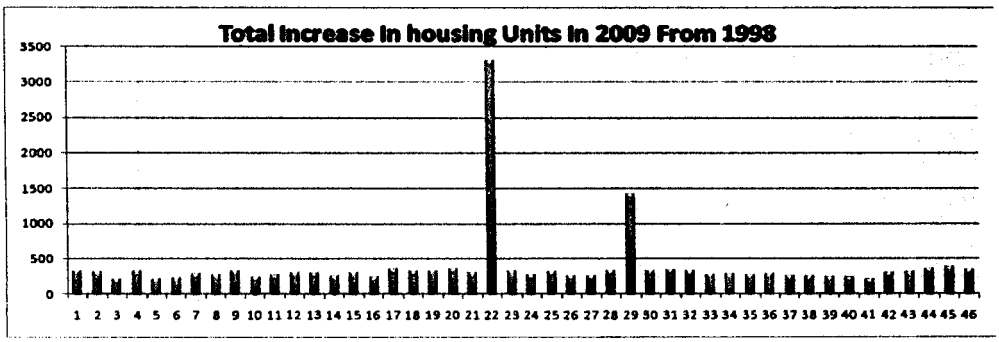

Figure 4.1.1 Total Increase in housing units in 2009 as compared with 1998

Figure 4.1.1 shows the total increase in housing units in year 2009 as compared with housing units in year 1998. This figure shows that the data estimated for year 2009 for all 46 UCs showed approximately 11.57% increase in total housing units except for two UCs. Data for UC 22 (Qayyumabad) showed 133.16 % increase in its housing units while 53.95 % increase was observed for UC 29 (Khurram Colony). Most of the houses were constructed in these two UCs during past 11 years because all other UCs were already occupied and could not afford further construction of houses.

4.2 Per capita basic water consumption in each UC

Table 4.2.1 Per capita basic water consumption

UC	Ucs AREA's Name	Name	person no	Sex	Drinking	Toilet Used	Flush Tank	Shower Bath	Bucket Bath	Teeth Brushing	Shaving	Hand& Face Washing	Ablution	Per Capita Consumption
1	Rata Amral	Amir	1	M	3.75	60	30	65		8		40	40	246.75
			2	M	3.75	60	15	65		8		40	40	231.75
			3	M	3.75	60	30	65		8		40	40	246.75
			4	M	3.75	48	30	65		8		40	40	234.75
			5	F	3.75	60	30	97.5		8		40	100	339.25
			6	F	3.75	48	30	97.5		8		40	100	327.25
			7	C	1.75	18	15	32.5		8		40	0	115.25
			8	C	1.75	12	15	32.5		8		40	0	109.25
1	Rata Amral	M. Ajmal Butt	1	M	2.25	18	15	65		8		40	40	188.25
1	Rata Amral	Abdul Khaliq	1	M	2.5	6	15	65		20	20	20	40	188.5
2	Milad Nagar, Dhok Ratta	Naveed	1	M	3	12	30		25	8	0	40	32	150
2	Milad Nagar, Dhok Ratta	Nasir Abbas	1	M	3.75	3	15		50	8	0	16	20	115.75
2	Milad Nagar, Dhok Ratta	Javed Iqbal	1	M	3.25	6	15		50	8	0	32	32	146.25
3	Mazhar Abad Hazara Colony	Rafi ullah	1	M	2.5	6	30	97.5		80	20	24	200	460
			2	F	2.5	6	30	195		80	0	32	100	445.5
3	Mazhar Abad Hazara Colony	MALIK MUBIN	1	M	2.5	9	30	130		20	20	16	16	243.5
			2	M	4.25	9	30	130		20	20	16	12	241.25
			3	F	3.75	6	15	195		20	0	24	12	275.75
			4	F	4	3	15	195		60	0	16	0	293
3	Mazhar Abad Hazara Colony	SHAIKH ADNAN	1	M	2.25	6	30	195		40	40	24	8	345.25
			2	F	3.75	9	30	65		40	0	16	32	195.75
4	Dhok Mangtal	Muhammad Nawaz	1	M	2.5	3	15	65		20	0	4	4	113.5
4	Dhok Mangtal	Mubasher Hassan	1	M	2	6	30		25	8	0	12	24	107
4	Dhok Mangtal	Hamid Hussain	1	M	2.5	6	15	97.5		80	20	24	200	445
			2	F	2.5	6	15	195		80	0	32	100	430.5
5	Alim abad, Dhok Hassu	M nasir Fayaz	1	M	3.25	6	15	130		16	20	32	12	234.25
			2	F	4.25	3	15	195		24	0	40	16	297.25
5	Alim abad, Dhok Hassu	malik nadeem	1	M	2.5	3	15	65		20	0	4	4	113.5
5	Alim abad, Dhok Hassu	Maqbool shah	1	M	2	6	15		25	8	0	12	24	92
6	Alim abad, Dhok Hassu	Nadeem shahzad	1	M	3	3	15		100	16	0	4	40	181
6	Alim abad, Dhok Hassu	zahid Mehmood	1	M	0.75	3	15		100	4	0	16	8	146.75
6	Alim abad, Dhok Hassu	fazal ur Rehman	1	M	1.5	6	15	130		24	0	40	20	236.5
7	Mohalla Muslim abad	Maqbool Ahmed	1	M	2	6	13	130		20	20	24	16	231
			2	M	3.25	3	13	65		20	20	16	28	168.25
			3	F	2.5	6	13		50	20	0	32	0	123.5
7	Mohalla Muslim abad	ARSLAM RASOOL	1	M	2.25	3	13		25	40	20	32	20	155.25
			2	F	3.5	3	13		50	60	0	48	12	189.5
7	Mohalla Muslim abad	ZULFIKAR ALI	1	M	2	6	13		120	20	20	12	12	205
			2	M	5	6	26		120	60	20	12	4	253
			3	M	4.25	3	13		60	20	0	24	8	132.25
			4	F	2.25	12	26		60	40	0	36	16	192.25
			5	F	2.5	12	26		120	40	0	12	4	216.5
8	Fauji Colony, peerwadhai	Nazeer Khan	1	M	2.5	6	13	65		16	8	8	8	126.5
			2	F	2.5	3	13	65		24	0	16	0	123.5
8	Fauji Colony, peerwadhai	Masood Akhtar	1	M	3	6	26		50	40	40	80	60	305
			2	F	2.25	6	26		50	60	0	60	60	264.25
			3	F	2.5	3	13		50	20	0	20	60	168.5
			4	F	2.5	9	26		50	60	0	40	0	187.5
8	Fauji Colony, peerwadhai	Hafeez ur Rehman	2	F	2.5	3	13		60	60	0	40	12	190.5
			3	F	3	3	13		30	20	0	8	0	77
9	Zia-ul-Haq Colony	Atta Hussain	1	M	1.25	9	30	32.5		16	8	16	40	152.75
9	Zia-ul-Haq Colony	Ehsaanullah	1	M	3.25	9	26	130		20	20	32	12	252.25
			2	F	2.75	3	13	130		20	0	8	4	180.75
			3	F	3.5	9	26	520		40	0	24	8	630.5
			4	F	1.5	9	26	260		40	0	8	4	348.5
9	Zia-ul-Haq Colony	Kaleem Aslam	1	M	2	3	15	97.5		8	0	24	100	249.5
10	Khayaban-e-sirsyed (North)	ali amir javeed	1	M	3.75	3	15	65		8	0	8	60	162.75
10	Khayaban-e-sirsyed (North)	kamran sahab	1	M	3.75	3	15	195		8	0	24	0	248.75
10	Khayaban-e-sirsyed (North)	ali amir javeed	1	M	5	3	15	97.5		8	0	8	24	160.5

11	Khayaban-e-sirsyed (South)	Mehboob Ali Khan	1	M	3.75	3	15	130		8	0	16	36	211.75
11	Khayaban-e-sirsyed (South)	yusaf sahab	1	M	2.5	3	15		30	8	20	4	0	82.5
11	Khayaban-e-sirsyed (South)	aayaz mehmod	1	M	3.75	6	30	65		8	0	20	40	172.75
12	Dhok Najju	RIAZ AKHTAR	1	M	2.5	9	30		120	4	20	20	20	225.5
			2	M	2.5	6	15		90	4	20	16	20	173.5
			3	F	1.5	6	15		60	4	0	12	20	118.5
			4	F	2.75	6	15		90	4	0	16	20	153.75
12	Dhok Najju	SOHAIL ABBAS	1	M	2.5	6	13	65		8	8	16	20	138.5
			2	F	2	6	13	32.5		8	0	12	20	93.5
12	Dhok Najju	SHEKH SHEHZAD	1	M	2.5	6	30	65		12	12	8	20	155.5
			2	F	1	6	30	65		12	0	8	20	142
13	New Katarian	Haris	1	M	2.5	15	75	78		8	0	36	0	214.5
			2	M	1.5	12	60	97.5		8	0	48	0	227
13	New Katarian	MALIK SHAHBAZ	1	M	2.5	12	30	65		20	0	40	0	169.5
			2	F	5	6	30	65		16	0	8	0	130
			3	F	3.25	6	30	65		12	0	24	0	140.25
13	New Katarian	NOOR AHMED	1	M	3.75	12	30	195		16	0	24	0	280.75
			2	F	2.5	12	30	195		8	0	36	0	283.5
			3	C	2.75	12	30	130		24	0	64	0	262.75
14	F-Block satellite Town	shahid	1	M	2.25	3	15	130		8	20	8	20	206.25
			2	F	2	6	30	130		8	0	12	20	208
14	F-Block satellite Town	Mh.nazir	1	M	5	18	30	162.5		8	20	12	20	275.5
			2	F	4	18	45	162.5		8	0	16	20	273.5
14	F-Block satellite Town	shafqat Rashool	1	M	4	6	30	195		8	12	16	20	291
			2	F	3.25	9	45	195		8	0	12	20	292.25
15	Saidpur Scheme	Amir Butt	1	F	1.25	12	52	97.5		8	0	40	0	210.75
			2	M	1.75	9	39	130		20	0	28	0	227.75
			3	M	2	18	39	78		20	0	64	0	221
			4	F	2.25	12	39	130		20	0	16	0	219.25
			5	M	1	9	39	45.5		20	0	24	0	138.5
15	Saidpur Scheme	Amir Bashir	1	M	1.5	12	30	32.5		8	0	16	0	100
			2	M	2	12	30	78		8	0	40	0	170
			3	M	1.5	12	30	156		8	0	8	0	215.5
			4	F	2.25	18	45	130		8	0	24	0	227.25
15	Saidpur Scheme	ali raza	1	M	2.5	12	39		180	24	0	8	0	265.5
			2	M	3.75	6	26		60	24	0	4	0	123.75
			3	M	5.75	6	26		30	12	0	8	0	87.75
			4	M	3.75	15	65		120	20	0	20	0	243.75
			5	F	5.75	12	52		30	20	0	16	0	135.75
			6	F	5.5	9	39		30	20	0	20	0	123.5
			7	F	4	6	26		60	8	0	8	0	112
			8	F	6	15	65		60	8	0	12	0	166
16	Mohalla Eidgah	Hafeez Ahmed	1	M	1.25	36	30	65		24	0	16	0	172.25
			2	F	1.25	36	45	130		28	0	20	0	260.25
			3	C	3.75	12	15	52		28	0	48	0	158.75
16	Mohalla Eidgah	Maqbool hussain	1	M	2.5	75	30	130		20	0	24	0	281.5
			2	F	2.5	75	15	78		20	0	28	0	218.5
			3	M	2	75	30	97.5		20	0	40	0	264.5
16	Mohalla Eidgah	M. Waqas Anwar	1	M	4.25	12	30		50	40	0	32	12	180.25
			2	F	4	24	45		75	67.5	0	72	13.5	301
			3	F	4	24	45		75	45	0	45	13.5	251.5
17	Dhok Babu Irfan	Najam al hassan	1	M	4	18	30		30	40	60	24	100	306
			2	M	3.75	45	15		30	24	80	16	100	313.75
			3	M	3.75	18	15		30	32	0	24	0	122.75
			4	M	2.25	27	30		30	24	0	60	0	173.25
			5	F	3.25	45	30		30	12	0	60	100	280.25
			6	F	3.75	27	45		30	20	0	24	100	249.75
			7	F	2	36	15		30	24	0	48	0	155
17	Dhok Babu Irfan	Shoaib	1	M	3.5	36	26	78		40	80	24	100	387.5
			2	M	4	27	26	97.5		40	0	24	100	318.5
			3	M	4	27	13	65		60	0	24	0	193
			4	F	3.5	48	39	65		24	0	24	0	203.5
			5	F	2.5	36	26	65		24	0	32	100	285.5
			6	F	2.5	36	26	65		32	0	32	0	193.5

17	Dhok Babu Irfan	Saeed	1	M	3.5	36	26	65		36	60	24	100	350.5
			2	M	3.25	45	26	65		24	0	16	100	279.25
			3	M	2.5	60	26	65		32	0	16	0	201.5
			4	M	2.5	48	39	65		40	0	24	0	218.5
			5	F	2.5	45	26	65		60	0	32	0	230.5
			6	F	3.75	48	26	65		60	0	32	100	334.75
18	New Malpur Colony Pindora	Imran S. Khan	1	M	4.5	18	13			16	12	32	36	131.5
			2	F	3.75	18	13		50	24	0	24	0	132.75
			3	F	4.25	12	13		25	16	0	24	32	126.25
18	New Malpur Colony Pindora	Rizwan	1	M	3	6	26	195		16	20	12	100	378
			2	F	2	3	26	260		16	0	12	100	419
			3	F	1.5	6	13	195		24	0	12	100	351.5
			4	F	1.25	6	13	325		16	0	12	100	473.25
			5	C	2.5	3	13	195		16	0	12	100	341.5
18	New Malpur Colony Pindora	Ab. Hameed	1	M	3	9	15		120	8	12	20	48	235
			2	F	2.5	9	15		90	4	0	32	80	232.5
			3	M	2.5	9	15		120	8	12	24	48	238.5
			4	M	2.5	9	15		270	8	20	40	80	444.5
			5	F	2.5	9	15		90	8	0	32	80	236.5
19	Mohalla Shareefabad	KHURAM JAVEED	1	F	10	6	30		120	16	0	32	24	238
			2	M	5	6	30		120	16	12	24	8	221
19	Mohalla Shareefabad	A MUHAMMAD YO	1	M	3.75	72	45	104	50	40	0	80	100	494.75
			2	M	2.5	36	45	117	25	120	0	100	100	545.5
			3	F	2	60	60	65	50	40	0	80	100	457
			4	M	1.5	36	30	156		180	120	120	40	683.5
19	Mohalla Shareefabad	KHALIDA	1	F	2	75	75	130	50	4	0	8	160	504
			2	M	2.5	48	60	65	25	4	8	12	12	236.5
20	Asghar mall Scheme	Mr. M. Basharat	1	M	1.5	24	52	65	225	24	40	80	80	591.5
			2	M	1.25	12	52	156	150	24	0	80	80	555.25
			3	F	1.5	48	52	65	150	16	0	48	100	480.5
			4	F	1.75	24	52	234	150	24	0	96	80	661.75
			5	F	1.5	9	39	104	225	16	0	96	100	590.5
20	Asghar mall Scheme	Iram Kalim Sheheryar	1	M	3.75	15	13	65		60	20	72	100	348.75
			2	M	3.75	24	13	65		60	20	72	60	317.75
			3	M	3.75	9	13	65		60	20	72	60	302.75
			4	F	1.5	45	13	65		60	0	72	60	316.5
			5	F	3	27	13	65		60	0	72	100	340
			6	F	3.75	18	13	65		60	0	72	40	271.75
			7	M	3.25	24	13	65		40	0	48	60	253.25
20	Asghar mall Scheme	Dr. Minhas	1	M	4.25	6	15	130		8	8	12	12	195.25
			2	F	3.25	12	15	130		12	0	8	12	192.25
21	Dhok Kala Khan	saleem aqbal	1	M	3.75	12	30	156		4	20	12	12	249.75
			2	M	2.75	6	15	130		4	0	12	12	181.75
21	Dhok Kala Khan	chuhdray jaweed	1	M	2.25	30	26	65		4	0	12	0	139.25
			2	M	3.25	12	13	195		4	0	16	0	243.25
			3	F	3.5	45	26	130		4	0	16	0	224.5
21	Dhok Kala Khan	yousaf masih	1	M	2	45	52	130		8	0	8	0	245
			2	M	2.5	9	26	97.5		8	0	12	0	155
			3	M	2.5	18	26	65		8	0	4	0	123.5
			4	M	2.5	9	26	130		16	0	4	0	187.5
			5	F	1.25	60	39	65		16	0	48	0	229.25
			6	F	1.75	15	52	97.5		16	0	28	0	210.25
22	Qayyumabad	Chaoudhry Meharban	1	M	3.5	24	30	130		4	0	12	8	211.5
22	Qayyumabad	Abdul ghafoor	1	M	2.5	6	15		25	8	0	8	12	76.5
			2	F	1.75	18	30		50	16	0	16	12	143.75
22	Qayyumabad	ALI SHEER	1	M	2.5	30	30		50	16	12	12	0	152.5
			2	F	4	9	15		37.5	16	0	16	8	105.5
23	Dhok Kashmirian	Mrs Muhammad salee	1	M	3.75	12	15	130		16	0	8	0	184.75
			2	F	2.5	12	15	195		16	0	32	0	272.5
			3	C	2.75	12	15	130		16	0	32	0	207.75

23	Dhok Kashmirian	Mrs Muneer	1	F	3	75	15	130		40	0	40	0	303
			2	M	2.5	75	15	130		40	0	12	0	274.5
23	Dhok Kashmirian	M-Naqeeb Abbasi	1	M	3.75	12	30		120	8	20	20	36	249.75
			2	F	3.75	12	30		120	4	0	8	80	257.75
			3	C	2.5	9	15		180	8	0	36	60	310.5
			4	C	1.25	9	15		180	20	0	64	0	289.25
24	Khana Kak,Dhok Ali Akbar	M Irfan	1	M	2.5	6	15	32.5		16	0	40	100	212
			2	M	1.5	12	15	32.5		16	0	16	100	193
			3	M	2.25	6	15	32.5		16	0	16	100	187.75
			1	M	2	12	15	32.5		16	0	8	100	185.5
24	Khana Kak,Dhok Ali Akbar	Danish Iqbal	2	M	2	9	15		30	12	0	8	40	116
			3	M	2	12	30		30	12	0	4	40	130
			4	F	2	9	15		30	12	0	4	60	132
			5	F	2	6	15		30	12	0	24	80	169
			6	F	2	3	15		30	16	0	24	60	150
			7	C	2	6	15		30	16	0	24	40	133
			8	C	2	36	45		30	16	0	16	60	205
			9	C	2	6	30		30	20	0	16	60	164
			10	C	2	9	15		30	12	0	16	60	144
			11	C	2	6	15		30	8	0	4	80	145
24	Khana Kak,Dhok Ali Akbar	HAROON AHMED	1	F	3.75	6	15		120	8	0	12	12	176.75
25	Sadiqabad	Syed Qasim Ali	1	M	7.5	48	30	65		20	60	16	40	286.5
			2	M	3	36	30	65		24	60	16	36	270
			3	F	5	60	15	130		24	0	12	40	286
			4	F	3.75	27	45	65		24	0	16	40	220.75
			5	F	3.75	36	30	65		32	0	12	40	218.75
25	Sadiqabad	Asim Khan	1	M	5	192	30		120	40	0	32	36	455
25	Sadiqabad	Abdurehman	1	F	2.5	9	26		25	8	0	24	40	134.5
			2	F	2.5	12	26		25	8	0	24	40	137.5
			3	F	3.75	6	13		25	16	0	24	40	127.75
			4	M	5	6	13		25	8	0	8	40	105
			5	M	6	6	26		25	8	0	8	40	119
			6	M	2.5	6	13		25	8	0	8	32	94.5
			7	M	1.75	3	13		25	8	0	8	32	90.75
26	Afandi Colony	M. Nauman	1	M	4	6	15	97.5		40	20	24	4	210.5
			2	M	3.5	6	30	195		20	20	8	8	290.5
			3	F	4	6	15	260		60	0	32	4	381
			4	F	3.5	9	15	520		40	0	24	16	627.5
26	Afandi Colony	M. Umer Asghar	1	M	3.25	3	13	130		20	20	60	4	253.25
			2	M	2.5	6	13	195		20	20	40	12	308.5
			3	F	2.5	9	13	292.5		60	0	120	12	509
26	Afandi Colony	Khuwaja Younis	1	M	3.25	6	30	65		20	0	24	20	168.25
			2	M	2.25	6	15	130		40	20	40	8	261.25
			3	F	2.5	3	15	195		60	0	40	4	319.5
27	Muslim Town (East)	Tariq M Meer	1	M	2.5	45	30	130		40	0	16	0	263.5
			2	F	3.75	30	15	130		20	0	32	0	230.75
27	Muslim Town (East)	Ameer asim	1	M	2.5	6	15	130		20	0	8	0	181.5
27	Muslim Town (East)	Nadar Khan	2	F	3.75	12	30		50	16	0	16	36	163.75
			3	C	2.5	9	15		50	16	0	60	48	200.5
28	Muslim Town (West)	M Saddiq	1	M	2.5	9	45	65		40	40	32	24	257.5
			2	F	3.75	12	45	65		60	0	24	16	225.75
			3	F	4	9	45	130		40	0	24	32	284
			4	F	5	3	15	65		20	0	32	16	156
28	Muslim Town (West)	Zafar Iqbal	1	M	2.5	12	30	32.5		8	20	16	16	137
			2	M	3.75	6	15	65		8	0	16	12	125.75
			3	F	4.25	12	30	65		8	0	8	16	143.25
28	Muslim Town (West)	Saleem	1	M	4.25	6	30		50	40	0	40	12	182.25
			2	F	4	12	30		75	60	0	32	12	225
			3	F	4	12	30		75	40	0	40	12	213

34	Banni	ali ahmad	1	M	3.75	9	39		150	40	0	24	0	265.75
			2	F	5	6	13		50	40	0	24	0	138
34	Banni	malik muhammad ayub	1	M	5	15	65		150	20	0	24	0	279
34	Banni	muhammad rafiquee	1	M	5	15	65		100	20	0	16	0	221
			2	F	6	9	26		150	20	0	24	0	235
35	Mohalla Imam bargah	AZIZ NASEEM ULL	1	M	3.75	9	39	195		40	0	16	0	302.75
35	Mohalla Imam bargah	AURANGZAIB	1	M	4.25	12	52	260		40	0	8	0	376.25
35	Mohalla Imam bargah	M.hussain	1	M	5	6	26		150	40	0	8	0	235
36	Mohan pura	Hamid Haseeb	1	M	2.5	15	65		25	28	0	24	0	159.5
36	Mohan pura	Sheikh khalid	1	M	2.25	6	30	195		40	40	32	8	353.25
			2	F	3.75	9	45	65		40	0	32	32	226.75
36	Mohan pura	Raja Amjad	1	M	2.5	3	15	195		8	0	12	24	259.5
					0	0	0			0	0	0	0	
37	Dhok Dadal	Nazir ahamed	1	M	3.75	12	15	65		12	40	8	100	255.75
			2	M	3.25	6	30	65		12	0	8	100	224.25
			3	M	2	12	15	65		12	0	8	100	214
			4	F	3	12	30	65		12	0	8	100	230
			5	F	1.75	9	15	65		12	0	8	100	210.75
			6	M	3.25	12	30	65		12	0	8	100	230.25
			7	F	2.5	18	15	65		12	0	8	100	220.5
37	Dhok Dadal	Arshad Mehmood But	1	M	3.75	12	30	130		16	20	8	0	219.75
			2	F	3.75	12	30	26		16	0	36	0	123.75
			3	F	3	18	30	26		24	0	32	0	133
37	Dhok Dadal	Zohaib Hassan	1	M	6	27	26		50	24	0	8	0	141
			2	M	5	30	26		50	28	0	8	0	147
			3	F	4.5	48	26		50	20	0	20	0	168.5
			4	F	3.75	18	13		100	40	0	96	0	270.75
			5	F	2.5	24	26		50	12	0	84	0	198.5
			6	F	5	45	52		75	20	0	24	0	221
			7	M	6	18	26		75	8	0	12	0	145
38	Ganj Mandi	Zrar khan	1	M	5	9	39	195		8	0	24	0	280
			2	M	6	6	26	260		4	0	12	0	314
			3	F	6	15	65	195		4	0	16	0	301
38	Ganj Mandi	Shahzar Ali	1	M	6	9	26		25	8	0	28	0	102
			2	F	5	9	26		25	8	0	20	0	93
			3	M	3.75	9	26		25	20	0	8	0	91.75
38	Ganj Mandi	Zahid Khattak	1	M	3.75	9	39		50	4	0	4	0	109.75
			2	M	5	6	26		75	8	0	4	0	124
			3	F	4.5	6	26		100	20	0	8	0	164.5
			4	F	5.75	15	26		75	16	0	20	0	157.75
39	Waris Khan	Atif Munnawar	1	M	2.5	36	26	156		8	0	16	0	244.5
			2	F	1.25	24	26	78		16	0	12	0	157.25
39	Waris Khan	M. Saleem	1	F	6	12	15	65		24	0	16	0	138
			2	M	4.25	36	45	52		24	0	8	0	169.25
39	Waris Khan	sahrab ali khan	1	M	3	12	26		25	8	8	12	12	106
40	Purana Qilla	M. Shakil	1	M	2.5	6	15	130		8	0	4	0	165.5
			2	M	3	3	15	136.5		12	0	12	0	181.5
			3	M	3.5	9	30	52		16	0	24	0	134.5
			4	F	2.75	3	15	130		40	0	56	0	246.75
			5	F	2.25	6	15	156		8	0	64	0	251.25
			6	F	2.75	3	15	156		8	0	16	0	200.75
40	Purana Qilla	Naseemuddin	1	F	2.5	60	30	156		20	0	16	0	284.5
			2	F	3.75	3	15	65		20	0	12	0	118.75
			3	F	3	3	15	97.5		20	0	16	0	154.5
40	Purana Qilla	Muhammad Naseer	1	M	3.75	12	30		60	16	20	36	32	209.75
			2	F	4	12	30		60	16	0	8	36	166
			3	C	2	12	15		90	24	0	32	16	191
41	Saidpuri Gate	chuadry muhammad il	1	M	3.25	12	13	130		20	20	60	32	290.25
			2	M	4	18	26	65		60	0	20	24	217
			3	F	2.5	30	39	65		60	0	80	0	276.5
			4	F	3.75	24	39	65		20	0	120	0	271.75

41	Saidpuri Gate	muhammad bilal qures	1	M	3.75	12	30	195	25	20	20	8	40	353.75
41	Saidpuri Gate	muhammad shabir	1	M	2.5	27	30		50	8	20	12	40	189.5
			2	M	2.25	36	30		50	8	40	12	40	218.25
			3	F	2	12	15		25	8	0	12	40	114
42	Millat Colony	HASAN ABDUL WA	1	F	2.5	12	30	65		16	0	8	0	133.5
			2	C	3.25	12	30	97.5		16	0	60	0	218.75
42	Millat Colony	khuram Shehzad	1	M	5.25	48	60	65		28	0	8	0	214.25
			2	M	3.25	18	30	65		40	0	24	0	180.25
42	Millat Colony	Liaqat Ali Azeem	1	M	2.5	180	60	130		40	0	16	0	428.5
			2	F	2.5	180	45	52		40	0	24	0	343.5
			3	F	2.5	144	60	52		40	0	28	0	326.5
43	Dhok Khabba	Hafiz Akhtar	1	M	3.75	6	30		50	4	0	12	16	121.75
			2	M	4.25	6	30		25	4	8	12	8	97.25
			3	F	2	12	30		100	12	0	20	12	188
43	Dhok Khabba	M Ashraf	1	M	1.75	6	30		60	4	0	16	8	125.75
			2	M	4	9	15		60	8	8	8	16	128
			3	F	4.25	6	30		120	12	0	16	8	196.25
43	Dhok Khabba	Amjad mehmood	1	M	2.5	6	30		25	8	0	4	16	91.5
			2	M	3.5	9	30		25	8	0	4	16	95.5
			3	F	2.25	9	15		62.5	8	0	4	16	116.75
44	Dhok Farman ali	wasif khan	1	M	0.75	12	30		25	20	40	20	60	207.75
			2	M	0.75	6	15		25	40	80	20	40	226.75
			3	F	0.5	18	45		25	12	0	40	0	140.5
			4	M	0.25	12	30		50	8	0	40	0	140.25
			5	M	0.25	6	15		50	20	0	20	0	111.25
44	Dhok Farman ali	Malik Rizwan Ahmed	1	M	2.5	6	30	130		40	20	24	4	256.5
			2	M	2.5	6	30	130		40	20	16	16	260.5
			3	F	3.75	3	15	65		40	0	24	16	166.75
			4	F	4.25	6	30	65		60	0	24	4	193.25
44	Dhok Farman ali	Muhammad Asif	1	M	2.5	6	30	65		20	20	32	8	183.5
			2	F	4	3	15	65		60	0	48	12	207
45	Chamanzar Colony	Ali Ahmad	1	M	2.5	6	15		60	8	20	12	20	143.5
			2	F	1.5	6	15		60	8	0	12	20	122.5
45	Chamanzar Colony	Gul Bas	1	M	2.5	3	13		25	12	20	16	40	131.5
			2	F	2	3	13		25	12	0	16	40	111
45	Chamanzar Colony	Dr. Shoaib Khan	1	M	2.5	3	15		50	20	40	8	20	158.5
			2	F	1.75	6	15		25	20	0	12	20	99.75
46	Chachi Mohalla	Major Safdar Waqar	1	M	0.75	12	13		12.5	8	20	4	0	70.25
46	Chachi Mohalla	Sajjad Mehmood Jan	1	M	3.75	54	26	65		16	60	16	80	320.75
			2	C	2	48	26	32.5		16		32	0	156.5
			3	F	5	36	26	65		16		36	100	284
			4	F	3.75	72	39	65		16		36	100	331.75
46	Chachi Mohalla	Mr. Adnan	1	M	2.5	195	75	65		8		24	0	369.5
			2	M	2.5	180	75	65		12		24	0	358.5
			3	F	2.75	150	75	130		20		8	0	385.75

Table 4.2.1 shows the per capita basic daily water consumption in all 46 UCs of Rawal Town. Water for basic activities such as drinking, toilet use, bathing, hand & face washing and ablution was calculated in liters for males, females and children and then by

adding water for all these activities, per capita basic water consumption per day was calculated. From the above results obtained, it was found that the average per capita basic water consumption was 228.42 liters. Minimum per capita consumption was found to be 70.25 liters for UC 46 (Chachi Mohalla) and maximum of 683.5 liters for UC 19 (Mohalla Shareefabad).

Table 4.2.2 Group statistics

	Sex	N	Mean	Std. Deviation	Std. Error Mean
Hand & Face washing	Male	225	22.2044	18.06667	1.20444
	Female	165	28.8303	22.09724	1.72027

Table 4.2.2 shows the mean and standard deviation of hand & face washing for male and female. This table shows that on average females consumed more water as compared to males for hand & face washing. The standard deviation and standard error of mean of females is also greater than the males.

Table 4.2.3 Independent Sample Tests

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Hand & Face washing	Equal variances assumed	5.739	.017	-3.253	388	.001	-6.62586	2.03659	-10.62999	-2.62172
	Equal variances not assumed			-3.155	309.709	.002	-6.62586	2.10000	-10.75793	-2.49378

Table 4.2.3 exhibits the sample T-test.. In this table sample T-test was applied for the equality of mean by using the variables sex and hand & face washing. From this table, it was observed that the high value of t=-3.253 and P- value= .001, means that there is significant difference between these two variables when it is compared at equal variance assumed and not equal variance assumed.

Table 4.2.4 Descriptive

	Sex			Statistic	Std. Error
Total Per Capita Consumption	Female	Mean		237.7939	8.48707
		95% Confidence Interval for Mean	Lower Bound	221.0359	
			Upper Bound	254.5519	
		5% Trimmed Mean		227.7441	
		Median		218.5000	
		Variance		11885.005	
		Std. Deviation		109.01837	
		Minimum		77.00	
		Maximum		661.75	
		Range		584.75	
		Interquartile Range		126.50	
		Skewness		1.473	.189
		Kurtosis		2.784	.376
	Male	Mean		223.9078	6.48118
		95% Confidence Interval for Mean	Lower Bound	211.1359	
			Upper Bound	236.6797	
		5% Trimmed Mean		215.8623	
		Median		214.2500	
		Variance		9451.272	
		Std. Deviation		97.21765	
		Minimum		70.25	
		Maximum		683.50	
		Range		613.25	
		Interquartile Range		110.13	
		Skewness		1.394	.162
		Kurtosis		3.218	.323

and UC 38 (Ganj Mandi) were consuming 5 l/c/d water for drinking purpose. 5 l/c/d is the international requirement for drinking which is essential for survival.

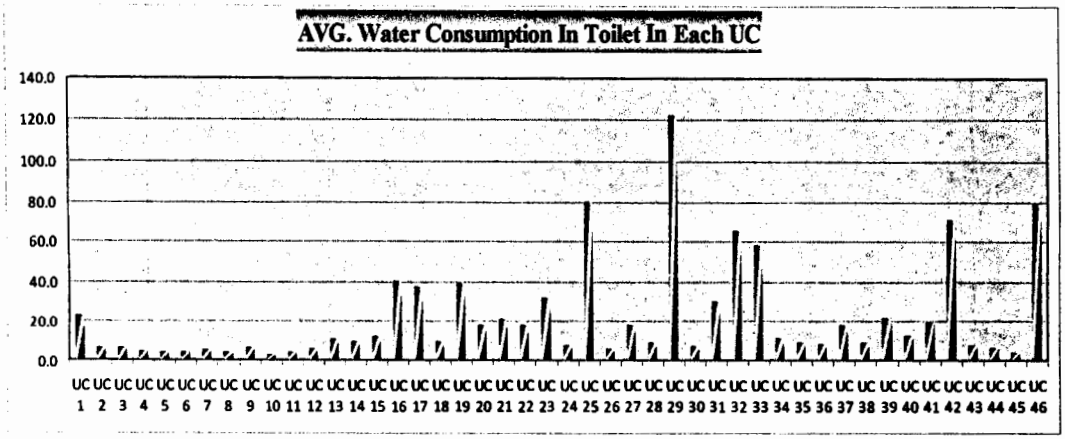

Figure 4.3.2 Average water consumption for toilet/sanitation in 46 UCs

Figure 4.3.2 exhibits the average water consumption for toilet sanitation for all 46 UCs. This figure shows that average water consumed for toilet sanitation in most of the UCs is negligible. In UC 10 (Khayaban-e-sir syed), the average water consumption for toilet sanitation was 3 l/c/d which is very low for sanitary purpose. Improper sanitation could lead to a number of water washed diseases. This figure also showed that in some UCs water consumption was relatively high as compared to other UCs. On average, the data for UC 29 (Khurram Colony) showed highest water consumption for toilet sanitation which was 122 l/c/d. There is a large difference between highest and lowest values of water consumed for toilet sanitation. This may be due to insufficient provision of water in some UCs.

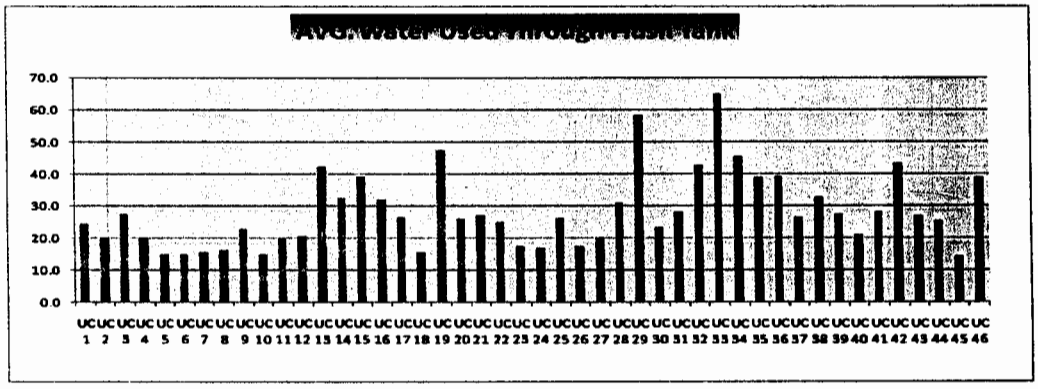

Figure 4.3.3 Average water flushed through flush Tanks in 46 UCs

Figure 4.3.3 shows the average water flushed out through flush tanks in 46 UCs. Water flushed through flush tanks depends on the type of flush tank installed. From the market survey, two types of flush tanks were observed in Rawal Town. The UCs or houses in which eastern flush tank was installed consumed more water as compared to UCs or houses having western flush tank. Data for UC 29 (Khurram Colony), and UC 33 (Kartar Pura) showed increasing trend as compared to all other UCs. In UC 29 and UC 33 most of the houses have eastern flush tank installed in them. The average highest figure is greater than 60 l/c/d for UC 33.

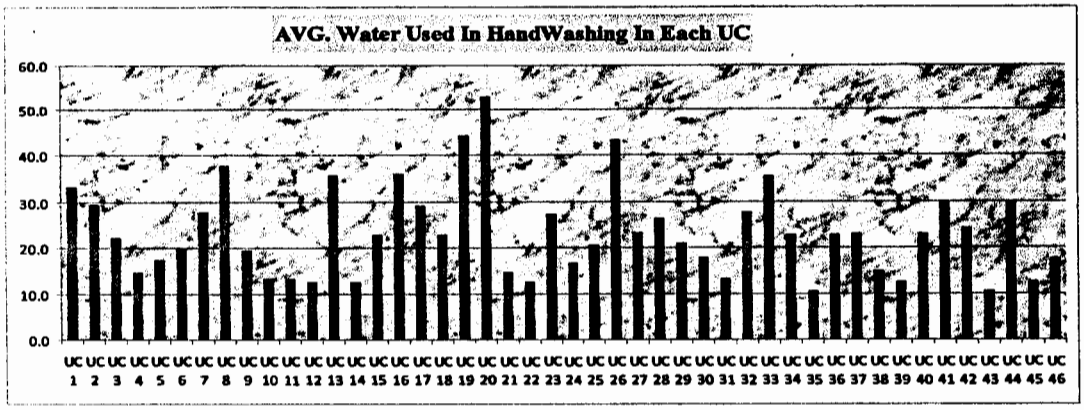

Figure 4.3.4 Average water consumption for hand & face washing in 46 UCs

Figure 4.3.4 exhibits the average water consumption for hand and face washing in all 46 UCs of Rawal Town. Hand and face washing is the activity which is done most of the times during a day. It is considered to be the main activity for the wastage of water. In most of the houses, tap was left running while washing the hand and face. Unawareness is the major reason behind this wastage. Females were the main contributors behind this wastage because they spend most of their time in houses and perform various household chores. Figure 4.3.5 shows that in all of the UCs, per capita usage of water for hand and face washing was above 10 l/c/d. Data for UC 20 (Asghar mall Scheme) showed the maximum water consumption for hand and face washing and the value exceeded 50 l/c/d.

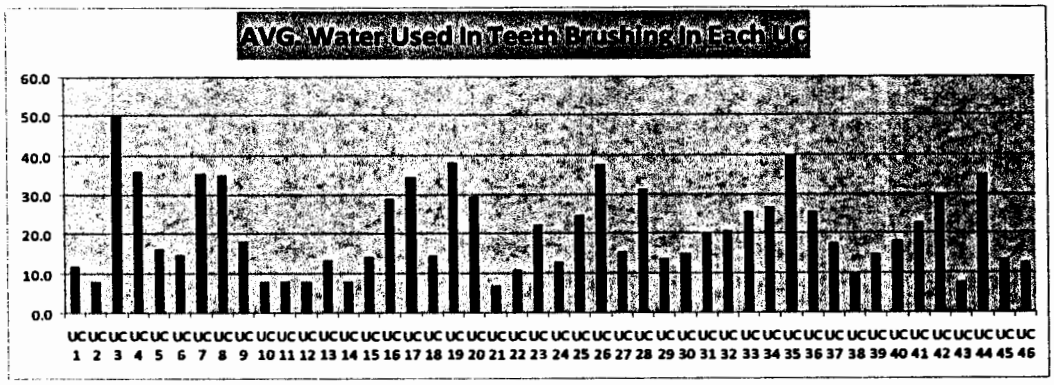

Figure 4.3.5 Average water consumption for teeth brushing in 46 UCs

Figure 4.3.5 exhibits the average water consumption for teeth brushing in all 46 UCs of Rawal Town. Tooth brushing is also one of the activities which contribute in water wastage. Most of the people waste water during teeth brushing by leaving the tap running. This figure shows that much water is consumed for teeth brushing in most of the UCs. Data for UC 3 (Mazharabad, Hazara Colony) showed that the average per capita water consumed for teeth brushing was 50 l/c/d. This value is very high for a

single person because a tooth brushing is only done once or twice a day. From this figure it is found that much water was lost during teeth brushing.

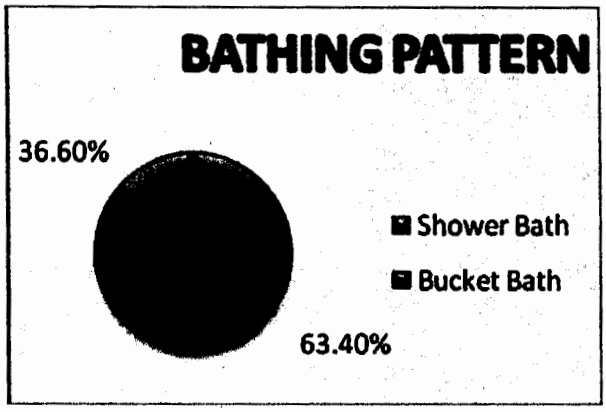

Figure 4.3.6 Bathing pattern in Rawal Town

Figure 4.3.6 exhibits bathing pattern in Rawal Town. It was found that people had different bathing patterns. From the data collected, it was found that 63.40% respondents took shower (bath) whereas, 36.60% took bucket bath. Shower bath trend was higher as compared to bucket bath in Rawal town.

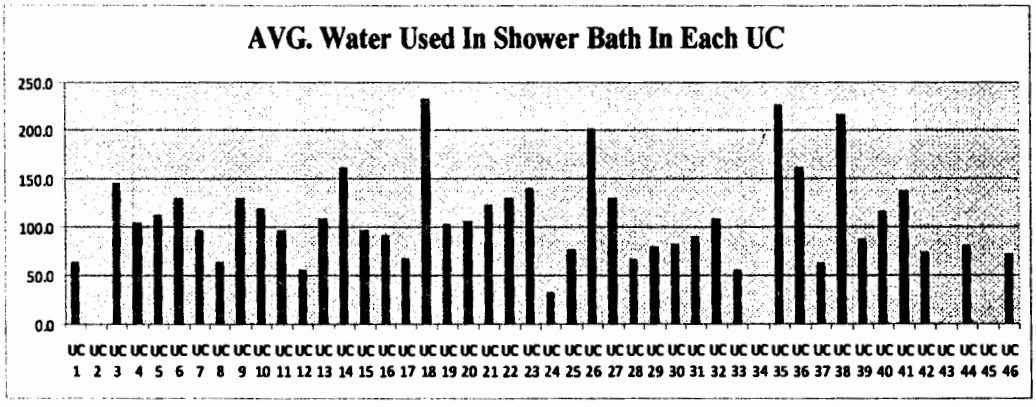

Figure 4.3.7 Average water consumption for shower bath in each UC

Figure 4.3.7 shows the average water consumed for shower bath in different UCs. From the data obtained, it was found that in most of the UCs shower bath was taken.

While taking shower bath much water was consumed as compared to bucket bath because shower was left running for the whole time while taking the bath. The water consumed during shower bath depends on the shower flow/min. Average flow/min observed in different UCs was 6.5 liters. Data for UC 18 (New Malpur Colony, Pindora), UC 26 (Afandi Colony), UC 35 (Mohalla Imam Bargah) and UC 38 (Ganj Mandi) showed high water consumption. The highest figure was found in UC 18 (New Malpur Colony, Pindora) which was nearly 250 l/c/d, this is a very high figure for bathing which is considered to be the wastage of water.

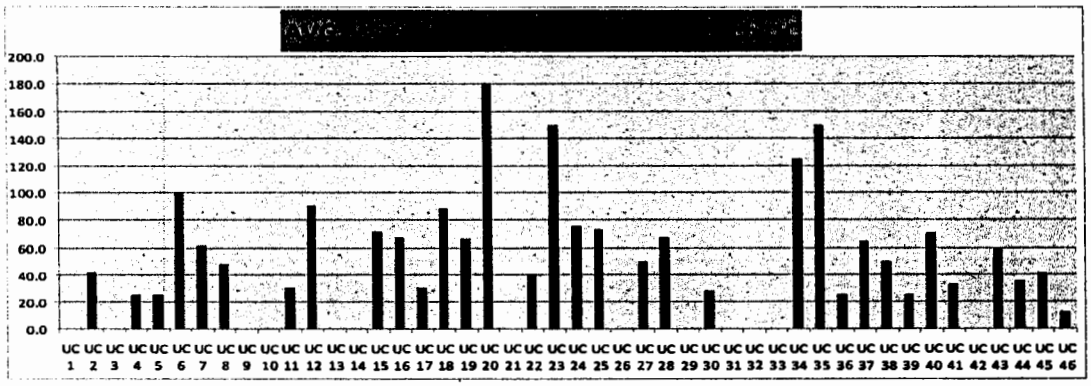

Figure 4.3.8 Average water consumption for bucket bath in Rawal Town

Figure 4.3.8 shows the average water consumed in different UCs while taking bucket bath. Bucket bath pattern was relatively less than shower bath. Water consumed for bucket bath depends on the size of the bucket. Two sizes were observed during the survey. Average size of buckets available in market was 30 liters with lid and 25 liters without lid. Data for UC 20 (Asghar mall Scheme) showed highest water consumption. The maximum average value was found to be 180 l/c/d. UC 46 (Chachi Mohalla) showed minimum water consumption for bucket bath.

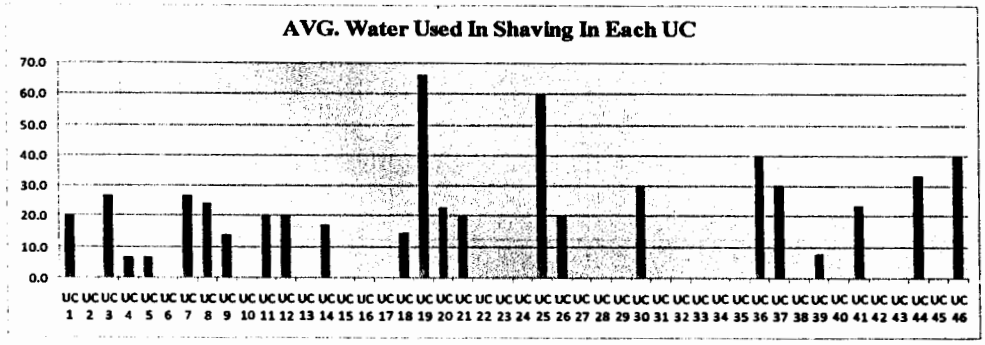

Figure 4.3.9 Average water consumption for shaving in different UCs

Figure 4.3.9 shows the average water usage for shaving in different UCs. Data for UC 19 (Mohalla Shareefabad) showed highest water consumption for shaving. The highest value was nearly 70 l/c/d. Shaving is also considered to be one of the variables which contribute to the wastage of water.

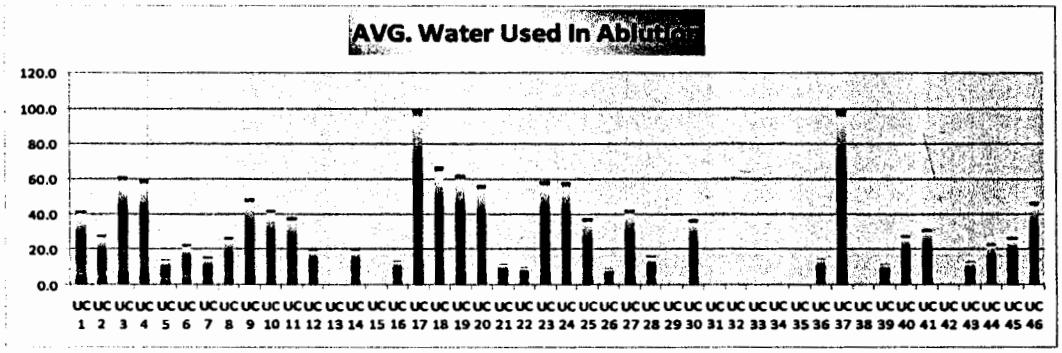

Figure 4.3.10 Average water consumption for ablution in each UC

Figure 4.3.10 shows the average water consumed for ablution in different UCs. Highest consumption trend was found in UC 17 (Dhok Babu Irfan) and UC 37 (Dhok Dadal). 100 l/c/d water was consumed for ablution in these two UCs.

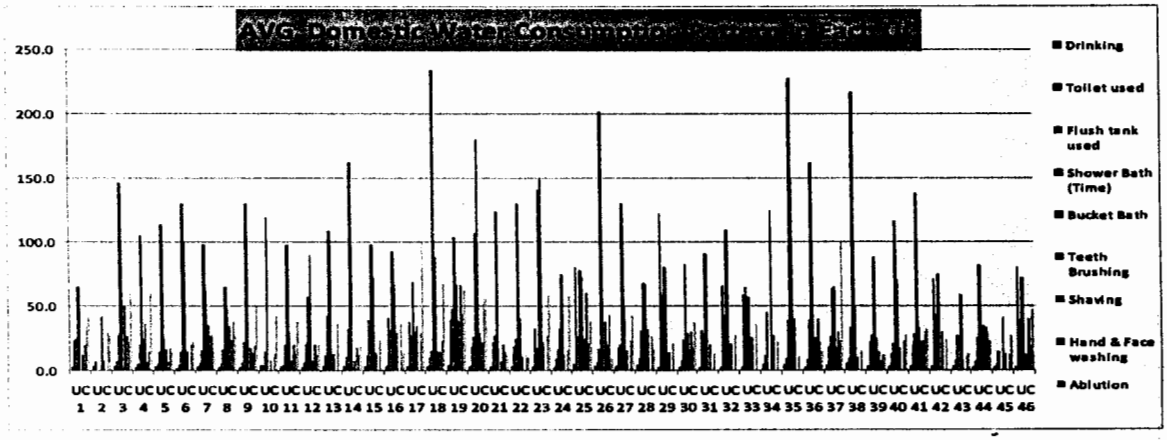

Figure 4.3.11 AVG. Domestic Water Consumption Pattern in Each UC

Figure 4.3.11 shows overall average domestic water consumption pattern of 46 UCs of Rawal Town. Different components of basic water requirements such as drinking water for survival, water for human hygiene and water for sanitation services (toilet use, teeth brushing, shaving, hand and face washing, and ablution) are shown in it. Different UCs had different consumption patterns for all of these components. From the data collected, it was found that the water consumed for two important variables; drinking and toilet sanitation was very low as compared to other variables. These two variables are essential for human survival. Insufficient drinking and improper sanitation could lead to various diseases. Average data for Banni and Ganj mandi showed that people were consuming sufficient water for drinking. Similarly UC 29 (Khurram Colony) showed sufficient water consumption for toilet sanitation. From all of the average data, it was found that UC 45 (Chamanzar Colony) showed very low water consumption for all of the variables, whereas, wastage of water was observed in UC 18 (New Malpur Colony, Pindora), UC 20 (Asghar mall scheme) and UC 35 (Mohalla Imam Bargah), respectively.

Table 4.3.1 Descriptive Statistics

	Mean	Std. Deviation	N
Consumption	298.4243	80.57859	42
Drinking	2.9619	.69981	42
Toilet Use	23.5238	26.36148	42
Hand & Face washing	23.7357	9.88058	42
Shower Bath	111.0500	46.50831	42

Table 4.3.1 exhibits the descriptive statistics of the variables, consumption, drinking, toilet use, hand & face washing and shower bath. It is observed from table 4.3.1 that on average people consumed less water for drinking and more water for shower bath. Mean value of toilet use and hand & face washing showed that on average people consumed an equal quantity of water for both of them.

Table 4.3.2 Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	Shower Bath, Hand & Face washing, Toilet Use, Drinking(a)	.	Enter

a. All requested variables entered.
b. Dependent Variable: Consumption

Table 4.3.2 exhibits the variables entered/removed. In this table, the variable 'consumption' is regressed on four different variables i.e. the filled model is:

$$\gamma \text{ (consumption)} = \alpha + \beta_1\chi_1 + \beta_2\chi_{2+} \beta_3\chi_{3+} \beta_4\chi_4$$

Where α is that value of γ when χ_1, χ_2, χ_3 and χ_4 are equal to zero, called γ -intercept where β_1, β_2, β_3, β_4 are slope co-efficient of the variables drinking, toilet use, hand & face washing and shower bath, respectively.

Table 4.3.3 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	135598.597	4	33899.649	9.603	.000(a)
	Residual	130610.698	37	3530.019		
	Total	266209.295	41			

a. Predictors: (Constant), Shower Bath, Hand & Face washing, Toilet Use, Drinking
b. Dependent Variable: Consumption

In Table 4.3.3 ANOVA was applied to study that all variables have equal means under H_0 (null hypothesis) and at least one of the mean is different under H_1 (alternate hypothesis). The high value of F=9.603 and p-value=.000, lead to the rejection of null hypothesis. So, because of this, alternate hypothesis is accepted i.e. one of the mean is different. It means that all of the variables have different effect on total consumption. Shower bath had maximum effect on total water consumption. The results obtained from statistical analysis are given in the table 4.3.4.

Table 4.3.4 Unstandardized and Standardized Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	29.025	50.162		.579	.566
	Drinking	22.488	14.144	.195	1.590	.120
	Toilet Use	.760	.373	.249	2.036	.049
	Hand & Face washing	3.400	.948	.417	3.585	.001
	Shower Bath	.938	.225	.542	4.177	.000

Table 4.3.4 shows the coefficients of independent variables. In this table, the coefficients of the independent variables i.e. drinking, toilet use, hand & face washing and shower bath were tested by applying the t-test on each of the variables. From this table, it is found that all four independent variables have the positive co-efficient i.e. positive slope. It is also observed from the table that the toilet use, hand & face washing and shower bath are significant variables because their P-value is less than 0.05 (level of significance). These variables have significant effect on the total per capita basic water consumption, but the variable drinking is not significant at 0.05 (level of significance) which means that the water consumed for drinking purpose was too low that it has no significant effect on the total per capita water consumption.

4.4 Minimum & Maximum Trends of Basic Water Consumption

Table 4.4.1 Minimum basic water consumption in households of 46 UCs

Ucs	Area Name	Houses no	Drinking	Toilet used	Flush tank used	Shower Bath (Time)	Bucket Bath	Teeth Brushing	Shaving	Hand & Face washing	Ablution
		1	1.75	12	15	32.5		8		40	0
1		2	2.25	18		65		8		40	40
	Rata Amral	3	2.5	6		65		20	20	20	40
									-		
	Millad	1	3	12			25	8		40	32
2	Nagar, Dhok	2	3.75	3			50	8		16	20
	Ratta	3	3.25	6			50	8		32	32
	Mazhar	1	2.5	6	30	97.5		80	20	24	100
3	Abad,	2	2.5	3	15	130		20	20	16	12
	Hazara Colony	3	2.25	6	30	65		40	40	16	8
		1	2.5	3	15	65		20	0	4	4
4	Dhok	2	2	6	30		25	8	0	12	24
	Mangtal	3	2.5	6	15	97.5		80	20	24	100
		1	3.25	3	15	130		16	20	32	12
5	Alim abad,Dhok	2	2.5	3	15	65		20	0	4	4

	hassu (North)										
		3	2	6	15		25	8	0	12	24
	Nawab	1	3	3	15		100	16	0	4	40
6	Colony, Dhok	2	0.75	3	15		100	4		16	8
	Hassu (South)	3	1.5	6	15	130		24		40	20
		1	2	3	13	65	50	20	20	16	16
7	Mohalla	2	2.25	3	13		25	40	20	32	12
	Muslimabad	3	2	3	13		60	20	20	12	4
		1	2.5	3	13	65		16	8	8	8
8	Fauji Colony,	2	2.25	3	13		50	20	40	20	60
	Peerwadhai	3	2.5	3	13		30	20		8	12
		1	3.75	3	15	65		8		8	60
9	Zia-ul-Haq	2	3.75	3	15	195		8		24	0
	Colony	3	5	3	15	97.5		8		8	24
	Khayaban-e-	1	3.75	3	15	130		8		16	36
10	Sirsyed	2	2.5	3	15		30	8	20	4	0
	(North)	3	3.75	6	30	65		8		20	40
	Khayaban-e-	1	1.5	6	15		60	4	20	12	20
11	Sirsyed	2	2	6	13	32.5		8	8	12	20
	(South)	3	1	6	30	65		12	12	8	20
		1	1.5	12	60	78		8		36	0
12		2	2.5	6	30	65		12		8	0
	Dhok Najju	3	2.5	12	30	130		8		24	0
		1	2	3	15	130		8	20	8	20
13	New	2	4	18	30	162.5		8	20	12	20
	Katarian	3	3.25	6	30	195		8	12	12	20
		1	1	9	39	45.5		8		16	0
14	F-Block	2	1.5	12	30	32.5		8		8	0
	satellite Town	3	2.5	6	26		30	8		4	0
		1	1.25	12	15	52		24		16	
15	Saidpur	2	2	75	15	78		20		24	
	Scheme	3	4	12	30		50	40		32	12
		1	2	18	15		30	12		16	100
16	Mohalla	2	2.5	27	13	65		24		24	100
	Eidgah	3	2.5	36	26	65		24		16	100
		1	3.75	12	13		25	16		24	32
17	Dhok Babu	2	1.25	3	13	195		16		12	100
	Irfan	3	2.5	9	15		90	4	12	20	48

		1	7.5	6	30		120	16	12	28	16
18	New Malpur	2	2.4375	51	45	110.5	41.6	95	120	95	85
	Colony	3	2.25	61.5	67.5	97.5	37.5	4		10	86
		1	5	6	30		120	16	12	24	8
19	Mohalla	2	1.5	36	30	65	25	40	120	80	40
	Shareefabad	3	2	48	60	65	25	4		8	12
		1	1.25	9	39	65	150	16	40	48	80
20	Asghar Mall	2	1.5	9	13	65		40	20	48	40
	Scheme	3	3.25	6	15	130		8	8	8	12
		1	2.75	6	15	130		4	20	12	12
21	Dhok Kala	2	2.25	12	13	65		4		12	
	Khan	3	1.25	9	26	65		8		4	
		1	3.5	24	30	130		4		12	8
22		2	1.75	6	15		25	8		8	12
	Qayyumabad	3	2.5	9	15		37.5	16		12	
		1	2.5	12	15	130		16		8	
23	Dhok	2	2.5	75	15	130		40		12	
	Kashmirian	3	1.25	9	15		120	4		8	36
		1	1.5	6	15	32.5		16		16	100
24		2	2	3	15	32.5	30	8		4	40
	Khana Kak	3	3.75	6	15		120	8		12	12
		1	3	27	15	65		20	0	12	36
25		2	5	192	30		120	40		32	36
	Sadiqabad	3	1.75	3	13		25	8		8	32
		1	3.5	6	15	97.5		20		8	4
26	Afandi	2	2.5	3	13	130		20		40	4
	Colony	3	2.25	3	15	65		20		24	4
		1	2.5	30	15	130		20		16	
27	Muslim Town	2	2.5	6	15	130		0		8	0
	(East)	3	2.5	9	15		50	16		16	36
		1	2.5	3	15	65		20		24	16
28	Muslim Town	2	2.5	6	15	32.5		8		8	12
	(West)	3	4	6	30		50	40		32	12
		1	2.25	72	30	65		4		8	0
29	Khuram	2	2	90	45	45.5		8		8	0
	Colony	3	2.5	72	45	39		8		4	0
		1	1.25	3	15	65		12	40	16	12
30		2	1	6	30		25	16		8	40
	Chah Sultan	3	1.5	6	15	65		8	20	4	4

		1	2	12	13	65		20		16	0
31	Dhok Hukam	2	2.5	45	26	130		20		12	0
	dad	3	1.75	12	26	65		20		8	0
		1	1.25	15	39	97.5		4		8	0
32		2	2	6	13	97.5		20		32	0
	Amar pura	3	2,5	144	60	52		8		16	0
		1	2.25	12	60	45.5		8		12	0
33		2	2.5	96	60	39		20		12	0
	Kartar Pura	3	2	18	45	52		12		12	0
		1	3.75	6	13		50	40		24	
34		2	5	15	65		150	20		24	0
	Banni	3	5	9	26		100	20		16	
		1	3.75	9	39	195		40		16	0
35	Mohalla	2	4.25	12	52	260		40		8	0
	Imam Bargah	3	5	6	26		150	40		8	0
		1	2.5	15	65		25	28		24	0
36		2	2.25	6	30	65		40	40	32	8
	Mohan Pura	3	2.5	3	15	195		8		12	24
37		1	1.75	6	15	65		12	40	8	100
		2	3	12	30	26		16	20	8	
	Dhok Dadal	3	2.5	18	13		50	8		8	
38		1	5	6	26	195		4		12	0
		2	3.75	9	26		25	8		8	0
	Ganj Mandi	3	3.75	6	26		50	4		4	0
39		1	1.25	24	26	78		8		12	
		2	4.25	12	15	52		24		8	
	Waris Khan	3	3	12	26		25	8	8	12	12
40		1	2.25	3	15	52		8		4	
		2	2.5	3	15	65		20		12	
	Purana Qilla	3	2	12	15		60	16		8	16
41		1	2.5	12	13	65		20	20	20	0
		2	3.75	12	30	195	25	20	20	8	40
	Saidpuri gate	3	2	12	15		25	8	20	12	40
42		1	2.5	12	30	65		16		8	0
		2	3.25	18	30	65		28		8	
	Millat Colony	3	2.5	144	45	52		40		16	
43		1	2	6	30		25	4		12	8
	Dhok	2	1.75	6	15		60	4		8	8
	Khabba	3	2.25	6	15		25	8		4	16

44		1	0.25	6	15		25	8	40	20	0
	Dhok farman	2	2.5	3	15	65		40	20	16	4
	Ali	3	2.5	3	15	65		20	20	32	8
45		1	1.5	6	15		60	8		12	20
	Chamanzar	2	2	3	13		25	12		16	40
	Colony	3	1.75	3	15		25	20		8	20
46		1	0.75	12	13		12.5	8	20	4	0
	Chachi	2	2	36	26	32.5		16	60	16	80
	Mohalla	3	2.5	150	75	65		8		8	
			0.75	12	13	32.5	12.5	8	20	4	80

Table 4.4.1 shows the minimum basic water consumption for each household of 46 UCs in Rawal Town. The minimum water consumption for drinking, toilet sanitation, flush tank, shower bath, bucket bath, teeth brushing, shaving, hand and face washing and ablution was calculated for each household by taking the minimum of water consumption by each member of the household. This data is important to find out variation in water consumption among different houses living in the same area.

Table 4.4.2 Total Minimum basic water consumption pattern of 46 UCs

Ucs	Drinking	Toilet used	Flush tank used	Shower Bath (Time)	Bucket Bath	Teeth Brushing	Shaving	Hand & Face washing	Ablution
1	1.75	6	15	32.5		8	20	20	40
2	3	3			25	8		16	20
3	2.25	3	15	65		20	20	16	8
4	2	3	15	65	25	8	20	4	4
5	2	3	15	65	25	8	0	4	4
6	0.75	3	15	130	100	4	0	4	8
7	2	3	13	65	25	20	20	12	4
8	2.25	3	13	65	30	16	8	8	8
9	3.75	3	15	65		8		8	24
10	2.5	3	15	65	30	8	20	4	36
11	1	6	13	32.5	60	4	8	8	20
12	1.5	6	30	65		8		8	0
13	2	3	15	130		8	12	8	20
14	1	6	26	32.5	30	8		4	0
15	1.25	12	15	52	50	20		16	12
16	2	18	13	65	30	12		16	100
17	1.25	3	13	195	25	4	12	12	32
18	2.25	6	30	97.5	37.5	4	12	10	16
19	1.5	6	30	65	25	4	12	8	8
20	1.25	6	13	65	150	8	8	8	12

21	1.25	6	13	65		4	20	4	12
22	1.75	6	15	130	25	4		8	8
23	1.25	9	15	130	120	4		8	36
24	1.5	3	15	32.5	30	8		4	12
25	1.75	3	13	65	25	8	0	8	32
26	2.25	3	13	65		20		8	4
27	2.5	6	15	130	50	16		8	36
28	2.5	3	15	32.5	50	8		8	12
29	2	72	30	39		4		4	0
30	1	3	15	65	25	8	20	4	4
31	1.75	12	13	65		20		8	0
32	1.25	6	13	52		4		8	0
33	2	12	45	39		8		12	0
34	3.75	6	13		50	20		16	0
35	3.75	6	26	195	150	40		8	0
36	2.25	3	15	65	25	8	40	12	8
37	1.75	6	13	26	50	8	20	8	100
38	3.75	6	26	195	25	4		4	0
39	1.25	12	15	52	25	8	8	8	12
40	2	3	15	52	60	8		4	16
41	2	12	13	65	25	8	20	8	40
42	2.5	12	30	52		16		8	0
43	1.75	6	15		25	4		4	8
44	0.25	3	15	65	25	8	20	16	4
45	1.5	3	13		25	8		8	20
46	0.75	12	13	32.5	12.5	8	20	4	80
	0.25	3	13	26	12.5	4	8	4	4

Table 4.4.2 exhibits total minimum basic water consumption pattern of 46 UCs. In this table, the minimum values for water consumed for drinking, toilet sanitation, flush tank, bucket bath, shower bath, shaving, hand & face washing and ablution for 46 UCs is compared with one another. From the data collected, overall minimum water consumed for drinking was 0.25 l/c/d, toilet sanitation 3 l/c/d, flush tank 13 l/c/d, shower bath 26 l/c/d, bucket bath 12.5 l/c/d, teeth brushing 4 l/c/d, shaving 8 l/c/d, hand & face washing 4 l/c/d and for ablution was 4 l/c/d, respectively.

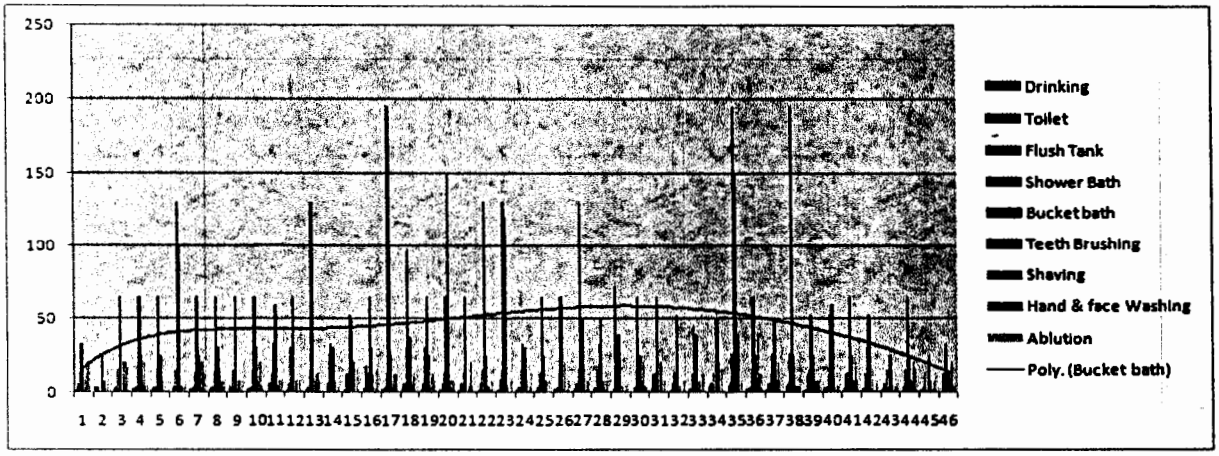

Figure 4.4.2 Total Minimum basic water consumption pattern of 46 UCs

Figure 4.4.2 exhibits the total minimum basic water consumption pattern of all of the 46 UCs. From this figure, it is found that data for UC 6 (Dhok Hassu (South)), UC 11 (Khayaban-e-sirsyed (south)), UC 14 (F- Block satellite Twon), UC 30 (Chah Sultan), UC 44 (Dhok Farman Ali), UC 46 (Chachi Mohalla) showed lower drinking water consumption pattern. The drinking water consumption in Dhok Farman Ali was as less as 0.25 l/c/d. Similarly data for UC 2 (Milad nagar Dhok Ratta), UC 3 (Mazharabad Hazara Colony), UC 4 (Dhok Mangtal), UC 5 (Alim abad Dhok hassu (North)), UC 6 (Dhok Hassu (South)), UC 7 (Mohalla Muslimabad), UC 8 (Fauji Colony Peerwadhai), UC 9 (Zia-ul-Haq Colony), UC 10 (Khayaban-e sirsyed (North)), UC 13 (New Katarian), UC 17 (Dhok Babu Irfan), UC 24 (Khana kak Dhok Ali Akbar), UC 25 (Sadiqabad), UC 26 (Afandi Colony), UC 28 (Muslim Town (west)), UC 30 (Chah sultan), UC 36 (Mohan Pura), UC 40 (Purana Qilla), UC 44 (Dhok farman Ali), and UC 45 (Chamanzar Colony) showed minimum water consumption for toilet use.

Table 4.4.3 Maximum basic water consumption in each household of 46 UCs

Ucs	Area Name	Houses no	Drinking	Toilet used	Flush tank used	Shower Bath (Time)	Bucket Bath	Teeth Brushing	Shaving	Hand & Face washing	Ablution
		1	3.75	60	30	97.5		8		40	100
1		2	2.25	18		65		8		40	40
	Rata Amral	3	2.5	6		65		20	20	20	40
		1	3	12			25	8		40	32
2	Millad Nagar,	2	3.75	3			50	8		16	20
	Dhok Ratta	3	3.25	6			50	8		32	32
	Mazhar	1	2.5	6	30	195		80	20	32	200
3	Abad, Hazara	2	4.25	9	30	195		60	20	24	16
	Colony	3	3.75	9	30	195		40	40	24	32
		1	2.5	3	15	65		20	0	4	4
4	Dhok	2	2	6	30		25	8	0	12	24
	Mangtal	3	2.5	6	15	195		80	20	32	200
		1	4.25	6	15	195		24	20	40	16
5	Alim abad,Dhok hassu (North)	2	2.5	3	15	65		20	0	4	4
		3	2	6	15		25	8	0	12	24
	Nawab	1	3	3	15		100	16	0	4	40
6	Colony, Dhok	2	0.75	3	15		100	4		16	8
	Hassu (South)	3	1.5	6	15	130		24		40	20
		1	3.25	6	13	130	50	20	20	32	28
7	Mohalla	2	3.5	3	13		50	60	20	48	20
	Muslimabad	3	5	12	26		120	60	20	36	16
		1	2.5	6	13	65		24	8	96	8
8	Fauji Colony,	2	3	9	26		50	60	40	80	60
	Peerwadhai	3	3	3	13		60	60		40	12
		1	1.25	9	30	32.5		16	8	16	40
9	Zia-ul-Haq	2	3.5	9	26	520		40	20	32	12
	Colony	3	2	3	15	97.5		8		24	100
	Khayaban-e-	1	3.75	3	15	65		8		8	60
10	Sirsyed	2	3.75	3	15	195		8		24	0
	(North)	3	5	3	15	97.5		8		8	24
	Khayaban-e-	1	3.75	3	15	130		8		16	36
11	Sirsyed	2	2.5	3	15		30	8	20	4	0
	(South)	3	3.75	6	30	65		8		20	40
	Dhok Najju	1	2.75	9	30		120	4	40	20	20

12		2	2.5	6	13	65		8	8	16	20
		3	2.5	6	30	65		12	12	8	20
		1	2.5	15	75	97.5		8		48	0
13		2	5	12	30	65		20		40	0
	New Katarian	3	3.75	12	30	195		24		64	0
	F-Block	1	2.25	6	30	130		8	20	12	20
14	satellite	2	5	18	45	162.5		8	20	16	20
	Town	3	4	9	45	195		8	12	16	20
		1	2.25	18	52	130		20		64	0
15	Saidpur	2	2.25	18	45	156		8		40	0
	Scheme	3	6	15	65		180	24		20	0
		1	3.75	36	45	130		28		48	
16	Mohalla	2	2.5	75	30	130		20		40	
	Eidgah	3	4.25	24	45		75	40		72	13.5
		1	4	45	45		30	40		60	100
17	Dhok Babu	2	4	48	39	97.5		60		32	100
	Irfan	3	3.75	60	39	65		60		32	100
		1	4.5	18	13		50	24		32	36
18	New Malpur	2	3	6	26	325		24		12	100
	Colony	3	3	9	15		270	8	20	40	80
		1	10	6	30		120	16	12	32	24
19	Mohalla	2	3.75	72	60	156	50	180	120	120	100
	Shareefabad	3	2.5	75	75	130	50	4		12	160
		1	1.75	48	52	234	225	24	40	96	100
20	Asghar Mall	2	3.75	45	13	65		60	20	72	100
	Scheme	3	4.25	12	15	130		12	8	12	12
		1	6.5	12	30	156		4	20	12	12
21	Dhok Kala	2	3.5	45	26	195		4		16	
	Khan	3	2.5	60	52	130		16		48	
		1	3.5	24	30	130		4		12	8
22		2	2.5	18	30		50	16		16	12
	Qayyumabad	3	4	30	30		50	16		16	
		1	3.75	12	15	195		16		32	
23	Dhok	2	3	75	15	130		40		40	
	Kashmirian	3	3.75	12	30		180	20		64	80
		1	2.5	12	15	32.5		16		40	100
24		2	2	36	45	32.5	30	20		24	100
	Khana Kak	3	3.75	6	15		120	8		12	12
		1	7.5	60	45	130		32	60	16	40
25		2	5	192	30		120	40		32	36
	Sadiqabad	3	6	12	26		25	16		24	40

		1	4	9	30	520		60		32	16
26	Afandi	2	3.25	9	13	292.5		60	20	120	12
	Colony	3	3.25	6	30	195		60		40	20
		1	3.75	45	30	130		40		32	
27	Muslim Town	2	2.5	6	15	130		0		8	0
	(East)	3	3.75	12	30		50	16		60	48
		1	5	12	45	130		60		32	32
28	Muslim Town	2	4.25	12	30	65		8		16	16
	(West)	3	4.25	12	30		75	60		40	12
		1	2.5	165	75	156		20		40	0
29	Khuram	2	2.75	180	75	91		24		16	0
	Colony	3	2.75	180	75	104		20		48	0
		1	2.5	12	30	97.5		24	40	48	20
30		2	3.25	12	60		50	20		8	100
	Chah Sultan	3	2.5	12	15	130		8	20	24	20
		1	2.25	24	26	65		20		20	0
31	Dhok Hukam	2	2.5	45	39	156		20		16	0
	dad	3	2.5	45	39	65		20		8	0
		1	2.5	36	39	260		20		32	0
32		2	2.25	6	26	97.5		40		36	0
	Amar pura	3	2.5	180	75	130		40		48	0
		1	2.75	36	90	65		16		64	0
33		2	2.75	180	75	65		40		56	0
	Kartar Pura	3	2.75	30	75	78		40		60	0
		1	5	9	39		150	40		24	
34		2	5	15	65		150	20		24	0
	Banni	3	6	15	65		150	20		24	
		1	3.75	9	39	195		40		16	0
35	Mohalla	2	4.25	12	52	260		40		8	0
	Imam Bargah	3	5	6	26		150	40		8	0
		1	2.5	15	65		25	28		24	0
36		2	3.75	9	45	195		40	40	32	32
	Mohan Pura	3	2.5	3	15	195		8		12	24
37		1	3.75	18	30	65		12	40	8	100
		2	3.75	18	30	130		24	20	36	
	Dhok Dadal	3	6	48	52		100	40		96	
38		1	6	15	65	260		8		24	0
		2	6	9	26		25	20		28	0
	Ganj Mandi	3	5.75	15	39		100	20		20	0
39	Waris Khan	1	2.5	36	26	156		16		16	

Table 4.4.4 Total Maximum basic water consumption pattern of 46 UCs

Ucs	Drinking	Toilet used	Flush tank used	Shower Bath (Time)	Bucket Bath	Teeth Brushing	Shaving	Hand & Face washing	Ablution
1	3.75	60	30	97.5		20	20	40	100
2	3.75	12			50	8		40	32
3	4.25	9	30	195		80	40	32	200
4	2.5	6	30	195	25	80	20	32	200
5	4.25	6	15	195	25	24	20	40	24
6	3	6	15	130	100	24	0	40	40
7	5	12	26	130	120	60	20	48	28
8	3	9	26	65	60	60	40	96	60
9	3.5	9	30	520		40	20	32	100
10	5	3	15	195		8		24	60
11	3.75	6	30	130	30	8	20	20	40
12	2.75	9	30	65	120	12	40	20	20
13	5	15	75	195		24		64	0
14	5	18	45	195		8	20	16	20
15	6	18	65	156	180	24		64	0
16	4.25	75	45	130	75	40		72	13.5
17	4	60	45	97.5	30	60		60	100
18	4.5	18	26	325	270	24	20	40	100
19	10	75	75	156	120	180	120	120	160
20	4.25	48	52	234	225	60	40	96	100
21	6.5	60	52	195		16	20	48	12
22	4	30	30	130	50	16		16	12
23	3.75	75	30	195	180	40		64	80
24	3.75	36	45	32.5	120	20		40	100
25	7.5	192	45	130	120	40	60	32	40
26	4	9	30	520		60	20	120	20
27	3.75	45	30	130	50	40		60	48
28	5	12	45	130	75	60		40	32
29	2.75	180	75	156		24		48	0
30	3.25	12	60	130	50	24	40	48	100
31	2.5	45	39	156		20		20	0
32	2.5	180	75	260		40		48	0
33	2.75	180	90	78		40		64	0
34	6	15	65		150	40		24	0
35	5	12	52	260	150	40		16	0
36	3.75	15	65	195	25	40	40	32	32
37	6	48	52	130	100	40	40	96	100
38	6	15	65	260	100	20		28	0
39	6	36	45	156	25	24	8	16	12
40	4	60	30	156	90	40		64	36
41	4	36	39	195	50	60	40	120	40
42	5.25	180	60	130		40		60	0

43	4.25	12	30		120	12		20	16
44	4.25	18	45	130	50	60	80	48	60
45	2.5	6	15		60	20		16	40
46	5	195	75	130	12.5	20	60	36	100
	10	195	90	520	270	180	120	120	200

Table 4.4.4 exhibits maximum basic water consumption pattern of 46 UCs. In this table, maximum values for water consumed for drinking, toilet sanitation, flush tank, bucket bath, shower bath, shaving, hand & face washing and ablution for 46 UCs was compared with one another. From the data collected, overall maximum water consumed for drinking was 10 l/c/d, for toilet sanitation 195 l/c/d, water consumed for flush tank 90 l/c/d, for shower bath 520 l/c/d, for bucket bath 270 l/c/d, for teeth brushing 180 l/c/d, for shaving 120 l/c/d, for hand & face washing 120 l/c/d and for ablution was 200 l/c/d respectively. All these figures showed excessive usage of water.

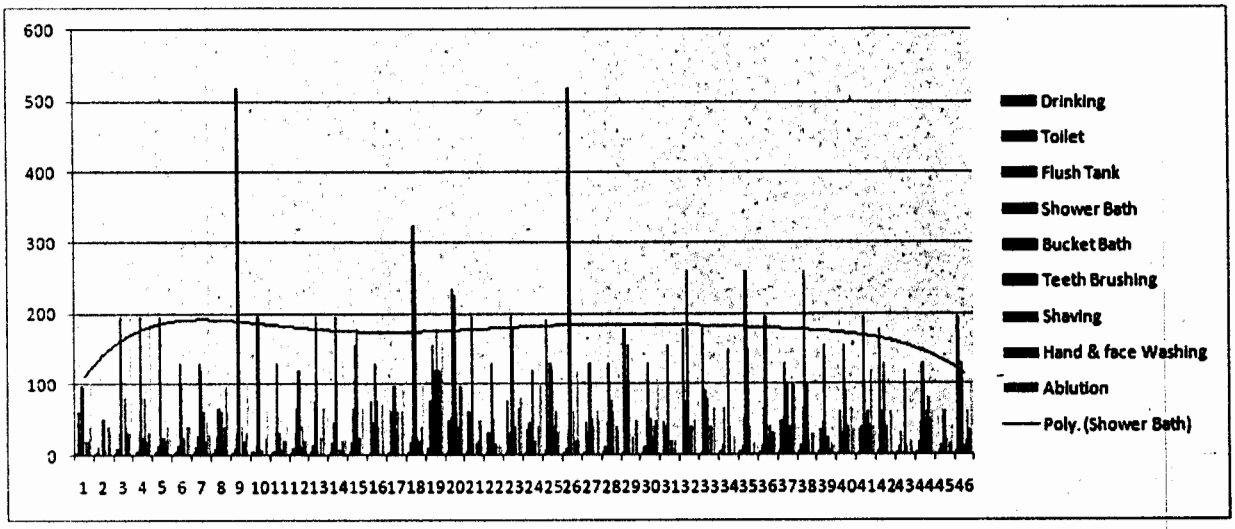

Figure 4.4.4 Total Maximum basic water consumption pattern of 46 UCs

Figure 4.4.4 exhibits a total maximum basic water consumption pattern of 46 UCs. From this figure, it is found that data for UC 9 (Zia-ul-Haq Colony), UC 18 (New Malpur Colony), and UC 26 (Afandi Colony) showed maximum water consumption for shower

bath. Maximum water consumed for shower bath was above 500 l/c/d. Data for UC 25 (sadiqabad), UC 29 (Khurram Colony), UC 32 (Amar Pura), UC 42 (Millat Colony) and UC 46 (Chachi Mohalla) showed maximum water consumption for toilet use. Data for UC 15 (saidpur Scheme), UC 18 (New Malpur Colony), UC 20 (Asghar mall Scheme) and UC 23 (Dhok Kashmirian) showed maximum water consumption through bucket bath. Data for UC 3 (Mazhar abad Hazara Colony), UC 4 (Dhok Mangtal), UC 7 (Mohalla Muslim abad), UC 8 (Fauji Colony Peerwadhai), UC 20 (Asghar mall Scheme), UC 26 (Afandi Colony), UC 28 (Muslim Town (west)), UC 41 (Said puri gate), UC 44 (Dhok farman Ali) showed maximum water consumption for teeth brushing. UC 43 (Dhok Khabba) and UC 19 (Mohalla Shareefabad) showed maximum consumption for shaving. UC 8 (Fauji Colony Peerwadhai), UC 19 (Mohalla Shareefabad), UC 20 (Asghar mall Scheme), UC 25 (Sadiqabad), UC 37 (Dhok Dadal), UC 41 (Saidpuri gate) showed maximum water utilization through hand and face washing. Whereas, the data for UC 1 (Rata Amral), UC 3 (Mazhar abad Hazara Colony), UC 4 (Dhok Mangtal), UC 9 (Zia-ul-Haq Colony), UC 17 (Dhok babu Irfan), UC 18 (New malpur Colony), UC 19 (Mohalla Shareefabad), UC 20 (Asghar mall Scheme), UC 24 (Khana Kak), UC 30 (Chah sultan), UC 37 (Dhok Dadal) and UC 46 (Chachi Mohalla) showed maximum trend of water consumption through ablution. As compared to all these activities, drinking water consumption was less as compared to international standards.

Table 4.4.5 Total average, minimum and maximum basic water consumption

ACTIVITIES	AVERAGE L/C/D	MAX L/C/D	MIN L/C/D	STANDARD REQUIRMENTS L/C/D (GLEICK 1996)
DRINKING	3.0	10	0.25	5
SHOWER BATH	111.0	520	26	15
BUCKET BATH	61.6	270	12.5	
TEETH BRUSHING	20.8	180	4	FOR ALL TYPES OF SANITATION SERVICES 20
SHAVING	24.6	120	8	
HAND & FACE WASHING	23.3	120	4	
ABLUTION	28.6	200	4	
TOILET USE	22.1	195	3	
FLUSH TANK	28.4	90	13	

Figure 4.4.5 exhibits average, minimum and maximum basic water consumption and their comparison with the international standard as given by Gleick (1996) for various activities. These values were extracted by taking the average, minimum and maximum of overall data for 46 UCs. It was found that basic water consumption in Rawal Town is higher than the basic water requirement as given by Gleick except the water consumed for drinking.

4.5 Piped water coverage in Rawal Town

After calculating the basic water consumption in different UCs, in this section piped water coverage of Rawal Town was estimated to find out the coverage gaps and other issues related to water supply and to detect the link between piped water coverage and basic water consumption in UCs.

Table 4.5.1 Estimation of piped water coverage of Rawal town in 2009

UC 2	18277	2666	2241		26374	2974	2549	1669	2549		56%
UC 4	20128	2834	2320		29045	3162	2648	1984	2648		63%
UC 6	12643	1924	1360		18244	2147	1583	1660	1660		77%
UC 8	18155	2326	1336		26198	2595	1605	1827	1827		70%
UC 10	14456	2100	1980		20860	2343	2223	1054	2223		45%
UC 12	17814	2607	2150		25705	2909	2452	1994	2452		69%
UC 14	15677	2255	2162		22622	2516	2423	1376	2423		55%
UC 16	14557	2070	1945		21006	2309	2184	1640	2184		71%
UC 18	18482	2817	2756		26669	3143	3082	2600	3082		83%
UC 20	19681	3135	2853		28400	3498	3216	1930	3216		55%
UC 22	16318	2474	1866		23547	5768	5160	5772	5772		100%
UC 24	16398	2319	1648		23662	2587	1908	1163	1908		45%
UC 26	14964	2261	1894		21593	2523	2156	568	2156		23%
UC 28	17993	2804	1934		25964	3128	2258	972	2258		31%
UC 30	19320	2842	2523		27879	3171	2852	2680	2852		85%
UC 32	18285	2841	2444		26385	3170	2773	1601	2773		51%
UC 34	16152	2399	2053		23307	2676	2330	1396	2330		52%
UC 36	17579	2500	2345		25366	2789	2634	1597	2634		57%
UC 38	16119	2232	1909		23260	2490	2167	1659	2167		67%
UC 40	14440	2048	1359		20837	2285	1596	726	1596		32%
UC 42	17437	2622	2439		25161	2925	2742	861	2742		29%
UC 44	20836	3086	2485		30066	3443	2842	2137	2842		62%
UC 46	19252	2910	2686		27780	3247	3023	1477	3023		45%

Table 4.4.1 exhibits the estimation of piped water coverage in Rawal town. This table describes the population of Rawal Town, the housing units and houses with piped water connections in year 1998. Then population in year 2009, the housing units and houses with piped water connections in year 2009 were estimated from it. WASA data related to its domestic water customers was provided by Water and Sanitation Agency Rawalpindi. And then all percentages such as total piped water coverage percentage in year 1998, estimated total piped water coverage percentage in year 2009 and WASA domestic coverage percentage was calculated from the given and estimated data.

Future population of each UC of Rawal Town was estimated by applying the formula F = Population in year 1998 *(1 + i)^ n. Where F= future Population, i = annual growth rate, n = designed period in years. The growth rate for urban population of Rawalpindi is 3.39 %. Similarly the estimated total housing units were calculated by applying the same formula but instead of 3.39%, 1% growth rate was applied to it.

During year 2009, houses with piped water connections were calculated by subtracting total housing units during year 1998 from total housing units during year 2009 and then adding it to sources of drinking water for year 1998. Houses with piped connections in year 2009= drinking water sources in year 1998+ (total housing units in year 2009-total housing units in year 1998).

Domestic customer data for year 2009 was provided by WASA. To calculate corrected housing units in year 2009 with piped connections, formula was applied that if value for calculated housing units in year 2009 with piped water connection is greater than the piped water coverage record provided by WASA, then the corrected one would be the calculated estimated housing units in year 2009 with piped water connections but if data provided by WASA would have greater values than the calculated housing units in year 2009 with piped water connection data, then WASA data would be the corrected one.

Total piped water coverage percentage for year 2009 was calculated by dividing corrected houses with piped water connections in year 2009 by total housing units for year 2009. The degree of improvement was calculated by subtracting total piped water coverage percentage for year 1998 from total piped water coverage percentage for year

2009. Whereas total piped water coverage percentage for year 1998 was calculated by dividing 1998's sources of drinking water by 1998's total housing units. WASA coverage percentage was calculated by dividing WASA domestic customers by total housing units of year 2009.

The percentage change was calculated by subtracting total piped water coverage in year percentage for year 1998 from WASA coverage percentage for year 2009.

WASA Piped Water Coverage Percentage Comparison with 1998 Piped Water Coverage Percentage

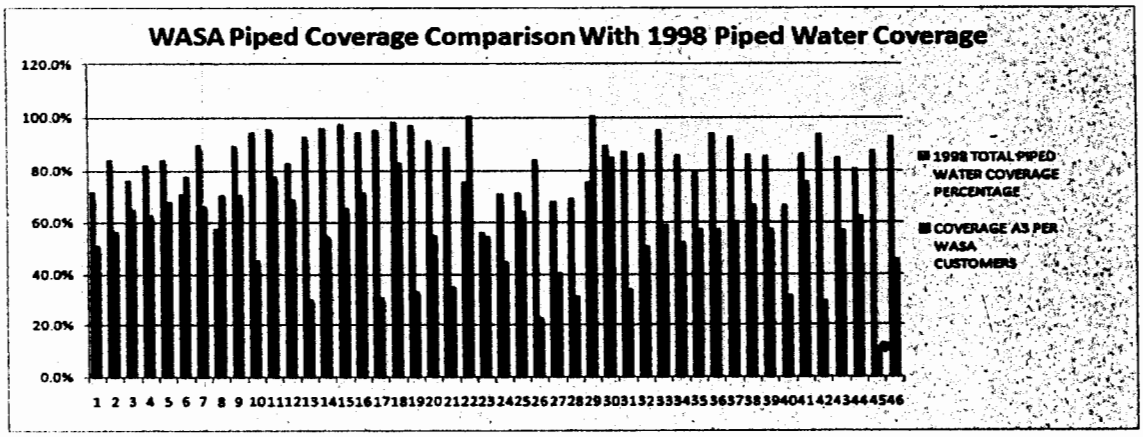

Figure 4.5.1 WASA piped water coverage comparison with 1998 piped water coverage

Figure 4.5.1 exhibits the comparison of WASA piped water coverage in year 2009 with the piped water coverage in year 1998. The figure shows that in almost all of the UCs, WASA piped water coverage percentage was far less than piped water coverage percentage for year 1998 except in four UCs. Data for UC6 (Nawab Colony Dhok Hassu) showed 6.65% improvement, while same for UC 8 (Fauji Colony Peerwadhai),

UC 22 (Qayyumabad), and UC 29 (Khurram Colony) which showed 12.97%, 24.64 % and 24.34 % improvement, respectively.

A large coverage gap was observed in most of the UCs. WASA was providing 64.40% less coverage to UC 13 (New Katarian). In the year 1998, the piped water coverage in UC 13 (New Katarian) was 92.2% while in year 2009 it was reduced to 30%.

In UC 17 (Dhok Babu Irfan), in 1998 the piped water coverage was 94.9% and it was reduced to 31 % in 2009. For UC 26 (Afandi Colony) piped water coverage provided by WASA was reduced from 83.8% in year 1998 to 23% in year 2009. The coverage for UC 42 (Millat Colony) in 1998 was 93.0 % and it was 29% in year 2009.

The lowest water coverage was found in UC 45 (Chamanzar Colony). Chamanzar Colony had 87.5% piped water coverage in year 1998 and only 11 % was found in year 2009.

The reduction in coverage percentages for UC 17 (Dhok Babu Irfan), UC 26 (Afandi Colony), UC 42 (Millat Colony) and UC 45 (Chamanzar Colony) was found to be 64.40 %, 61.25 %, 63.59 % and 76.07 %, respectively.

Comparison between year 1998 and Estimated Required Piped water Coverage in year 2009

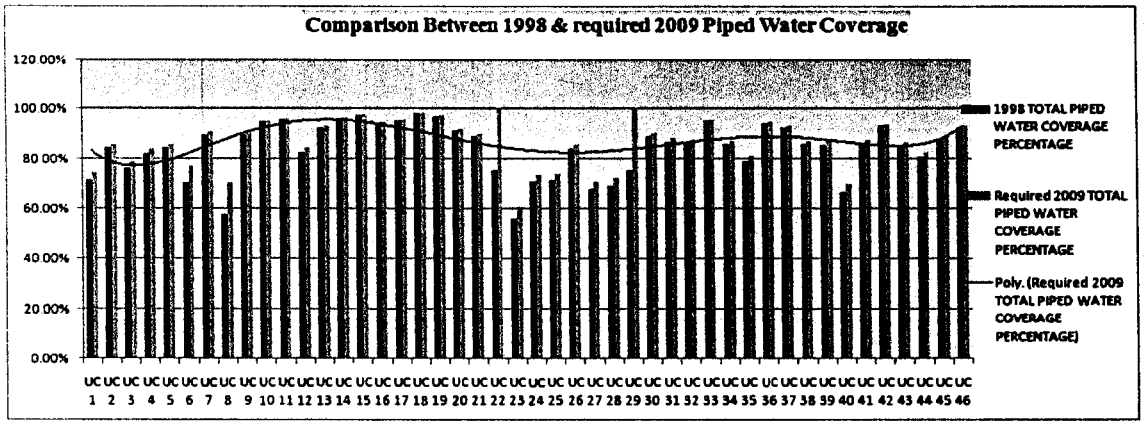

Figure 4.5.2 Comparison Between year 1998 & estimated required piped water coverage in year 2009

Figure 4.5.2 shows the comparison between year 1998 & estimated required piped water coverage for year 2009. From the calculations, it is found that according to the current population, the estimated corrected piped water coverage percentage for year 2009 was almost equivalent to piped water coverage in year 1998. It means that in year 1998 the population was less than the population in year 2009 but the piped water coverage was higher as compared to WASA piped water coverage for year 2009 except for UC 22 (Qayyumabad) and UC 29 (Khurram Colony) which required more coverage in year 2009 than it was in year 1998. In year 1998, the piped water coverage for UC 22 was 75.42% and in year 2009 it required 100% coverage. Similarly in year 1998, the coverage for UC 29 was 75.49% and 100% was required in 2009. In year 1998, these two UCs had low piped water coverage, and the reason behind it may be the fewer housing units in these UCs.

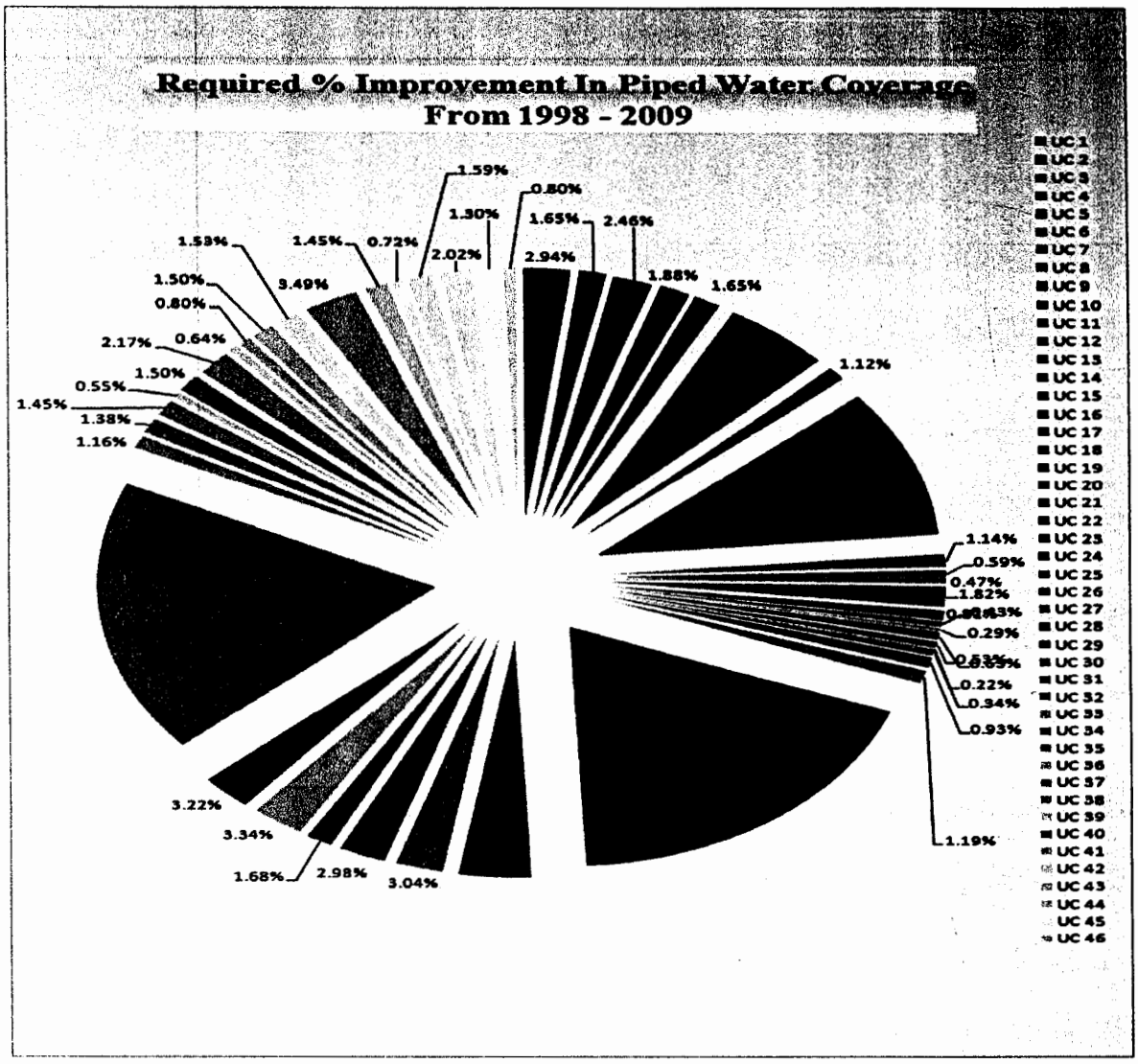

Figure 4.5.3 Required percentage improvement in piped water coverage from 1998-2009

Figure 4.5.3 exhibits the percentage improvement in the water coverage in year 2009 as compared with the piped water coverage in year 1998 for 46 UCs of Rawal town. It was calculated by subtracting the piped water coverage percentage for year 1998 from estimated required piped water coverage percentage in year 2009. This figure shows that UC 1 required 2.94%, UC 2 1.65%, UC 3 2.46%, UC 4 1.88%, UC 5 1.65%, UC 6 6.65%, UC 7 1.12%, UC 8 12.97%, UC 9 1.14%, UC 10 0.59%, UC 11 0.47%, UC 12

1.82%, UC 13 0.81%, UC 14 0.43%, UC 15 0.29%, UC 16 0.63%, UC 17 0.53%, UC 18 0.22%, UC 19 0.34%, UC 20 0.93% , UC 21 1.19%, UC 22 24.64% , UC 23 4.57%, UC 24 3.04%, UC 25 2.98%, UC 26 1.68%, UC 27 3.34%, UC 28 3.22%, UC 29 24.34%, UC 30 1.16%, UC 31 1.38%, UC 32 1.45%, UC 33 0.55%, UC 34 1.50%, UC 35 2.17%, UC 36 0.64%, UC 37 0.80%, UC 38 1.50%, UC 39 1.53%, UC 40 3.49%, UC 41 1.45%, UC 42 0.72%, UC 43 1.59%, UC 44 2.02%, UC 45 1.30%, and UC 46 0.80% improvement in piped water coverage. UC 22 (Qayyumabad) and UC 29 (Khurram Colony) required greater piped water coverage than it was in 1998.

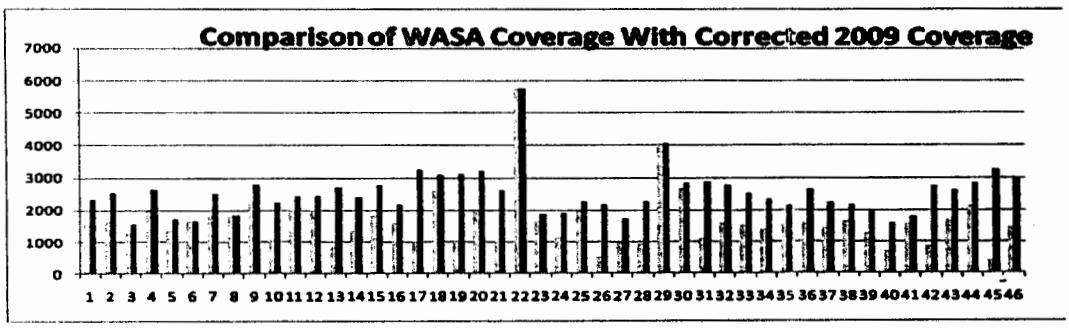

Figure 4.5.4 Comparison of WASA piped water coverage in year 2009 with estimated corrected piped water coverage in year 2009

Figure 4.5.4 shows the comparison of existing WASA piped water coverage for year 2009 with estimated required piped water coverage for year 2009. It was observed that WASA coverage in all UCs was less than the estimated corrected piped water coverage for year 2009 except in UC 22 (Qayyumabad) and UC 29 (Khurram Colony) in which coverage was 100%, which means that it was equivalent to calculated estimated coverage for year 2009. As compared to all other UCs the piped water coverage in these two UCs was low in 1998 and after estimating the required piped water coverage in year 2009 it

was found that these two UCs required 100% coverage. By correlating the data obtained from WASA about their customers and the estimated required piped water coverage for year 2009, it was found that WASA is providing ideal water coverage in these two UCs and WASA piped water coverage was 100%. But in UC 10 (Khayaban), UC 13 (New katarian), UC 17 (Dhok Babu Irfan), UC 19 (Mohalla Shareefabad), UC 21 (Dhok Kala Khan), UC 26 (Afandi Colony), UC 28 (Muslim Town (west)), UC 40 (Purana-Qilla), UC 42 (Millat Colony) and UC 45 (Chamanzar colony), piped water coverage was far less than the estimated values.

Table 4.5.2 Improvement required in WASA coverage in each UC for year 2009

UCs	2009 WASA DOMESTIC CUSTOMERS	Corrected 2009 houses with piped connection	Required Improvement In WASA Coverage
UC 1	1594	2328	734
UC 2	1669	2549	880
UC 3	1283	1564	281
UC 4	1984	2648	664
UC 5	1364	1725	361
UC 6	1660	1660	0
UC 7	1827	2492	665
UC 8	1827	1827	0
UC 9	2201	2819	618
UC 10	1054	2223	1169
UC 11	1987	2456	469
UC 12	1994	2452	458
UC 13	863	2694	1831
UC 14	1376	2423	1047
UC 15	1847	2768	921
UC 16	1640	2184	544
UC 17	1036	3239	2203
UC 18	2600	3082	482
UC 19	1058	3099	2041
UC 20	1930	3216	1286
UC 21	1019	2622	1603
UC 22	5772	5772	0

UC 23	1682	1869	187
UC 24	1163	1908	745
UC 25	1965	2278	313
UC 26	568	2156	1588
UC 27	987	1741	754
UC 28	972	2258	1286
UC 29	4039	4039	0
UC 30	2680	2852	172
UC 31	1119	2872	1753
UC 32	1601	2773	1172
UC 33	1538	2500	962
UC 34	1396	2330	934
UC 35	1517	2151	634
UC 36	1597	2634	1037
UC 37	1453	2255	802
UC 38	1659	2167	508
UC 39	1311	1994	683
UC 40	726	1596	870
UC 41	1553	1801	248
UC 42	861	2742	1881
UC 43	1710	2611	901
UC 44	2137	2842	705
UC 45	417	3248	2831
UC 46	1477	3023	1546

Table 4.5.2 exhibits the total improvement required in WASA coverage in 2009 in comparison with the estimated required piped water coverage. The required improvement in each UC was calculated by subtracting WASA coverage for year 2009 from estimated required piped water coverage for year 2009. This figure shows that in UC 6 (Nawab Colony Dhok Hassu), UC 8 (Fauji Colony Peerwadhai), UC 22 (Qayyumabad) and UC 29 (Khurram Colony), WASA piped water coverage was equivalent to the estimated required piped water coverage. However, in most of the UCs the coverage was far below the estimated required piped water coverage. Data for UC 45 (Chamanzar colony) showed the highest gap in coverage. WASA was only providing

piped water to 417 customers, however according to the estimation; UC 45 required coverage of 3248 customers whereas, 2831 customers were without piped water coverage.

Table 4.5.3 Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	WASA Coverage Average Per Capita Consumption	46	.089	.554

Table 4.5.3 exhibits the paired sample correlation between WASA coverage and average per capita basic water consumption for year 2009. Correlation between the variables 'WASA coverage in year 2009' and 'per capita consumption' was calculated. It was found that the correlation (γ=0.089) between these two variables was very small, so both variables tend to increase in a positive direction but with a very slow speed. Some of the UCs having low piped water connection showed low per capita water consumption pattern e.g. UC 45 (Chamanzar Colony) had low piped water coverage and low per capita basic water consumption. Similarly in UC 29 (Khurram Colony) piped water coverage was equivalent to ideal piped water coverage and the consumption data calculated showed that people are consuming sufficient amount of water for most of the variables. But this was not the case with all UCs which means that these two variables are linked to each other but due to some issues their connection is weak.

Table 4.5.4 Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	WASA Coverage - Average Per Capita Consumption	1360.519	867.125	127.85	1103.015	1618.024	10.641	45	.000

Table 4.5.4 exhibits the paired sample test. In this paired sample T-Test was applied on the variables 'WASA' and 'Consumption'. The null and alternate hypothesis obtained from it was:

H_0: $\mu_{Wasa-\mu\ consumption}=0$

H_1: $\mu_{Wasa-\mu consumption}\neq 0$

From this table, it is observed that the high value of t=10.641 and p-value=.000 which means that there was a significant difference between the variables 'WASA' and 'Consumption'. So, therefore there is no valid evidence to accept H_0 i.e. $\mu_{Wasa=\mu\ consumption}$. WASA coverage has effect on per capita consumption but some other issues are there which make this effect weak.

Key Issues

Many water related issues, due to improper management of water supplying authority were observed during the study.

- In-sufficient piped water supply was observed in many UCs. In UC 45 (Chamanzar colony), the piped water coverage was very low. WASA was providing only 11% piped water coverage in this UC. By correlating the piped water coverage with the per capita consumption, it was found that the UC 45 showed minimum consumption pattern for all variables.
- Most of the people claimed about illegal piped water connections and installation of illegal motors in many houses resulting in lower water pressure in other houses. From the data collected, it was found that piped water coverage in UC 26 (Afandi Colony) was only 23% and the results of water consumption showed maximum water usage for shower bath, showing wastage of water in this UC.
- Non-metering was also the main issue. Irrespective of the amount of water consumed, fixed billing system was applied to each household.
- Improper maintenance of pipes was also observed. In most of the areas, pipe leakages were found. These leakages not only contribute to the loss of water but also contribute to the water contamination. In UC 22 (Qayyumabad), the piped water coverage was 100% but the water consumption for basic purposes was low in this UC.
- It was also observed that due to poor quality of water people were not consuming piped water for their drinking and cooking purposes, they brought water from filtration plants for their consumption purposes, and this was the reason that average low drinking water consumption was observed in almost all of the UCs.

4.6 CONCLUSIONS/DISCUSSIONS

Current study exhibits the calculations for basic household water consumption pattern and estimation of piped water coverage for 46 Union Councils of Rawal Town for the year 2009. The estimated population of Rawal Town in year 2009 was 112,8316 and housing units were 133,258. All of the UCs showed 11.57% increase in their housing units except UC 22 (Qayyumabad) and UC 29 (Khurram Colony) which showed 133.16% and 53.95% increase in their housing units.

As far as basic water consumption is concerned, 138 household samples were analyzed and their average, minimum and maximum consumption was calculated. After calculating per capita basic water consumption among these households, it was found that average per capita water consumption was 228.42 l/c/d while minimum and maximum per capita basic water consumption was found to be 70.25 l/c/d and 683.5 l/c/d, respectively. From the descriptive statistical analysis, it was found that the females consumed more water as compared to males.

From overall averages of domestic water consumption for all 46 UCs of Rawal Town, it was found that the average drinking water consumption was 3 l/c/d which was low as compared to the international requirement for survival which is 5 l/c/d. However, this was not the case with personal hygiene. The water consumption for bathing alone was much higher than the international requirement. The average estimates for shower bath was 111.0 l/c/d whereas for bucket bath was 61.6 l/c/d.

The minimum values derived from the collected data were found to be: for drinking 0.25 l/c/d, for toilet sanitation 3l/c/d, for flush tank 13 l/c/d, for shower bath 26 l/c/d, for bucket bath 12.5 l/c/d, for teeth brushing 4 l/c/d, for shaving 8 l/c/d, for hand & face washing 4 l/c/d and for ablution 4 l/c/d. The sum of minimum values of basic water consumption for all activities showed the lowest possible consumption per activity. By combining minimum of all activities for all UCs, the minimum value found was 74.75 l/c/d which was in-sufficient for a person living in urban space. From these results, it was found that water consumed for two important variables i.e. drinking and toilet sanitation was very low. The minimum value for drinking was far less than the basic human requirement. The water consumption of less than 2 l/c/d could cause mild dehydration and the risks associated with it are headache, fainting, urinary tract infection and constipation. Seizure, arrhythmias and shocks may results in case of severe dehydrations.

By calculating the maximum values for water consumption, it was found that the overall maximum water consumed for drinking was 10 l/c/d, for toilet sanitation 196 l/c/d, water consumed through flush tank 90 l/c/d, for shower bath 520 l/c/d, for bucket bath 270 l/c/d, for teeth brusing 180 l/c/d, for shaving 120 l/c/d, for hand & face washing 120 l/c/d and same for ablution was 200 l/c/d. These calculated maximum values represent the wastage of water. From all these figures, it is observed that basically water consumed for hygienic purposes contributes to the major wastage. However, these values could be helpful in the planning of domestic water supply to the urban area.

Piped water coverage for all of 46 UCs of Rawal Town was calculated to find out the coverage gap and to evaluate that how much piped water coverage was required in each UC. Some of the UCs such as UC 6 (Dhok hassu), UC 8 (Peerwadhai), UC 22 (Qayyumabad) and UC 29 (Khurram colony) had ideal piped water coverage, whereas all other UCs showed low piped water coverage. Data for UC 45 (Chamanzar colony) showed the minimum piped water coverage. WASA was providing only 11 % piped water in this UC.

By correlating the basic water consumption data with the piped water coverage data, it is found that these are interlinked with each other which means that both of these tend to increase or decrease together. UCs having more piped water coverage showed relatively higher consumption pattern as compared to other UCs in which piped water coverage was lower. Similarly people having piped water connections or having ground wells/bores used much water as compared to others e.g. in UC 45 piped water coverage was low so the water consumption in this UC was also found to be low for all variables as compared to other UCs. It was also observed that some of the UCs showed high water consumption although the piped water coverage was low in them, it means that piped water coverage had effects on water consumption but, some issues like leakages, illegal piped water connections make their association weak.

During the survey, water supply pipe leakages were observed. Not only water was lost through this but it was also responsible for contamination of water. Almost in all UCs, drinking water consumption pattern was low which means that quality of water available to them was poor. Most of the people of Rawal Town used filtration plant

water for drinking and cooking purposes, this was the main reason behind low drinking water consumption in Rawal Town.

Despite the shortcomings, the results obtained from this study could help in resolving many key issues related to the water allocation. The findings may be useful in providing more reasonable basis for deciding how much water needs to be allocated for domestic purposes in the time of water shortage or water crises. With this information, the total water requirement of the population of a city could be determined more accurately and could help government in deciding how much water to produce-and would ultimately result in overall improvement in the water distribution system.

4.7 RECOMMENDATIONS

Water is a basis for human dignity. The contravention of the human right to clean water is heroically destroying the human potential. As water sustainability is the main issue so its preservation is important at government as well as household level.

Household Level

- Timely monitoring and maintenance of water pipes and appliances like flush tank should be done at the household, so that any leakages and wastage of water could be avoided in houses.

- Utensils and apprentices which consume less water should be installed or used in houses.

- Tap should not be left running during teeth brushing, shaving, hand and face washing. Tap and shower should be turned off while soaping.

Government Level

- Water should be treated as a basic human right. Sufficient amount of water should be provided to each household for fulfilling their basic water requirement. All people should have access to at least 20 liters of clean water a day.

- Already existing piped water network should be repaired and maintained for the provision of clean water at household level. If not possible the separate pipe network for consumption water should be provided so that all houses have clean water for

consumption purposes such as for drinking and cooking and they do not need to go to collect drinking water from filtration plants.

- Water metering should be done at the main lines of areas and at household level, so that government authorities may have accurate consumption records.

- Timely inspection and maintenance of water supply pipe lines should be done; leakages in water supply pipe lines should be repaired to avoid water loss and contamination.

- Proper investigation should be done to identify the people having illegal piped water connections.

- Water utilities should be regulated to improve efficiency; ensure equity and accountability to all people living within that area. Water provision should be in line with the principles of non discrimination and equality.

- For the planning and best use of current water resources in a sustainable manner, it is crucial to know that how people use water in their daily routine. This information will help decision makers in allocation and preservation of water in the time of water shortage.

- Raising awareness among people that how to use water wisely, and how to reduce its wastage.

- Investigations regarding customer problems should be carried out periodically.

- In water management and allocation, participatory decision making mechanism should be developed. People should be encouraged to participate and give their opinions about the decisions related to water.

- Recently launched "National drinking water policy" should be implemented in its true letter and spirit.

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APPENDIX

Calculation of Per Capita Basic Water Consumption in 46 UCs

UC	Ucs AREA's Name	Name	person	Sex	Drinking			Toilet used				Com mode	Flush tank used			Inte rnal plu mbi ng pipe	liters
		house owner name	n serial no	M=male F=female C=Child	No Of glasse s in	Glass size	Litres One time	No Of Ti	No of flush or	Size of Flush bowl	Litres One time	Type	No Of Time	size of flush tank	Litre s One		
1	Rata Amral	Amir	1	M	15	0.25	3.75	5	4	3	60	indian	2	15	30	0.5	2.94
			2	M	15	0.25	3.75	5	4	3	60		1	15	15		2.94
			3	M	15	0.25	3.75	5	4	3	60		2	15	30		2.94
			4	M	15	0.25	3.75	4	4	3	48		2	15	30		2.94
			5	F	15	0.25	3.75	5	4	3	60		2	15	30		2.94
			6	F	15	0.25	3.75	4	4	3	48		2	15	30		2.94
			7	C	7	0.25	1.75	3	2	3	18		1	15	15		2.94
			8	C	7	0.25	1.75	2	2	3	12		1	15	15		2.94
1	Rata Amral	M. Ajmal Butt	1	M	9	0.25	2.25	1	6	3	18	indian	1	15	15	0.5	2.94
1	Rata Amral	Abdul Khaliq	1	M	10	0.25	2.5	2	1	3	6	indian	1	15	15	0.5	2.94
2	Milad Nagar, Dhok Ratta	Naveed	1	M	12	0.25	3	4	1	3	12	indian	2	15	30	0.5	
2	Milad Nagar, Dhok Ratta	Nasir Abbas	1	M	15	0.25	3.75	1	1	3	3	indian	1	15	15	0.5	
2	Milad Nagar, Dhok Ratta	Javed Iqbal	1	M	13	0.25	3.25	2	1	3	6	indian	1	15	15	0.5	
3	Mazhar Abad Hazara Colony	RAFI ULLAH SHANWARI	1	M	10	0.25	2.5	2	1	3	6	indian	2	15	30	0.75	2.94
			2	F	10	0.25	2.5	2	1	3	6		2	15	30		2.94
3	Mazhar Abad Hazara Colony	MALIK MUBIN	1	M	10	0.25	2.5	3	1	3	9	indian	2	15	30	0.75	2.94
			2	M	17	0.25	4.25	3	1	3	9		2	15	30		2.94
			3	F	15	0.25	3.75	2	1	3	6		1	15	15		2.94
			4	F	16	0.25	4	1	1	3	3		1	15	15		2.94
3	Mazhar Abad Hazara Colony	SHAIKH ADNAN	1	M	9	0.25	2.25	2	1	3	6	indian	2	15	30		2.94
			2	F	15	0.25	3.75	3	1	3	9		2	15	30		2.94
4	Dhok Mangtal	Muhammad Nawaz	1	M	10	0.25	2.5	1	1	3	3	indian	1	15	15	0.5	2.94
4	Dhok Mangtal	Mubasher Hassan	1	M	8	0.25	2	2	1	3	6	indian	2	15	30	0.5	
4	Dhok Mangtal	Hamid Hussain	1	M	10	0.25	2.5	2	1	3	6	indian	1	15	15	0.75	2.94
			2	F	10	0.25	2.5	2	1	3	6		1	15	15		2.94
5	Alim abad, Dhok Hassu	M nasir Fayaz	1	M	13	0.25	3.25	2	1	3	6	indian	1	15	15	1	2.94
			2	F	17	0.25	4.25	1	1	3	3		1	15	15		2.94
5	Alim abad, Dhok Hassu	malik nadeem	1	M	10	0.25	2.5	1	1	3	3	indian	1	15	15	0.5	2.94
5	Alim abad, Dhok Hassu	Maqbool shah	1	M	8	0.25	2	2	1	3	6	indian	1	15	15	0.5	
							0				0				0		
6	Alim abad, Dhok Hassu	Nadeem shahzad	1	M	12	0.25	3	1	1	3	3	indian	1	15	15	0.5	
							0				0				0		
6	Alim abad, Dhok Hassu	zahid Mehmood	1	M	3	0.25	0.75	1	1	3	3	indian	1	15	15	1	
							0				0				0		
6	Alim abad, Dhok Hassu	fazal ur Rehman	1	M	6	0.25	1.5	2	1	3	6	indian	1	15	15		2.94
							0				0				0		
7	Mohalla Muslim abad	MAQBOOL AHMED	1	M	8	0.25	2	2	1	3	6	both	1	13	13	0.75	2.94
			2	M	13	0.25	3.25	1	1	3	3		1	13	13		2.94
			3	F	10	0.25	2.5	2	1	3	6		1	13	13		
							0				0				0		
7	Mohalla Muslim abad	ARSLAM RASOOL	1	M	9	0.25	2.25	1	1	3	3	both	1	13	13	1	
			2	F	14	0.25	3.5	1	1	3	3		1	13	13		
							0				0				0		
7	Mohalla Muslim abad	ZULFIKAR ALI	1	M	8	0.25	2	2	1	3	6	both	1	13	13	0.75	
			2	M	20	0.25	5	2	1	3	6		2	13	26		
			3	M	17	0.25	4.25	1	1	3	3		1	13	13		
			4	F	9	0.25	2.25	4	1	3	12		2	13	26		
			5	F	10	0.25	2.5	4	1	3	12		2	13	26		
							0				0				0		
8	Fauji Colony, peerwadhai	Nazeer Khan	1	M	10	0.25	2.5	2	1	3	6	both	1	13	13	0.75	2.94
			2	F	10	0.25	2.5	1	1	3	3		1	13	13		2.94
							0				0				0		
8	Fauji Colony, peerwadhai	Masood Akhtar	1	M	12	0.25	3	2	1	3	6	both	2	13	26	1	
			2	F	9	0.25	2.25	2	1	3	6		2	13	26		
			3	F	10	0.25	2.5	1	1	3	3		1	13	13		
			4	F	10	0.25	2.5	3	1	3	9		2	13	26		
							0				0				0		
8	Fauji Colony, peerwadhai	Hafeez ur Rehman	2	F	10	0.25	2.5	1	1	3	3	both	1	13	13	0.5	
			3	F	12	0.25	3	1	1	3	3		1	13	13		
							0				0				0		
9	Zia-ul-Haq Colony	Atta Hussain	1	M	5	0.25	1.25	3	1	3	9	indian	2	15	30	0.75	2.94
							0				0				0		

9	Zia-ul-Haq Colony	Ehsaanullah	1	M	13	0.25	3.25	3	1	3	9	both	2	13	26	0.5	2.94
			2	F	11	0.25	2.75	1	1	3	3		1	13	13		2.94
			3	F	14	0.25	3.5	3	1	3	9		2	13	26		2.94
			4	F	6	0.25	1.5	3	1	3	9		2	13	26		2.94
							0				0				0		
9	Zia-ul-Haq Colony	Kaleem Aslam	1	M	8	0.25	2	1	1	3	3	indian	1	15	15	0.5	2.94
							0				0				0		
10	Khayaban-e-sirsyed (North)	ali amir javeed	1	M	15	0.25	3.75	1	1	3	3	indian	1	15	15	0.5	2.94
							0				0				0		
10	Khayaban-e-sirsyed (North)	kamran sahab	1	M	15	0.25	3.75	1	1	3	3	indian	1	15	15	0.5	2.94
							0				0				0		
10	Khayaban-e-sirsyed (North)	ali amir javeed	1	M	20	0.25	5	1	1	3	3	indian	1	15	15	0.5	2.94
							0				0				0		
11	Khayaban-e-sirsyed (South)	Mehboob Ali Khan	1	M	15	0.25	3.75	1	1	3	3	indian	1	15	15	0.5	2.94
							0				0				0		
11	Khayaban-e-sirsyed (South)	yusaf sahab	1	M	10	0.25	2.5	1	1	3	3	indian	1	15	15	0.5	
							0				0				0		
11	Khayaban-e-sirsyed (South)	aayaz mehmod	1	M	15	0.25	3.75	2	1	3	6	indian	2	15	30	0.5	2.94
							0				0				0		
12	Dhok Najju	RIAZ AKHTAR	1	M	10	0.25	2.5	3	1	3	9	indian	2	15	30	1	
			2	M	10	0.25	2.5	2	1	3	6		1	15	15		
			3	F	6	0.25	1.5	2	1	3	6		1	15	15		
			4	F	11	0.25	2.75	2	1	3	6		1	15	15		
							0				0				0		
12	Dhok Najju	SOHAIL ABBAS	1	M	10	0.25	2.5	2	1	3	6	both	1	13	13	1	2.94
			2	F	8	0.25	2	2	1	3	6		1	13	13		2.94
							0				0				0		
12	Dhok Najju	SHEKH SHEHZAD	1	M	10	0.25	2.5	2	1	3	6	indian	2	15	30	1	2.94
			2	F	4	0.25	1	2	1	3	6		2	15	30		2.94
							0				0				0		
13	New Katarian	Haris	1	M	10	0.25	2.5	5	1	3	15	INDIAN	5	15	75	0.5	2.94
			2	M	6	0.25	1.5	4	1	3	12		4	15	60		2.94
							0				0				0		
13	New Katarian	MALIK SHAHBAZ HUSSAIN	1	M	10	0.25	2.5	2	2	3	12	indian	2	15	30	0.5	2.94
			2	F	20	0.25	5	2	1	3	6		2	15	30		2.94
			3	F	13	0.25	3.25	2	1	3	6		2	15	30		2.94
							0				0				0		
13	New Katarian	NOOR AHMED	1	M	15	0.25	3.75	2	2	3	12	indian	2	15	30	0.5	2.94
			2	F	10	0.25	2.5	2	2	3	12		2	15	30		2.94
			3	c	11	0.25	2.75	2	2	3	12		2	15	30		2.94
							0				0				0		
14	F-Block satellite Town	shahid	1	M	9	0.25	2.25	1	1	3	3	indian	1	15	15		2.94
			2	F	8	0.25	2	2	1	3	6		2	15	30		2.94
							0				0				0		
14	F-Block satellite Town	Mh.nazir	1	M	20	0.25	5	6	1	3	18	indian	2	15	30	1	2.94
			2	F	16	0.25	4	6	1	3	18		3	15	45		2.94
							0				0				0		
14	F-Block satellite Town	shafqat Rashool	1	M	16	0.25	4	2	1	3	6	indian	2	15	30	1	2.94
			2	F	13	0.25	3.25	3	1	3	9		3	15	45		2.94
							0				0				0		
15	Saidpur Scheme	Amir Butt	1	F	5	0.25	1.25	4	1	3	12	both	4	13	52	0.5	2.94
			2	M	7	0.25	1.75	3	1	3	9		3	13	39		2.94
			3	M	8	0.25	2	6	1	3	18		3	13	39		2.94
			4	F	9	0.25	2.25	4	1	3	12		3	13	39		2.94
			5	M	4	0.25	1	3	1	3	9		3	13	39		2.94
							0				0				0		
15	Saidpur Scheme	Amir Bashir	1	M	6	0.25	1.5	2	2	3	12	indian	2	15	30	0.75	2.94
			2	M	8	0.25	2	2	2	3	12		2	15	30		2.94
			3	M	6	0.25	1.5	2	2	3	12		2	15	30		2.94
			4	F	9	0.25	2.25	2	3	3	18		3	15	45		2.94
							0				0				0		
15	Saidpur Scheme	ali raza	1	M	10	0.25	2.5	4	1	3	12	English	3	13	39	0.5	
			2	M	15	0.25	3.75	2	1	3	6		2	13	26		
			3	M	23	0.25	5.75	2	1	3	6		2	13	26		
			4	M	15	0.25	3.75	5	1	3	15		5	13	65		
			5	F	23	0.25	5.75	4	1	3	12		4	13	52		
			6	F	22	0.25	5.5	3	1	3	9		3	13	39		
			7	F	16	0.25	4	2	1	3	6		2	13	26		
			8	F	24	0.25	6	5	1	3	15		5	13	65		
							0				0				0		

16	Mohalla Eidgah	Hafeez Ahmed	1	M	5	0.25	1.25	4	3	3	36	i	2	15	30		2.94
			2	F	5	0.25	1.25	4	3	3	36		3	15	45		2.94
			3	c	15	0.25	3.75	2	2	3	12		1	15	15		2.94
							0				0				0		
16	Mohalla Eidgah	Maqbool hussain	1	M	10	0.25	2.5	5	5	3	75		2	15	30		2.94
			2	F	10	0.25	2.5	5	5	3	75		1	15	15		2.94
			3	M	8	0.25	2	5	5	3	75		2	15	30		2.94
							0				0				0		
16	Mohalla Eidgah	M. Waqas Anwar	1	M	17	0.25	4.25	2	2	3	12	indian	2	15	30		
			2	F	16	0.25	4	4	2	3	24		3	15	45		
			3	F	16	0.25	4	4	2	3	24		3	15	45		
							0				0				0		
17	Dhok Babu Irfan	Najam al hassan	1	M	16	0.25	4	3	2	3	18	INDIAN	2	15	30	0.5	
			2	M	15	0.25	3.75	3	5	3	45		1	15	15		
			3	M	15	0.25	3.75	2	3	3	18		1	15	15		
			4	M	9	0.25	2.25	3	3	3	27		2	15	30		
			5	F	13	0.25	3.25	3	5	3	45		2	15	30		
			6	F	15	0.25	3.75	3	3	3	27		3	15	45		
			7	F	8	0.25	2	4	3	3	36		1	15	15		
							0				0				0		
17	Dhok Babu Irfan	Shoaib	1	M	14	0.25	3.5	3	4	3	36	both	2	13	26	0.5	2.94
			2	M	16	0.25	4	3	3	3	27		2	13	26		2.94
			3	M	16	0.25	4	3	3	3	27		1	13	13		2.94
			4	F	14	0.25	3.5	4	4	3	48		3	13	39		2.94
			5	F	10	0.25	2.5	3	4	3	36		2	13	26		2.94
			6	F	10	0.25	2.5	3	4	3	36		2	13	26		2.94
							0				0				0		
17	Dhok Babu Irfan	Saeed	1	M	14	0.25	3.5	3	4	3	36	both	2	13	26	0.5	2.94
			2	M	13	0.25	3.25	3	5	3	45		2	13	26		2.94
			3	M	10	0.25	2.5	4	5	3	60		2	13	26		2.94
			4	M	10	0.25	2.5	4	4	3	48		3	13	39		2.94
			5	F	10	0.25	2.5	3	5	3	45		2	13	26		2.94
			6	F	15	0.25	3.75	4	4	3	48		2	13	26		2.94
							0				0				0		
18	New Malpur Colony Pindora	Imran S. Khan	1	M	18	0.25	4.5	2	3	3	18	both	1	13	13	0.5	
			2	F	15	0.25	3.75	2	3	3	18		1	13	13		
			3	F	17	0.25	4.25	2	2	3	12		1	13	13		
							0				0				0		
18	New Malpur Colony Pindora	Rizwan	1	M	12	0.25	3	2	1	3	6	both	2	13	26	0.5	2.94
			2	F	8	0.25	2	1	1	3	3		2	13	26		2.94
			3	F	6	0.25	1.5	2	1	3	6		1	13	13		2.94
			4	F	5	0.25	1.25	2	1	3	6		1	13	13		2.94
			5	C	10	0.25	2.5	1	1	3	3		1	13	13		2.94
							0				0				0		
18	New Malpur Colony Pindora	Ab. Hameed	1	M	12	0.25	3	3	1	3	9	indian	1	15	15	0.5	
			2	F	10	0.25	2.5	3	1	3	9		1	15	15		
			3	M	10	0.25	2.5	3	1	3	9		1	15	15		
			4	M	10	0.25	2.5	3	1	3	9		1	15	15		
			5	F	10	0.25	2.5	3	1	3	9		1	15	15		
							0				0				0		
19	Mohalla Shareefabad	KHURAM JAVEED	1	F	40	0.25	10	2	1	3	6	indian	2	15	30	0.5	
			2	M	20	0.25	5	2	1	3	6		2	15	30		
							0				0				0		
19	Mohalla Shareefabad	RANA MUHAMMAD YOUNA	1	M	15	0.25	3.75	4	6	3	72	indian	3	15	45		2.94
			2	M	10	0.25	2.5	3	4	3	36		3	15	45		2.94
			3	F	8	0.25	2	4	5	3	60		4	15	60		2.94
			4	M	6	0.25	1.5	3	4	3	36		2	15	30		2.94
							0				0				0		
19	Mohalla Shareefabad	KHALIDA	1	F	8	0.25	2	5	5	3	75	indian	5	15	75		2.94
			2	M	10	0.25	2.5	4	4	3	48		4	15	60		2.94
							0				0				0		
20	Asghar mall Scheme	Mr. M. Basharat	1	M	6	0.25	1.5	4	2	3	24	both	4	13	52	0.5	2.94
			2	M	5	0.25	1.25	4	1	3	12		4	13	52		2.94
			3	F	6	0.25	1.5	4	4	3	48		4	13	52		2.94
			4	F	7	0.25	1.75	4	2	3	24		4	13	52		2.94
			5	F	6	0.25	1.5	3	1	3	9		3	13	39		2.94
							0				0				0		

20	Asghar mall Scheme	Iram Kalim Sheheryar	1	M	15	0.25	3.75	5	1	3	15	Indian,	1	13	13	0.5	2.94
			2	M	15	0.25	3.75	4	2	3	24		1	13	13		2.94
			3	M	15	0.25	3.75	3	1	3	9		1	13	13		2.94
			4	F	6	0.25	1.5	5	3	3	45		1	13	13		2.94
			5	F	12	0.25	3	3	3	3	27		1	13	13		2.94
			6	F	15	0.25	3.75	3	2	3	18		1	13	13		2.94
			7	M	13	0.25	3.25	4	2	3	24		1	13	13		2.94
							0				0				0		
20	Asghar mall Scheme	Dr. Minhas	1	M	17	0.25	4.25	2	1	3	6	indian	1	15	15		2.94
			2	F	13	0.25	3.25	2	2	3	12		1	15	15		2.94
							0				0				0		
21	Dhok Kala Khan	saleem aqbal	1	M	15	0.25	3.75	2	2	3	12	indian	2	15	30		2.94
			2	M	11	0.25	2.75	1	2	3	6		1	15	15		2.94
							0				0				0		
21	Dhok Kala Khan	chuhdray jaweed	1	M	9	0.25	2.25	5	2	3	30	wester	2	13	26		2.94
			2	M	13	0.25	3.25	2	2	3	12		1	13	13		2.94
			3	F	14	0.25	3.5	5	3	3	45		2	13	26		2.94
							0				0				0		
21	Dhok Kala Khan	yousaf masih	1	M	8	0.25	2	5	3	3	45	both	4	13	52	1	2.94
			2	M	10	0.25	2.5	3	1	3	9		2	13	26		2.94
			3	M	10	0.25	2.5	3	2	3	18		2	13	26		2.94
			4	M	10	0.25	2.5	3	1	3	9		2	13	26		2.94
			5	F	5	0.25	1.25	5	4	3	60		3	13	39		2.94
			6	F	7	0.25	1.75	5	1	3	15		4	13	52		2.94
							0				0				0		
22	Qayyumabad	Chaoudhry Meharban	1	M	14	0.25	3.5	2	4	3	24	indian	2	15	30		2.94
							0				0				0		
22	Qayyumabad	Abdul ghafoor	1	M	10	0.25	2.5	1	2	3	6	indian	1	15	15	0.75	2.94
			2	F	7	0.25	1.75	2	3	3	18		2	15	30		2.94
							0				0				0		
22	Qayyumabad	ALI SHEER	1	M	10	0.25	2.5	2	5	3	30	indian	2	15	30	0.75	2.94
			2	F	16	0.25	4	1	3	3	9		1	15	15		2.94
							0				0				0		
23	Dhok Kashmirian	Mrs Muhammad saleem	1	M	15	0.25	3.75	2	2	3	12	indian	1	15	15	0.5	2.94
			2	F	10	0.25	2.5	2	2	3	12		1	15	15		2.94
			3	c	11	0.25	2.75	2	2	3	12		1	15	15		2.94
							0				0				0		
23	Dhok Kashmirian	Mrs Muneer	1	F	12	0.25	3	5	5	3	75	indian	1	15	15	0.5	2.94
			2	M	10	0.25	2.5	5	5	3	75		1	15	15		2.94
							0				0				0		
23	Dhok Kashmirian	M-Naqeeb Abbasi	1	M	15	0.25	3.75	2	2	3	12		2	15	30		2.94
			2	F	15	0.25	3.75	2	2	3	12		2	15	30		2.94
			3	c	10	0.25	2.5	3	1	3	9		1	15	15		2.94
			4	c	5	0.25	1.25	3	1	3	9		1	15	15		2.94
							0				0				0		
24	Khana Kak,Dhok Ali Akbar	M Irfan	1	M	10	0.25	2.5	1	2	3	6	INDIAN	1	15	15	0.5	2.94
			2	M	6	0.25	1.5	2	2	3	12		1	15	15		2.94
			3	M	9	0.25	2.25	1	2	3	6		1	15	15		2.94
							0				0				0		
			1	M	8	0.25	2	2	2	3	12		1	15	15		2.94
24	Khana Kak,Dhok Ali Akbar	Danish Iqbal	2	M	8	0.25	2	3	1	3	9	INDIAN	1	15	15	0.5	
			3	M	8	0.25	2	2	2	3	12		2	15	30		
			4	F	8	0.25	2	3	1	3	9		1	15	15		
			5	F	8	0.25	2	2	1	3	6		1	15	15		
			6	F	8	0.25	2	1	1	3	3		1	15	15		
			7	c	8	0.25	2	2	1	3	6		1	15	15		
			8	c	8	0.25	2	4	3	3	36		3	15	45		
			9	c	8	0.25	2	1	2	3	6		2	15	30		
			10	c	8	0.25	2	3	1	3	9		1	15	15		
			11	c	8	0.25	2	2	1	3	6		1	15	15		
							0				0				0		
24	Khana Kak,Dhok Ali Akbar	HAROON AHMED	1	F	15	0.25	3.75	2	1	3	6	indian	1	15	15	0.75	
							0				0				0		
25	Sadiqabad	Syed Qasim Ali	1	M	30	0.25	7.5	4	4	3	48	INDIAN	2	15	30	0.5	2.94
			2	M	12	0.25	3	3	4	3	36		2	15	30		2.94
			3	F	20	0.25	5	4	5	3	60		1	15	15		2.94
			4	F	15	0.25	3.75	3	3	3	27		3	15	45		2.94
			5	F	15	0.25	3.75	3	4	3	36		2	15	30		2.94
							0				0				0		

25	Sadiqabad	Asim Khan	1	M	20	0.25	5	8	8	3	192	Indian	2	15	30	0.5	2.94
							0				0				0		
25	Sadiqabad	Abdurehman	1	F	10	0.25	2.5	3	1	3	9	Both	2	13	26	0.5	2.94
			2	F	10	0.25	2.5	4	1	3	12		2	13	26		2.94
			3	F	15	0.25	3.75	2	1	3	6		1	13	13		2.94
			4	M	20	0.25	5	2	1	3	6		1	13	13		2.94
			5	M	24	0.25	6	2	1	3	6		2	13	26		2.94
			6	M	10	0.25	2.5	2	1	3	6		1	13	13		2.94
			7	M	7	0.25	1.75	1	1	3	3		1	13	13		2.94
							0				0				0		
26	Afandi Colony	M. Nauman	1	M	16	0.25	4	2	1	3	6	indian	1	15	15	0.75	2.94
			2	M	14	0.25	3.5	2	1	3	6		2	15	30		2.94
			3	F	16	0.25	4	2	1	3	6		1	15	15		2.94
			4	F	14	0.25	3.5	3	1	3	9		1	15	15		2.94
							0				0				0		
26	Afandi Colony	M. Umer Asghar	1	M	13	0.25	3.25	1	1	3	3	both	1	13	13	0.75	2.94
			2	M	10	0.25	2.5	2	1	3	6		1	13	13		2.94
			3	F	10	0.25	2.5	3	1	3	9		1	13	13		2.94
							0				0				0		
26	Afandi Colony	Khuwaja Younis	1	M	13	0.25	3.25	2	1	3	6	indian	2	15	30	1	2.94
			2	M	9	0.25	2.25	2	1	3	6		1	15	15		2.94
			3	F	10	0.25	2.5	1	1	3	3		1	15	15		2.94
							0				0				0		
27	Muslim Town (East)	Tariq M Meer	1	M	10	0.25	2.5	3	5	3	45	indian	2	15	30	0.5	2.94
			2	F	15	0.25	3.75	2	5	3	30		1	15	15		2.94
							0				0				0		
27	Muslim Town (East)	Ameer asim	1	M	10	0.25	2.5	2	1	3	6	indian	1	15	15	0.5	2.94
							0				0				0		
27	Muslim Town (East)	Nadar Khan	2	F	15	0.25	3.75	2	2	3	12	indian	2	15	30	0.5	
			3	c	10	0.25	2.5	3	1	3	9	-	1	15	15		
							0				0				0		
28	Muslim Town (West)	M Saddiq	1	M	10	0.25	2.5	3	1	3	9	Indian	3	15	45	1	2.94
			2	F	15	0.25	3.75	4	1	3	12		3	15	45		2.94
			3	F	16	0.25	4	3	1	3	9		3	15	45		2.94
			4	F	20	0.25	5	1	1	3	3		1	15	15		2.94
							0				0				0		
28	Muslim Town (West)	Zafar Iqbal	1	M	10	0.25	2.5	2	2	3	12	Indian	2	15	30	1	2.94
			2	M	15	0.25	3.75	1	2	3	6		1	15	15		2.94
			3	F	17	0.25	4.25	2	2	3	12		2	15	30		2.94
							0				0				0		
28	Muslim Town (West)	Saleem	1	M	17	0.25	4.25	2	1	3	6	Indian	2	15	30		
			2	F	16	0.25	4	4	1	3	12		2	15	30		
			3	F	16	0.25	4	4	1	3	12		2	15	30		
							0				0				0		
29	Khurram Colony	Shabir	1	M	10	0.25	2.5	4	8	3	96	I	4	15	60	1.5	2.94
			2	M	10	0.25	2.5	4	10	3	120		4	15	60		2.94
			3	M	9	0.25	2.25	5	11	3	165		5	15	75		2.94
			4	F	10	0.25	2.5	4	10	3	120		4	15	60		2.94
			5	F	10	0.25	2.5	3	8	3	72		2	15	30		2.94
							0				0				0		
29	Khurram Colony	Rasheed	1	M	10	0.25	2.5	4	8	3	96	I	4	15	60	NA	2.94
			2	F	9	0.25	2.25	4	10	3	120		3	15	45		2.94
			3	F	8	0.25	2	3	10	3	90		3	15	45		2.94
			4	M	11	0.25	2.75	5	12	3	180		5	15	75		2.94
							0				0				0		
29	Khurram Colony	Allauddin	1	M	11	0.25	2.75	5	10	3	150	I	5	15	75	0.75	2.94
			2	M	11	0.25	2.75	4	10	3	120		4	15	60		2.94
			3	M	10	0.25	2.5	4	10	3	120		4	15	60		2.94
			4	F	10	0.25	2.5	3	10	3	90		3	15	45		2.94
			5	F	10	0.25	2.5	5	12	3	180		5	15	75		2.94
			6	F	10	0.25	2.5	5	12	3	180		5	15	75		2.94
			7	M	11	0.25	2.75	3	8	3	72		3	15	45		2.94
							0				0				0		
30	Chah Sultan	M. Riaz	1	M	10	0.25	2.5	2	1	3	6	indian	1	15	15	0.75	2.94
			2	M	8	0.25	2	1	1	3	3		1	15	15		2.94
			3	F	5	0.25	1.25	4	1	3	12		2	15	30		2.94
			4	F	5	0.25	1.25	2	1	3	6		1	15	15		2.94
			5	M	10	0.25	2.5	2	1	3	6		1	15	15		2.94
							0				0				0		

30	Chah Sultan	Israr	1	M			0		0	2	1	25	50	1	5	4	20	1	10	40	2	1	8	3	5	60
			2	M			0		0	1	1	25	25	1	4	4	16			0	2	1	8	2	5	40
			3	M			0		0	1	1	25	25	1	5	4	20			0	2	1	8	3	5	60
			4	M			0		0	1	1	25	25	1	5	4	20			0	2	1	8	4	5	80
			5	F			0		0	1	1	25	25	1	5	4	20			0	2	1	8	5	5	100
			6	F			0		0	1	1	25	25	1	5	4	20			0	2	1	8	5	5	100
			7	F			0		0	1	1	25	25	1	5	4	20			0	- 2	1	8	5	5	100
			8	M			0		0	1	1	25	25	1	5	4	20			0	2	1	8	5	5	100
							0		0								0			0			0			0
30	Chah Sultan	M.Waheed	1	M	6.5	10	65	1	65					1	2	4	8	1	5	20	4	1	16	3	1	12
			2	M	6.5	10	65	2	130					1	2	4	8	1	5	20	6	1	24	5	1	20
			3	F	6.5	10	65	1	65					1	2	4	8			0	1	1	4	1	1	4
							0		0								0			0			0			0
31	Dhok Hukam Dad	sadaqt	1	M	6.5	10	65	1	65					1	5	4	20			0	4	1	16			0
			2	M	6.5	10	65	1	65					1	5	4	20			0	5	1	20			0
							0		0								0			0			0			0
31	Dhok Hukam Dad	Ishaq Ahmad	1	M	6.5	12	78	2	156					1	5	4	20			0	4	1	16			0
			2	M	6.5	10	65	2	130					1	5	4	20			0	3	1	12			0
							0		0								0			0			0			0
.31	Dhok Hukam Dad	Shahid Sultan	1	M	6.5	10	65	1	65					1	5	4	20			0	2	1	8			0
			2	F	6.5	10	65	1	65					1	5	4	20			0	2	1	8			0
							0		0								0			0			0			0
32	AmarPura	Haji M. Shafi S	1	M	6.5	15	97.5	1	97.5					1	2	4	8			0	1	2	8			0
			2	M	6.5	20	130	2	260					1	1	4	4			0	2	1	8			0
			3	F	6.5	15	97.5	1	97.5					1	5	4	20			0	4	2	32			0
							0		0								0			0			0			0
32	AmarPura	Muhammad Ic	1	M	6.5	15	97.5	1	97.5					1	10	4	40			0	3	3	36			0
			2	M	6.5	15	97.5	1	97.5					1	5	4	20			0	4	2	32			0
							0		0								0			0			0			0
32	AmarPura	Dilawar Hassa	1	M	6.5	10	65	2	130					2	5	4	40			0	4	1	16			0
			2	F	6.5	8	52	1	52					2	2	4	16			0	3	4	48			0
			3	F	6.5	8	52	1	52					1	2	4	8			0	3	3	36			0
							0		0								0			0			0			0
33	Kartar Pura	majid ali	1	M	6.5	7	45.5	1	45.5					1	2	4	8			0	2	2	16			0
			2	M	6.5	8	52	1	52					1	2	4	8			0	3	1	12			0
			3	F	6.5	10	65	1	65					2	2	4	16			0	6	2	48			0
			4	F	6.5	9	58.5	1	58.5					2	2	4	16			0	4	4	64			0
			5	F	6.5	10	65	1	65					1	2	4	8			0	5	3	60			0
							0		0								0			0			0			0
33	Kartar Pura	khalida maqb	1	M	6.5	10	65	1	65					1	5	4	20			0	1	3	12			0
			2	M	6.5	8	52	1	52					2	5	4	40			0	4	3	48			0
			3	F	6.5	6	39	1	39					1	5	4	20			0	7	2	56			0
			4	F	6.5	7	45.5	1	45.5					2	5	4	40			0	6	2	48			0
			5	F	6.5	6	39	1	39					2	5	4	40			0	4	1	16			0
							0		0								0			0			0			0
33	Kartar Pura	abdulrahman	1	M	6.5	8	52	1	52					2	5	4	40			0	5	3	60			0
			2	F	6.5	10	65	1	65					2	5	4	40			0	3	1	12			0
			3	F	6.5	10	65	1	65					2	5	4	40			0	4	1	16			0
			4	M	6.5	6	39	2	78					1	3	4	12			0	3	3	36			0
							0		0								0			0			0			0
34	Banni	ali ahmad	1	M			0		0	3	2	25	150	2	5	4	40			0	2	3	24			0
			2	F			0		0	2	1	25	50	2	5	4	40			0	2	3	24			0
							0		0				0				0			0			0			0
34	Banni	malik muham	1	M			0		0	2	3	25	150	1	5	4	20			0	2	3	24			0
							0		0				0				0			0			0			0
34	Banni	muhammad ra	1	M			0		0	2	2	25	100	1	5	4	20			0	2	2	16			0
			2	F			0		0	2	3	25	150	1	5	4	20			0	3	2	24			0
							0		0				0				0			0			0			0
35	Mohalla Imam bargah	AZIZ NASEEM	1	M	6.5	10	65	3	195				0	1	10	4	40			0	2	2	16			0
							0		0				0				0			0			0			0
35	Mohalla Imam bargah	AURANGZAIB	1	M	6.5	10	65	4	260				0	1	10	4	40			0	1	2	8			0
							0		0				0				0			0			0			0
35	Mohalla Imam bargah	M.hussain	1	M			0		0	2	3	25	150	1	10	4	40			0	1	2	8			0
							0		0				0				0			0			0			0

36	Mohan pura	Hamid Haseeb	1	M	10	0.25	2.5	5	1	3	15	English	5	13	65	0.5	
							0				0				0		
36	Mohan pura	Sheikh khalid	1	M	9	0.25	2.25	2	1	3	6	Indian	2	15	30		2.94
			2	F	15	0.25	3.75	3	1	3	9		3	15	45		2.94
							0				0				0		
36	Mohan pura	Raja Amjad	1	M	10	0.25	2.5	1	1	3	3	indian	1	15	15	0.5	2.94
							0				0				0		
37	Dhok Dadal	Nazir ahamed	1	M	15	0.25	3.75	4	1	3	12	indian	1	15	15	0.5	2.94
			2	M	13	0.25	3.25	1	2	3	6		2	15	30		2.94
			3	M	8	0.25	2	2	2	3	12		1	15	15		2.94
			4	F	12	0.25	3	2	2	3	12		2	15	30		2.94
			5	F	7	0.25	1.75	1	3	3	9		1	15	15		2.94
			6	M	13	0.25	3.25	2	2	3	12		2	15	30		2.94
			7	F	10	0.25	2.5	3	2	3	18		1	15	15		2.94
							0				0				0		
37	Dhok Dadal	Arshad Mehmood Butt	1	M	15	0.25	3.75	2	2	3	12	indian	2	15	30	0.5	2.94
			2	F	15	0.25	3.75	2	2	3	12		2	15	30		2.94
			3	F	12	0.25	3	3	2	3	18		2	15	30		2.94
							0				0				0		
37	Dhok Dadal	Zohaib Hassan	1	M	24	0.25	6	3	3	3	27	English	2	13	26	0.5	
			2	M	20	0.25	5	5	2	3	30		2	13	26		
			3	F	18	0.25	4.5	4	4	3	48		2	13	26		
			4	F	15	0.25	3.75	2	3	3	18		1	13	13		
			5	F	10	0.25	2.5	4	2	3	24		2	13	26		
			6	F	20	0.25	5	5	3	3	45		4	13	52		
			7	M	24	0.25	6	3	2	3	18		2	13	26		
							0				0				0		
38	Ganj Mandi	Zrar khan	1	M	20	0.25	5	3	1	3	9	English	3	13	39	0.5	2.94
			2	M	24	0.25	6	2	1	3	6		2	13	26		2.94
			3	F	24	0.25	6	5	1	3	15		5	13	65		2.94
							0				0				0		
38	Ganj Mandi	Shahzar Ali	1	M	24	0.25	6	3	1	3	9	English	2	13	26	0.5	
			2	F	20	0.25	5	3	1	3	9		2	13	26		
			3	M	15	0.25	3.75	3	1	3	9		2	13	26		
							0				0				0		
38	Ganj Mandi	Zahid Khattak	1	M	15	0.25	3.75	3	1	3	9	English	3	13	39	0.5	
			2	M	20	0.25	5	2	1	3	6		2	13	26		
			3	F	18	0.25	4.5	2	1	3	6		2	13	26		
			4	F	23	0.25	5.75	5	1	3	15		2	13	26		
							0				0				0		
39	Waris Khan	Atif Munnawar	1	M	10	0.25	2.5	3	4	3	36	weste	2	13	26		2.94
			2	F	5	0.25	1.25	2	4	3	24		2	13	26		2.94
							0				0				0		
39	Waris Khan	M. Saleem	1	F	24	0.25	6	2	2	3	12	indian	1	15	15	0.5	2.94
			2	M	17	0.25	4.25	4	3	3	36		3	15	45		2.94
							0				0				0		
39	Waris Khan	sahrab ali khan	1	M	12	0.25	3	2	2	3	12	both	2	13	26	0.75	
							0				0				0		
40	Purana Qilla	M. Shakil	1	M	10	0.25	2.5	2	1	3	6	Indian	1	15	15	1	2.94
			2	M	12	0.25	3	1	1	3	3		1	15	15		2.94
			3	M	14	0.25	3.5	3	1	3	9		2	15	30		2.94
			4	F	11	0.25	2.75	1	1	3	3		1	15	15		2.94
			5	F	9	0.25	2.25	2	1	3	6		1	15	15		2.94
			6	F	11	0.25	2.75	1	1	3	3		1	15	15		2.94
							0				0				0		
40	Purana Qilla	Naseemuddin	1	F	10	0.25	2.5	4	5	3	60	Indian	2	15	30	1	2.94
			2	F	15	0.25	3.75	1	1	3	3		1	15	15		2.94
			3	F	12	0.25	3	1	1	3	3		1	15	15		2.94
							0				0				0		
40	Purana Qilla	Muhammad Naseer	1	M	15	0.25	3.75	2	2	3	12	indian	2	15	30	0.5	
			2	F	16	0.25	4	2	2	3	12		2	15	30		
			3	c	8	0.25	2	4	1	3	12		1	15	15		
							0				0				0		
41	Saidpuri Gate	chuadry muhammad ilyas	1	M	13	0.25	3.25	2	2	3	12	both	1	13	13	0.75	2.94
			2	M	16	0.25	4	3	2	3	18		2	13	26		2.94
			3	F	10	0.25	2.5	5	2	3	30		3	13	39		2.94
			4	F	15	0.25	3.75	4	2	3	24		3	13	39		2.94
							0				0				0		

41	Saidpuri Gate	muhammad bilal qureshi	1	M	15	0.25	3.75	2	2	3	12	indian	2	15	30	0.5	2.94
							0				0				0		
41	Saidpuri Gate	muhammad shabir	1	M	10	0.25	2.5	3	3	3	27	indian	2	15	30		
			2	M	9	0.25	2.25	3	4	3	36		2	15	30		
			3	F	8	0.25	2	2	2	3	12		1	15	15		
							0				0				0		
42	Millat Colony	HASAN ABDUL WAHID	1	F	10	0.25	2.5	2	2	3	12	indian	2	15	30	0.5	2.94
			2	c	13	0.25	3.25	2	2	3	12		2	15	30		2.94
							0				0				0		
42	Millat Colony	khuram Shehzad	1	M	21	0.25	5.25	4	4	3	48		4	15	60		2.94
			2	M	13	0.25	3.25	2	3	3	18	indian	2	15	30	0.75	2.94
							0				0				0		
42	Millat Colony	Liaqat Ali Azeem	1	M	10	0.25	2.5	5	12	3	180	i	4	15	60	0.75	2.94
			2	F	10	0.25	2.5	5	12	3	180		3	15	45		2.94
			3	F	10	0.25	2.5	4	12	3	144		4	15	60		2.94
							0				0				0		
43	Dhok Khabba	Hafiz Akhtar	1	M	15	0.25	3.75	2	1	3	6	indian	2	15	30	0.5	
			2	M	17	0.25	4.25	2	1	3	6		2	15	30		
			3	f	8	0.25	2	4	1	3	12		2	15	30		
							0				0				0		
43	Dhok Khabba	M Ashraf	1	M	7	0.25	1.75	2	1	3	6	indian	2	15	30	3.4	
			2	M	16	0.25	4	3	1	3	9		1	15	15		
			3	F	17	0.25	4.25	2	1	3	6		2	15	30		
							0				0				0		
43	Dhok Khabba	Amjad mehmood	1	M	10	0.25	2.5	2	1	3	6	indian	2	15	30	1	
			2	M	14	0.25	3.5	3	1	3	9		2	15	30		
			3	F	9	0.25	2.25	3	1	3	9		1	15	15		
							0				0				0		
44	Dhok Farman ali	wasif khan	1	M	3	0.25	0.75	2	2	3	12	indian	2	15	30	1	
			2	M	3	0.25	0.75	1	2	3	6		1	15	15		
			3	F	2	0.25	0.5	3	2	3	18		3	15	45		
			4	M	1	0.25	0.25	2	2	3	12		2	15	30		
			5	M	1	0.25	0.25	1	2	3	6		1	15	15		
							0				0				0		
44	Dhok Farman ali	Malik Rizwan Ahmed	1	M	10	0.25	2.5	2	1	3	6	Indian	2	15	30	1	2.94
			2	M	10	0.25	2.5	2	1	3	6		2	15	30		2.94
			3	F	15	0.25	3.75	1	1	3	3		1	15	15		2.94
			4	F	17	0.25	4.25	2	1	3	6		2	15	30		2.94
							0				0				0		
44	Dhok Farman ali	Muhammad Asif	1	M	10	0.25	2.5	2	1	3	6	Indian	2	15	30		2.94
			2	F	16	0.25	4	1	1	3	3		1	15	15		2.94
							0				0				0		
45	Chamanzar Colony	Ali Ahmad	1	M	10	0.25	2.5	2	1	3	6	indian	1	15	15	1	
			2	F	6	0.25	1.5	2	1	3	6		1	15	15		
							0				0				0		
45	Chamanzar Colony	Gul Bas	1	M	10	0.25	2.5	1	1	3	3	both	1	13	13	1	
			2	F	8	0.25	2	1	1	3	3		1	13	13		
							0				0				0		
45	Chamanzar Colony	Dr. Shoaib Khan	1	M	10	0.25	2.5	1	1	3	3	indian	1	15	15	1	
			2	F	7	0.25	1.75	2	1	3	6		1	15	15		
							0				0				0		
46	Chachi Mohalla	Major Safdar Waqar	1	M	3	0.25	0.75	1	4	3	12	english	1	13	13	0.5	
							0				0				0		
46	Chachi Mohalla	Sajjad Mehmood Jan	1	M	15	0.25	3.75	3	6	3	54	both	2	13	26	0.5	2.94
			2	C	8	0.25	2	4	4	3	48		2	13	26		2.94
			3	F	20	0.25	5	3	4	3	36		2	13	26		2.94
			4	F	15	0.25	3.75	4	6	3	72		3	13	39		2.94
							0				0				0		
46	Chachi Mohalla	Mr. Adnan	1	M	10	0.25	2.5	5	13	3	195	i	5	15	75	0.75	2.94
			2	M	10	0.25	2.5	5	12	3	180		5	15	75		2.94
			3	F	11	0.25	2.75	5	10	3	150		5	15	75		2.94

UC	Ucs AREA's Name	Name	person	Sex				Shower Bat		Bucket Bath				Teeth Brushing				Shaving			Hand & Face washing			Ablution		
		house owner name	n serial no	=male F=f	flow/min (liter	Time of one use	Litres for each	No Of Tim	water used in a	No Of Tim	No Of Bu	Avg bu	Litres On	No Of Tim	Time for	tap flow/	Litres On	No Of	Time for tap	Litres One	No Of Times in day	Time of one use	Litres One time	No Of Time	Time of one	Litres One
1	Rata Amral	Amir	1	M	6.5	10	65	1	65					1	2	4	8				5	2	40	5	2	40
			2	M	6.5	10	65	1	65					1	2	4	8				5	2	40	5	2	40
			3	M	6.5	10	65	1	65					1	2	4	8				5	2	40	5	2	40
			4	M	6.5	10	65	1	65					1	2	4	8				5	2	40	5	2	40
			5	F	6.5	15	97.5	1	97.5					1	2	4	8				5	2	40	5	5	100
			6	F	6.5	15	97.5	1	97.5					1	2	4	8				5	2	40	5	5	100
			7	C	6.5	5	32.5	1	32.5					1	2	4	8				5	2	40			0
			8	C	6.5	5	32.5	1	32.5					1	2	4	8				5	2	40			0
1	Rata Amral	M. Ajmal Butt	1	M	6.5	10	65	1	65					1	2	4	8				5	2	40	5	2	40
1	Rata Amral	Abdul Khaliq	1	M	6.5	10	65	1	65					1	5	4	20	1	5	20	5	1	20	5	2	40
2	Milad Nagar, Dhok Ratt	Naveed	1	M			0		0	1	1	25	25	1	2	4	8			0	5	2	40	4	2	32
2	Milad Nagar, Dhok Ratt	Nasir Abbas	1	M			0		0	2	1	25	50	1	2	4	8			0	2	2	16	5	1	20
2	Milad Nagar, Dhok Ratt	Javed Iqbal	1	M			0		0	2	1	25	50	1	2	4	8			0	4	2	32	4	2	32
3	Mazhar Abad Hazara Co	RAFI ULLAH SH	1	M	6.5	15	97.5	1	97.5					2	10	4	80	1	5	20	3	2	24	5	10	200
			2	F	6.5	15	97.5	2	195					2	10	4	80			0	4	2	32	5	5	100
3	Mazhar Abad Hazara Co	MALIK MUBIN	1	M	6.5	10	65	2	130					1	5	4	20	1	5	20	2	2	16	4	1	16
			2	M	6.5	10	65	2	130					1	5	4	20	1	5	20	2	2	16	3	1	12
			3	F	6.5	10	65	3	195					1	5	4	20			0	3	2	24	3	1	12
			4	F	6.5	10	65	3	195					3	5	4	60			0	2	2	16			0
3	Mazhar Abad Hazara Co	SHAIKH ADNA	1	M	6.5	10	65	3	195					2	5	4	40	1	10	40	3	2	24	2	1	8
			2	F	6.5	10	65	1	65					2	5	4	40			0	2	2	16	8	1	32
4	Dhok Mangtal	Muhammad Na	1	M	6.5	5	32.5	2	65					1	5	4	20			0	1	1	4	1	1	4
4	Dhok Mangtal	Mubasher Hass	1	M			0		0	1	1	25	25	1	2	4	8			0	3	1	12	3	2	24
4	Dhok Mangtal	Hamid Hussain	1	M	6.5	15	97.5	1	97.5					2	10	4	80	1	5	20	3	2	24	5	10	200
			2	F	6.5	15	97.5	2	195					2	10	4	80			0	4	2	32	5	5	100
5	Alim abad, Dhok Hassu	M nasir Fayaz	1	M	6.5	10	65	2	130					2	2	4	16	1	5	20	4	2	32	3	1	12
			2	F	6.5	10	65	3	195					3	2	4	24			0	5	2	40	4	1	16
5	Alim abad, Dhok Hassu	malik nadeem	1	M	6.5	5	32.5	2	65					1	5	4	20			0	1	1	4	1	1	4
5	Alim abad, Dhok Hassu	Maqbool shah	1	M			0		0	1	1	25	25	1	2	4	8			0	3	1	12	3	2	24
							0		0								0			0			0			0
6	Alim abad, Dhok Hassu	Nadeem shah	1	M			0		0	2	2	25	100	2	2	4	16			0	1	1	4	5	2	40
							0		0								0			0			0			0
6	Alim abad, Dhok Hassu	zahid Mehmo	1	M			0		0	1	4	25	100	1	1	4	4			0	4	1	16	2	1	8
							0		0								0			0			0			0
6	Alim abad, Dhok Hassu	fazal ur Rehm	1	M	6.5	10	65	2	130					3	2	4	24			0	5	2	40	5	1	20
							0		0								0			0			0			0
7	Mohalla Muslim abad	MAQBOOL AH	1	M	6.5	10	65	2	130					1	5	4	20	1	5	20	3	2	24	4	1	16
			2	M	6.5	10	65	1	65					1	5	4	20	1	5	20	2	2	16	1	7	28
			3	F			0		0	2	1	25	50	1	5	4	20			0	4	2	32			0
							0		0								0			0			0			0
7	Mohalla Muslim abad	ARSLAM RASO	1	M			0		0	1	1	25	25	2	5	4	40	1	5	20	4	2	32	5	1	20
			2	F			0		0	2	1	25	50	3	5	4	60			0	6	2	48	3	1	12
							0		0								0			0			0			0
7	Mohalla Muslim abad	ZULFIKAR ALI	1	M			0		0	2	2	30	120	1	5	4	20	1	5	20	1	3	12	3	1	12
			2	M			0		0	2	2	30	120	3	5	4	60	1	5	20	1	3	12	1	1	4
			3	M			0		0	1	2	30	60	1	5	4	20			0	2	3	24	2	1	8
			4	F			0		0	1	2	30	60	2	5	4	40			0	3	3	36	4	1	16
			5	F			0		0	2	2	30	120	2	5	4	40			0	1	3	12	1	1	4
							0		0				0				0			0			0			0
8	Fauji Colony, peerwadh	Nazeer Khan	1	M	6.5	10	65	1	65				0	2	2	4	16	1	2	8	2	1	8	2	1	8
			2	F	6.5	10	65	1	65				0	3	2	4	24			0	4	1	16			0
							0		0				0				0			0			0			0
8	Fauji Colony, peerwadh	Masood Akhtar	1	M			0		0	2	1	25	50	2	5	4	40	1	10	40	4	5	80	3	5	60
			2	F			0		0	2	1	25	50	3	5	4	60			0	3	5	60	3	5	60
			3	F			0		0	2	1	25	50	1	5	4	20			0	1	5	20	3	5	60
			4	F			0		0	2	1	25	50	3	5	4	60			0	2	5	40			0
							0		0				0				0			0			0			0
8	Fauji Colony, peerwadh	Hafeez ur Rehr	2	F			0		0	2	1	30	60	3	5	4	60			0	5	2	40	3	1	12
			3	F			0		0	1	1	30	30	1	5	4	20			0	1	2	8			0
							0		0								0			0			0			0
9	Zia-ul-Haq Colony	Atta Hussain	1	M	6.5	5	32.5	1	32.5					2	2	4	16	1	2	8	4	1	16	5	2	40
							0		0								0			0			0			0

9	Zia-ul-Haq Colony	Ehsaanullah	1	M	6.5	20	130	1	130					1	5	4	20	1	5	20	4	2	32	3	1	12
			2	F	6.5	20	130	1	130					1	5	4	20			0	1	2	8	1	1	4
			3	F	6.5	20	130	4	520					2	5	4	40			0	3	2	24	2	1	8
			4	F	6.5	20	130	2	260					2	5	4	40			0	1	2	8	1	1	4
							0		0								0			0			0			0
9	Zia-ul-Haq Colony	Kaleem Aslam	1	M	6.5	15	97.5	1	97.5					1	2	4	8			0	3	2	24	5	5	100
							0		0								0			0			0			0
10	Khayaban-e-sirsyed (N	ali amir javeed	1	M	6.5	10	65	1	65					1	2	4	8			0	1	2	8	5	3	60
							0		0								0			0			0			0
10	Khayaban-e-sirsyed (N	kamran sahab	1	M	6.5	10	65	3	195					1	2	4	8			0	3	2	24			0
							0		0								0			0			0			0
10	Khayaban-e-sirsyed (N	ali amir javeed	1	M	6.5	15	97.5	1	97.5					1	2	4	8			0	2	1	8	3	2	24
							0		0								0			0			0			0
11	Khayaban-e-sirsyed (Sc	Mehboob Ali	1	M	6.5	20	130	1	130					1	2	4	8			0	2	2	16	3	3	36
							0		0								0			0			0			0
11	Khayaban-e-sirsyed (Sc	yusaf sahab	1	M			0		0	1	1	30	30	1	2	4	8	1	5	20	1	1	4			0
							0		0								0			0			0			0
11	Khayaban-e-sirsyed (Sc	aayaz mehmo	1	M	6.5	10	65	1	65					1	2	4	8			0	5	1	20	5	2	40
							0		0								0			0			0			0
12	Dhok Najju	RIAZ AKHTAR	1	M			0		0	4	1	30	120	1	1	4	4	1	5	20	5	1	20	5	1	20
			2	M			0		0	3	1	30	90	1	1	4	4	1	5	20	4	1	16	5	1	20
			3	F			0		0	2	1	30	60	1	1	4	4			0	3	1	12	5	1	20
			4	F			0		0	3	1	30	90	1	1	4	4			0	4	1	16	5	1	20
							0		0								0			0			0			0
12	Dhok Najju	SOHAIL ABBAS	1	M	6.5	5	32.5	2	65					1	2	4	8	1	2	8	4	1	16	5	1	20
			2	F	6.5	5	32.5	1	32.5					1	2	4	8			0	3	1	12	5	1	20
							0		0								0			0			0			0
12	Dhok Najju	SHEKH SHEHZA	1	M	6.5	5	32.5	2	65					1	3	4	12	1	3	12	2	1	8	5	1	20
			2	F	6.5	5	32.5	2	65					1	3	4	12			0	2	1	8	5	1	20
							0		0								0			0			0			0
13	New Katarian	Haris	1	M	6.5	12	78	1	78					1	2	4	8			0	3	3	36			0
			2	M	6.5	15	97.5	1	97.5					2	1	4	8			0	4	3	48			0
							0		0								0			0			0			0
13	New Katarian	MALIK SHAHB	1	M	6.5	10	65	1	65					1	5	4	20			0	5	2	40			0
			2	F	6.5	10	65	1	65					2	2	4	16			0	1	2	8			0
			3	F	6.5	10	65	1	65					1	3	4	12			0	2	3	24			0
							0		0								0			0			0			0
13	New Katarian	NOOR AHMED	1	M	6.5	10	65	3	195					1	4	4	16			0	3	2	24			0
			2	F	6.5	10	65	3	195					1	2	4	8			0	3	3	36			0
			3	c	6.5	10	65	2	130					1	6	4	24			0	4	4	64			0
							0		0								0			0			0			0
14	F-Block satellite Town	shahid	1	M	6.5	10	65	2	130					1	2	4	8	1	5	20	2	1	8	5	1	20
			2	F	6.5	10	65	2	130					1	2	4	8			0	3	1	12	5	1	20
							0		0								0			0			0			0
14	F-Block satellite Town	Mh.nazir	1	M	6.5	5	32.5	5	162.5					1	2	4	8	1	5	20	3	1	12	5	1	20
			2	F	6.5	5	32.5	5	162.5					1	2	4	8			0	4	1	16	5	1	20
							0		0								0			0			0			0
14	F-Block satellite Town	shafqat Rasho	1	M	6.5	10	65	3	195					1	2	4	8	1	3	12	4	1	16	5	1	20
			2	F	6.5	10	65	3	195					1	2	4	8			0	3	1	12	5	1	20
							0		0								0			0			0			0
15	Saidpur Scheme	Amir Butt	1	F	6.5	15	97.5	1	97.5					1	2	4	8			0	5	2	40			0
			2	M	6.5	10	65	2	130					1	5	4	20			0	7	1	28			0
			3	M	6.5	12	78	1	78					1	5	4	20			0	8	2	64			0
			4	F	6.5	10	65	2	130					1	5	4	20			0	2	2	16			0
			5	M	6.5	7	45.5	1	45.5					1	5	4	20			0	3	2	24			0
							0		0								0			0			0			0
15	Saidpur Scheme	Amir Bashir	1	M	6.5	5	32.5	1	32.5					1	2	4	8			0	2	2	16			0
			2	M	6.5	6	39	2	78					1	2	4	8			0	5	2	40			0
			3	M	6.5	12	78	2	156					1	2	4	8			0	1	2	8			0
			4	F	6.5	10	65	2	130					1	2	4	8			0	3	2	24			0
							0		0								0			0			0			0
15	Saidpur Scheme	ali raza	1	M			0		0	2	3	30	180	2	3	4	24			0	2	1	8			0
			2	M			0		0	1	2	30	60	2	3	4	24			0	1	1	4			0
			3	M			0		0	1	1	30	30	1	3	4	12			0	2	1	8			0
			4	M			0		0	2	2	30	120	1	5	4	20			0	5	1	20			0
			5	F			0		0	1	1	30	30	1	5	4	20			0	4	1	16			0
			6	F			0		0	1	1	30	30	1	5	4	20			0	5	1	20			0
			7	F			0		0	2	1	30	60	1	2	4	8			0	2	1	8			0
			8	F			0		0	2	1	30	60	1	2	4	8			0	3	1	12			0
							0		0								0			0			0			0

16	Mohalla Eidgah	Hafeez Ahmed	1	M	6.5	10	65	1	65					1	6	4	24			0	2	2	16			0
			2	F	6.5	10	65	2	130					1	7	4	28			0	5	1	20			0
			3	c	6.5	8	52	1	52					1	7	4	28			0	6	2	48			0
							0		0								0			0			0			0
16	Mohalla Eidgah	Maqbool huss	1	M	6.5	20	130	1	130					1	5	4	20			0	3	2	24			0
			2	F	6.5	12	78	1	78					1	5	4	20			0	7	1	28			0
			3	M	6.5	15	97.5	1	97.5					1	5	4	20			0	5	2	40			0
							0		0								0			0			0			0
16	Mohalla Eidgah	M. Waqas Anv	1	M			0		0	2	1	25	50	2	5	4	40			0	4	2	32	3	1	12
			2	F			0		0	3	1	25	75	3	5	4.5	68			0	8	2	72	3	1	13.5
			3	F			0		0	3	1	25	75	2	5	4.5	45			0	5	2	45	3	1	13.5
							0		0				0				0			0			0			0
17	Dhok Babu Irfan	Najam al hass	1	M			0		0	1	1	30	30	2	5	4	40	1	15	60	3	2	24	5	5	100
			2	M			0		0	1	1	30	30	2	3	4	24	1	20	80	2	2	16	5	5	100
			3	M			0		0	1	1	30	30	2	4	4	32			0	2	3	24			0
			4	M			0		0	1	1	30	30	2	3	4	24			0	3	5	60			0
			5	F			0		0	1	1	30	30	1	3	4	12			0	5	3	60	5	5	100
			6	F			0		0	1	1	30	30	1	5	4	20			0	3	2	24	5	5	100
			7	F			0		0	1	1	30	30	2	3	4	24			0	4	3	48			0
							0		0								0			0			0			0
17	Dhok Babu Irfan	Shoaib	1	M	6.5	12	78	1	78					2	5	4	40	1	20	80	3	2	24	5	5	100
			2	M	6.5	15	97.5	1	97.5					2	5	4	40			0	3	2	24	5	5	100
			3	M	6.5	10	65	1	65					3	5	4	60			0	3	2	24			0
			4	F	6.5	10	65	1	65					2	3	4	24			0	3	2	24			0
			5	F	6.5	10	65	1	65					2	3	4	24			0	4	2	32	5	5	100
			6	F	6.5	10	65	1	65					2	4	4	32			0	4	2	32			0
							0		0								0			0			0			0
17	Dhok Babu Irfan	Saeed	1	M	6.5	10	65	1	65					3	3	4	36	1	15	60	3	2	24	5	5	100
			2	M	6.5	10	65	1	65					2	3	4	24			0	2	2	16	5	5	100
			3	M	6.5	10	65	1	65					2	4	4	32			0	2	2	16			0
			4	M	6.5	10	65	1	65					2	5	4	40			0	3	2	24			0
			5	F	6.5	10	65	1	65					3	5	4	60			0	4	2	32			0
			6	F	6.5	10	65	1	65					3	5	4	60			0	4	2	32	5	5	100
							0		0								0			0			0			0
18	New Malpur Colony Pir	Imran S. Khan	1	M			0		0					2	2	4	16	1	3	12	4	2	32	3	3	36
			2	F			0		0	1	2	25	50	2	3	4	24			0	2	3	24			0
			3	F			0		0	1	1	25	25	2	2	4	16			0	3	2	24	4	2	32
							0		0				0				0			0			0			0
18	New Malpur Colony Pir	Rizwan	1	M	6.5	15	97.5	2	195				0	2	2	4	16	1	5	20	3	1	12	5	5	100
			2	F	6.5	20	130	2	260				0	2	2	4	16			0	3	1	12	5	5	100
			3	F	6.5	15	97.5	2	195				0	2	3	4	24			0	3	1	12	5	5	100
			4	F	6.5	25	162.5	2	325				0	2	2	4	16			0	3	1	12	5	5	100
			5	C	6.5	15	97.5	2	195				0	2	2	4	16			0	3	1	12	5	5	100
							0		0				0				0			0			0			0
18	New Malpur Colony Pir	Ab. Hameed	1	M			0		0	2	2	30	120	2	1	4	8	1	3	12	5	1	20	4	3	48
			2	F			0		0	1	3	30	90	1	1	4	4			0	4	2	32	4	5	80
			3	M			0		0	2	2	30	120	2	1	4	8	1	3	12	3	2	24	4	3	48
			4	M			0		0	3	3	30	270	2	1	4	8	1	5	20	5	2	40	4	5	80
			5	F			0		0	1	3	30	90	2	1	4	8			0	4	2	32	4	5	80
							0		0				0				0			0			0			0
19	Mohalla Shareefabad	HURAM JAVEE	1	F			0		0	2	2	30	120	2	2	4	16			0	4	2	32	3	2	24
			2	M			0		0	2	2	30	120	2	2	4	16	1	3	12	2	3	24	1	2	8
							0		0				0				0			0			0			0
19	Mohalla Shareefabad	MUHAMMAD Y	1	M	6.5	8	52	2	104	2	1	25	50	1	10	4	40			0	2	10	80	5	5	100
			2	M	6.5	6	39	3	117	1	1	25	25	2	15	4	120			0	5	5	100	5	5	100
			3	F	6.5	10	65	1	65	2	1	25	50	1	10	4	40			0	2	10	80	5	5	100
			4	M	6.5	12	78	2	156				0	3	15	4	180	2	15	120	2	15	120	2	5	40
							0		0				0				0			0			0			0
19	Mohalla Shareefabad	KHALIDA	1	F	6.5	10	65	2	130	1	2	25	50	1	1	4	4			0	2	1	8	5	8	160
			2	M	6.5	10	65	1	65	1	1	25	25	1	1	4	4	1	2	8	3	1	12	1	3	12
							0		0				0				0			0			0			0
20	Asghar mall Scheme	Mr. M. Bashar	1	M	6.5	10	65	1	65	3	3	25	225	3	2	4	24	1	10	40	5	4	80	4	5	80
			2	M	6.5	12	78	2	156	3	2	25	150	3	2	4	24			0	5	4	80	4	5	80
			3	F	6.5	10	65	1	65	2	3	25	150	2	2	4	16			0	4	3	48	5	5	100
			4	F	6.5	12	78	3	234	3	2	25	150	3	2	4	24			0	6	4	96	4	5	80
			5	F	6.5	8	52	2	104	3	3	25	225	2	2	4	16			0	6	4	96	5	5	100
							0		0								0			0			0			0

20	Asghar mall Scheme	Iram Kalim Sh	1	M	6.5	10	65	1	65					3	5	4	60	1	5	20	6	3	72	5	5	100
			2	M	6.5	10	65	1	65					3	5	4	60	1	5	20	6	3	72	5	3	60
			3	M	6.5	5	32.5	2	65					3	5	4	60	1	5	20	6	3	72	5	3	60
			4	F	6.5	10	65	1	65					3	5	4	60			0	6	3	72	5	3	60
			5	F	6.5	10	65	1	65					3	5	4	60			0	6	3	72	5	5	100
			6	F	6.5	10	65	1	65					3	5	4	60			0	6	3	72	5	2	40
			7	M	6.5	10	65	1	65					2	5	4	40			0	4	3	48	5	3	60
							0		0								0			0			0			0
20	Asghar mall Scheme	Dr. Minhas	1	M	6.5	10	65	2	130					1	2	4	8	1	2	8	3	1	12	3	1	12
			2	F	6.5	10	65	2	130					3	1	4	12			0	2	1	8	3	1	12
							0		0								0			0			0			0
21	Dhok Kala Khan	saleem aqbal	1	M	6.5	8	52	3	156					1	1	4	4	1	5	20	3	1	12	3	1	12
			2	M	6.5	10	65	2	130					1	1	4	4			0	3	1	12	3	1	12
							0		0								0			0			0			0
21	Dhok Kala Khan	chuhdray jawe	1	M	6.5	10	65	1	65					1	1	4	4			0	3	1	12			0
			2	M	6.5	15	97.5	2	195					1	1	4	4			0	4	1	16			0
			3	F	6.5	20	130	1	130					1	1	4	4			0	4	1	16			0
							0		0								0			0			0			0
21	Dhok Kala Khan	yousaf masih	1	M	6.5	20	130	1	130					1	2	4	8			0	2	1	8			0
			2	M	6.5	15	97.5	1	97.5					1	2	4	8			0	3	1	12			0
			3	M	6.5	10	65	1	65					1	2	4	8			0	1	1	4			0
			4	M	6.5	10	65	2	130					2	2	4	16			0	1	1	4			0
			5	F	6.5	10	65	1	65					2	2	4	16			0	6	2	48			0
			6	F	6.5	15	97.5	1	97.5					2	2	4	16			0	7	1	28			0
							0		0								0			0			0			0
22	Qayyumabad	Chaoudhry Me	1	M	6.5	10	65	2	130					1	1	4	4			0	3	1	12	2	1	8
							0		0								0			0			0			0
22	Qayyumabad	Abdul ghafoo	1	M			0		0	1	1	25	25	1	2	4	8			0	2	1	8	3	1	12
			2	F			0		0	2	1	25	50	2	2	4	16			0	4	1	16	3	1	12
							0		0				0				0			0			0			0
22	Qayyumabad	ALI SHEER	1	M			0		0	2	1	25	50	2	2	4	16	1	3	12	3	1	12			0
			2	F			0		0	1	1.5	25	38	2	2	4	16			0	4	1	16	2	1	8
							0		0				0				0			0			0			0
23	Dhok Kashmirian	Mrs Muhamm	1	M	6.5	10	65	2	130				0	2	2	4	16			0	2	1	8			0
			2	F	6.5	10	65	3	195				0	2	2	4	16			0	4	2	32			0
			3	c	6.5	10	65	2	130				0	2	2	4	16			0	4	2	32			0
							0		0				0				0			0			0			0
23	Dhok Kashmirian	Mrs Muneer	1	F	6.5	10	65	2	130				0	1	10	4	40			0	5	2	40			0
			2	M	6.5	10	65	2	130				0	1	10	4	40			0	3	1	12			0
							0		0				0				0			0			0			0
23	Dhok Kashmirian	M-Naqeeb Ab	1	M			0		0	2	2	30	120	1	2	4	8	1	5	20	5	1	20	3	3	36
			2	F			0		0	2	2	30	120	1	1	4	4			0	2	1	8	5	4	80
			3	c			0		0	2	3	30	180	1	2	4	8			0	3	3	36	3	5	60
			4	c			0		0	2	3	30	180	1	5	4	20			0	4	4	64			0
							0		0				0				0			0			0			0
24	Khana Kak,Dhok Ali Akt	M Irfan	1	M	6.5	5	32.5	1	32.5				0	2	2	4	16			0	2	5	40	5	5	100
			2	M	6.5	5	32.5	1	32.5				0	2	2	4	16			0	2	2	16	5	5	100
			3	M	6.5	5	32.5	1	32.5				0	2	2	4	16			0	2	2	16	5	5	100
							0		0				0				0			0			0			0
			1	M	6.5	5	32.5	1	32.5				0	2	2	4	16			0	2	1	8	5	5	100
24	Khana Kak,Dhok Ali Akt	Danish Iqbal	2	M			0		0	1	1	30	30	1	3	4	12			0	1	2	8	5	2	40
			3	M			0		0	1	1	30	30	1	3	4	12			0	1	1	4	5	2	40
			4	F			0		0	1	1	30	30	1	3	4	12			0	1	1	4	5	3	60
			5	F			0		0	1	1	30	30	1	3	4	12			0	2	3	24	5	4	80
			6	F			0		0	1	1	30	30	1	4	4	16			0	2	3	24	5	3	60
			7	c			0		0	1	1	30	30	1	4	4	16			0	2	3	24	5	2	40
			8	c			0		0	1	1	30	30	1	4	4	16			0	2	2	16	5	3	60
			9	c			0		0	1	1	30	30	1	5	4	20			0	2	2	16	5	3	60
			10	c			0		0	1	1	30	30	1	3	4	12			0	2	2	16	5	3	60
			11	c			0		0	1	1	30	30	1	2	4	8			0	1	1	4	5	4	80
							0		0				0				0			0			0			0
24	Khana Kak,Dhok Ali Akt	AROON AHME	1	F			0		0	2	2	30	120	2	1	4	8			0	3	1	12	3	1	12
							0		0				0				0			0			0			0

25	Sadiqabad	Syed Qasim Al	1	M	6.5	10	65	1	65				0	1	5	4	20	1	15	60	4	1	16	5	2	40
			2	M	6.5	10	65	1	65				0	2	3	4	24	1	15	60	2	2	16	3	3	36
			3	F	6.5	10	65	2	130				0	2	3	4	24			0	3	1	12	5	2	40
			4	F	6.5	10	65	1	65				0	2	3	4	24			0	4	1	16	5	2	40
			5	F	6.5	10	65	1	65				0	2	4	4	32			0	3	1	12	5	2	40
							0		0				0				0			0			0			0
25	Sadiqabad	Asim Khan	1	M			0		0	2	2	30	120	2	5	4	40			0	4	2	32	3	3	36
							0		0				0				0			0			0			0
25	Sadiqabad	Abdurehman	1	F			0		0	1	1	25	25	1	2	4	8			0	3	2	24	5	2	40
			2	F			0		0	1	1	25	25	1	2	4	8			0	3	2	24	5	2	40
			3	F			0		0	1	1	25	25	2	2	4	16			0	3	2	24	5	2	40
			4	M			0		0	1	1	25	25	1	2	4	8			0	1	2	8	5	2	40
			5	M			0		0	1	1	25	25	1	2	4	8			0	1	2	8	5	2	40
			6	M			0		0	1	1	25	25	1	2	4	8			0	1	2	8	4	2	32
			7	M			0		0	1	1	25	25	1	2	4	8			0	1	2	8	4	2	32
							0		0				0				0			0			0			0
26	Afandi Colony	M. Nauman	1	M	6.5	15	97.5	1	97.5				0	2	5	4	40	1	5	20	3	2	24	1	1	4
			2	M	6.5	15	97.5	2	195				0	1	5	4	20	1	5	20	1	2	8	2	1	8
			3	F	6.5	20	130	2	260				0	3	5	4	60			0	4	2	32	1	1	4
			4	F	6.5	20	130	4	520				0	2	5	4	40			0	3	2	24	4	1	16
							0		0				0				0			0			0			0
26	Afandi Colony	M. Umer Asgh	1	M	6.5	10	65	2	130				0	1	5	4	20	1	5	20	3	5	60	1	1	4
			2	M	6.5	10	65	3	195				0	1	5	4	20	1	5	20	2	5	40	3	1	12
			3	F	6.5	15	97.5	3	292.5				0	3	5	4	60			0	6	5	120	3	1	12
							0		0				0				0			0			0			0
26	Afandi Colony	Khuwaja Youn	1	M	6.5	10	65	1	65				0	1	5	4	20			0	3	2	24	5	1	20
			2	M	6.5	10	65	2	130				0	2	5	4	40	1	5	20	5	2	40	2	1	8
			3	F	6.5	10	65	3	195				0	3	5	4	60			0	5	2	40	1	1	4
							0		0				0				0			0			0			0
27	Muslim Town (East)	Tariq M Meer	1	M	6.5	10	65	2	130				0	1	10	4	40			0	2	2	16			0
			2	F	6.5	10	65	2	130				0	1	5	4	20			0	4	2	32			0
							0		0				0				0			0			0			0
27	Muslim Town (East)	Ameer asim	1	M	6.5	10	65	2	130				0	1	5	4	20			0	1	2	8			0
							0		0				0				0			0			0			0
27	Muslim Town (East)	Nadar Khan	2	F			0		0	2	1	25	50	2	2	4	16			0	2	2	16	3	3	36
			3	c			0		0	2	1	25	50	2	2	4	16			0	5	3	60	3	4	48
							0		0				0				0			0			0			0
28	Muslim Town (West)	M Saddiq	1	M	6.5	10	65	1	65				0	2	5	4	40	1	10	40	4	2	32	3	2	24
			2	F	6.5	10	65	1	65				0	3	5	4	60			0	3	2	24	2	2	16
			3	F	6.5	10	65	2	130				0	2	5	4	40			0	3	2	24	4	2	32
			4	F	6.5	10	65	1	65				0	1	5	4	20			0	4	2	32	2	2	16
							0		0				0				0			0	-		0			0
28	Muslim Town (West)	Zafar Iqbal	1	M	6.5	5	32.5	1	32.5				0	1	2	4	8	1	5	20	4	1	16	4	1	16
			2	M	6.5	5	32.5	2	65				0	1	2	4	8			0	4	1	16	3	1	12
			3	F	6.5	5	32.5	2	65				0	1	2	4	8			0	1	2	8	4	1	16
							0		0				0				0			0			0			0
28	Muslim Town (West)	Saleem	1	M			0		0	2	1	25	50	2	5	4	40			0	5	2	40	3	1	12
			2	F			0		0	3	1	25	75	3	5	4	60			0	4	2	32	3	1	12
			3	F			0		0	3	1	25	75	2	5	4	40			0	5	2	40	3	1	12
							0		0				0				0			0			0			0
29	Khurram Colony	Shabir	1	M	6.5	8	52	2	104				0	1	2	4	8			0	5	2	40			0
			2	M	6.5	10	65	2	130				0	1	1	4	4			0	4	1	16			0
			3	M	6.5	12	78	2	156				0	1	2	4	8			0	5	2	40			0
			4	F	6.5	10	65	1	65				0	1	3	4	12			0	1	2	8			0
			5	F	6.5	10	65	1	65				0	1	5	4	20			0	2	1	8			0
							0		0				0				0			0			0			0
29	Khurram Colony	Rasheed	1	M	6.5	7	45.5	2	91				0	2	3	4	24			0	3	1	12			0
			2	F	6.5	6	39	2	78				0	1	2	4	8			0	2	2	16			0
			3	F	6.5	7	45.5	1	45.5				0	1	5	4	20			0	2	1	8			0
			4	M	6.5	8	52	1	52				0	1	5	4	20			0	2	2	16			0
							0		0				0				0			0			0			0
29	Khurram Colony	Allauddin	1	M	6.5	9	58.5	1	58.5				0	1	3	4	12			0	1	1	4			0
			2	M	6.5	8	52	1	52				0	1	5	4	20			0	4	2	32			0
			3	M	6.5	7	45.5	2	91				0	1	2	4	8			0	3	1	12			0
			4	F	6.5	6	39	1	39				0	1	2	4	8			0	2	2	16			0
			5	F	6.5	7	45.5	2	91				0	1	3	4	12			0	3	3	36			0
			6	F	6.5	8	52	2	104				0	1	5	4	20			0	4	3	48			0
			7	M	6.5	8	52	1	52				0	1	2	4	8			0	5	2	40			0
							0		0				0				0			0			0			0

30	Chah Sultan	M. Riaz	1	M	6.5	10	65	1	65				0	1	5	4	20	1	10	40	4	2	32	3	1	12
			2	M	6.5	15	97.5	1	97.5				0	1	4	4	16	1	10	40	6	2	48	5	1	20
			3	F	6.5	10	65	1	65				0	2	3	4	24			0	2	2	16	5	1	20
			4	F	6.5	15	97.5	1	97.5				0	1	4	4	16			0	3	2	24	5	1	20
			5	M	6.5	10	65	1	65				0	1	3	4	12	1	10	40	4	2	32	5	1	20
							0		0				0				0			0			0			0
30	Chah Sultan	Israr	1	M			0		0	2	1	25	50	1	5	4	20	1	10	40	2	1	8	3	5	60
			2	M			0		0	1	1	25	25	1	4	4	16			0	2	1	8	2	5	40
			3	M			0		0	1	1	25	25	1	5	4	20			0	2	1	8	3	5	60
			4	M			0		0	1	1	25	25	1	5	4	20			0	2	1	8	4	5	80
			5	F			0		0	1	1	25	25	1	5	4	20			0	2	1	8	5	5	100
			6	F			0		0	1	1	25	25	1	5	4	20			0	2	1	8	5	5	100
			7	F			0		0	1	1	25	25	1	5	4	20			0	2	1	8	5	5	100
			8	M			0		0	1	1	25	25	1	5	4	20			0	2	1	8	5	5	100
							0		0								0			0			0			0
30	Chah Sultan	M.Waheed	1	M	6.5	10	65	1	65					1	2	4	8	1	5	20	4	1	16	3	1	12
			2	M	6.5	10	65	2	130					1	2	4	8	1	5	20	6	1	24	5	1	20
			3	F	6.5	10	65	1	65					1	2	4	8			0	1	1	4	1	1	4
							0		0								0			0			0			0
31	Dhok Hukam Dad	sadaqt	1	M	6.5	10	65	1	65					1	5	4	20			0	4	1	16			0
			2	M	6.5	10	65	1	65					1	5	4	20			0	5	1	20			0
							0		0								0			0			0			0
31	Dhok Hukam Dad	Ishaq Ahmad	1	M	6.5	12	78	2	156					1	5	4	20			0	4	1	16			0
			2	M	6.5	10	65	2	130					1	5	4	20			0	3	1	12			0
							0		0								0			0			0			0
31	Dhok Hukam Dad	Shahid Sultan	1	M	6.5	10	65	1	65					1	5	4	20			0	2	1	8			0
			2	F	6.5	10	65	1	65					1	5	4	20			0	2	1	8			0
							0		0								0			0			0			0
32	AmarPura	Haji M. Shafi S	1	M	6.5	15	97.5	1	97.5					1	2	4	8			0	1	2	8			0
			2	M	6.5	20	130	2	260					1	1	4	4			0	2	1	8			0
			3	F	6.5	15	97.5	1	97.5					1	5	4	20			0	4	2	32			0
							0		0								0			0			0			0
32	AmarPura	Muhammad Id	1	M	6.5	15	97.5	1	97.5					1	10	4	40			0	3	3	36			0
			2	M	6.5	15	97.5	1	97.5					1	5	4	20			0	4	2	32			0
							0		0								0			0			0			0
32	AmarPura	Dilawar Hassa	1	M	6.5	10	65	2	130					2	5	4	40			0	4	1	16			0
			2	F	6.5	8	52	1	52					2	2	4	16			0	3	4	48			0
			3	F	6.5	8	52	1	52					1	2	4	8			0	3	3	36			0
							0		0								0			0			0			0
33	Kartar Pura	majid ali	1	M	6.5	7	45.5	1	45.5					1	2	4	8			0	2	2	16			0
			2	M	6.5	8	52	1	52					1	2	4	8			0	3	1	12			0
			3	F	6.5	10	65	1	65					2	2	4	16			0	6	2	48			0
			4	F	6.5	9	58.5	1	58.5					2	2	4	16			0	4	4	64			0
			5	F	6.5	10	65	1	65					1	2	4	8			0	5	3	60			0
							0		0								0			0			0			0
33	Kartar Pura	khalida maqb	1	M	6.5	10	65	1	65					1	5	4	20			0	1	3	12			0
			2	M	6.5	8	52	1	52					2	5	4	40			0	4	3	48			0
			3	F	6.5	6	39	1	39					1	5	4	20			0	7	2	56			0
			4	F	6.5	7	45.5	1	45.5					2	5	4	40			0	6	2	48			0
			5	F	6.5	6	39	1	39					2	5	4	40			0	4	1	16			0
							0		0								0			0			0			0
33	Kartar Pura	abdulrahman	1	M	6.5	8	52	1	52					2	5	4	40			0	5	3	60			0
			2	F	6.5	10	65	1	65					2	5	4	40			0	3	1	12			0
			3	F	6.5	10	65	1	65					2	5	4	40			0	4	1	16			0
			4	M	6.5	6	39	2	78					1	3	4	12			0	3	3	36			0
							0		0								0			0			0			0
34	Banni	ali ahmad	1	M			0		0	3	2	25	150	2	5	4	40			0	2	3	24			0
			2	F			0		0	2	1	25	50	2	5	4	40			0	2	3	24			0
							0		0				0				0			0			0			0
34	Banni	malik muham	1	M			0		0	2	3	25	150	1	5	4	20			0	2	3	24			0
							0		0				0				0			0			0			0
34	Banni	muhammad ra	1	M			0		0	2	2	25	100	1	5	4	20			0	2	2	16			0
			2	F			0		0	2	3	25	150	1	5	4	20			0	3	2	24			0
							0		0				0				0			0			0			0
35	Mohalla imam bargah	AZIZ NASEEM	1	M	6.5	10	65	3	195				0	1	10	4	40			0	2	2	16			0
							0		0				0				0			0			0			0
35	Mohalla imam bargah	AURANGZAIB	1	M	6.5	10	65	4	260				0	1	10	4	40			0	1	2	8			0
							0		0				0				0			0			0			0
35	Mohalla imam bargah	M.hussain	1	M			0		0	2	3	25	150	1	10	4	40			0	1	2	8			0
							0		0				0				0			0			0			0
36	Mohan pura	Hamid Haseeb	1	M			0		0	1	1	25	25	1	7	4	28			0	3	2	24			0
							0		0				0				0			0			0			0

36	Mohan pura	Sheikh khalid	1	M	6.5	10	65	3	195				0	2	5	4	40	1	10	40	4	2	32	2	1	8
			2	F	6.5	10	65	1	65				0	2	5	4	40			0	4	2	32	8	1	32
							0		0				0				0			0			0			0
36	Mohan pura	Raja Amjad	1	M	6.5	15	97.5	2	195				0	1	2	4	8			0	3	1	12	3	2	24
							0		0				0				0			0			0			0
37	Dhok Dadal	Nazir ahamed	1	M	6.5	10	65	1	65				0	1	3	4	12	1	10	40	2	1	8	5	5	100
			2	M	6.5	10	65	1	65				0	1	3	4	12			0	2	1	8	5	5	100
			3	M	6.5	10	65	1	65				0	1	3	4	12			0	2	1	8	5	5	100
			4	F	6.5	10	65	1	65				0	1	3	4	12			0	2	1	8	5	5	100
			5	F	6.5	10	65	1	65				0	1	3	4	12			0	2	1	8	5	5	100
			6	M	6.5	10	65	1	65				0	1	3	4	12			0	2	1	8	5	5	100
			7	F	6.5	10	65	1	65				0	1	3	4	12			0	2	1	8	5	5	100
							0		0				0				0			0			0			0
37	Dhok Dadal	Arshad Mehm	1	M	6.5	10	65	2	130				0	2	2	4	16	1	5	20	2	1	8			0
			2	F	6.5	2	13	2	26				0	2	2	4	16			0	3	3	36			0
			3	F	6.5	2	13	2	26				0	2	3	4	24			0	4	2	32			0
							0		0				0				0			0			0			0
37	Dhok Dadal	Zohaib Hassan	1	M			0		0	1	2	25	50	1	6	4	24			0	2	1	8			0
			2	M			0		0	2	1	25	50	1	7	4	28			0	2	1	8			0
			3	F			0		0	1	2	25	50	1	5	4	20			0	5	1	20			0
			4	F			0		0	2	2	25	100	1	10	4	40			0	6	4	96			0
			5	F			0		0	2	1	25	50	1	3	4	12			0	7	3	84			0
			6	F			0		0	3	1	25	75	1	5	4	20			0	3	2	24			0
			7	M			0		0	3	1	25	75	1	2	4	8			0	3	1	12			0
							0		0				0				0			0			0			0
38	Ganj Mandi	Zrar khan	1	M	6.5	10	65	3	195				0	1	2	4	8			0	6	1	24			0
			2	M	6.5	10	65	4	260				0	1	1	4	4			0	3	1	12			0
			3	F	6.5	10	65	3	195				0	1	1	4	4			0	4	1	16			0
							0		0				0				0			0			0			0
38	Ganj Mandi	Shahzar Ali	1	M			0		0	1	1	25	25	1	2	4	8			0	7	1	28			0
			2	F			0		0	1	1	25	25	1	2	4	8			0	5	1	20			0
			3	M			0		0	1	1	25	25	1	5	4	20			0	2	1	8			0
							0		0				0				0			0			0			0
38	Ganj Mandi	Zahid Khattak	1	M			0		0	1	2	25	50	1	1	4	4			0	1	1	4			0
			2	M			0		0	1	3	25	75	1	2	4	8			0	1	1	4			0
			3	F			0		0	2	2	25	100	1	5	4	20			0	2	1	8			0
			4	F			0		0	1	3	25	75	2	2	4	16			0	5	1	20			0
							0		0				0				0			0			0			0
39	Waris Khan	Atif Munnawa	1	M	6.5	12	78	2	156				0	1	2	4	8			0	4	1	16			0
			2	F	6.5	12	78	1	78				0	2	2	4	16			0	3	1	12			0
							0		0				0				0			0			0			0
39	Waris Khan	M. Saleem	1	F	6.5	10	65	1	65				0	2	3	4	24			0	4	1	16			0
			2	M	6.5	4	26	2	52				0	2	3	4	24			0	2	1	8			0
							0		0				0				0			0			0			0
39	Waris Khan	sahrab ali kha	1	M			0		0	1	1	25	25	1	2	4	8	1	2	8	3	1	12	3	1	12
							0		0				0				0			0			0			0
40	Purana Qilla	M. Shakil	1	M	6.5	10	65	2	130				0	1	2	4	8			0	1	1	4			0
			2	M	6.5	7	45.5	3	136.5				0	1	3	4	12			0	3	1	12			0
			3	M	6.5	8	52	1	52				0	2	2	4	16			0	6	1	24			0
			4	F	6.5	10	65	2	130				0	2	5	4	40			0	7	2	56			0
			5	F	6.5	12	78	2	156				0	1	2	4	8			0	8	2	64			0
			6	F	6.5	12	78	2	156				0	1	2	4	8			0	2	2	16			0
							0		0				0				0			0			0			0
40	Purana Qilla	Naseemuddin	1	F	6.5	12	78	2	156				0	1	5	4	20			0	2	2	16			0
			2	F	6.5	10	65	1	65				0	1	5	4	20			0	3	1	12			0
			3	F	6.5	15	97.5	1	97.5				0	1	5	4	20			0	2	2	16			0
							0		0				0				0			0			0			0
40	Purana Qilla	Muhammad N	1	M			0		0	2	1	30	60	2	2	4	16	1	5	20	3	3	36	4	2	32
			2	F			0		0	2	1	30	60	2	2	4	16			0	2	1	8	3	3	36
			3	c			0		0	3	1	30	90	2	3	4	24			0	4	2	32	2	2	16
							0		0				0				0			0			0			0
41	Saidpuri Gate	chuadry muha	1	M	6.5	10	65	2	130				0	1	5	4	20	1	5	20	3	5	60	4	2	32
			2	M	6.5	10	65	1	65				0	3	5	4	60			0	1	5	20	3	2	24
			3	F	6.5	10	65	1	65				0	3	5	4	60			0	4	5	80			0
			4	F	6.5	10	65	1	65				0	1	5	4	20			0	6	5	120			0
							0		0				0				0			0			0			0
41	Saidpuri Gate	muhammad b	1	M	6.5	15	97.5	2	195	1	1	25	25	1	5	4	20	1	5	20	2	1	8	5	2	40
							0		0				0				0			0			0			0
41	Saidpuri Gate	muhammad sl	1	M			0		0	2	1	25	50	1	2	4	8	1	5	20	3	1	12	5	2	40
			2	M			0		0	2	1	25	50	1	2	4	8	2	5	40	3	1	12	5	2	40
			3	F			0		0	1	1	25	25	1	2	4	8			0	3	1	12	5	2	40
							0		0				0				0			0			0			0

42	Millat Colony	HASAN ABDUL	1	F	6.5	10	65	1	65				0	2	2	4	16			0	2	1	8			0
			2	c	6.5	15	97.5	1	97.5				0	2	2	4	16			0	5	3	60			0
							0		0				0				0			0			0			0
42	Millat Colony	khuram Shehz	1	M	6.5	10	65	1	65				0	1	7	4	28			0	1	2	8			0
			2	M	6.5	10	65	1	65				0	2	5	4	40			0	3	2	24			0
							0		0				0				0			0			0			0
42	Millat Colony	Liaqat Ali Azee	1	M	6.5	10	65	2	130				0	2	5	4	40			0	2	2	16			0
			2	F	6.5	8	52	1	52				0	2	5	4	40			0	6	1	24			0
			3	F	6.5	8	52	1	52				0	2	5	4	40			0	7	1	28			0
							0		0				0				0			0			0			0
43	Dhok Khabba	Hafiz Akhtar	1	M			0		0	2	1	25	50	1	1	4	4			0	3	1	12	4	1	16
			2	M			0		0	1	1	25	25	1	1	4	4	1	2	8	3	1	12	2	1	8
			3	f			0		0	2	2	25	100	3	1	4	12			0	5	1	20	3	1	12
							0		0				0				0			0			0			0
43	Dhok Khabba	M Ashraf	1	M			0		0	2	1	30	60	1	1	4	4			0	4	1	16	2	1	8
			2	M			0		0	2	1	30	60	2	1	4	8	1	2	8	2	1	8	4	1	16
			3	F			0		0	2	2	30	120	3	1	4	12			0	4	1	16	2	1	8
							0		0				0				0			0			0			0
43	Dhok Khabba	Amjad mehmo	1	M			0		0	1	1	25	25	1	2	4	8			0	1	1	4	4	1	16
			2	M			0		0	1	1	25	25	1	2	4	8			0	1	1	4	4	1	16
			3	F			0		0	1	2.5	25	63	1	2	4	8			0	1	1	4	4	1	16
							0		0				0				0			0			0			0
44	Dhok Farman ali	wasif khan	1	M			0		0	1	1	25	25	1	5	4	20	1	10	40	1	5	20	3	5	60
			2	M			0		0	1	1	25	25	1	10	4	40	1	20	80	1	5	20	2	5	40
			3	F			0		0	1	1	25	25	1	3	4	12			0	1	10	40			0
			4	M			0		0	1	2	25	50	1	2	4	8			0	1	10	40			0
			5	M			0		0	1	2	25	50	1	5	4	20			0	1	5	20			0
							0		0				0				0			0			0			0
44	Dhok Farman ali	Malik Rizwan	1	M	6.5	10	65	2	130				0	2	5	4	40	1	5	20	3	2	24	1	1	4
			2	M	6.5	10	65	2	130				0	2	5	4	40	1	5	20	2	2	16	4	1	16
			3	F	6.5	10	65	1	65				0	2	5	4	40			0	3	2	24	4	1	16
			4	F	6.5	10	65	1	65				0	3	5	4	60			0	3	2	24	1	1	4
							0		0				0				0			0			0			0
44	Dhok Farman ali	Muhammad A	1	M	6.5	10	65	1	65				0	1	5	4	20	1	5	20	4	2	32	2	1	8
			2	F	6.5	10	65	1	65				0	3	5	4	60			0	6	2	48	3	1	12
							0		0				0				0			0			0			0
45	Chamanzar Colony	Ali Ahmad	1	M			0		0	2	1	30	60	1	2	4	8	1	5	20	3	1	12	5	1	20
			2	F			0		0	2	1	30	60	1	2	4	8			0	3	1	12	5	1	20
							0		0				0				0			0			0			0
45	Chamanzar Colony	Gul Bas	1	M			0		0	1	1	25	25	1	3	4	12	1	5	20	2	2	16	5	2	40
			2	F			0		0	1	1	25	25	1	3	4	12			0	2	2	16	5	2	40
							0		0				0				0			0			0			0
45	Chamanzar Colony	Dr. Shoaib Kha	1	M			0		0	2	1	25	50	1	5	4	20	2	5	40	2	1	8	5	1	20
			2	F			0		0	1	1	25	25	1	5	4	20			0	3	1	12	5	1	20
							0		0				0				0			0			0			0
46	Chachi Mohalla	Major Safdar V	1	M			0		0	1	0.5	25	13	1	2	4	8	1	5	20	1	1	4			0
							0		0								0			0			0			0
46	Chachi Mohalla	Sajjad Mehmo	1	M	6.5	10	65	1	65					2	2	4	16	1	15	60	2	2	16	4	5	80
			2	C	6.5	5	32.5	1	32.5					2	2	4	16				4	2	32			0
			3	F	6.5	10	65	1	65					2	2	4	16				3	3	36	5	5	100
			4	F	6.5	10	65	1	65					2	2	4	16				3	3	36	5	5	100
							0		0								0						0			0
46	Chachi Mohalla	Mr. Adnan	1	M	6.5	10	65	1	65					1	2	4	8				3	2	24			0
			2	M	6.5	10	65	1	65					1	3	4	12				3	2	24			0
			3	F	6.5	10	65	2	130					1	5	4	20				2	1	8			0

PIPED WATER COVERAGE DATA SHEET

UCs	1998 POPULATION Adults	1998 POPULATION of age group 10 plus	1998 HOUSING UNITS BY TYPE	1998 HOUSING UNITS BY TYPE	1998 HOUSING UNITS BY TYPE	1998 HOUSING TOTAL	SOURCE OF DRINKING WATER	1998 TOTAL PIPED WATER COVERAE PERCENTAGE
	1998	1998	PACCA	SEMI-PACCA	KACHA	Total 1998 HOUSNG	1998 PIPED WATER	%age
RATTA AMRAL UC NO.01	18445	13902	2509	45	245	2799	2004	71.6%
DHOK RATTA UC NO.02	18277	13839	2473	37	156	2666	2241	84.1%
HAZARA COLONY UC NO.03	13959	9518	1705	16	59	1780	1358	76.3%
DHOK MANGTAL UC NO.04	20128	14547	2666	103	65	2834	2320	81.9%
DHOK HASSU (NORTH) UC NO.05	13000	9085	1761	8	34	1803	1516	84.1%
DHOK HASSU (SOUTH) UC NO.06	12643	9105	1874	24	26	1924	1360	70.7%
PIRWADHAI UC NO.07	17294	12264	2417	11	45	2473	2206	89.2%
FAUJI COLONY UC NO.08	18155	12111	1940	78	308	2326	1336	57.4%
BANGISH COLONY UC NO.09	18880	13463	2597	30	176	2803	2495	89.0%
KHYBAN SIR SYED(NORTH)UC N0.10	14456	10963	2021	17	62	2100	1980	94.3%
KHYBAN SIR SYED(SOUTH)UC NO.11	15962	11737	2203	61	30	2294	2191	95.5%
DHOK NAJJU UC NO.12	17814	12944	2355	20	232	2607	2150	82.5%
NEW KATARIAN UC NO.13	16929	12936	2510	38	49	2597	2394	92.2%
F-BLOCK (ST.TOWN) NO.14	15677	11860	2234	6	15	2255	2162	95.9%
SAIDPUR SCHEME UC NO.15	16635	12742	2525	8	12	2545	2474	97.2%
MOHALLA EIDGAH UC NO.16	14557	10800	2037	13	20	2070	1945	94.0%
DHOK BABU IRFAN UC NO.17	19261	14436	3001	3	37	3041	2887	94.9%
PINDORA UC NO.18	18482	14142	2774	13	30	2817	2756	97.8%

SATELLITE TOWN UC NO.19	18242	14599	2842	5	14	2861	2768	96.7%
ASGHAR MALL SCHEME UC NO.20	19681	15697	3121	10	4	3135	2853	91.0%
DHOK KALA KHAN UC NO.21	16530	12254	2549	8	63	2620	2319	88.5%
QAYYUMAB AD UC NO.22	16318	11605	2433	17	24	2474	1866	75.4%
DHOK KASHMIRIAN UC NO.23	17193	12822	2746	16	6	2768	1549	56.0%
DHOK ALI AKBAR UC NO.24	16398	12227	2288	7	24	2319	1640	70.7%
SADIQABAD UC NO.25	16931	12849	2728	5	17	2750	1960	71.3%
AFANDI COLONY UC NO.26	14964	11515	2257	2	2	2261	1894	83.8%
MUSLIM TOWN (EAST) UC NO.27	14597	11218	2188	1	5	2194	1487	67.8%
MUSLIM TOWN (WEST) UC NO.28	17993	13707	2789		15	2804	1934	69.0%
KHURRAM COLONY UC NO.29	17185	12904	2564	34	30	2628	1984	75.5%
CHAH SULTAN UC NO.30	19320	14776	2794	10	38	2842	2523	88.8%
DHOK HUKAM DAD UC NO.31	19615	14901	2860	29	35	2924	2534	86.7%
AMAR PURA UC NO.32	18285	14102	2589	83	169	2841	2444	86.0%
KARTAR PURA UC NO.33	15961	12382	2332	1	19	2352	2228	94.7%
BANNI UC NO.34	16152	12539	2294	17	88	2399	2053	85.6%
MOHALLA IMAMBARA UC NO.35	16988	13200	2199	23	151	2373	1877	79.1%
MOHANPURA UC NO.36	17579	13505	2414	43	43	2500	2345	93.8%
DHOK DALAL UC NO.37	15383	11354	2126	13	33	2172	2004	92.3%
GANJ MANDI UC NO.38	16119	12209	2109	16	107	2232	1909	85.5%
WARIS KHAN UC NO.39	14184	11046	1786	38	236	2060	1756	85.2%
PURANA QILLA UC NO.40	14440	11204	1993	21	34	2048	1359	66.4%
SHAH CHAN CHARAGH UC NO.41	13835	10585	1706	11	129	1846	1587	86.0%
MILLAT COLONY UC	17437	13679	2526	45	51	2622	2439	93.0%

NO.42								
DHOK KHABBA UC NO.43	17914	13820	2572	50	91	2713	2297	84.7%
DHOK FARMAN ALI UC NO.44	20836	15654	3008	44	34	3086	2485	80.5%
CHAMANZAR COLONY UC NO.45	22041	16777	3154	22	104	3280	2869	87.5%
CITY UC NO.46	19252	15125	2646	26	238	2910	2686	92.3%

ESTIMATED 2009 POPULATION Adults	**ESTIMATED 2009 POPULATION of age group 10 plus**	**Total Houses 2009**	**2009 houses with piped connection**	**2009 WASA DOMESTIC CUSTOMERS**	**Corrected 2009 houses with piped connection**	**2009 TOTAL PIPED WATER COVERAGE PERCENTAGE**	Improvement	COVERAGE AS PER WASA CUSTOMERS	%age change from 1998 as per WASA customer data
2,009	**2,009**	**No**	**No**	**No**	**No**	**%age**	**%age**	**%age**	**%age**
26,616	20,060	3,123	2,328	1594	2328	75%	2.94%	51.04%	-20.55%
26,374	19,970	2,974	2,549	1669	2549	86%	1.65%	56.11%	-27.95%
20,143	13,734	1,986	1,564	1283	1564	79%	2.46%	64.61%	-11.69%
29,045	20,991	3,162	2,648	1984	2648	84%	1.88%	62.75%	-19.11%
18,759	13,110	2,012	1,725	1364	1725	86%	1.65%	67.81%	-16.27%
18,244	13,138	2,147	1,583	1660	1660	77%	6.65%	77.33%	6.65%
24,955	17,697	2,759	2,492	1827	2492	90%	1.12%	66.22%	-22.98%
26,198	17,476	2,595	1,605	1827	1827	70%	12.97%	70.40%	12.97%
27,244	19,427	3,127	2,819	2201	2819	90%	1.14%	70.38%	-18.63%
20,860	15,820	2,343	2,223	1054	2223	95%	0.59%	44.99%	-49.30%
23,033	16,936	2,559	2,456	1987	2456	96%	0.47%	77.64%	-17.87%
25,705	18,678	2,909	2,452	1994	2452	84%	1.82%	68.56%	-13.91%
24,428	18,667	2,897	2,694	863	2694	93%	0.81%	29.79%	-62.40%
22,622	17,114	2,516	2,423	1376	2423	96%	0.43%	54.69%	-41.18%
24,004	18,387	2,839	2,768	1847	2768	97%	0.29%	65.05%	-32.16%
21,006	15,584	2,309	2,184	1640	2184	95%	0.63%	71.01%	-22.95%
27,793	20,831	3,393	3,239	1036	3239	95%	0.53%	30.54%	-64.40%
26,669	20,407	3,143	3,082	2600	3082	98%	0.22%	82.73%	-15.11%
26,323	21,066	3,192	3,099	1058	3099	97%	0.34%	33.15%	-63.60%
28,400	22,651	3,498	3,216	1930	3216	92%	0.93%	55.18%	-35.82%

23,853	17,682	2,923	2,622	1019	2622	90%	1.19%	34.86%	-53.65%
23,547	16,746	5,768	5,160	5772	5772	100%	24.64%	100.06%	24.64%
24,809	18,502	3,088	1,869	1682	1869	61%	4.57%	54.47%	-1.50%
23,662	17,643	2,587	1,908	1163	1908	74%	3.04%	44.95%	-25.77%
24,431	18,541	3,068	2,278	1965	2278	74%	2.98%	64.05%	-7.23%
21,593	16,616	2,523	2,156	568	2156	85%	1.68%	22.52%	-61.25%
21,063	16,187	2,448	1,741	987	1741	71%	3.34%	40.32%	-27.45%
25,964	19,779	3,128	2,258	972	2258	72%	3.22%	31.07%	-37.90%
24,798	18,620	4,046	3,402	4039	4039	100%	24.34%	99.83%	24.34%
27,879	21,322	3,171	2,852	2680	2852	90%	1.16%	84.52%	-4.25%
28,304	21,502	3,262	2,872	1119	2872	88%	1.38%	34.30%	-52.36%
26,385	20,349	3,170	2,773	1601	2773	87%	1.45%	50.51%	-35.52%
23,032	17,867	2,624	2,500	1538	2500	95%	0.55%	58.61%	-36.12%
23,307	18,094	2,676	2,330	1396	2330	87%	1.50%	52.16%	-33.42%
24,514	19,047	2,647	2,151	1517	2151	81%	2.17%	57.30%	-21.80%
25,366	19,488	2,789	2,634	1597	2634	94%	0.64%	57.26%	-36.54%
22,198	16,384	2,423	2,255	1453	2255	93%	0.80%	59.96%	-32.30%
23,260	17,617	2,490	2,167	1659	2167	87%	1.50%	66.62%	-18.91%
20,467	15,939	2,298	1,994	1311	1994	87%	1.53%	57.04%	-28.20%
20,837	16,167	2,285	1,596	726	1596	70%	3.49%	31.77%	-34.58%
19,964	15,274	2,060	1,801	1553	1801	87%	1.45%	75.41%	-10.56%
25,161	19,739	2,925	2,742	861	2742	94%	0.72%	29.43%	-63.59%
25,850	19,942	3,027	2,611	1710	2611	86%	1.59%	56.50%	-28.17%
30,066	22,589	3,443	2,842	2137	2842	83%	2.02%	62.07%	-18.46%
31,805	24,209	3,659	3,248	417	3248	89%	1.30%	11.40%	-76.07%
27,780	21,825	3,247	3,023	1477	3023	93%	0.80%	45.49%	-46.81%

Personal Information			
First Name:	Last Name:		
Address:			
Area Name		No of adult male members above	
UC #		No of adult Female members above	
Phone #		No of Children (1 – 10 years)	
		No of Children (11 – 18 years)	

General House Information
Internal plumbing Pipe Size:
Size of Flush Tank:
Size of shower/ (Flow/min) :
Size of bucket:
o Commode Type : ☐ Eastern (WC) ☐ Western (Seat Commode)
Bathing Pattern (Male) ☐ Shower ☐ Bucket Bathing Pattern (Female) ☐ Shower ☐ Bucket

Water Activities	1		2		3		4		5		6		7		8	
	Male/Female		Male/Female		Male/Female		Male/Female		Male/Female		Male/Female		Male/Female		Male/Female	
	Time Liters	No of Times	Time Liters	No of Times	Time Liters	No of Times	Time Liters	No of Times	Time Liters	No of Times	Time Liters	No of Times	Time Liters	No of Times	Time Liters	No of Times
In the Bathroom																
Drinking																
Toilet Flushes																
Showers																
Shower Time																
Bucket Bath																
Teeth Brushing																
Shaving																
Face Washing																
Ablution																