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# Primary Necessitates and Basic needs of water for Human beings

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ABSTRACT

The objective of this note is to present data pertaining to the basic needs and minimal requirements of water for sustenance and survival. In view of the concerns expressed by various agencies and citizen groups on the dwindling water supplies and the lack of access to clean water in many parts of the world, this note may help the reader to put in perspective the quantity of available water resources and the basic per capita water needs and minimal requirements of humans for their survival to carry on their other daily activities. India is taken as a case in point to examine the availability of its water resources for various uses. Other developing countries may make their own inventories of water available for various uses, and how they can meet the daily minimum needs of their people. The questions posed in the epilog section of this note are provided for readers to think seriously as to what can be done to ensure the sustainability of the economic growth of developing countries, and still preserve the quality and quantity of existing water resources.



## Introduction

### Availability of Water:

The average annual precipitation in India is reported to be 4,000 Cu.Kilometers[1]. The same quantity was also reported by the Tata Energy Research Institute[2] (TERI, now known as The Energy and Resources Institute). The TERI report also reported that the per capita available water is 2464 cu.m per year, which amounts 6750 liters of water per person per day assuming India's population as 1 billion. TERI has also reported that of the annual precipitation, 115 million hectare-meters becomes surface water and 50 million-hectare meters reaches ground water, where as the remainder either is lost due to evaporation or ends up as soil moisture. If the surface water and groundwater are only considered, the per capita available water amounts to 4,520 liters per capita per day. In contrast, however, according to a report of the Ministry of Water Resources of the Government of India, the availability of combined utilizable-surface and groundwater resources is about 1,122 Cu. Km per annum[3], or 3,073 liters per day per capita assuming a population of 1 billion.

It is also known that the 4,000 Cu.Km of water is unevenly distributed in the subcontinent. The annual per capita utilizable water availability has been reported to vary from 18,417 Cu.m in the Brahmaputra valley to 180 Cu.m (˜500 litres per capita per day) in the Sabarmati basin[4]. From a cursory look, regardless of the reported spatial differences in the available per capita water resources, the amount of water available appears to be more than adequate to satisfy daily needs of the masses in India. However, many areas experience scarcity of water, and it is predicted that water shortages will continue to occur in many parts of India. What are the reasons for the scarcity of water? Can a solution to the problem be found to sustain the economic growth of India and before it is too late to ensure national security, safety, and health of the Public.

## Basic and Minimal Human Needs of Water in Rural and Semi-urban Areas of Developing Countries

Taking India as an example, for the most part people still live in villages and semi-urban areas that are heavily populated in developing countries. Planners and volunteers who work on water projects to deliver safe drinking water to these people require information on the minimum quantity of water required to satisfy the basic needs of villagers. Also, similar information would be useful to municipalities for supplying water to satisfy the needs of people, who migrate to urban areas and live in squalid conditions in the outskirts of towns and cities where piped water supply does not exist. Often times, these people live in even worse conditions than those that prevail in poor villages. There are certain basic needs of water for the survival of humans regardless of their economic status. Basic needs in this paper mean the direct needs for drinking, washing, cleaning, cooking etc., to carry on their daily activities disregarding the water that is used for the production of goods and services in sectors such as the industrial, commercial, agricultural, recreational sectors etc. Minimal needs denote the minimum quantities of water required to survive, maintain, and carry on day-to-day activities at a personal level.

From a survey of the literature and observations made in this study, Table 1 presents the per capita intake of water under normal routine activity conditions. However, it should be noted that the intake of water will generally be above the quantities reported particularly for athletically and physical fitness oriented individuals and for others as well under the sweltering conditions of tropics where water losses occur through the body due to perspiration. The National Research Council recommended 2 to 4.5 liters per day based on a calorie intake of food in the range of 2,000 to 3,000 calories per day[12].Gleick argues that it should be the right of all humans to be served with these basic water requirements, and governments must be obliged to satisfy the minimal requirements and recommended a minimum requirement of about 5 liters per day per capita for survival of humans living in subtropical and tropical climates[13].

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**Table 1: Average Daily Water Consumption for Human Survival[a]**

| Reference | Ave. Per Capita Daily Water Intake |
|---|---|
| 5 | 2.5[b] |
| 6 | 2.5[b] |
| 7 | 2.5 |
| 8 | 1.8 to 3.0 |
| 9 | 2.0 |
| 10 | 2.0 |
| 11 | 3 |
| 12 | 2-3.5[c] |

a: During normal activity and temperate climate.
b: Actual fluid requirements measured for early space flights. Recommended intake minimum for Apollo astronauts in command module under routine conditions was 2.9 liters per day.
C: Author's personal intake at age 20. Lower number was in winter and higher number was in summer

**Table 2: Distance to Water Source and Domestic Water Use[13]**

| Water Source/Distance | Water Use, L/d/capita |
|---|---|
| Public Standpipe, farther than 1 kilometer | <10 |
| Public Standpipe, Closer than 1 kilometer | 20 |
| House Connection, Simple plumbing Pour flush toilet | 60-100 |
| House Connection, Urban with gardens | 150-400 |

**Table 3: Recommended Basic Water Requirements for Human Needs[13]**

| Requirement | Recommended Minimum L/D/Capita | Range L/D/Capita |
|---|---|---|
| Drinking | 5 | 2-5 |
| Sanitation | 20 | 0 to >75 |
| Bathing | 15 | 5 to 70 |
| Cooking and Kitchen | 10 | 10 to 50 |
| Total Recommended Basic Requirement | 50 | |

From measurements of water consumed by a family of two in a rural area in India for routine activities starting from waking up in the morning until going to bed was determined to be about 30 to 35 liters per capita per day[14] .These uses comprised of brushing teeth and face washing in the morning (1 liter), posterior cleansing for personal hygiene (1 liter; neither a latrine nor tissue paper was used), cooking (4 liters), water for bath(water collected in a pail and poured with a tumbler -13 liters),drinking (3 liters),washing of clothes (6 liters;72 liters of water was used to wash 6 days of laundry), and washing of dishes (5 liters).These quantities are likely to be higher with people who have ready access to a water source in their vicinity and have the luxury of taking bath twice a day during summer time.

The consumption of water varies in the same geographical location, depending of the distance to the source of the water supply. Table 2 presents the per capita water use[13]. Gleick has recommended the basic requirements of water for human needs, and these are presented in Table 3. For the four basic needs of drinking, sanitation, bathing, and cooking in the kitchen, he recommends a total of 50 liters per day per person to be accepted as a standard and goal to reach by international organizations and water providers to afford a minimum quality of life to humans. His recommended minimum of 20 liters for sanitation alone is high and not affordable by the villagers for pour flush and pit privies, which are being built in rural areas of India under its sanitary latrine program.

In a study conduced in a rural area of West Bengal, India about 50 years ago, the author with his colleagues measured the actual per capita quantity of wastewater contributed to septic tank latrines, and found it to be in the range of 5.36 to 5.98 liters per day per capita. This wastewater consisted of urine, feces, and ablution water used for personal hygiene and water used for flushing the toilets.[15]. The per capita total solid contributed to this wastewater was in the range of 46 to 56 grams per day.

**Epilog**

As previously indicated the purpose of this note is to provide salient information on the availability of water and on the minimal and basic requirements of water for routine type of activities for human survival. However, the degree of actual daily water consumption by human beings for personal use is guided by various factors. These factors include: a) availability of water, b) quality of water, c) access or proximity to water source, cultural habits, d) economic status, e) climate, f) Personal habits and traits etc. Of course, the total per capita water consumption as a whole of all the inhabitants of a region or country depends on the water-consumed for activities such as agriculture, industrial production of goods, services rendered by commercial establishments, recreation, etc. As the economic status of a country improves, so is water consumption.

Why even the basic needs of water for human survival are not being able to be satisfied in various parts of the world begs a lot of questions. It would be interesting to receive answers to the following questions from readers in spite of the apparent availability of water in the subcontinent to satisfy minimal water requirements for survival of people. It is not the intent of the author to provide the answers from his perspective. They are only asked here to challenge the reader to think about the basic and minimal needs of people and how they should be met. Although environmental and water resource economists and pundits know and articulate on what needs to be done to satisfy the basic water requirements of humans in developing countries, it will also be beneficial to the layman to get answers in simple terms to the following questions.

- Is the availability of water due to the climatic, spatial, and temporal factors?
- Is it due to improper planning?
- Is it due to improper policy, management, and appeasement to please one sector over the other?
- Is it due to political, economic, and social apathy?
- Is it due to lack of compliance and enforcement of the existing laws related to allocation of water for various uses?
- Is to due to a lack of a pricing policy for water?
- Is it due to the expectation of stakeholders that water should be treated as a free good because it is the gift of nature to mankind and a fundamental right?
- Is it due to lack of experts, who cannot solve the problem?
- What is it that makes water scarcity a routine occurrence and permits the squandering and degradation of the quality of water resources, which are considered, scared in countries such as India?
- What do international agencies and planners and policy makers envisage to satisfy the water needs of developing countries for sustaining the growth of the economies of various developing countries without having a major tragedy? Can something be learned from the previous plans and policies?

Regardless of the debate of how one would go about satisfying the minimal requirements of water, it is imperative that without a planned strategy and strict implementation of it with the participation of all stakeholders, the poor people in all areas of the world, are likely to face dire consequences in the future.

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