

Assessment of Water Consumption in Different Domestic Activities in Villages of Agra

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ABSTRACT

The study was conducted in the 20 Villages situated near by the Agra region to estimate the water consumption in the domestic activities at household level & capita level. Whole experimental area is divided into 5 main sites comprising 4 villages each site. Participatory Rural Appraisal (PRA) technique was used for collecting data through personal interview, focussed group discussion & direct observation. The Average consumption of water per household per day in different domestic activities at different sites was found 577.2 liter/day & Average consumption of water per capita per day in different domestic activities at different sites was estimated 77.8 liter/day which was just double from given Ideal village standards in villages of Agra.

Keywords: Water Consumption, domestic activities, household level

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INTRODUCTION

The past few decades have experienced an increased rate of pressure on natural resources due to rapid population growth and its dependency on these resources. Maintenance of landscape, sustainability of optimum land use and water, in fact, depends on natural vegetation, and deforestation has been consistently singled out as a key element of many areas of global change research [4].

Water, the need of life, is likely to pose the greatest challenge on account of an increased demand with population rise and economic development, and shrinking supplies due to over-exploitation and pollution. Although water is an abundant and renewable natural resource covering two thirds of the planet, a very small proportion of this is effectively available for human use. In India, as a result of development, the demand for water is increasing both in urban and rural areas. This may increase tensions and disputes over sharing and command of water resources. The emerging scarcity of water has also raised a host of issues related to sustainability of the present form of economic development, sustained water supply, equity and social justice, water financing, pricing, governance and management. [3].

Nowadays, water is scarce and therefore should command a price. However, both water management and economics have been slow to adapt to this new reality. Several factors contribute to water scarcity. Average annual precipitation may be low, or it may be highly variable. Moreover, population growth and an increasing consumption of water per capita have resulted in a rapid increase in the demand for water. This tendency is likely to continue as water consumption for most uses is projected to increase by at least 50% by 2025 compared to 1995 level. Since the annually renewable fresh water available in a

particular location is typically constant, water scarcity is increasingly constraining food production [2].

Global Freshwater reserves are rapidly depleting and this is expected to significantly impact many densely populated areas of the world. Low to middle income developing regions as well as highly developed countries will face water stress in the future, unless existing water reserves are managed effectively. Although low and middle income developing countries currently have low per capita water consumption, rapid growth in population and inefficient use of water across sectors is expected to lead to a water shortage in the future. Developed countries traditionally have high per capita water consumption and need to focus on reducing their consumption through improved water management techniques and practices. By 2025, India, China and select countries in Europe and Africa will face water scarcity if adequate and sustainable water management initiatives are not implemented.

Traditionally, India has been well endowed with large Freshwater reserves, but the increasing population and overexploitation of surface and groundwater over the past few decades has resulted in water scarcity in some regions. Growth of the Indian economy is driving increased water usage across sectors. Wastewater is increasing significantly and in the absence of proper measures for treatment and management, the existing Freshwater reserves are being polluted. Increased urbanization is driving an increase in per capita water consumption in towns and cities. Urbanization is also driving a change in consumption patterns and increased demand for water-intensive agricultural crops and industrial products. The present study was carried out to find the water consumption patterns per household & per capita in the villages in domestic activities.

STUDY AREA

Agra is situated between 27°17' N & 77°58' E on the south-west corner of Uttar Pradesh. The location of the subdivision has been, since long, very significant from the geographical, historical & strategic point of view. Yamuna passes through the district for a distance of nearly 71km. The total area is 4041 sq.km.

Geologically, the district is generally covered by a thick layer of indo- Gangetic alluvium of Pleistocene to sub-recent periods. Calcareous concretions, locally known as “kankar” are found throughout the district, both in the block & nodular forms. The soils of the district are alluvial except for residual soils which occur in a narrow strip in the south & south-west. The climate is markedly periodic and of a semi-arid nature due to marked diurnal differences of temperature, high saturation deficit and moderately low rainfall. There are three distinct vegetation seasons. The district has to suffer from extremes of temperature, i.e., very low temperatures, sometimes below freezing point in winter and extremely high (upto 50° C or above) in summer. Heavy precipitation of rainfall occurs in the second half of July and the first half of August. The average annual rainfall of district is 607.1 mm, 90% of which is received during the monsoon season and nearly the half of the remaining 10% during winter.

In 2011, Agra had population of 4,380,793 of which male and female were 2,356,104 and 2,024,689 respectively. There was change of 21.00 percent in the population compared to population as per 2001. The initial provisional data suggest a density of 1,084 in 2011 compared to 896 of 2001. Average literacy rate of Agra in 2011 were 69.44 compared to 62.60 of 2001. If things are looked out at gender wise, male and female literacy were 78.32 and 59.16 respectively. For 2001 census, same figures stood at 74.60 and 48.35 in Agra District. Total literate in Agra District were 2,598,427 of which male and female were 1,572,552 and 1,025,875 respectively. In 2001, Agra District had 1,852,919 in its total region.

MATERIAL AND METHODS

The survey was done at 5 sites of Agra & these sites consists 4 villages each.

Site-A : Nagla Pema, Karbana, Nagla Talfi, Gadi Bangush

Site-B : Mau, Gailana, Kakretha, Budi ka Nagla

Site-C : Kailash Gram, Swami Mustkil, Baipur ki Garhi, Babarpur Mustkil

Site-D : Chhalesar, Tedi Bagiya, Telpi ka Nagla, Jharna Nala

Site-E : Runakata, Arsena, Singma, Keetham

It was essential to collect the data from residents of all the five sites. For giving equal representation to the residents of each site it was decided to interview an equal number of residents. Due to the constraint of time and access, a purposive sampling technique was used to identify the sample. The unit of inquiry was a household & individual. However, the key respondents for collecting the data were woman & old peoples; responsible for managing the household. The interviews were conducted with women from 100 households – 20 from each of the five sites.

Participatory Rural Appraisal (PRA) approach was found appropriate for need assessment as it is quick, extractive and participative. This approach recognizes that people can have different perceptions and opinions about the same issue. Following PRA techniques were used for collecting data and triangulation:

- Personal Interviews
- Focus Group Discussions
- Observations

Two Questionnaires were prepared to collect the data i.e. one for individual family data which was used at the time of personal interview & another for the village data to be used at the time of group discussion. It was not easy to convince the villagers to be gathered on a common place so that I visited the village generally at the time of evening while villagers come together to meet each other & there; group discussion was conducted in small-small groups. Observations were made while visiting the sites for conducting the interviews and the FGDs. I observed the water consumptions pattern & water resources available in the villages. The observations were very useful in understanding the practices and problems of the villagers.

RESULT AND DISCUSSION

Data obtained from PRA approach was utilized to know the consumption of water per household & per capita.

Table 1: Activity-wise Distribution of Water Consumption per household per day (*In liters*)

Activity	Total	Site-A	Site-B	Site-C	Site-D	Site-E
Drinking	134.5	27.5	25.6	25.4	30.0	26.0
Bathing	1083.1	189.7	236.1	176.3	318.0	163.0
Hand washing	36.3	7.3	6.6	7.1	8.1	7.2
Dental cleaning	37.6	8.3	6.4	6.5	8.5	7.9
Toilet	50.3	10.7	10.7	7.4	10.7	10.8
Washing clothes	374.1	68.2	74.1	63.6	90.0	78.3
Cooking	36.4	7.2	7.3	6.5	8.2	7.2
Washing veg.	20.2	3.9	3.8	3.5	5.1	3.9
Washing utensils	185.8	37.7	38.0	33.5	42.1	34.5
House cleaning	314.3	52.2	69.9	52.6	100.2	39.4
Others	613.3	14.1	16.1	13.7	554.9	14.5
Total	2886	426.8	494.6	396.1	1175.8	392.7

Table 2: Activity-wise Consumption of Water Per Capita Per day (*In liters*)

Activity	Total	Site-A	Site-B	Site-C	Site-D	Site-E
Drinking	18.5	3.8	3.6	3.8	3.7	3.6
Bathing	148.2	26.5	32.9	26.6	39.6	22.6
Hand washing	5.0	1.0	0.9	1.1	1.0	1.0
Dental cleaning	5.2	1.2	0.9	0.9	1.1	1.1
Toilet	6.9	1.5	1.5	1.1	1.3	1.5
Washing clothes	51.4	9.5	10.3	9.6	11.2	10.8
Cooking	5.0	1.0	1.0	1.0	1.0	1.0
Washing veg.	2.8	0.6	0.5	0.5	0.7	0.5
Washing utensils	25.8	5.3	5.3	5.1	5.3	4.8
House cleaning	42.8	7.3	9.7	7.9	12.5	5.4
Others	77.5	2.0	2.3	2.1	69.1	2.0
Total	389.1	59.7	68.9	59.7	146.5	54.3

Based on the comparative study of five sites, it was found that Water consumption at household level was 1175.8 liter/day & per capita level was 146.5 liter/day at Site D was max. due to the presence of submersible, jet pumps & other exhaustible devices; used for the purpose of supplying water to the main city of Agra & more wastage at their home. While min water consumption is found at the Site E (392.7 liter/day) at household level & (54.3 liter/day) at per capita level which was because of no more increment in conventional water resources in comparison to others.

Table 3: Domestic Water Consumption per Household and Per Capita per Day (In liters)

Area	Per Household		Per Capita
	Mean		Mean
Site-A	426.8		59.7
Site-B	494.6		68.9
Site-C	396.1		59.7
Site-D	1175.8		146.5
Site-E	392.7		54.3
Total	577.2		77.8

Although the forest is the major resources which meet the basic needs of the local communities particularly peripheral forest communities. It is recognized that involvement of utility of water & their consumption in different activities.

Arnold [1] said that, water should be regarded as an economic good; this report outlines the principles underlying the analysis of the economic value of water. The distinctive roles of positive economics and normative economics in dealing with the concept of value are stated. Some useful concepts for coping with the topic of economic valuation of natural resources in general are addressed, such as willingness to pay, consumer surplus, producer surplus, demand and supply curves, and market goods value. I have observed following conclusions during the study -

- Average consumption of water per capita per day in different domestic activities at different sites = 77.8 liter/day & 28397 liter/per year.
- Average consumption of water per household per day in different domestic activities at different sites = 577.2 liter/day & 210678 liter/day.
- Total consumption of water in different domestic activities per village per day = 207792 liter/day.
- Indian standard of water consumption in Ideal Village = 40 liter/day/capita (National rural drinking water program.2010).
- Average no. of person per village = 2594
- Average no. of household per village = 360
- Availability of water per capita is projected to decrease by about 44% during the period from 1997 to 2050. (Water: The India Story.2009).

The consumption of water has different values at different sites due to change of consumption of water in different activities. The consumption of water was **double** from given Ideal village standards in villages of Agra.

Some points to be noted that during the study that some villages were found; selling water to the city area. Another point is also to be noted that no. of reservoir in villages were reduced or completely denudated, as well as no proper recycling unit of water occurs in villages.

According to the world scenario global per capita water availability in India is about 1700000 liter/person/year & this value is categorized in stress condition. According to US Census Beauru.2008, Agricultural shares of total water consumption is expected to decrease while Domestic & Industrial shares are projected high growing shares of total water consumption between 2000 & 2050. North & Central America, South America, Australia have availability of fresh water resources maximum than population percentage but Europe, Africa & Asia have fresh water availability resources minimum than population percentage [5].

This study finds that the water level shut down about 1 foot per year. It is due to excess amount of water exhausted from ground by various types of sources like as Tubewells, Jet pumps etc.

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