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SURVEY BASED PROJECT REPORT

(For Partial Fulfillment of Course GEOGP 302 SEC)

SOLAN : APPROACHING URBAN WATER SCARCITY

FROM SOURCE TO ALLOCATION

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अप्स्वन्तरमृतमप्सु भेषजम् ।

जल में अमृत है, जल में औषधि है।

THERE IS NECTAR IN WATER;
THERE IS MEDICINE IN WATER.

ऋग्वेद १.२३.१९ । RIGVEDA 1.23.19

THE ABSTRACT

SOLAN : APPROACHING URBAN WATER SCARCITY

"The Earth has enough resources for our need, but not for our greed."

-Mahatma Gandhi

Water is a finite resource available to all, which is to be utilized respectfully and with reverence. The present research on 'Solan: Approaching Urban Water Scarcity' is a survey based project report prepared to identify the problem of water scarcity and its various dimensions, causative factors, trends and related aspects in Solan on the basis of primary data and secondary data collected blended with observations, suggestions and considerations of institutions, communities and common public.

The research deals with comprehending Water Scarcity and its various facets by undertaking the computation and representation of data diagrammatically and finally interpret the issue connecting it with global parameters.

The water problem in Solan is typically not supply or demand specific but accounts for a complex inter-related components from source of water to its distribution and further withdrawal system. The causes of water scarcity in Solan are having various dimensions ranging from government decisions to individual decisions for using water and dealing water shortage with different tools and techniques of utilization and management of Water.

Solan currently faces water shortage in Summer and Monsoon season but due to the increasing trend of population growth, urbanization, climate change the current seasonal water scarcity can become a water crisis for the town in upcoming years leading to many socio-economic problems and one of them is Water Inequality.

For solving this sustainable urban development plans must be created so that water resource is not exploited and overused. What is needed a call for wise action to bridge the gap and address a problem which is not only regional but a global problem. Requirement is a combination of innovative technologies, stronger governance, and community-driven initiatives.

10/2/2025

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CHAPTER: 1
INTRODUCTION

O Water, You are the source of all lives
Source: Sukta 9, Mandala 10, Rigveda

Water is life, and life on Earth is intertwined with it. From time immemorial water has been driving force of civilizations and has remained at the core of human development and is critical for socio-economic growth, energy and food production, healthy ecosystems and for human survival itself. Water is at the heart of adaptation to climate change, serving as the crucial link between society and environment. Traditionally, water has been treated as a common good, as it is rivalrous in consumption but often difficult to exclude users, particularly in its natural state. The increasing pressure on water resources due to population growth, industrialization , pollution and climate change has led to a paradigm shift in the perception of water as a mere common good. Today, water is increasingly recognized as an economic good with characteristics of both common and club goods .

Rapid urbanization, industrialization and changed pattern of consumption has resulted in socio-economic and environmental consequences paving way for water scarcity (physical and economic water scarcity) as faced by many urban cities around the world.

The town of Solan is also among many urban areas which face water problem and is on the verge of becoming *water stressful** city in upcoming times owing to the rapid poor and unplanned socio-economic development, increase in population; dislocated supply, distribution and withdrawal system of water.

The process of urbanization, industrialization and population growth heightens the demand for water putting additional stress on already limited freshwater resources. In addition, climate change is exacerbating water scarcity for the world's cities and Solan is no exception to it.

*Water Stress refers to the impact of high water use (either withdrawals or consumption) relative to water availability. It is measured as ratio of water use to availability.
Water Shortage is seen as population driven scarcity, measured as per capita water availability.

1.1 STATEMENT OF PROBLEM

Himachal being a 'surplus water state' yet the town of Solan has been increasingly facing water problem in terms of water shortage, water quality, irregular supply and distribution of water since recent years.
The problem of water shortage in Solan continues to rise inspite of two water schemes (DWSS-Giri and LWSS- Ashwani) providing water to the town.
There are certain areas which remain under water scarcity all year and in summers the situation becomes extreme for the whole town.
The uneven distribution of water and prevailing disparity in the availability of water for public is expanding. Further, there is no sufficient management during shortage which aggravates the issue.

Thus, the problem of ***Water Scarcity**** is a major urban problem faced by the inhabitants of Solan town and is impending as a crisis in future if not settled wisely. This problem involves all the stakeholders (from supplier to consumer and government bodies) either to exacerbate or resolve the issue.
Secondly, water scarcity affects not only socio-economic activities but also the natural physical environment which threatens the whole ecosystem (both physical and cultural).

***Water Scarcity is the lack of freshwater resources to meet the standard water demand. It results from insufficient available freshwater resources to meet the human and environmental demands of any area. There are two types of water scarcity :**

Physical Water Scarcity
or absolute water scarcity occurs when the use of water resources outpaces the supply.

Economic Water Scarcity
is due to the lack of water infrastructure in general or to the poor management of water resources where infrastructure is in place.

According to UN WATER, Water Scarcity is a relative concept. The amount of water that can be physically accessed varies as supply and demand changes. Water scarcity intensifies as demand increases and/or as water supply is affected by decreasing quantity or quality.

There are several indicators of water scarcity such as Water Poverty Index (weighted average of 5 components- water availability, access, capacity, use, and environment); IWMI indicator (proportion of water supply i.e. water availability, accounting for water infrastructure); Falkenmark indicator (per capita availability) etc.

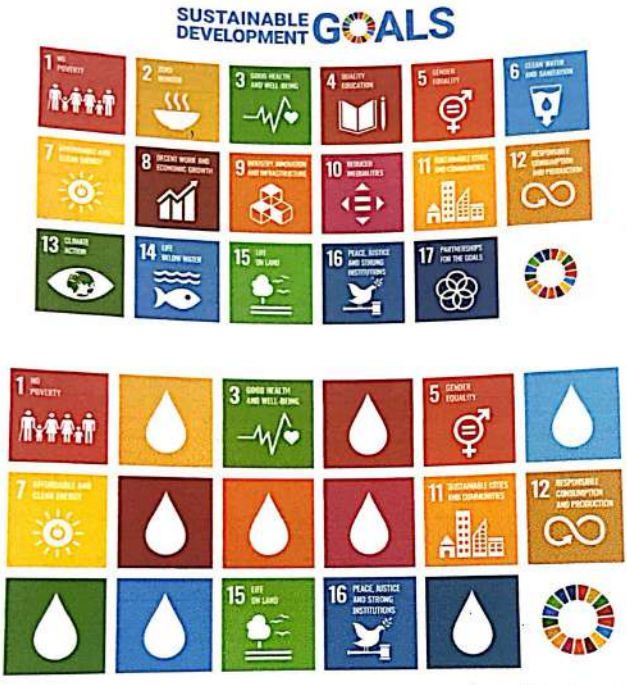


Fig 1.1 : SDGs

SDG 6 : CLEAN WATER AND SANITATION

Fig 1.2 : SDG 6 Clean Water and Sanitation

1.2 OBJECTIVES AND EXPECETD OUTCOMES

Considering the mentioned problem, the present study discusses the water resilience of Solan City as part of field survey project. The study looks into the looming threat of water scarcity and the causative factors behind such problem of water shortage affecting people disproportionately. The study is aimed at :

- Comprehending the Water Problem
  (Describe water scarcity and its dimensions)
- Identify the causative factors currently causing and will lead to water scarcity.
- Management
  (Before, During, After Water Scarcity; at multiple levels from consumer to supplier to institutional body)
- Discuss the gaps, challenges, good practices and recommendations regarding water problem
- Brief Outlook on Future Prospects

1.3 LITERATURE REVIEW

The present research study on Water Scarcity has been undertaken by various institutions around the world. The phenomena of water scarcity is studied by urban planners, scientists, climatologists, environmentalists, geographers and the issue of water is of utmost importance in today's world due to industrialization, urbanization and unplanned development undertakings which also affect the water usage and consumption patterns of people.

The literature review for the present research included the reviewal study of **'Review of Domestic Water Conservation Practices in Saudi Arabia' by Omar K.M. Quda and Ahmad Shawesh** where physical water scarcity prevails.
Second review was done of **'Water : Consumption, Usage Patterns, and Residential Infrastructure. A comparative analysis of three regions in the Lima Metropolitan area' by Rondiel and Sarmiento.**

Besides these the study of **Inventorization of water resources in Solan Block of Himachal Pradesh**, India as published by Current World Environment provided knowledge of water resources of Solan Block.

The thematic paper published by **NIDM - Water Crisis in Indian Cities : A systematic Failure or wrath of Changing Climate**, showcased the water problem and its various dimensions in Indian Cities of Delhi and Chennai and also provided best practices and recommendations for solving the issue of water scarcity.

1.4 SCOPE AND LIMITATIONS

The scope of present study on *Solan: Approaching Urban Water Scarcity* is very wide. Being a sprawling urban Himalayan city, Solan presents a good urban landscape for impending urban problems and issues related to Climate Change. As water problem is a problem not of a city but of the whole globe, the present research can be generalized to other sprawling urban towns and cities of Himachal Pradesh. The causative factors of water problem and its related management at all levels is necessary to be studied to address future issues concerning water.
Secondly, this study aims realize water as a resource to be respected rather than as a commodity available for use only. This realization is highly required globally.

The limitations of the present study includes: Limitations of Field Techniques as a methodology of obtaining data (where people hesitate to provide true and accurate knowledge, time constraints, economic constraints) and lack of proper secondary data from official institutions. Besides, this research is restricted to urban water problem and do not address water problem in general (rural and urban both).

1.5 STUDY AREA : SOLAN

Solan is a city in the Indian state of Himachal Pradesh and district headquarters of Solan district. It is located at 30.92 N latitude and 77.12 E longitude. Solan has an average elevation of 1550 metres. It is located 45.5 km south of Shimla. The city is situated between Chandigarh and Shimla on the Kalka- Shimla Highway-5. Located on the Punjab-Himachal Border, Solan is nestled in the Shiwalik Hills of the Himalayas.

Solan is considered as an average temperature hill station and is an ideal station from residential view point. It is the third largest Municipal Corporation of Himachal Pradesh spread over an area of 33.43 km sq. with a residential population of 47,418 making it the third largest city in Himachal Pradesh after Shimla. Solan had an average literacy rate of 85.02 percent.
Solan MC is divided into 17 wards. MC is responsible for providing basic amenities like water and sewerage.

Solan is a hub of horticulture produce marketing. Tomatoes, plums, apricots, kiwi, apples, and seasonal vegetables constitutes major economic activity for the town. Known for the production of quality mushrooms, as a result of the vast mushroom farming in the area Solan is called the Mushroom City Of India and is also known for its bulk production of tomatoes. Solan has one of the oldest breweries in the country.
The city has become an industrial hub of Himachal Pradesh. The small-scale and medium industrial units provide employment, and play a role in the economy of the inhabitants of Solan. These industrial units mainly belong to hosiery, food, wood, paper, leather, glass, chemical, mechanical, pharmaceuticals, food processing, electrical, and electronics services.
Tourism contributes to the economy as there are many places of interest in and around Solan which include Maa Shoolini Devi Temple, Jatoli Temple, Mohan Meakin Breweries, Toy train and Solan Railway Station which is a UNESCO World Heritage Site, Karol Tibba, Brog, Chail, Kasauli, Giripul, Sadhupul.
Besides, people from other places visit Solan to use the health, educational, commercial and other infrastructure available. Many new industries are setting up in the city. Solan has thus became a sprawling urban centre which is greatly attracting investments in all sectors.

1.6 METHODOLOGY

The present research investigates the problem of Water Shortage and Management in Solan City. Water is a basic amenity of all sectors in general and residential areas in particular. Shortage of water disrupts all the undertakings by an individual, family, community and society hence creating many socio-economic issues and conflicts. Water shortage is a complex problem involving all stakeholders from suppliers to consumers and decision makers.

For addressing this research problem primary data and secondary data both were gathered. Thus, a ***blended approach*** of Qualitative and Quantitative research was employed for collecting data. Experimental and descriptive data were gathered via ground field work.

The study area is administratively divided into 17 wards and each ward has been taken as basic unit of study whereas the smallest unit for data collection is household. A population sample of 10 percent was selected from each ward of the study area.

Data Collection Methods :

Our study area is divided into 17 administrative wards and each ward was taken as a unit of study and analysis for convenience whereas the smallest unit for data collection was taken as household. Due to time constraints, a population sample of 10 percent from each ward was taken for collection of primary data.

Survey : Field Survey was conducted by visiting different wards and random households were selected for survey. Questionnaire method was accordingly employed, consisting of a total of 24 questions both closed (multiple choice questions) and open-ended questions.

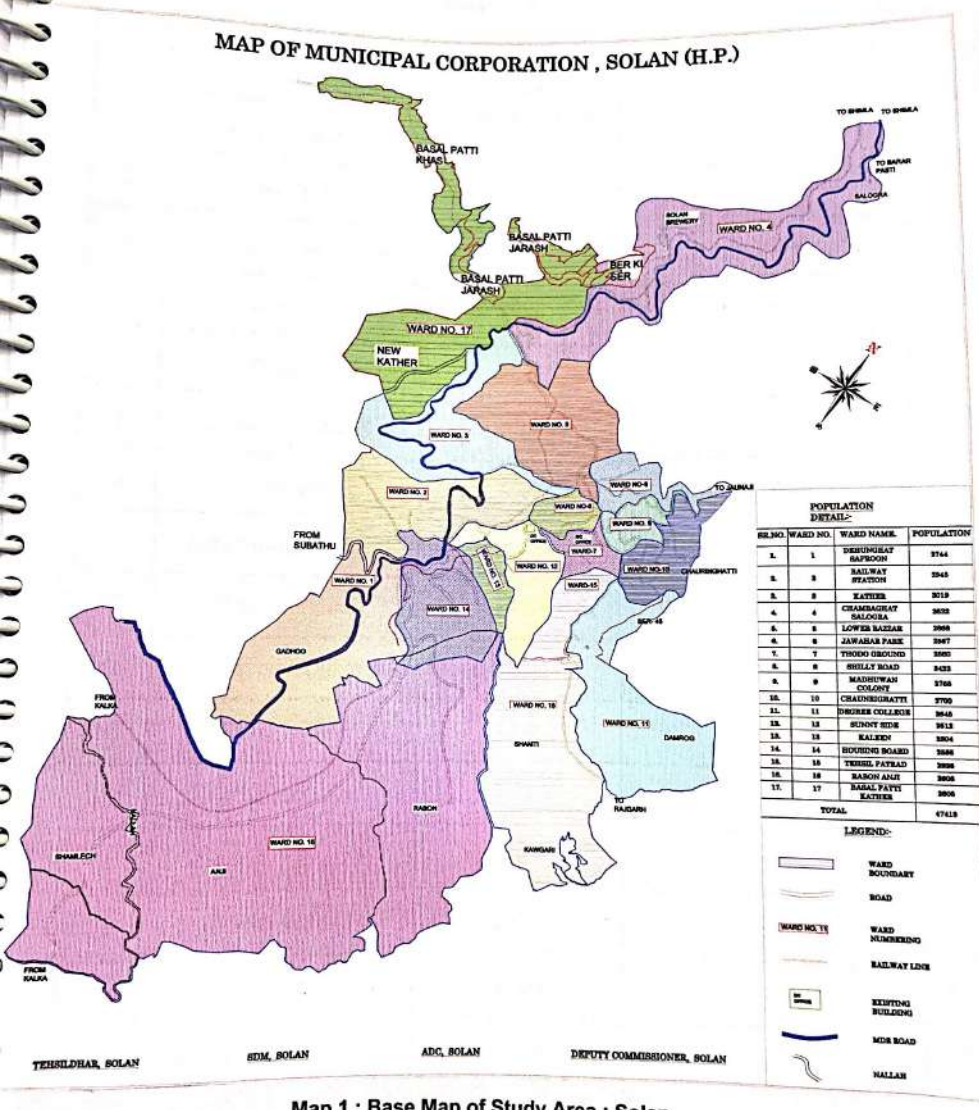
Schedule method was also employed wherever felt necessary. Observation method was undertaken during field visits to Water Scheme Plants and during casual visits for survey.

Secondary data was gathered from concerned government bodies (Jal Shakti Vibhag and Municipal Corporation).

Analysis Methods :

Mixed methods integrating both qualitative and quantitative approaches into one coherent analytical process was used.

The primary data collected was ward wise plotted in tables in Microsoft Excel and ward wise computation and analysis was carried out which was compared, interpreted and integrated to provide a whole picture of research issue.



Map 1 : Base Map of Study Area : Solan

SR. NO.	WARD	POPULATION	HOUSEHOLDS
1	Dehunghat	2744	1170
2	Railway Station	2945	1640
3	Kather	3019	722
4	Chambaghat Salogra	2622	459
5	Lower Bazzar	2868	576
6	Jawahar Park	2567	721
7	Thodo Ground	2880	770
8	Shilly Road	3422	612
9	Madhuvan Colony	2765	760
10	Chaunrighati	2700	715
11	Degree College	2645	308
12	Sunny Side	2512	1040
13	Kaleen	2804	362
14	Housing Board	2586	799
15	Tehsil Patrad	2926	750
16	Rabon Anji	2608	731
17	Basal Patti Kather	2805	1493
	TOTAL	47418	13628

Table 1.1 : LIST OF WARDS (with number of households and population)

CHAPTER : 2

WATER FLOW DYNAMICS
(Sources, Supply, Storage and Distribution)

In order to understand the problem of water shortage, we need to look into the water flow dynamics in our study area Solan. So, in the present chapter, we track the flow of water in Solan town from its raw form to its potable form. The journey starts from the rivers of Himalayas and ends in the homes of people, involving government bodies, institutions, communities and individuals.

WATER FLOW FLOWCHART

SOURCE

The River Giri and the Ashwini Khad

Others : Locally available Natural Sources (Springs, called *Chashma* and Baodis)

→

SUPPLY

There are two water supply schemes underJal Shakti Vibhag

1. DWSS Giri, Solan
2. LWSS Ashwani, Solan

STORAGE

Main Water Tank at Dharo ki Dhar (Water from Giri)

↓

Tanks at Tank Road (Water from Ashwani and Giri)
Under Municipal Corporation

DISTRIBUTION

Municipal Corporation

→

CONSUMPTION

Domestic, Public, Commercial, and Industrial Uses

WITHDRAWAL

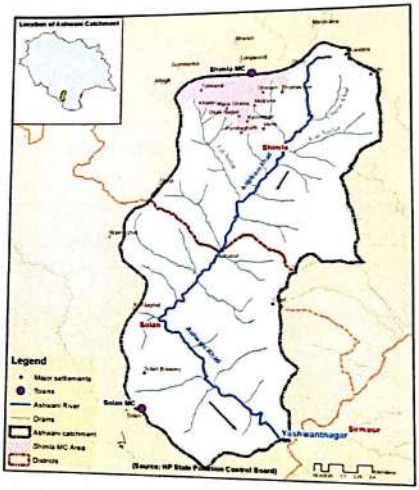
After Sewage treatment, the treated water is released back into local streams and rivers

2.1 SOURCE OF WATER

The urban water demands of Solan town are fulfilled by two main rivers - the Giri and the Ashwani Khad. The Ashwani Khad meets the Giri in Gaura while the Giri an important tributary of the Yamuna river, flows towards south in the eastern part of Solan district and forms part of the Yamuna river basin.
Thus, our study area lies in the Giri sub-basin which is a part of the Yamuna river system and thus a part of the Ganga Drainage Basin.

2.1 (a) The Ashwani Khad

- The Ashwani Khad is formed by Churat Nallah and Jagroti Nallah in Shimla. Various other rivulets and nallahs emerging from the Shimla town also meets the Ashwani Khad.
- After flowing for a distance of 16 km, the Ashwani enters district Solan, upstream of village Sadhupul. The catchment area in district Solan mainly comprises of villages like Kohari, Ded, Sunnu Tikri, Galai and exists Solan at Village Gaura near Yashwantnagar.
- The total stretch of Ashwani Khad in district Solan is 22 km. The Ashwani meets River Giri at Village Gaura, Yashwantnagar, Sirmaur.



Map 2 : Drainage Map of Ashwani Khad
Source : HP State Pollution Control Board

2.1 (b) The Giri River

- The river Giri is an important tributary pf the Yamuna, which drains a part of South-Eastern Himachal Pradesh. The Giri or Giriganga originates from a small spring in the hills of Kotkhai-Kharapather, 'Kupad' in Shimla. It flows through the districts of Shimla, Solan, and Sirmaur and finally joins the Yamuna at Paonta Sahib.
- After covering a distance of 40 km in Shimla till Sainj, it enters district Solan. Decentralized Water Supply System, DWSS- Giri, based in Gaura, Yashwantnagar is the current scheme on Giri which supplies water to Solan town.

2.2 THE SUPPLY OF WATER TO SOLAN TOWN

The supply of water from the Giri and the Ashwani rivers to Solan town is undertaken by Jal Shakti Vibhag under two water supply system schemes which are : the DWSS-Giri Water Scheme and the LWSS-Ashwani Water Scheme.

2.2 (a) LWSS-ASHWANI WATER SCHEME

- The raw water of Ashwani Khad is lifted to Solan town under the Lift Water Supply System (LWSS) Ashwani Water Scheme. The project was started in 1971 and improvement was carried in 1994.
- There are two stages of supply under the LWSS-Ashwani Scheme :

  I. Stage I - Ashwani Khad

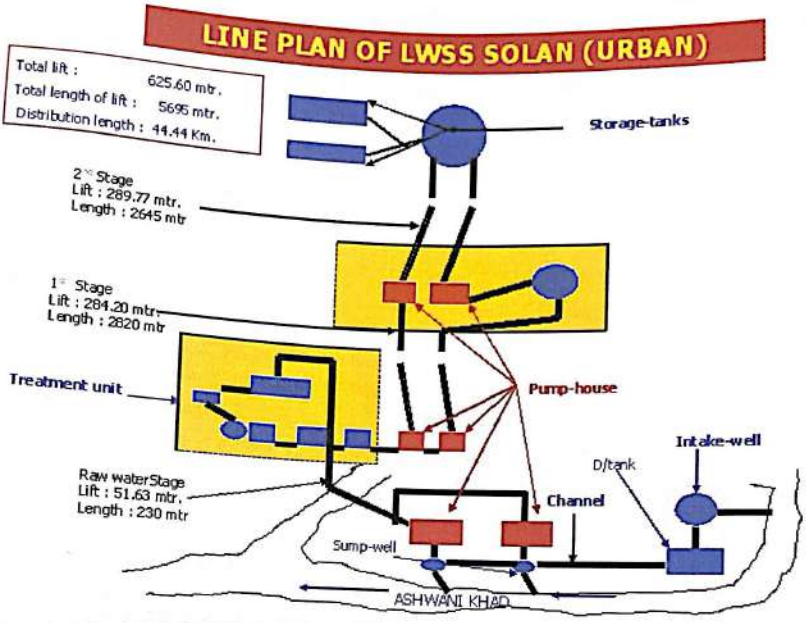
  II. Stage II - Village Shilli
- At Stage I Ashwani Khad, there exists two supply scheme provisions - Old (1971) and New (1994).
- Due to high pollution of Ashwani Khad, UV Disinfection System and Gaseous Chlorination System were installed in 2019. Since then no major improvement has been done in the scheme.

Fig 2.1: Intake Well (Raw Water Stage)

Fig 2.2: Clarifier and Flocculator (Pre-Sedimentation Stage)

Fig 2.3: Gaseous Chlorination

Fig 2.4: UV Disinfection System



Digital Diagram 1 :LWSS- Ashwani
Source : Jal Shakti Vibhag

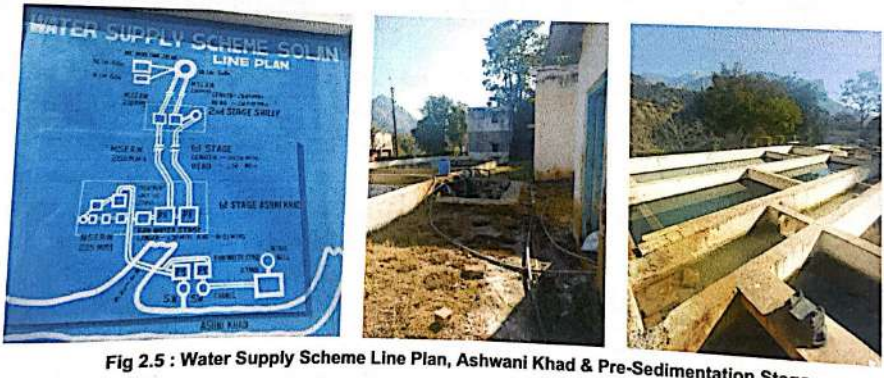


Fig 2.5 : Water Supply Scheme Line Plan, Ashwani Khad & Pre-Sedimentation Stage

Future Proposals :

- Proposal for joining the Giri River Scheme with Ashwini Water Scheme by proposing a Rising Main from Giri to Raw Water Tank of LWSS Solan Ashwini Khad.
- Proposal of changing the source of Ashwini Water Scheme.

PROBLEMS ASSOCIATED WITH LWSS-ASHWANI

I. Obsolete machinery

The machinery installed in pump houses, filter houses and in general have become obsolete and have depreciated. Thus, machinery at all stages of supply is needed to be replaced as this poses a problem in smooth flow of water and its treatment and further supply.

Fig 2.6 : Machinery installed at Ashwani Water Plant

Fig 2.7 : Pipelines

II. Obsolete pipelines

Pipelines form the indispensable element of whole process of water supply from its source to end stage of pumping water to main storage tanks. The pipelines have not been changed since 1994 and thus have become outdated and require repair and maintenance almost everyday.

III. Leakages

Leakages are the cause of major loss of water during the supply process and due to weak pipes leakages prevail and are addressed everyday at different stages of treatment and supply plant.

IV. Lack of personnel

The plant and system lacks the staff personnel. One person is engaged in multiple tasks. The work ratio is 1 : 4 where one person handles the tasks of four persons which leads to lack of specialization.

V. Pollution

The water of Ashwini river is treated in various stages because the river water is one of the most polluted waters of the state. The Ashwini water treatment involves pre-sedimentation (Adding Alum, Bleaching Powder), clarifiers, flocculators, filter houses, gaseous chlorination, UV Disinfection Mechanism. All these processes require continuous maintenance and are very expensive.

Fig 2.8 : Adding alum and bleaching powder for purifying water (Pre-Chlorination Stage)

Fig 2.9 : Flocs in Water during Flocculation

2.2 (b) DWSS- GIRI WATER SCHEME

- The raw water of the River Giri is supplied to Solan town under the Decentralized Water Supply System (DWSS) Giri Water Scheme. The Giri Water Scheme was proposed in the year 2004-05 and was approved in 2007, with an initial cost of Rs. 56 crores. In 2008-09, the scheme was completely ready with water treatment plant of capacity 14.72 MLD (million litres per day).

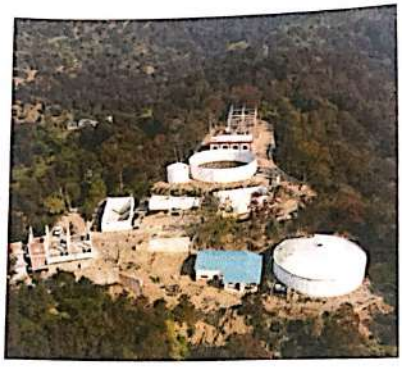


Fig 2.10 : DWSS- Giri Water Scheme

- In 2018-19 improvement of the scheme was undertaken and a second water treatment plant with capacity of 7.36 MLD was ready. Currently, water treatment plant has a capacity of 22.08 MLD.

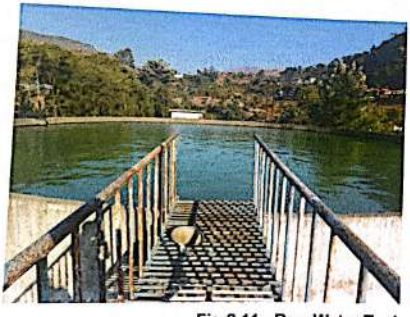


Fig 2.11 : Raw Water Tank and Clariflocculator, Giri

Fig 2.12 : Rising Main Giri

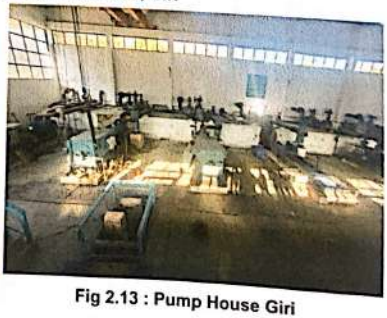


Fig 2.13 : Pump House Giri

FUTURE PROPOSALS FOR THE DWSS-GIRI WATER SCHEME

I. Percolation Wells

Percolation wells will help majorly in monsoon season as they will naturally purify water in the initial stages and this would help in reducing the amount of silt which poses a problem in water supply due to blockage of pipelines. There is a proposal of constructing two percolation wells and a filtration unit to deal with the issue of siltation in the monsoons.

II. Dam Proposal

There is a proposal of dam in the upstream of Giri in order to reduce sedimentation which is a major problem of Giri Water Scheme especially during rains.

III. Overall Upgradation of Scheme

The upgradation Rs. 12.73 crore has been worked out. This would ensure the lifting of the remaining 7.4 MLD to augment water supply, as the scheme was lifting only 14.60 million litres per day (MLD) of water as against the installed capacity of 22 MLD.

Sketch 1 : Improvement of Water Supply System to Solan Town and Adjoining Areas From Giri River ; Source : JSV, Solan

UPGRADATION OF DWSS-GIRI

Fig 2.14 : New Clariflocculator and Clarifier

Fig 2.15 : Improvement of existing Filter Unit and New Filter Beds

Fig 2.16 : New Infrastructural Development and Improvement of existing Infrastructure

2.3 STORAGE OF WATER

The water after treatment process from DWSS- Giri and LWSS-Ashwani is supplied to storage tanks under Jal Shakti Vibhag.

I. Dharo Ki Dhar (Main Water Storage Tank)

The clean water from DWSS-Giri is stored at Main Water Tank at Dharo ki Dhar with an existing tank capacity of 37 lakh litres. There is a proposal of a new tank with storage capacity of 25,76,000 litres and installation of gaseous chlorination plant.

II. Tanks at Tank Road (Storage Tanks for Solan Town)

There are 3 water tanks under Municipal Corporation at Tank Road which serve as the main storage tanks for Solan town. The water from LWSS-Ashwani is directly stored here while the Giri Water is supplied from Dharo ki Dhar to these tanks through gravity main.

The first tank has a storage capacity of 18 lakh litre and other two tanks are of 12 lakh litre and 8 lakh litre respectively .

Water from these tanks is now distributed in Solan town under Municipal Corporation.

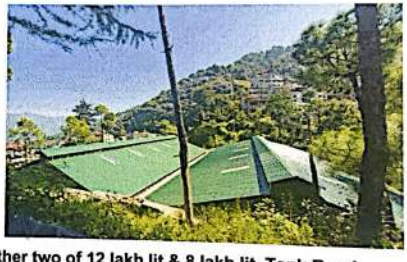


Fig 2.17 : Main Storage Tank (37 lakh lit) and other two of 12 lakh lit & 8 lakh lit, Tank Road

Fig 2.18 : Condition of water tank from inside

Fig 2.19 : Water Supply Key

III. Other Storage Tanks

There are many other storage tanks at different locations under Municipal Corporation. One is at Jawahar Park and other is in Dehunghat with capacity of 10 lakh litre respectively .

2.4 DISTRIBUTION OF WATER

- The water from MC Tanks at Tank Road is supplied to various tanks of lesser capacities and then finally the water reaches the homes, schools, colleges, offices, industries, hotels, restaurants etc. and is used by people. The distribution of water is entirely under MC.
- The distribution of water is not systematic in Solan town owing to the outdated pipelines and obsolete distribution system of supply lines. The water is supplied through the older system of 1994 till now, which hinders the proper and judicious distribution of water.
- Another point is that there are certain wards which are served by Jal Shakti Vibhag. There are separate branches of MC and JSV supplying water to Solan town.
- From Main Water Tanks at Tank Road, two branches are bifurcated, one goes to Shamti area and another to Jawahar Park area. Around all wards are served by MC except Ward 1, 16 and 17 which are mostly served by JSV.
- JSV have water branches to Dehunghat (Ward 1), Chambaghat (Ward 16) and Basal Patti Kather (Ward 17) however MC too serves these wards.
- Under Municipal Corporation there are 8500 domestic water connections and 1500 commercial water connections.

Fig 2.20 : Pipelines in Ward No. 1,Dehunghat and Pipelines in Market

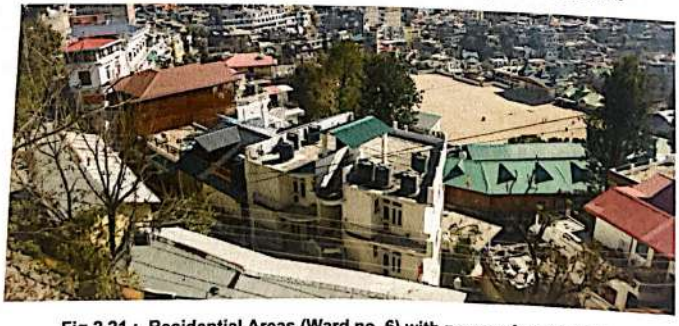


Fig 2.21 : Residential Areas (Ward no. 6) with personal water tanks

CHAPTER : 3

DIAGRAMMATIC PRESENTATION OF DATA & ANALYSIS

In this chapter of Diagrammatic Presentation of Data and Analysis, we undertake the presentation of primary data collected and computed of all 17 wards of Solan town individually as well as collectively.

For individual ward a total of 6 parameters are described which are : the source of water, water shortage, frequency of shortage, season of shortage, water shortage in days and management during shortage.

After providing a picture ward wise we undertake Solan Collective Analysis which presents the different facets of water problem in Solan.

SOLAN COLLECTIVE ANALYSIS

A total of twelve aspects have been depicted diagramatically to look into the water problem faced by households.

(All data presented is in percentages and is solely based on the primary survey conducted by our team)

Fig 3.1 : Condition of Public Water Taps, Mall Road Solan

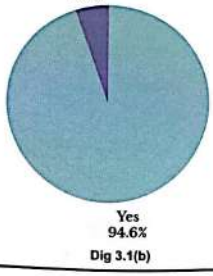
I. WARD NO. 1, DEHUNGHAT WARD

- Households : 1170
- Population : 2744

Source of Water

Dig 3.1(a)

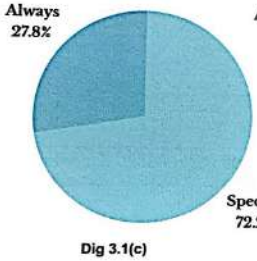
Water Shortage



Dig 3.1(b)

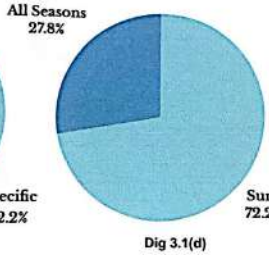
- 87.5% households have JSV connections, while 12.5% have both JSV & MC connections.
- 94.6% households face water shortage and 24% don't have any water problem.

Frequency of Shortage



Dig 3.1(c)

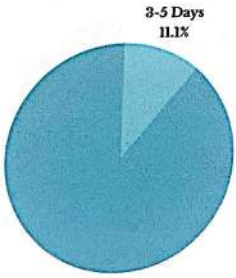
Season of Shortage



Dig 3.1(d)

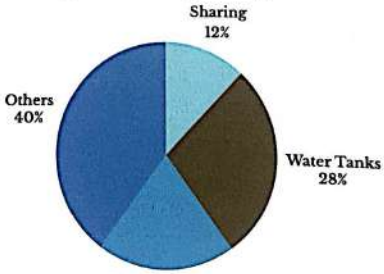
- Of 94.6% households facing water shortage, 72.2% face in specific conditions or seasons (Summers) while 27.8% households always face water shortage.
- Water Shortage remains for more than 7 days for 88.9% households.

Water Shortage in Days



Dig 3.1(e)

Management During Shortage



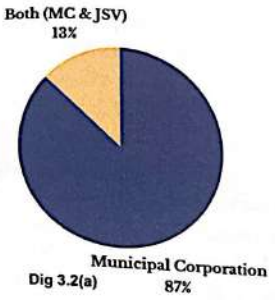
Dig 3.1(f)

Natural Source of Water is available which is used by 20% of households. The ward remains under water crisis all summers.

II. WARD NO.2, RAILWAY STATION WARD

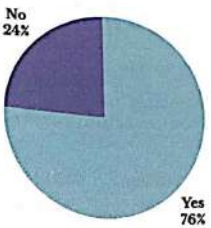
- Households : 1640
- Population : 2945

Source of Water



Dig 3.2(a)

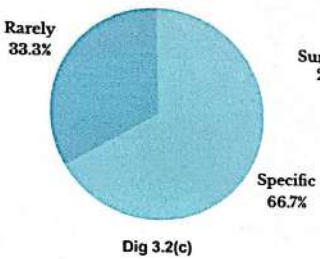
Water Shortage



Dig 3.2(b)

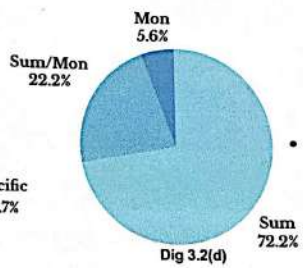
- 87% households have MC connections and 13% households have both MC and JSV connections.
- 76% households face water shortage and 24% don't have any water problem.

Frequency of Shortage



Dig 3.2(c)

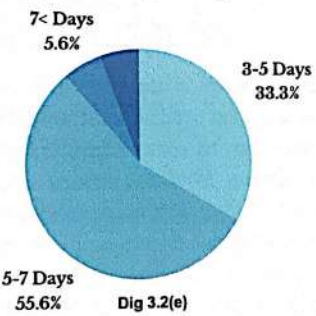
Season of Shortage



Dig 3.2(d)

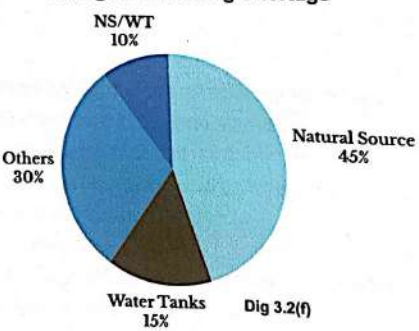
- Of 76% households facing water shortage, 66.7% face in specific conditions or seasons while 33.3% rarely have any water problem.
- Summers remain the time of major scarcity for 72.2% households.

Water Shortage in Days



Dig 3.2(e)

Management During Shortage



Dig 3.2(f)

- Shortage remains for 5-7 days for 55.6% households, 3-5 days for 33.3% and 5.6% face shortage for 1-3 days as well as more than 7 days respectively.
- Majority (45%) make use of natural source available in the ward.

WARD NO. 1
DEHUNGHAT

The Dehunghat Ward is mainly served by Jal Shakti Vibhag. All the households have JSV water connections of which 12.5% have both JSV and MC connections.
A majority of households, 94.6% have water shortage of that 27.8% always have issues relating to water while 72.2% during specific conditions or seasons. Summers are the season of extreme shortage, however shortage remains all year for 27.8% households.
Water Shortage remains for more than 7 days for 88.9% of households.
Management during scarcity is done at consumer level by calling water tanks, sharing, natural source and other means.
Other problems in this regard are the non-availability of road facilities, non-cooperation of Keyman and JSV. The households are really not satisfied with the water supply and distribution and ask for a change.

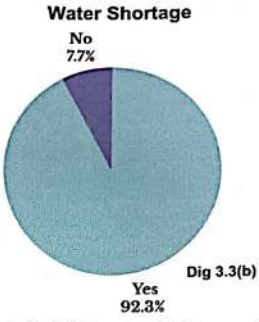
Fig 3.1(i) : Vikas Mohala Residential Area, Ward 1

WARD NO. 2
RAILWAY STATION

The Railway Station Ward is mainly served by Municipal Corporation, however some households have both MC and JSV connections (13% households).
The residential area of the ward is systematically planned and households face water shortage only in specific conditions or seasons especially when the whole town faces water scarcity i.e. in Summers and Monsoon.
Majority households face water problem in Summers (72.2%).
The management during Summers is well done by the people. The 24/7 natural source of water is used by all near by people. Water Tanks are called only during extreme scarcity conditions.

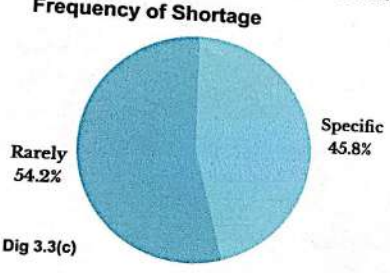
III. WARD NO. 3, KATHER WARD

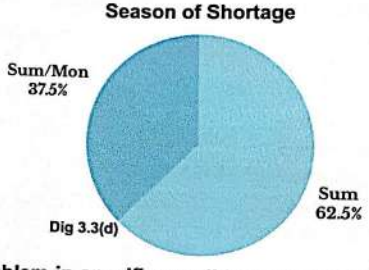
- Households: 722
- Population: 3019



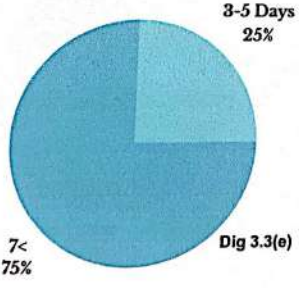
90% households have MC Water Connections and 10% have JSV Connections.

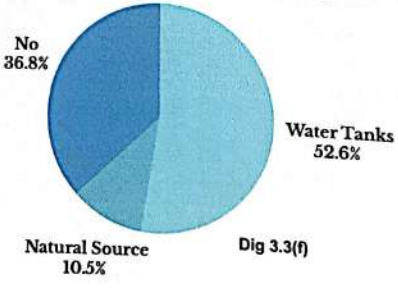
Of 92.3% Households facing Water Shortage





Around 45.8% households have water problem in specific conditions or seasons and 54.2% rarely have water problem. In Summers shortage is faced by 62.5% households and 37.5% face shortage in Summers & Monsoon both.



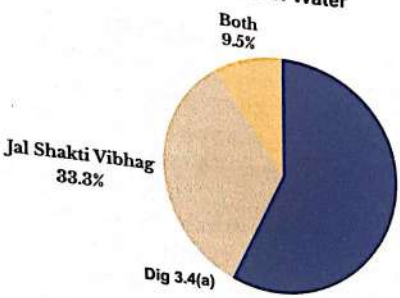


Water Shortage remains for 3-5 days for 25% households while 75% face shortage for more than 7 days. A 24/7 natural source of water is available and is used by near by residents.

IV. WARD NO. 4, CHAMBAGHAT SALOGRA

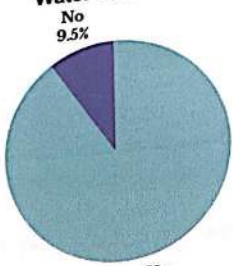
- Households : 459
- Population : 2622

Source of Water



Dig 3.4(a)

Water Shortage

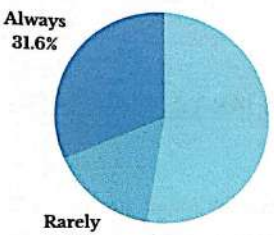


Dig 3.4(b)

The ward is served by MC and JSV both

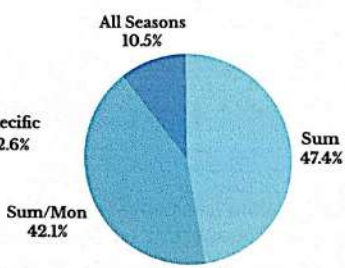
Of 90.5% Households facing Water Shortage

Frequency of Shortage



Dig 3.4(c)

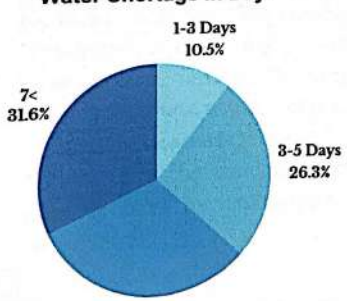
Season of Shortage



Dig 3.4(d)

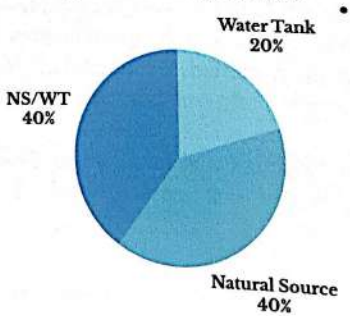
- **Around 52.6% households have water problem in specific conditions or seasons, 31.6% always have water problem while 15.8% rarely face water shortage.**
- **In Summers 47.4% families face shortage, 42.1% face in Summers & Monsoon both and 10.5% face shortage all seasons.**

Water Shortage in Days



Dig 3.4(e)

Management During Shortage



Dig 3.4(f)

Water Shortage remains for more than 5 days for 63.2% households., 3-5 days for 26.3% and 1-3 days for 10.5%.

WARD NO. 3
KATHER

The Kather Ward is mainly served by Municipal Corporation. Majority households (92.3%) face water shortage but not extreme. 54.2% households rarely face water problem, while 45.8% have water issues in specific conditions or seasons, when whole Solan faces water shortage. Summers are the season of water shortage that too lasts for 3-5 days for 25% households and more than 7 days for 75% households.

Households near to natural source make use of it, while others call water tanks. More than half (52.6%) households call Water Tanks.

The ward faces water shortage only when the whole town faces water problem. However, the ward manages the problem in a planned way.

WARD NO. 4
CHAMBAGHAT SALOGRA

The Chambahghat Salogra Ward had recently came under Municipal Corporation (Jan 2025) and was previously served by JSV, however now 57.1% households have MC water connections while 33.3% have both MC and JSV connections.

More than 90% households have water shortage of which 31.6% always face water problem, while 52.6% in specific conditions or seasons and 15.8% rarely.

Summers are the main season of water shortage. Around 10.5% always have water shortage in all seasons. For maximum households shortage remains for 5-7 days.

There are natural sources of water which are used throughout the year and become a boon during shortage season.

According to the residents the lack of monsoon is a reason of water shortage supplemented by exploitation of natural sources and lack of administrative awareness.

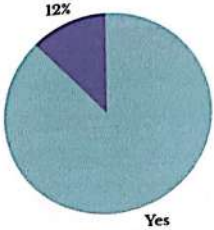
- Households : 576
- Population : 2868

V. WARD NO. 5, LOWER BAZAR

Source of Water

Dig 3.5(a)

Water Shortage

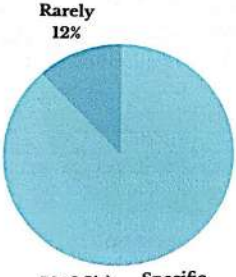


Dig 3.5(b)

Municipal Corporation serves the ward

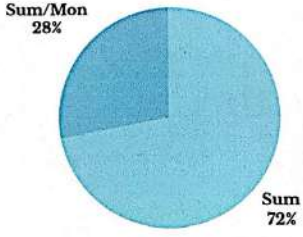
Of 88% Households facing Water Shortage

Frequency of Shortage



Dig 3.5(c)

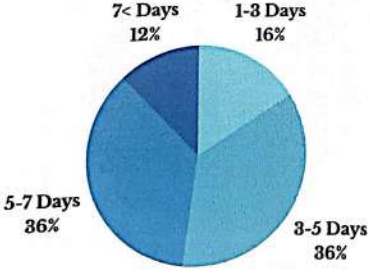
Season of Shortage



Dig 3.5(d)

- 88% households have water problem in specific conditions or seasons while 12% rarely face any water shortage.
- Summers remain the major season of shortage for 72% households, while Summers & Monsoon both for 28%.

Water Shortage in Days



Dig 3.5(e)

- Water Shortage remains for 3-5 days and 5-7 days for 72% households, 12% face it for more than 7 days and 1-3 days for 12% families.
- There is a natural source available in the ward, however during shortage residents look for water tankers.

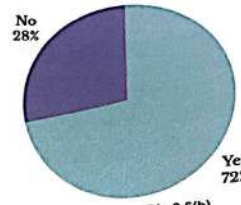
VI. WARD NO. 6, JAWAHAR PARK

- Households : 721
- Population : 2567

Source of Water

Dig 3.6(a)

Water Shortage

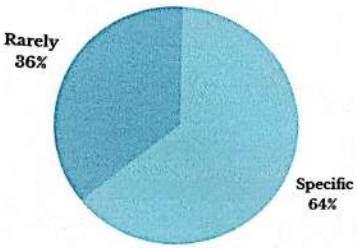


Dig 3.6(b)

Municipal Corporation serves the ward

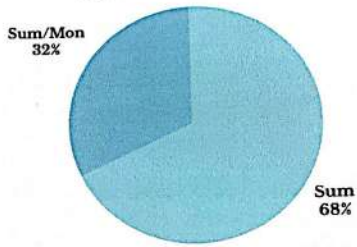
Of 72% Households facing Water Shortage

Frequency of Shortage



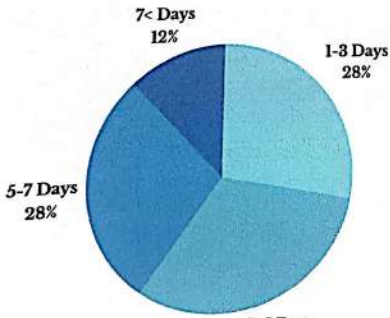
Dig 3.6(c)

Season of Shortage



Dig 3.6(d)

Water Shortage in Days



Dig 3.6(e)

- 64% households have water shortage in Specific conditions or seasons, while 36% rarely have any problem.
- 68% households experience water shortage in Summers & 32% in Summers and Monsoon both.
- Shortage remains for 3-5 days for 32% households, 5-7 days for 28% & more than 7 days for 12%.
- There is no natural source available in the ward, thus water tankers are called during extreme shortage which is a rare event.

WARD NO. 5
LOWER BAZAR

The Lower Bazar is served by Municipal Corporation. This ward is full of hustle and bustle as it serves the main market of Solan and thus requires water in every sector. The residential areas face water shortage mainly in specific seasons or conditions (88%) while 12% households rarely face water shortage. The season of shortage remains Summers for 72% of households and 28% face water problem in both Summers and Monsoon.

The days of shortage varies with location and demands, for 36% households shortage lasts for 3-5 days, which may extend to more than 7 days as well.

As per the residents of the ward, main water shortage is faced when there is lack of supply in the whole town. There is a natural source available but during scarcity people call water tankers.

WARD NO. 6
JAWAHAR PARK

The Jawahar Park ward is also entirely served by Municipal Corporation. The location of tanks over the ward supports the supply of water to the households. Around 72% of households face water shortage and 28% do not have any water related problem. Of 72% households facing shortage 36% rarely face it while 64% have water issues in specific seasons or conditions. Majority face shortage in Summers (68%) and 32% have problem in both Summers and Monsoon.

Shortage lasts for 3-5 days for maximum households. Water Shortage is not a considerable issue for the households of the ward as they do not have much problem due to the smooth supply lines and location of water tanks vertically above the ward.

However, during extreme shortage in Summers, residents call for water tanks as there is no natural source available in the area.

VII. WARD NO. 7, THODO GROUND

- Households : 770
- Population : 2880

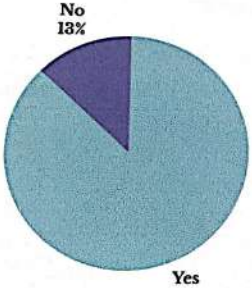
Source of Water

Municipal Corporation
100%

Dig 3.7(a)

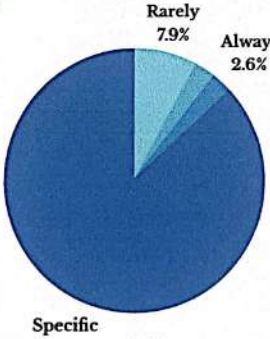
- The Thodo Ground Ward receives water entirely from MC. Around 87 percent of households face water shortage. Of that 87 percent 86.6 percent faces shortage during Specific Conditions or Seasons.
- 65.8 percent households face shortage specifically in Summers. Water Shortage remains for 3-5 days (42.9 percent) for majority households
- Residents cater to their water needs by a natural source available in the ward which proves to be a boon for them during shortage specifically during Shoolini Fair in June.

Water Shortage



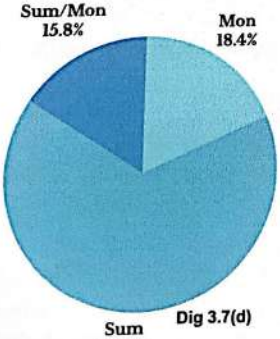
Dig 3.7(b)

Frequency of Shortage



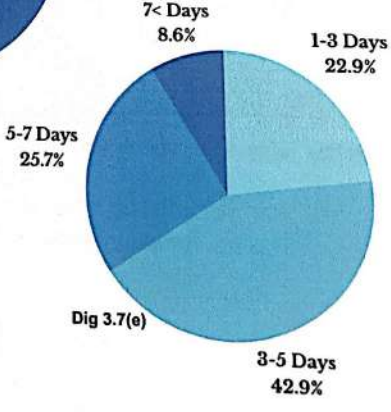
3.7(c)

Season



Dig 3.7(d)

Water Shortage in Days



Dig 3.7(e)

VIII. WARD NO. 8, SHILLY ROAD WARD

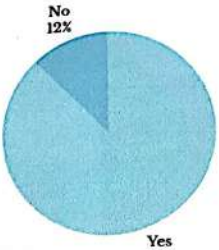
- Households : 612
- Population : 3422

Source

Municipal Corporation 100%

Dig 3.8(a)

Water Shortage

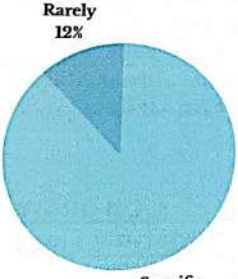


Dig 3.8(b)

Municipal Corporation serves the ward

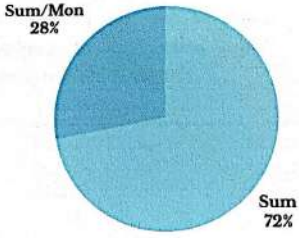
Of 88% Households facing Water Shortage

Frequency of Shortage



Dig 3.8(c)

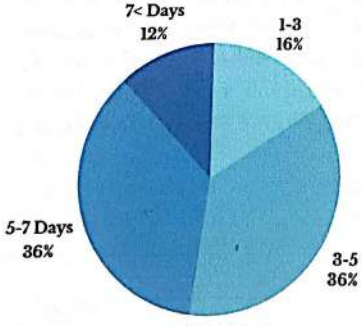
Season



Dig 3.8(d)

88% families have water problem in specific conditions or seasons while 12% rarely have any water problem. In Summers 72% face shortage & 28% in both Summers & Monsoon.

Water Shortage in Days



Dig 3.8(e)

Water Problem remains for 3-5 days and 5-7 days for 72% households. Shortage extends for more than 7 days for 12%.

A natural source of water is available which is used by 30% households.

WARD NO. 7
THODO GROUND

The Thodo Ground ward is served by Municipal Corporation. As per our survey, 87% of households face water shortage of which 86.8% have water problem in specific conditions or seasons, 7.9% rarely have water problem and 2.6% always face water shortage. The season of water shortage is Summers for 65.8% households, Monsoon for 18.4% households and Summers and Monsoon both for 15.8% households.

For maximum households (42.9%) the water shortage lasts for 3-5 days, followed by 5-7 days for 25.7%, 1-3 days for 22.9% and more than 7 days for 8.6% households. A natural source of water is available which is used by the near by residents during shortage and casually as well.

As per the respondents, there is no cooperation from the Municipal Corporation during Water Scarcity. There are certain areas where road facilities are not available which hinders water tankers to be called upon aggravating the issue of water problem seriously.

Fig 3.7 (i) : Leakage of Water, Ward 7

WARD NO. 8
SHILLY ROAD

The Shilly Road ward area receives water from Municipal Corporation. Of the total households 88% face water shortage of that 88% households, 12% rarely have water related issues and 88% have water problem in specific conditions. Majority (72%) households have water shortage during Summers while 28% in both Summers and Monsoon. The water shortage lasts for 3-5 days for 36% households, 1-3 days for 16%, 5-7 days for 36% and more than 7 days for 12%.

A natural source of water is available in the ward whose water is not fit for drinking but is used for other purposes.

Fig 3.7(ii) : Baodi, Shilly Road

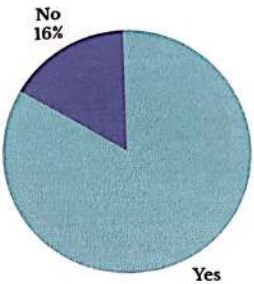
IX. WARD NO. 9, MADHUBAN COLONY

- Households : 715
- Population : 2765

Source of Water

Dig 3.9(a)

Water Shortage

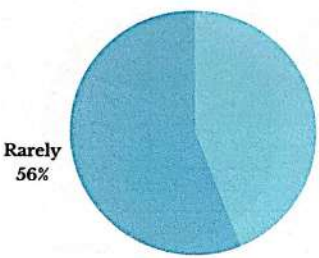


Dig 3.9(b)

Municipal Corporation serves the ward

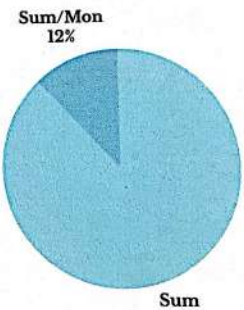
Of 84% Households facing Water Shortage

Frequency of Shortage



Dig 3.9(c)

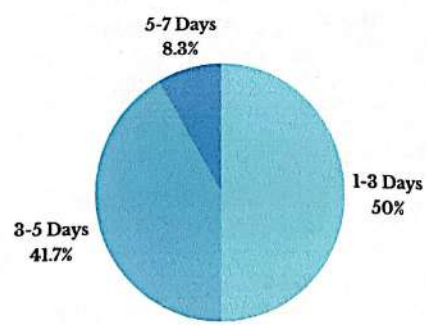
Season



Dig 3.9(d)

More than half households rarely face shortage of water (56%), while rest (44%) face water problem in specific conditions or seasons. In Summers 88% households have shortage & 12% have in Summers & Monsoon both.

Water Shortage in Days



Dig 3.9(e)

The ward don't face a major water problem. Shortage remains for 1-3 days for 50% of households, 3-5 days for 41.7% & 5-7 days for 8.3%.
There is no natural source of water available in the ward.

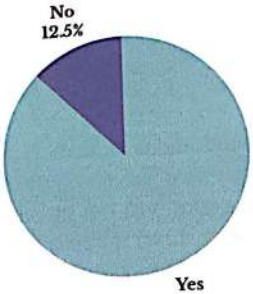
X. WARD NO. 10, CHAURNIGHATI

- Households : 715
- Population : 2700

Source of Water

Dig 3.10(a)

Water Shortage

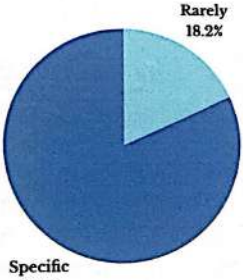


Dig 3.10(b)

Municipal Corporation serves all the households in the ward

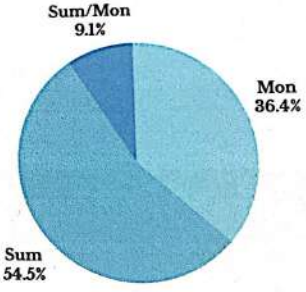
Of 87.5% Households facing Water Shortage

Frequency of Shortage



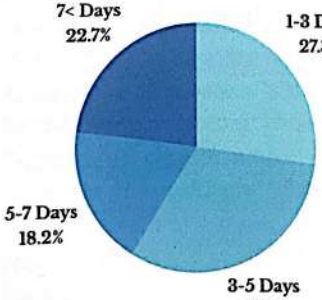
Dig 3.10(c)

Season



Dig 3.10(d)

Shortage in Days



Dig 3.10(e)

- 81.8% households face water shortage during specific seasons or conditions while 18.2% rarely have shortage of water.
- 54.5% households face water problem in Summers, 36.4% in Monsoon and 9.1% in both Summers and Monsoon.
- Water Shortage varies with 31.8% households having 3-5 days shortage, 27.3% for 1-3 days, 18.2% for 5-7 days and more than 7 days for 22.7% households.
- Residents also make use of a natural source of water at Pajo.

WARD NO. 9
MADHUBAN COLONY

The Madhuban Colony is served by Municipal Corporation. As per survey, 84% households face water problem of which 56% rarely face water problem and 44% face it during specific conditions or seasons. Summers are the season of shortage for 88% households while 12% have water problem in both Summers and Monsoon.

The shortage remains for 1-3 days for 50% households, 3-5 days for 41.7% and 5-7 days fort 8.3% households. This data clearly shows that the residents of this ward do not face an extreme water shortage problem. They have water shortage only when the whole town is facing it but that too is not so harsh in comparison to other wards. This may be credited to the management done by households on individual level.

There is no natural source of water available and residents also don't require any additional source of water. Water Tankers are called in extreme conditions by few households.

WARD NO. 10
CHAURNIGHATI

The Churnighati ward is also served by Municipal Corporation. 87.5% households face water problem of which 81.8% households have problem in specific conditions or seasons and 18.2% rarely have water problem. Summers remain the main season of shortage for 54.5% households, followed by Monsoon for 36.4% households and 9.1% face water problem in both Summers and Monsoon. Water Shortage lasts for 3-5 days for maximum households.

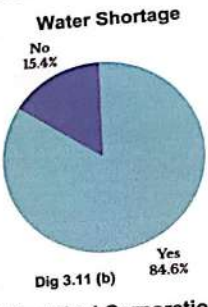
There is no natural source available in the ward but the residents bring water from a near by natural source in Pajo. During shortage this 24/7 water source proves to be boon for the people.

Fig 3.10 (i) : Pajo Natural Source of Water

XI. WARD NO. 11, DEGREE COLLEGE WARD

- Households : 308
- Population : 2645

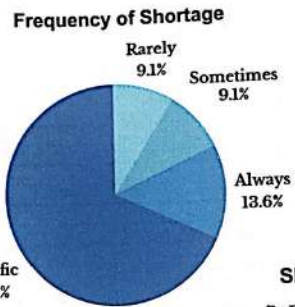
Dig 3.11 (a)

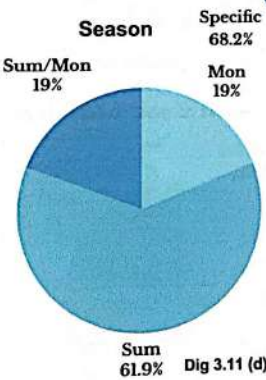


Dig 3.11 (b)

The households have water connections of Municipal Corporation.

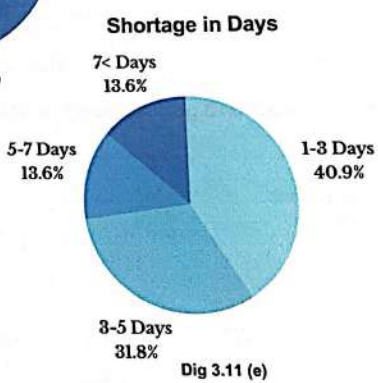
Of 84.6% Households facing Water Shortage





Dig 3.11 (d)

Dig 3.11 (c)



Dig 3.11 (e)

Around 68.2% face shortage in Specific conditions or seasons while 9.1% (Rarely), 18.6% (Always) and 9.1% (Sometimes). Summers experience high shortage (61.9%). 40.9% households face shortage for 1-3 days, 31.8% for 3-5 days, 13.6% for 5-7 days and more than 7 days.

Increasing migration and congestion in the ward results in more consumption and faulty management of water leading to shortage of water.

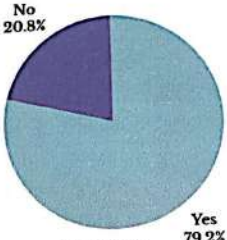
XII. WARD NO. 12, SUNNY SIDE

- Households : 1040
- Population : 2512

Source of Water

Dig 3.12 (a)

Water Shortage

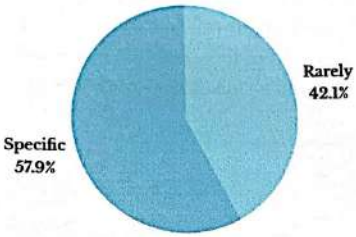


Dig 3.12 (b)

The ward receives water entirely from Municipal Corporation.

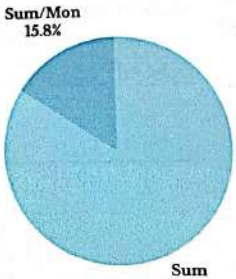
Of 79.2% Households facing Water Shortage

Frequency of Shortage



Dig 3.12 (c)

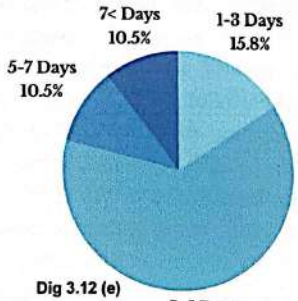
Season



Dig 3.12 (d)

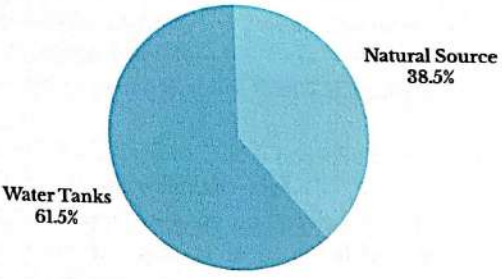
Around 58% households face shortage in specific conditions or seasons, majorly in Summers (84.2%).

Water Shortage in Days



Dig 3.12 (e)

Management During Shortage



Dig 3.12 (f)

Majority (63.2%) households face shortage for 3-5 days, while 10.5% households face shortage for more than 7 days.

Residents call paid water tankers during shortage, in addition to it there is a natural source available too, which is used by 38.5% households.

WARD NO. 11
DEGREE COLLEGE

The Degree College Ward receives water from Municipal Corporation. As per survey, 84.6% households face water shortage. The households majorly face water problem in specific conditions or seasons (68.2%), 13.6% households always face water shortage, 9.1% sometimes and 9.1% rarely face water shortage.

The season of shortage remains Summers for 61.9% households, Monsoon for 19% households and Summers and Monsoon both for 19% households. Shortage lasts for 1-3 dats for 40.1% households, 3-5 days for 31.8% households, 5-7 days for 13.6% households and more than 7 days for 13.6% households.

As per the respondents, water shortage there is poor water distribution system in the ward, secondly wastage of water in the form of overflowing tanks is noticed very often.

There is a natural source of water available in the ward catering to the water needs of locals.

Fig 3.11 (i) : Wastage of Water, GC Solan

WARD NO. 12
SUNNY SIDE

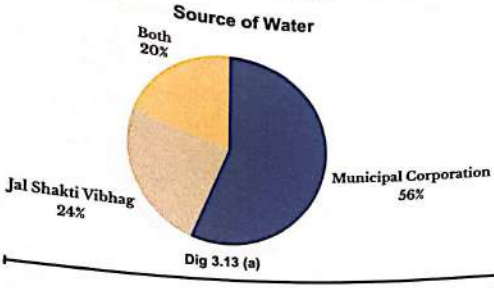
The Sunny Side ward is served by Municipal Corporation. As per our Survey, 79.2% households face water shortage and of that 57.9% households face water problem in specific conditions or seasons while 42.1% rarely face water shortage. The season of shortage remains Summers for majority (84.2%) and Summers and Monsoon for 15.8% households. Shortage lasts for 3-5 days for maximum households (63.2%), followed by 5-7 days for 10.5%, more than 7 days for 10.5% and 1-3 days for 15.8% households.

There are natural sources available which are used by 38.5% households and rest 61.5% are dependent on paid water tanks during water shortage.

As per the respondents, there is irregular supply of water and pipes are blocked in Monsoon which are not timely repaired. In addition to it, population growth (tenants) has increased the water demands in the ward.

XIII. WARD NO. 13, KALEEN

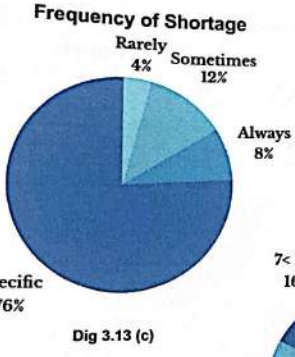
- Households : 362
- Population : 2804



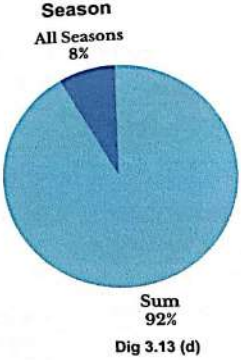
Dig 3.13 (a)

Dig 3.13 (b)

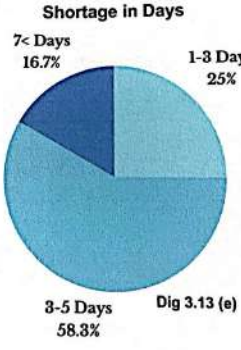
All the households face water shortage



Dig 3.13 (c)



Dig 3.13 (d)



Dig 3.13 (e)

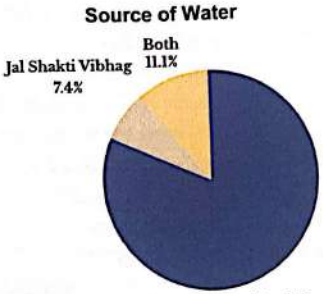
The ward of Kaleen faces 100% water shortage of which 76% faces in specific conditions or seasons while 12% sometimes and 8% always. Majority 92% faces shortage in Summers while 8% all seasons.

Here, 56% households have MC Connection and 24% have IPH Connection while 20% have both MC and IPH Connections. 58.3% households face shortage for 3-5 days on an average while 16.7% face shortage for more than 7 days.

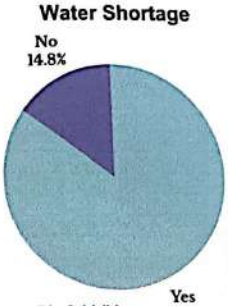
There are 4-5 natural sources (personal) which are used by community during shortage.

XIV. WARD NO. 14, HOUSING BOARD COLONY

- Households : 799
- Population : 2586

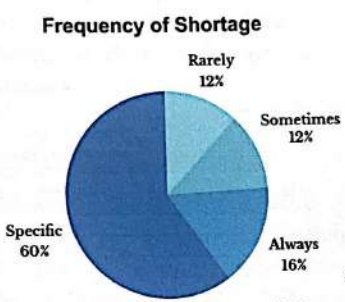


Dig 3.14 (a)

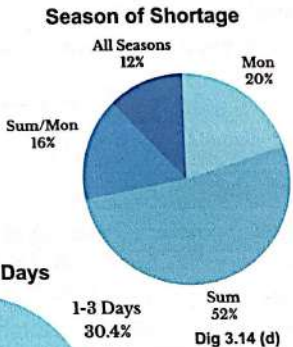


Dig 3.14 (b)

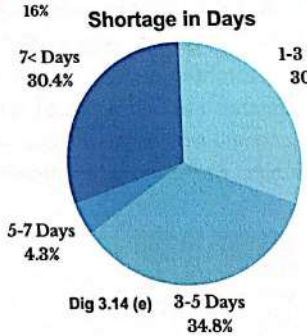
Of 85.2% Households facing Water Shortage



Dig 3.14 (c)



Dig 3.14 (d)



Dig 3.14 (e)

- **The Housing Board Colony Ward receives majority water from MC. Around 81.5 percent receives water from MC, 7.4 percent from IPH while 11 percent have both connections.**
- **Around 85.2% households face water shortage of which 60% face in Specific conditions and seasons. 16% households face shortage always. Scarcity is high during Summers (52%). Average shortage remains for 3-5 days (34.8%) while 30.4% face shortage for than 7 days. There is no natural source of water to cater the demands of people during shortage.**

WARD NO. 13
KALEEN

The households in Kaleen ward receives water together by MC and JSV. Majority households (56%) have MC water connections, 24% households have JSV Water Connections and 20% have both MC and JSV connections. Almost all households face water shortage with varying frequencies and intensities. 76% households have water problem in specific conditions or seasons, 8% households always face water shortage, 12% sometimes and 4% rarely face water shortage.

Fig 3.13(i) : Supply Lines

Water Shortage is faced during Summers by 92% households while 8% households have water shortage all seasons. Maximum households have 3-5 days shortage (58.3%), followed by 1-3 days (25%), and more than 7 days (16.7%). There are 4-5 natural sources of water available in the ward which caters the needs of water of near by residents, while for others the situation becomes extremely harsh in Summers.

WARD NO. 14
HOUSING BOARD COLONY

The Housing Board Ward is mainly served by Municipal Corporation (81.5%), 7.4% households are served by JSV and 11.1% have both MC and JSV connections. About 85.2% households have water shortage of that 60% face in specific conditions or seasons, 16% always, 12% sometimes and 12% rarely face water shortage. The season of water shortage remains Summers for 52%, Monsoon for 20%, Summers and Monsoon both for 16% and all seasons for 12%.
There is no natural source available in the ward so residents call upon water tanks during shortage.

Fig 3.14(i) : Leakage

Fig 3.14(ii) : Wastage of Water

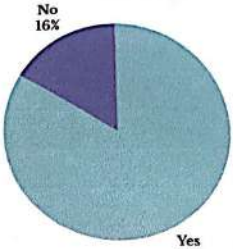
- Households : 750
- Population : 2926

XV. WARD NO. 15, TEHSIL PATRAD

Source of Water

Dig 3.15 (a)

Water Shortage

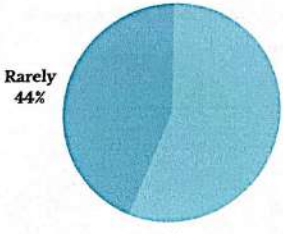


Dig 3.15 (b)

All households have water connections from Municipal Corporation.

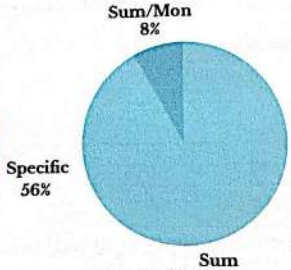
Of 84% Households facing Water Shortage

Frequency of Shortage



Dig 3.15 (c)

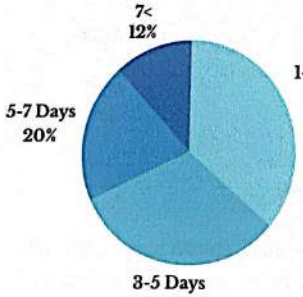
Season of Shortage



Dig 3.15 (d)

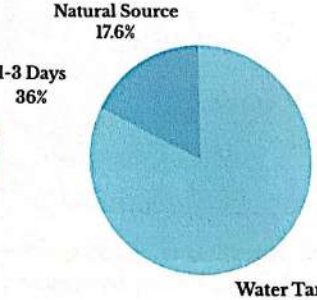
Households face water problem mostly in specific conditions (56%) that too in Summers (92%) while 8% households face problem in both Summers and Monsoon.

Water Shortage in Days



Dig 3.15 (e)

Management During Shortage

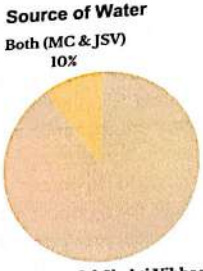


Dig 3.15 (f)

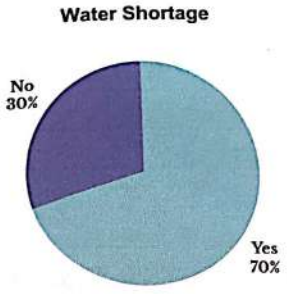
Shortage remains for 1-3 days and 3-5 days for 68% of households. Residents make use of a natural source of water near Shiv Mandir casually, however paid water tanks remain last option during extreme shortage.

XVI. WARD NO. 16, RABON ANJI

- Households : 731
- Population : 2608



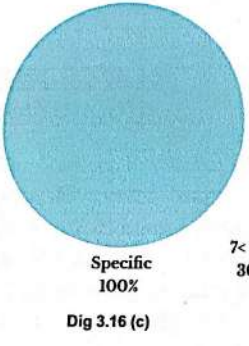
Dig 3.16 (a)



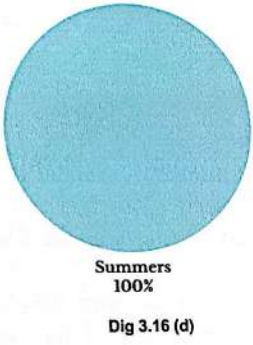
Dig 3.16 (b)

Around 90% households have water connections from Jal Shakti Vibhag, while 10% have both MC and JSV connections.

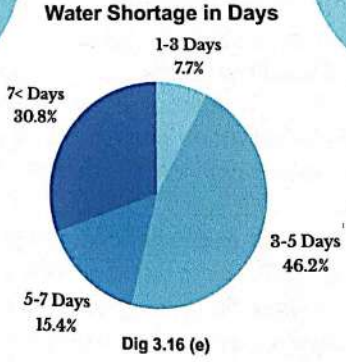
Of 70% Households facing Water Shortage



Dig 3.16 (c)



Dig 3.16 (d)



Dig 3.16 (e)

- **All 70% households face water problem in Summers with shortage remaining for around 3-5 days for 46.2% households, 5-7 days for 15.4% and this shortage extends for more than 7 days for 30.8% households.**
- **Management during shortage is done by a local natural source of water, however water tanks remain last option during extreme shortage of water.**

WARD NO. 15
TEHSIL PATRAD

The Tehsil Patrad ward receives water under Municipal Corporation. As per our survey, 84% households face water shortage of which 56% households have water problem in specific conditions or seasons and 44% rarely have water problem. Summers are the peak season of water shortage for 92% households and 8% households have water problem in both Summers and Monsoon.

Water Shortage remains for 1-3 days for 36% households, 3-5 days for 32%, 5-7 days for 20% and more than 7 days for 12% households.

Natural Source of Water is available in the ward is used by 17.6% households during shortage as well as casually, while 82.4% households are dependent on water tanks during water scarcity.

Fig 3.15 (i) : Shiv Mandir Baodi, Shamti

WARD NO. 16
RABON ANJI

The ward of Rabon Anji is mainly served by Jal Shakti Vibhag. 90% households have JSV water connections while 10% have both MC and JSV connections. Around 70% households have water shortage and households face water scarcity in specific conditions or seasons that too in Summers.

Water Shortage remains for 3-5 days for 46.2% households, more than 7 days for 30.8% households, 5-7 days for 15.4% households and 1-3 days for 7.7.% households.

There are several natural sources available in the ward, to name one is in Anji along the road, second in Shamlech and others. The ward is very large in area so different localities face water shortage in varied ways.

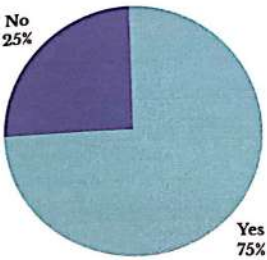
Water Tanks are called during extreme shortage of water only that too by affluent families. As per the respondents, the distribution system of water is not proper and needs upgradation.

- Households : 1493
- Population : 2805

XVII. WARD NO. 17, BASAL PATI KATHER

Source of Water

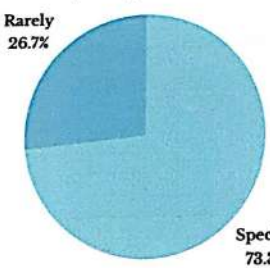
Water Shortage



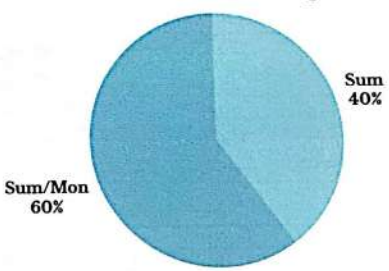
Around 90% of households have water connections from Jal Shakti Vibhag, while 10% have both MC and JSV connections.

Of 75 % Households facing Water Shortage

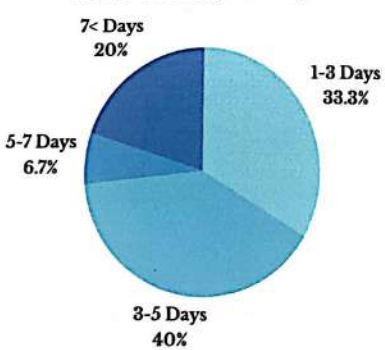
Frequency of Shortage



Season Of Shortage



Water Shortage in Days



- **Around 73.3 % households face shortage during specific conditions or seasons. 60% households face shortage in Summers and Monsoon both while 40% in Summers only. Majority households face shortage for 1-3 and 3-5 days.**
- **During shortage majority of households call water tanks, however a natural source of water is also available.**

WARD NO. 17
BASAL PATTI KATHER

Basal Patti Kather has recently came under Municipal Corporation as a ward. This ward is mainly served by Jal Shakti Vibhag. Around 90% households have JSV water connections while 10% have both MC and JSV connections.

As per survey, 75% households have water shortage of that 73.3% face water scarcity in specific conditions or seasons and 26.7% rarely face water shortage.

60% households face water problem in Summers and Monsoon both and 40% households face water shortage in Summers only.

Water Shortage remains for 3-5 days for 40% households, followed by 1-3 days for 33.3% households, more than 7 days for 20% and 5-7 days for 6.7% households.

There are natural sources of water also however majority households call upon water tanks during water shortage.

SOLAN

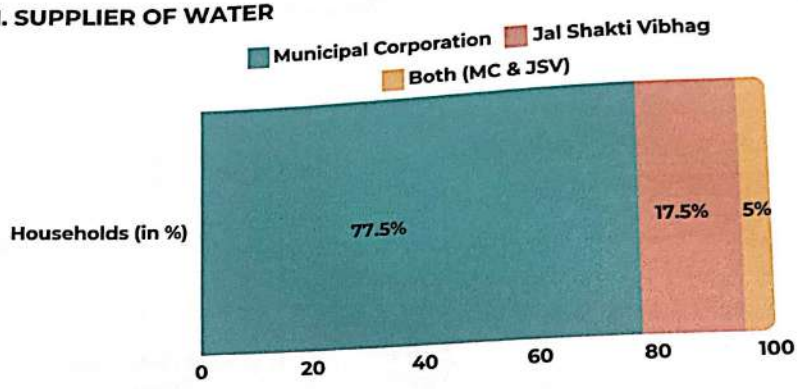
COLLECTIVE ANALYSIS

Collective analysis of all wards is presented describing the various facets of water problem and its management in Solan (urban). A total of twelve aspects have been depicted diagramatically to look into the problem of water faced by households of Solan.
(All the data presented is in percentages and is solely based on the primary survey conducted by our team.)

The 12 Diagrams describe the following parameters :

1. The Supplier of Water for Households
2. Water Shortage (Percentage of households)
3. Frequency of Water Shortage
4. Specific season of water shortage for different households
5. Water Receiving Days (during shortage)
6. Water Receiving Days (in general)
7. Water receiving hours in general
8. Storage Lasting Days
9. Management during Water Shortage
10. Notified for Water Shortage
11. Complaint for Water Shortage
12. Causes of Water Shortage (Based on personal suggestions of respondents)

I. SUPPLIER OF WATER

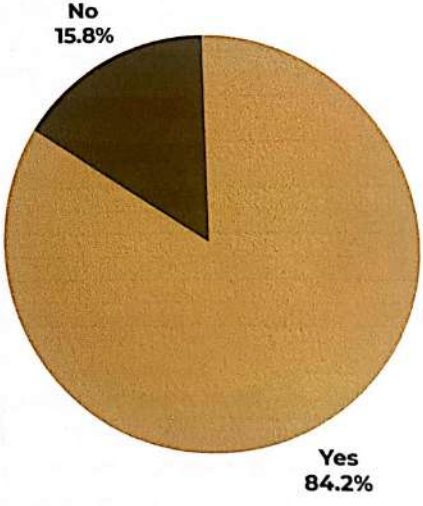


As per our survey, in Solan 77.5% households have water connections of Municipal Corporation, 17.5% households have water connections of Jal Shakti Vibhag, while 5% households have both MC & JSV connections. All wards are served by MC, however certain wards are together served by MC and JSV.

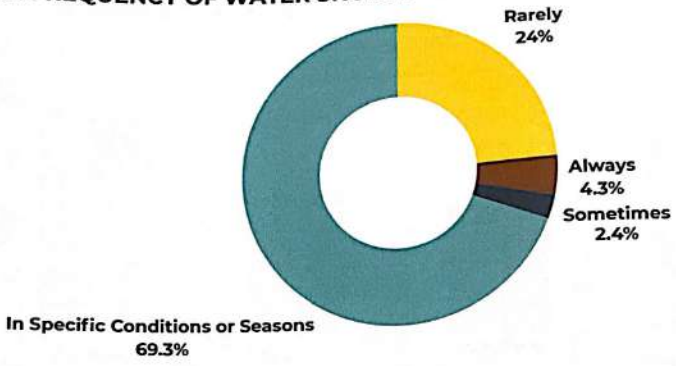
More than 85% households have water connections of JSV in Ward 1,16 and 17. Ward 1,2,3,4,13,14,16 and 17 are together served by MC and JSV while Ward 5,6,7,8,9,10,11,12 are entirely under MC.

II. WATER SHORTAGE

As per our primary survey, 84.2% of households in Solan town face water shortage with varying intensity and frequency. Around 15.8% of households don't face any water shortage. The reasons for water shortage vary with location, consumption patterns, storage, distribution etc.

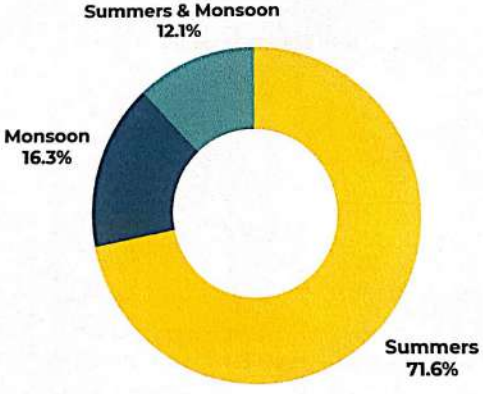


III. FREQUENCY OF WATER SHORTAGE



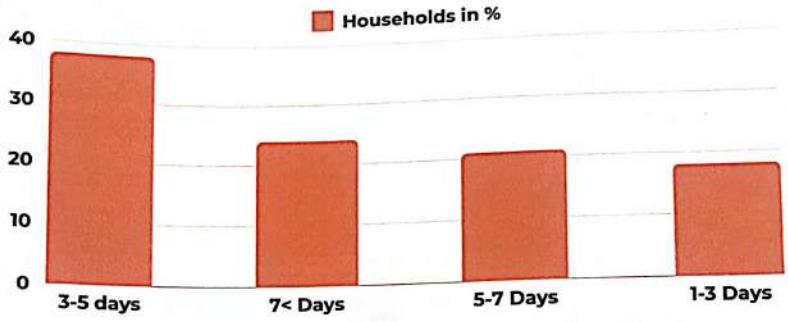
Of 84.2% households facing water shortage in Solan, majority of households about 69.3% face water shortage in specific conditions or seasons (like Shoolini Fair & Himachal Utsav) whereas 24% rarely face water shortage. The percenatge of households facing water shortage always is 4.3% while 2.4% sometimes face water shortage.

IV. SEASON OF WATER SHORTAGE



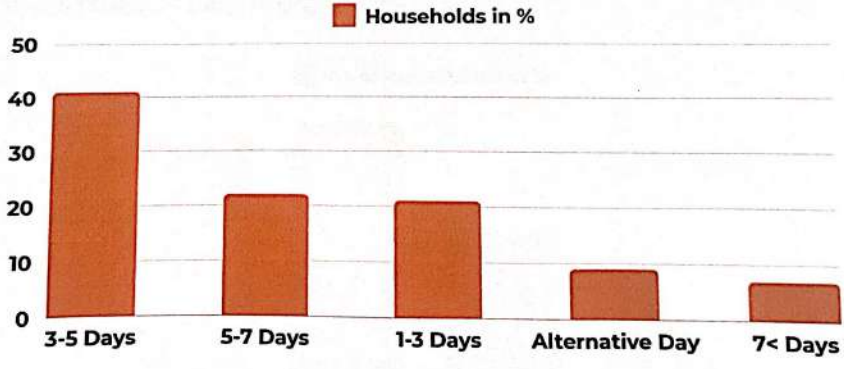
The season of water shortage is predominantly Summers in Solan. 83.7% households face water shortage in Summers, of that 71.6% face problem in summers only while 12.1% face water problem in Summers & Monsoon both. In Monsoon 28.4% households face water problem of which 16.3% have water problem only in Monsoon.

V. WATER RECEIVING DAYS (DURING SHORTAGE)



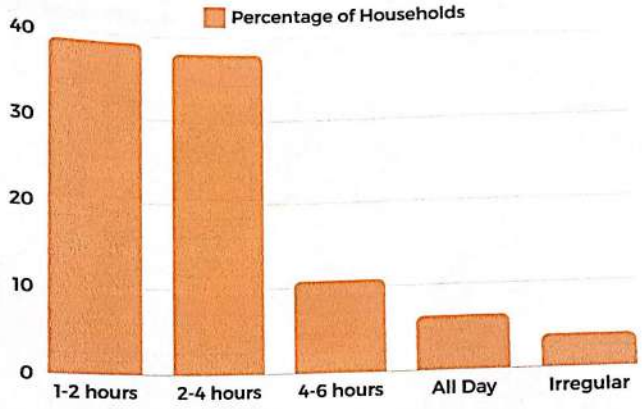
During shortage season, maximum households (38%) face shortage for 3-5 days followed by 24% households having shortage for more than 7 days. Shortage remains for 5-7 days for 21% and 1-3 days for 18% households.

VI. WATER RECEIVING DAYS (IN GENERAL)



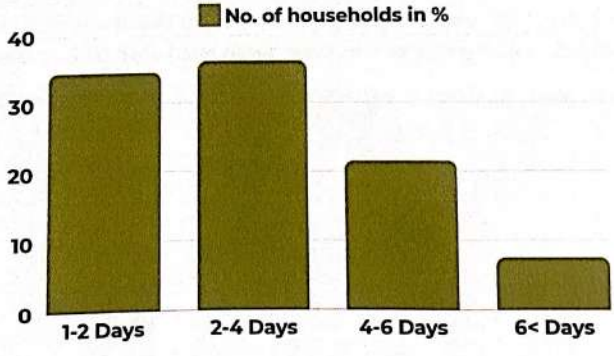
In general, 41% households receive water after 3-5 days followed by 22% who receive after 5-7 days and 21% receive after 1-3 days. The percentage of households receiving water on alternative day is 9% and 7% receive after more than 7 days.

VII. RECEIVING HOURS (IN GENERAL)



Th general receiving hours for maximum households is 1-2 hours and 2-4 hours. Around 39% households receive water in 1-2 hours and 38% for 2-4 hours. Around 6% households receive water all day, while 4% households have an irregular supply of water and 11 % households receive water for 4-6 hours.

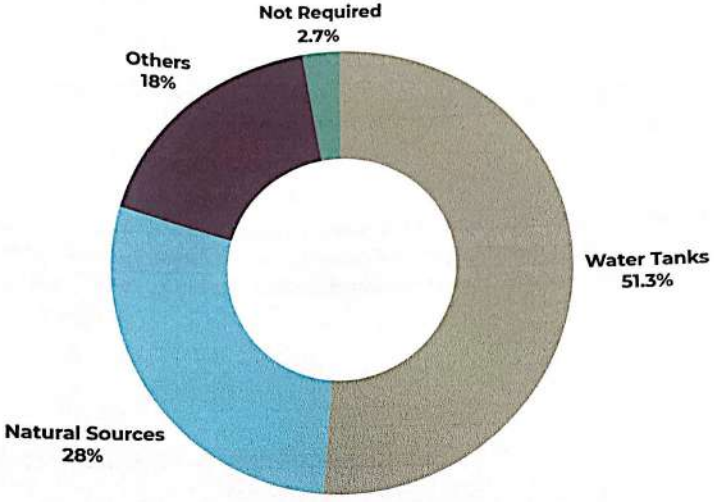
VIII. STORAGE LASTING IN DAYS



The storage lasting days denotes that for how many days can the water storage last if there is no water supply. Around 36% households it is 2-4 days, for 35% it is 1-2 days, 22% it is 4-6 days and 8% can have a storage lasting capacity of more than 6 days.

IX. MANAGEMENT DURING WATER SHORTAGE

Alternative Sources of Water at Consumer (Household) Level



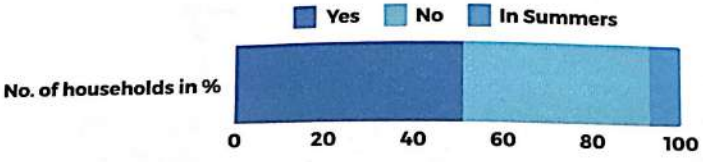
Majority households prefer water tanks around 51.3% households are depend on water tanks during shortage. These households are mainly those who do not have access to natural sources of water and have the capacity to spend money for water.

Around 28% households make use of natural sources. 2.7% don't require any management while 18% have other ways of managing water shortage.

Fig : Natural Sources :
Prem Gali Chashma and Boadi in Shamti

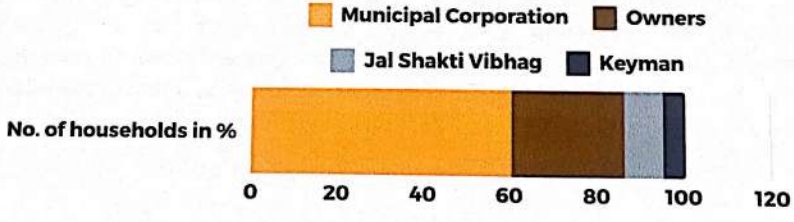
Fig :
Water Tank in Ward 14 HBC

X. NOTIFIED ABOUT WATER SHORTAGE



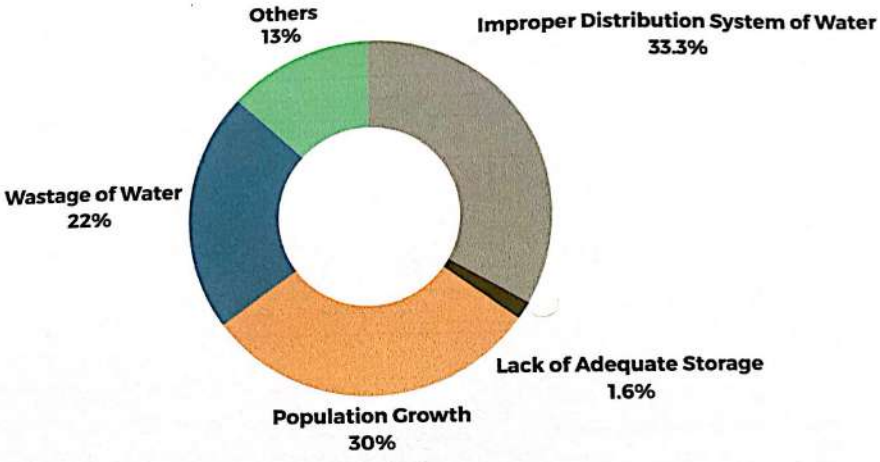
Of the households facing water shortage, 42% are notified about upcoming shortage from various sources (Councillor, Keyman, Social Media etc.) 51% households are not notified, however around 9% are notified during Summers only.

XI. COMPLAINT FOR WATER PROBLEM



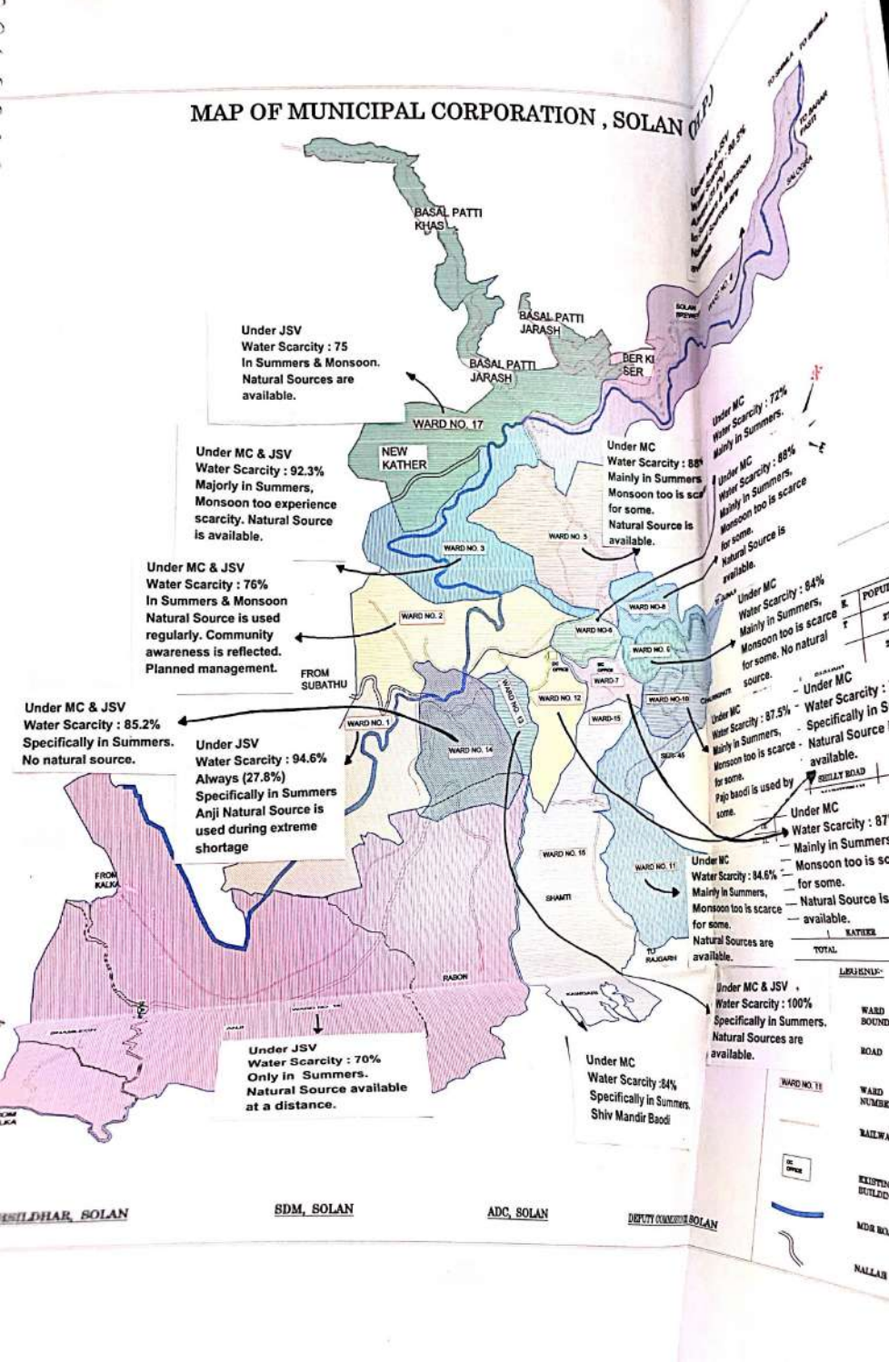
Of the total households facing shortage (84.2%) 33.33% complaint for water shortage. Of that 33.33%, 61% complaint to MC, 9 percent to JSV, 26 percent to owners and 5% to keyman.

XII. CAUSES OF WATER SHORTAGE



The present pie chart presents the data based on personal suggestions of respondents about the various causes of water problem in Solan town. According to the same, 33.33% households point out the improper distribution system of water, followed by Population Growth (30%), Wastage of Water (22%), Lack of Adequate Storage (1.6%) and Others (16%).

MAP OF MUNICIPAL CORPORATION , SOLAN (H.P.)



SDM, SOLAN

ADC, SOLAN

DEPUTY COMMISSIONER SOLAN

CHAPTER : 4

SOLAN: URBAN WATER SCARCITY

INTERPRETATIONS

The present chapter deals with the task of interpreting and elucidating our research problem of 'water shortage in Solan' on the basis of primary and secondary data gathered. Here, we discuss the dimensions of water scarcity in Solan, characteristics of water problem, causes and trends of water scarcity.

4.1 WATER SCARCITY : DIMENSIONS

The concept of water scarcity is somewhat ambiguous and complex to be defined as it implies different dimensions or facets. There are several dimensions of water scarcity which can be summarized as :

(i) scarcity **in availability** of freshwater of acceptable quality with respect to aggregated demand, in the simple case of **physical water scarcity.**

(ii) scarcity **in access** to water services, because of the failure of institutions in place to ensure reliable supply of water to users;

(iii) scarcity due to the **lack of adequate infrastructure**, irrespective of the level of water resources, due to financial constraints.

In Solan, water scarcity can be described as seasonal physical water scarcity with heavy weightage of economic water scarcity.

- The whole town faces major water scarcity in Summer season, along with certain areas having water problem in Monsoon too. During Summer the water level of Giri and Ashwani rivers decreases and in Monsoon the water level rises but due to siltation and contamination the quality of water decreases. Thus, leading to seasonal physical water scarcity in the town.
- The study area is mainly under economic water scarcity as in general Solan is sufficient in water resources (considering local natural sources too), but there is a lack of investment in infrastructure at all levels (treatment and supply plants, supply lines, storage tanks, distribution system). Secondly, economic water scarcity is caused by poor management of water supplies in general and during peak season in particular.

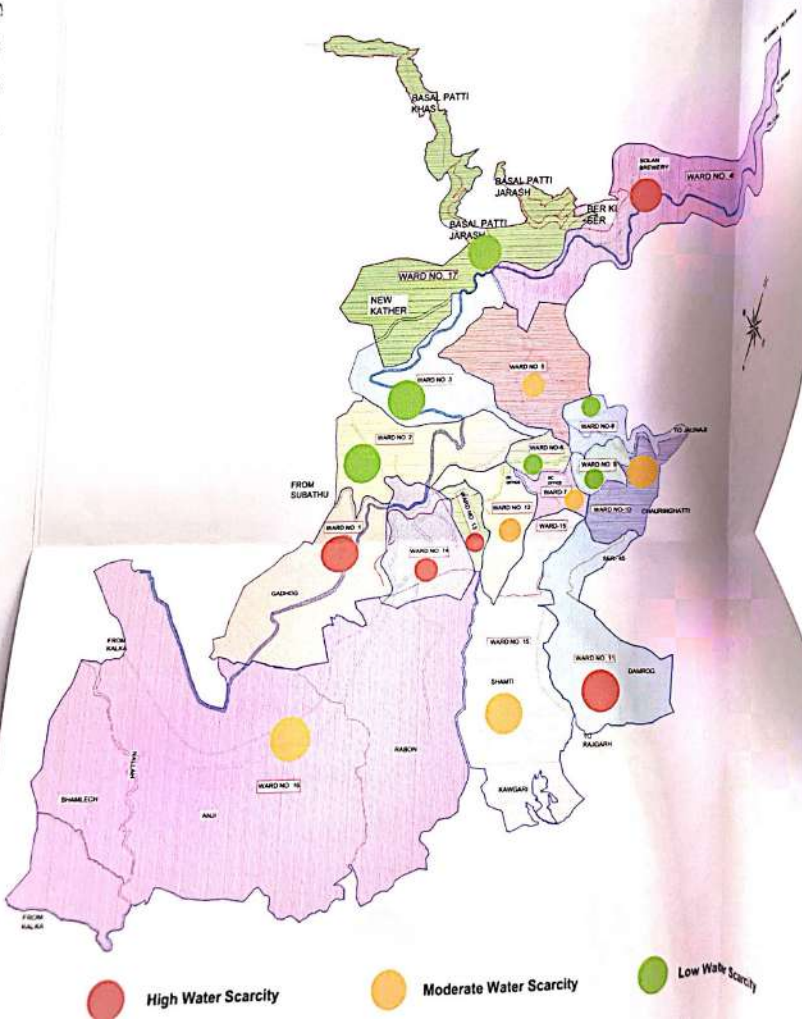
IV. SPACE-SPECIFIC

The problem of water scarcity varies with geographical and cultural location in Solan town. The Ward No. 6, Jawahar Park comes under low scarcity category due to the the location of main water storage tanks vertically above the ward, thus the supply is direct and there is no pressure problem in the ward. Similarly, Railway Station (Ward 2), Shilly Road (Ward 8) and Madhuban Colony (Ward 9) are low scarcity areas due to systematic planning and management of water.

The Dehunghat Ward (Ward 1) lacks water facilities along with road and communication facilities. Households face water shortage all seasons thus affecting their socio-economic life.

Kaleen (Ward 13), Degree College (Ward 11) and Tehsil Patrad (Ward 15) come under high category of water scarcity due to high demand of water owing to high population concentration in these areas.

Map 3 : Categories of wards facing water scarcity



V. GOVERNEMENT & INSTITUTUIONAL POLICIES

The water policies of government and institutions affect the water scarcity and its related management in the town. In deciding where to supply water affects the availability of water to the households. In Summers, the Giri river water is to diverted to other areas like Subathu, Dharampur, Parwanoo hence reducing the availability of water to Solan town. Other than this, the Giri also supplies water to Shimla, so in rationing the water to different sectors and to different areas is a decision of institution and government bodies as per the need of the time.

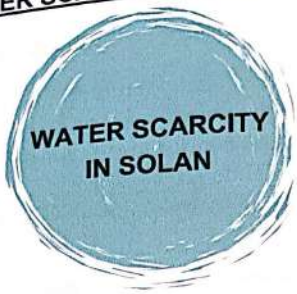
VI. WATER ACCESS INEQUALITIES

The disparities in water access is a major concern and a very crucial characteristic of water problem. The socio-economic disparities lead to water inequalities a situation called Water Divide. This water divide has rippling effects for vulnerable groups as health at risk, economic strains, education and gender inequality etc. Water Disparity is a result of household socio-economic level, consumption patterns and lifestyle, and most importantly the role of governance.

Fig 4.1 : Water Inequality : WATER DIVIDE
(i) Ward 2 with properly planned domestic water storage; (ii) Slum area in Rabon
The comparative picture questions the right to water ?

"The most unsustainable scenario is the one that foresees an increase of inequality and, in turn, unsustainable levels of water consumption among the elite and upper-middle-income groups. Conversely, the scenario that considers a more equal distribution of water across the different social groups along with more sustainable levels of consumption leads to reductions in total water use and pressure on the urban water balance," Mazzoleni, Foresight.

4.3 CAUSES OF WATER SCARCITY IN SOLAN



- **Lack of Infrastructure**

(supply, storage, distribution) Solan requires 80-90 lakh litre of water to fulfill demands of all (domestic, commercial, industrial etc.) everyday, however Solan receives 30-40 lakh litre per day as per MC in general with which decreases in Summers and Monsoon owing to various reasons as discussed earlier.

- **Lack of Local Water Policy**

There is no local water policy dealing with the conservation and usage of water for households. Wastage of Water is not regarded as punishable which should be.

- **Outdated and Obsolete System**

The distribution system of water in Solan has not been updated and renewed since 1994 as per MC. If any inefficiency emerges the action is taken only to repair it, but not to replace it. Thus, it is a major cause of water inefficiencies and leakages which lead to water problem.

- **Lack of Management**

There is lack of management at every level for addressing the problem of water scarcity. There is no preparation of management plan for addressing water shortage in Summers and Monsoon by institutions and local bodies. Secondly, there is no preparation for water shortage at the household level reason being water is regarded a a resource to be used not be respected- a big urban psychological problem.

- **Lack of Awareness**

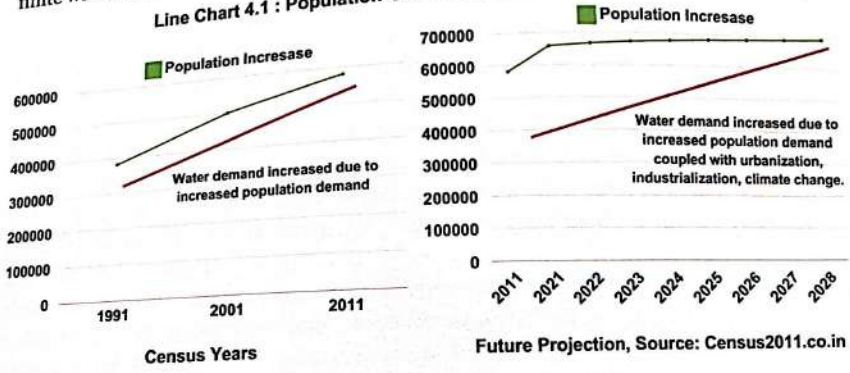
A major reason of water problem is lack of awareness to the individual household, community, and institutions in the process of water supply and distribution.

4.4 TRENDS OF WATER SCARCITY

A. Water Scarcity and Population Growth

According to FAO (Food and Agriculture Organization of UN), Water use has been growing globally at more than twice the rate of population increase in the last century, and an increasing number of regions are reaching the limit at which water services can be sustainably delivered. Essentially, demographic growth and economic development are putting unprecedented pressure on renewable, but finite water resources.

Line Chart 4.1 : Population Growth of Solan district



B. Water Scarcity and Urbanization

The process of urbanization is critical to sustainable water usage. The urban water crisis is caused by a combination of factors including unplanned urbanization, mismanagement of water resources, overreliance on groundwater, deforestation, climate change, and inadequate infrastructure for water distribution and sewage treatment. The situation will be exacerbated as rapidly growing urban areas place heavy pressure on neighbouring water resources. Moreover, environmental services and ecosystem functions can not be treated any longer as the residuals of all water users. In the future, climate change and bio-energy demands are expected to amplify the already complex relationship between world development and water demand.

THE CONCLUSION

SOLAN: APPROACHING URBAN WATER SCARCITY

Water Scarcity is a global problem and is a very common but ambiguous issue. The study area - Solan town majorly faces economic water scarcity with a touch of physical water scarcity. The survey based project report on "Solan: Approaching Urban Water Scarcity, From Source to Allocation" was focused to identify the problem of water shortage and its various facets in Solan and to interpret the combination of causes leading to such a problem. The methodology used to collect data was a blend of qualitative and quantitative approach. A combination of observations, meetings, and survey led to the analysis of Water Problem in Solan.

The foremost conclusion comes that Solan deals with economic water scarcity which means that the factors are human controllable, thus proper management, coordination between institutions (Municipal Corporation and Jal Shakti Vibhag), upgradation of water infrastructure in relation to growing demand can solve the present water problem.

Secondly. the major cause is that water becomes a consideration only during water scarcity i.e. during Summer and Monsoon seasons, when water availability is enough there is no consideration of water as a resource to be conserved. Water is reused only during water shortage, not before or after that. This points out the lack of awareness on the part of institutions, government bodies and most importantly on the part of individual households.

The process of urbanization, industrialization, changing consumption patterns (urban lifestyle) are leading to higher water demand than needed. Hence, a new issue emerging of Water Divide. Due to socio-economic inequalities there emerges water insecurity which leads to many social problems.

Water is a human right and as defined in Sustainable Development Goals of 2015, Clean Water and Sanitation is SDG 6 and affects various other SDGs. It is a duty of every individual to regard water as a resource to be conserved and respected rather not use it as an economic commodity and also not to attribute water as a free grant of nature.

The role of institutions and government bodies is very crucial into this matter. Water Policies must be created in order to manage water usage and consumption and to spread awareness for the proper and judicious utilization of water as a resource.

RECOMMENDATIONS

FROM AWARENESS TO ACTION : THE WAY FORWARD

Addressing water scarcity requires a combination of innovative technologies, stronger governance, and community-driven initiatives in order to lead a road towards equitable access to clean water.

The first step starts with awareness about water as a resource to be used judiciously. In order to resolve the problem, households need to undertake rainwater harvesting wherever its possible. Water reuse initiatives, such as treating wastewater for industrial use, can further alleviate pressure on freshwater supplies.

Government must invest in infrastructure like rainwater harvesting systems and wastewater recycling to reduce dependency on freshwater sources.

Renewal of water infrastructure from source of water (Giri and Ashwani), supply, distribution and allocation systems.

Strengthening policies and governance by implementing fair price-systems that ensure affordability for low-income households. Wastage of water must be regarded as punishable act by the local authorities.

In the end, changing the face of water scarcity involves education to motivate new behaviors. Coping with the coming era of water scarcity will require major overhaul of all forms of consumption, from individual use to the supply chains of major corporations.

Invention and implementation of new water conservation and water management technologies. There must be improvement of water catchment areas and its harvesting. Addressing Pollution is a critical point in solving the water scarcity as treatment of water requires a lot of expenses. There is a current need to improve distribution infrastructure.

Simply put, what is needed is holistic management of water which involves all the people, especially community involvement is needed backed by good and strict water regulations and policies.

We never know the worth of water till the well is dry.
-Thomas Fuller

Water is Nature's Daughter. She is gentle and sweet. If you let her go. we loose the flow and end up in retreat !
-The Dharma Trails-

BIBLIOGRAPHY

I Primary Data collected through Survey, Observation and on-site visit methods
II Secondary Data collected from :

- Government Bodies : Municipal Corporation and Jal Shakti Vibhag
- Online Official Sources :
  1. RAP-V-Ashwani and RAP-V-Giri; H.P. Pollution Control Board
  2. District Survey Report-2024 Solan,H.P.

III. Other online references :

- Food and Agriculture Organization : Article on Land and Water
- Global Water Inequality; the crisis of access, impact , and urgency! of IDRA
- Article on Water Equality: Figures and data that explore the global gap , Foresight
- Access to Water : Inequalities reinforced by climate change, Polytechnique insights
- Water Scarcity Facts and Statistics, Britannica
- Water : Consumption, usage patterns, and residential infrastructure, Rondinel-Sarmiento

SOLAN COLLECTIVE ANALYSIS TABLE

R. NO	WARD NAME	SOURCE OF WATER			WATER SHORTAGE		FREQUENCY				SEASON			
		MC	JSV	Both	Yes	No	Specific	Rarely	Always	Sometimes	Sum	Mon	Sum/Mon	All Season
1	Dehunghat		87.5	12.5	94.6	5.4	72.2		27.8		72.2			27.8
2	Railway Station	87		13	76	24	66.7	33.3			72.2	5.6	22.2	
3	Kather	90	10		92.3	7.7	45.8	54.2			62.5		37.5	
4	Chambaghat Salogra	57.1	33.3	9.5	90.5	9.5	52.6	15.8	31.6		47.4		42.1	10.5
5	Lower Bazar	100			88	12	88	12			72		28	
6	Jawahar Park	100			72	28	64	36			68		32	
7	Thodo Ground	100			87	13	86.8	7.9	2.6	2.6	65.8	18.4	15.8	
8	Shilly Road	100			88	12	88	12			72		28	
9	Madhuban Colony	100			84	16	44	56			88		12	
10	Chaurnighati	100			87.5	12.5	81.8	18.2			54.5	36.4	9.1	
11	Degree College	100			84.6	15.4	15	2	3	0	13	4	4	3
12	Sunny Side	100			79.2	20.8	57.9	42.1			84.2		15.8	
13	Kaleen	56	24	20	100		76	4	8	12	92			8
14	Housing Board Colony	81.5	7.4	11.1	85.2	14.8	60	12	16	12	52	20	16	12
15	Tehsil Patrad	100			84	16	56	44			92		8	
16	Rabon Anji		90	10	70	30	100				100			
17	Basal Patti Kather		90	10	75	25	73.3	26.7			40		60	

All data entries are in percentage and refers to the percentage of households

WRD (Shortage)			Receiving Hours					Storage Lasting Days				ADWS			NOTIFIED		COMPLAINT	
1-3 D	3-5 D	5-7 D	7< D	<2 hrs	2-4 hrs	4< hrs	Irregular	All Day	1-2 D	2-4 D	4-6 D	6< D	W Tanks	NS	OTH	Yes	No	MC	JSV	Keyman
	11.1		88.9	42.105	31.579		26.3158		21.053	57.895	21.053		28	20	52	26.316	73.684		68.75	12.5
	33.3	55.6	5.6	11.111	55.556	16.667	16.6667		36.842	36.842	15.789	10.526	20	50	30	40	60	62.5		12.5
	25		75	47.826	43.478			8.69565	38.095	42.857	19.048		52.6	10.5	36.8	20	80	54.545		18.182
10.5	26.3	31.6	31.6	22.222	71.429	28.571			68.75	31.25			38.4615	46.154	15.385	25	75			55.556
16	36	36	12	50	40	10			56.522	34.783	8.6957		65.2174	34.783		20	80	50		40
28	32	28	12	62.5	12.5		25		11.111	55.556	33.333		66.6667		33.333	22.222	77.778	50		33.333
22.9	42.9	25.7	8.6	28.571	51.429	5.7143		14.2857	8.8235	67.647	17.647	5.8824	25.9259	51.852	22.222	22.222	77.778	67.857		3.5714
16	36	36	12	52	40	8			38.095	42.857	19.048		60	32	8	50	50	54		20
50	41.7	8.3		50	31.818	18.182			28.571	19.048	28.571	23.81	25		75	56.522	43.478	83.333		
27.3	31.8	18.2	22.7	26.923	11.538	7.6923	38.4615	15.3846	26.316	52.632	15.789	5.2632	3	11	3	33.333	66.667	31.818		18.182
8	6	5	5	48	32	8	12		17.647	47.059	35.294		3	10	6	40.909	59.091	33.333		9.5238
15.8	63.2	10.5	10.5	23.81	42.857	14.286	9.52381	9.52381	12.5	45.455	9.0909	9.0909	61.5	38.5		61.905	38.095	43.75		18.75
25	58.3		16.7	12.821	41.026	12.821	15.3846	17.9487	77.273	22.727			28.5714	71.429		25	75	19.048	23.81	
30.4	34.8	4.3	30.4	44.444	37.037	11.111	7.40741		13.043	43.478	21.739	21.739	82.3529		17.647	32	68	63.636	9.0909	0.0222
36	32	20	12	20	60		20		15	35	40	10	82.4	17.6		26.316	73.684	70.5		
7.7	46.2	15.4	30.8	37.5	37.5		25	12.5	7.1429	50	14.286	28.571	60	26.667	13.333	31.25	68.75		50	50
33.3	40	6.7	20	53.8	46.1					72.2	27.2		69.2	30.7		64.2	35.7			25

ATA ANALYSIS TABLE
OPULATION : 2744
O. OF BUILDINGS : 1170 (As per MC)

WARD NO. 01 DEHUNGHAT SAPROON

UESTION	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
ESPONSE	Ownership Statu	M+F	Employe	Income Grou	Source of Wat	Water Shorta	When	Season	WRD (Shortag	WRD (Genera	Receiving Hr
1	Rent	1+1		1 15K-30K	IPH	Yes	Specific	Sum	3-5 D	4-5 D	-
2	Rent	1+0		1 8k-15k	IPH	Yes	Always	All Seasons	7<	7<	2-4 hrs
3	Rent				IPH	Yes	Specific	Sum	7<	5-6 D	Irregular
4	Rent	2+4		2 8k-15k	IPH	Yes	Specific	Sum	7< (14)	7<	<2 hrs
5	Privately Owned				IPH	Yes	Specific	Sum	7< (10)	2-3 D	-
6	Privately Owned	2+2		1 30K-50K	IPH	No	-	-	-	2-3 D	2-4 hrs
7	Govt. Quarter	1+1		2 50k<	Both	No	-	-	-	Daily	< 2hrs
8	Privately Owned	2+1	-	30k-50k	IPH	Yes	Always	All Seasons	7< (10)	7< (8-10)	Irregular
9	Privately Owned	3+3		2 30k-50k	IPH	Yes	Specific	Sum	7< (8-10)	3-4 D	< 2hrs
10	Rent	1+1		1 15K-30K	IPH	Yes	Specific	Sum	3-5 D	4-5 D	-
11	Rent	1+0		1 8k-15k	IPH	Yes	Always	All Seasons	7<	7<	2-4 hrs
12	Rent				IPH	Yes	Specific	Sum	7<	5-6 D	Irregular
13	Rent	2+4		2 8k-15k	IPH	Yes	Specific	Sum	7< (14)	7<	<2 hrs
14	Privately Owned				IPH	Yes	Specific	Sum	7< (10)	2-3 D	-
15	Privately Owned	2+2		1 30K-50K	IPH	No	-	-	-	2-3 D	2-4 hrs
16	Govt. Quarter	1+1		2 50k<	Both	No	-	-	-	Daily	< 2hrs
17	Privately Owned	2+1	-	30k-50k	IPH	Yes	Always	All Seasons	7< (10)	7< (8-10)	Irregular
18	Privately Owned	3+3		2 30k-50k	IPH	Yes	Specific	Sum	7< (8-10)	3-4 D	< 2hrs
19	Rent				IPH	Yes	Specific	Sum	7<	5-6 D	Irregular
20	Rent	2+4		2 8k-15k	IPH	Yes	Specific	Sum	7< (14)	7<	<2 hrs
21	Privately Owned				IPH	Yes	Specific	Sum	7< (10)	2-3 D	-
22	Privately Owned	2+2		1 30K-50K	IPH	No	-	-	-	2-3 D	2-4 hrs
23	Govt. Quarter	1+1		2 50k<	Both	No	-	-	-	Daily	< 2hrs
24	Privately Owned	4+1		2 50k<	IPH	Yes	Always	All Seasons	7<	2-3 D	2-4 hrs

Q12 Monitorin	Q13 Water Pur	Q14 Capacity	Q15 SLD	Q16 ADWS	Q17 Notified	Q18 Complaint	Q19 W Reuse	Q20 Causes	Q21 Remarks
W metre	No	2000 L	2-4 D	Sharing	No	IPH	No	-	
W bill	No	1000 L	4-6 D	W Tanks	-	Landlord	No	Pop. Growth	
W bill	No	500 L	2-4 D	NS	In Sum	IPH	No	Pop. Growth	Corruption, Lack of system
W bill	No	1000 L	2-4 D	OTH	No	-	No	Pop. Growth	
W metre	No	4000 L	2-4 D	W tanks	No	IPH	-		Lack of Rainfall, Constructions
W metre	No	4000 L	1-2 D	-	No	-	-		Sources are limited
W metre	Yes	2000 L	-	-	-	-	Yes	OTH	Individual Created Scarcity
W metre	No	2000 L	-	NS (2km	-	Keyman	Yes	IODS	Lack of coordination
W metre	No	4000 L	4-6 D	W tanks	No	IPH	No	Supply	Giri Scheme is faulty, market areas receive enough wa
W metre	No	2000 L	2-4 D	Sharing	No	IPH	No	-	
W bill	No	1000 L	4-6 D	W Tanks	-	Landlord	No	Pop. Growth	
W bill	No	500 L	2-4 D	NS	In Sum	IPH	No	Pop. Growth	
W bill	No	1000 L	2-4 D	OTH	No	-	No	Pop. Growth	
W metre	No	4000 L	2-4 D	W tanks	No	IPH	-		
W metre	No	4000 L	1-2 D	-	No	-	-		
W metre	Yes	2000 L	-	-	-	-	Yes	OTH	
W metre	No	2000 L	-	NS (2km	-	Keyman	Yes	IODS	
W metre	No	4000 L	4-6 D	W tanks	No	IPH	No	Supply	
W bill	No	500 L	2-4 D	NS	In Sum	IPH	No	Pop. Growth	
W bill	No	1000 L	2-4 D	OTH	No	-	No	Pop. Growth	
W metre	No	4000 L	2-4 D	W tanks	No	IPH	-		
W metre	No	4000 L	1-2 D	-	No	-	-		
W metre	Yes	2000 L	-	-	-	-	Yes	OTH	
W metre	No	3000 L	1-2 D	Sharing	No	IPH	Yes	Supply	

DATA ANALYSIS TABLE
POPULATION : 2945
NO. OF BUILDINGS :1640

WARD NO. 2 RAILWAY STATION

QUESTION	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
RESPONSE	Ownership Statu	M+F	Employe	ncome Grou	ource of Wate	Water Shortag	When	Season	VRD (Shortage	VRD (General	Receiving Hr
1	Privately Owne	0+2			MC	Yes	Specific	Sum/Mo	5-7 D	2-3 D	-
2	Rent	3+1		2 15k-30k	MC	Yes	Rarely	Sum	7<	1-2 D	2-4 hrs
3	Rent	3+1		2	MC	No				1-2 D	
4	Govt./Company	2+2		2 30k-50k	MC	Yes	Rarely	Sum	5-7 D	2-3 D	4<hrs
5	Govt./Company	3+1		2 Above 50k	Both	No				Alt	Irregular
6	Rent	3+0		3 30k-50k	MC	Yes	Specific	Sum	3-5 D	2-3 D	2-4 hrs
7	Rent	2+0		1 15k-30k	MC	Yes	Specific	Sum	3-5 D	3-4 D	<2hrs
8	Privately Owne	5+2		4 Above 50k	MC	Yes	Specific	Sum	3-5 D	2-3 D	2-4 hrs
9	Rent	1+2		1 15k-30k	Both	Yes	Specific	Sum	5-7 D	2-3 D	2-4 hrs
10	Privately Owne	2+1		1 Above 50k	MC	Yes	Specific	Mon	5-7 D	1-3 D	Irregular
11	Privately Owned				MC	Yes	Specific	Sum	3-5D	3-4D	2-4hrs
12	Rent				MC	Yes	Specific	Sum/Mo	3-5D	2-3D	<2hrs
13	Rent				Both	No					
14	Privately Owned				MC	Yes	Specific	Sum	5-7D	3-4D	2-4hrs
15	Privately Owned				MC	Yes	Specific	Sum/Mo	5-7 D	2-3 D	2-4hrs
16	Rent				MC	Yes	Rarely	Sum	5-7D	1-2 D	2-4 hrs
17	Rent				MC	No				1-2 D	
18	Privately Owned				MC	Yes	Rarely	Sum	5-7 D	2-3 D	4<hrs
19	Rent					Yes	Specific	sum	2-3D	1-2D	2-4hrs
21	Privately Owned				MC	Yes	Specific	Sum/Mo	5-7D	3-4D	4<hrs
22	Privately Owned				MC	No					
23	Rent				MC	Yes	Rarely	Sum	5-7D	1-2 D	2-4 hrs
24	Rent				MC	No				1-2 D	
25	Privately Owned				MC	Yes	Rarely	Sum	3-5D	2-3 D	4<hrs

Q12 Monitoring	Q13 Water Pump	Q14 Capacity	Q15 SLD	Q16 ADWS	Q17 Notified	Q18 Complain	Q19 W Reuse	Q20 Causes	Q21 Remarks
W Metre	No	2500 L	2-4 D	NS	-	MC	No	IODS	
W Metre	No	2000 L	6<	NS/WT	Yes	Keyman	Yes	-	Multiple Connections, Construction
		500 L		NS					
-		6000 L	2-4 D	OTH	-	-	-	WOW	Planning of use of Water
W Bill	-	6000 L					Yes	-	Summers- WRD 5-6 D, Scheme Privatisation, Planning acc t
W Bill	Yes	4000 L	1-2 D	NS	Yes	Owner	-	-	
W metre	No	3000 L	1-2 D	NS	Yes	-			
W Bill	No	16000 L	4-6 D	OTH	No	MC	-	Pop Growth	
W Bill	Yes	1000 L	1-2 D	OTH	No	Owner	Yes	IODS	
W bill	No	2000 L	6<	W Tanks	No	Keyman	No	-	Mismanagement, Leakages
W Meter	No	4000L	3-4D	NS	No	MC		WOW	
W Bill	No	5000L	1-2D	OTH	Yes	Owner		IODS	
W Metre		3000L	2-3D	W Tanks	No	MC		Pop Growth	
W Metre	No	2000 L	2-4 D	NS	-	MC	No	IODS	
W Metre	No	2000 L	4-6D	NS/WT	Yes	MC	Yes	Pop Growth	
		500 L	1-2D	NS				IODS	
-		6000 L	2-4 D	OTH	No	MC		WOW	
W Bill	No	3000L	2-3D	NS	No	Owner		Pop Growth	
W Meter	Yes	2000L	1-21D		No	MC		IODS	
W Metre	No	3000 L	4-6D	WT	Yes	MC	Yes	WOW	
		500 L	1-2D	NS				IODS	
-		5000 L	2-4 D	OTH	No	MC		WOW	

DATA ANALYSIS TABLE
POPULATION : 3019
NO. OF BUILDINGS : 722

WARD NO. 3 KATHER

QUESTIONS / RESPONSES	Q1 Ownership Status	Q2 M+F	Q3 Employed	Q4 Income Group	Q5 Source of Water	Q6 Water Shortage	Q7 When	Q8 Season	Q9 WRD (Shortage)	Q10 WRD (General)	Q11 Receiving Hrs	Q12 Monitoring
1	Privately Owned				MC	Yes	Rarely	Sum/Mon	7<	3-4 D	2-4 hrs	W Metre
2	Privately Owned				MC	Yes	Specific	Sum/Mon	7<	3-4 D	<2hrs	W Metre
3	Privately Owned				MC	Yes	Specific	Sum/Mon	3-5 D	1-2 D	<2hrs	W Metre
4	Privately Owned				MC	Yes	Specific	Sum/Mon	7<	2-3 D	2-4 hrs	W Metre
5	Privately Owned	3+3			IPH	Yes	Specific	Sum	7<	2-3 D	All day	-
6	Rent				-	Yes	Rarely	Sum	7<	3-4 D	-	W Bill
7	Rent				-	Yes	Rarely	Sum	7<	Alt	2-4 hrs	-
8	Privately Owned				MC	Yes	Rarely	Sum	3-5 D	Alt	<2 hrs	W Metre
9	Privately Owned				MC	Yes	Specific	Sum	7<	2-3 D	<2 hrs	W Metre
10	Privately Owned				MC	Yes	Rarely	Sum/Mon	7<	3-4 D	2-4 hrs	W Metre
11	Privately Owned				MC	Yes	Specific	Sum/Mon	7<	3-4 D	<2hrs	W Metre
12	Privately Owned				MC	Yes	Specific	Sum/Mon	3-5 D	1-2 D	<2hrs	W Metre
13	Privately Owned				MC	Yes	Specific	Sum/Mon	7<	2-3 D	2-4 hrs	W Metre
14	Privately Owned				IPH	Yes	Specific	Sum	7<	2-3 D	All day	-
15	Rent				-	Yes	Rarely	Sum	7<	3-4 D	-	W Bill
16	Rent				-	Yes	Rarely	Sum	7<	Alt	2-4 hrs	-
17	Privately Owned				MC	Yes	Rarely	Sum	3-5 D	Alt	<2 hrs	W Metre
18	Privately Owned				MC	Yes	Specific	Sum	7<	2-3 D	<2 hrs	W Metre
19	Rent				MC	No				2-3 D	2-4 hrs	W Metre
20	Privately Owned				MC	No				2-3 D	2-4 hrs	W Metre
21	Rent				-	Yes	Rarely	Sum	7<	Alt	2-4 hrs	-
22	Privately Owned				MC	Yes	Rarely	Sum	3-5 D	Alt	<2 hrs	W Metre
23	Rent				-	Yes	Rarely	Sum	7<	Alt	2-4 hrs	-
24	Privately Owned				MC	Yes	Rarely	Sum	3-5 D	Alt	<2 hrs	W Metre
25	Privately Owned				MC	Yes	Specific	Sum	7<	2-3 D	<2 hrs	W Metre
26	Privately Owned				MC	Yes	Rarely	Sum/Mon	7<	3-4 D	2-4 hrs	W Metre

Q13 Water Pump	Q14 Capacity	Q15 SLD	Q16 ADWS	Q17 Notified	Q18 Complaint	Q19 W Reuse	Q20 Causes	Q21 Remarks
Yes	4000 L	2-4 D	No	Yes	MC	No	Pop. Growth	
No	5000 L	2-4 D	No	Yes	MC	No	Pop. Growth	
No	4000 L	2-4 D	No	Yes	Councillor	Yes	Pop. Growth	
Yes	3000 L	2-4 D	WT	Yes	Councillor	-	Pop. Growth	
No	2000 L		NS					
-	500 L		-		Landlord			
-	1000 L	1-2 D	WT	Yes	Landlord	Yes	WOW	Supply
Yes	10000 L	4-6 D	WT	Yes	Keyman	No	Pop. Growth	Corruption
No	1000 L	1-2 D	-	Yes	MC		OTH	Non-Cooperation of Keyman
Yes	4000 L	2-4 D	No	Yes	MC	No	Pop. Growth	
No	5000 L	2-4 D	No	Yes	MC	No	Pop. Growth	
No	4000 L	2-4 D	No	Yes	Councillor	Yes	Pop. Growth	
Yes	3000 L	2-4 D	WT	Yes	Councillor	-	Pop. Growth	
No	2000 L		NS					
-	500 L		-		Landlord			
-	1000 L	1-2 D	WT	Yes	Landlord	Yes	WOW	
Yes	10000 L	4-6 D	WT	Yes	Keyman	No	Pop. Growth	
No	1000 L	1-2 D	-	Yes	MC		OTH	
Yes	1000 L					No	OTH	Underground Reserves of Water
Yes	3500 L	1-2 D				Yes	WOW	
-	1000 L	1-2 D	WT	Yes	Landlord	Yes	WOW	
Yes	10000 L	4-6 D	WT	Yes	Keyman	No	Pop. Growth	
-	1000 L	1-2 D	WT	Yes	Landlord	Yes	WOW	
Yes	10000 L	4-6 D	WT	Yes	Keyman	No	Pop. Growth	
No	1000 L	1-2 D	-	Yes	MC		OTH	
Yes	4000 L	2-4 D	No	Yes	MC	No	Pop. Growth	

DATA ANALYSIS TABLE
POPULATION : 2622
NO. OF BUILDINGS : 459

WARD NO. 4 CHAMBAGHAT SALOGRA

QUESTION	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
RESPONSE	Ownership Statu	M+F	Employee	Income Grou	Source of Wat	Water Shorta	When	Season	WRD (Shortag	WRD (Genera	Receiving Hr
1	Privately Owned	1+7		3 30k-50k	MC	Yes	Specific	Sum/Mon	3-5 D	Daily	-
2	Rent	1+0	-	8k-15k	MC	Yes	Specific	Sum	5-7 D (7<)	2-3 D	2-4 hrs
3	Rent	1+1		1 15k-30k	MC	Yes	Specific	Sum	7< (10)	Alt	2-4 hrs
4	Privately Owned	1+2	-	15k-30k	MC	Yes	Always	Sum/Mon	5-7 D	1-2 D	< 2hrs
5	Rent	3+3		4 30k-50k	MC	Yes	Always	Sum/Mon	5-7 D	2-3 D	2-4 hrs
6	Privately Owned	2+3		2 8k-15k	MC	Yes	Always	All seasons	7<	3-4 D	2-4 hrs
7	Privately Owned	3+4+T3		15k-30k	Both	Yes	Specific	Sum	2-3 D	Alt	2-4 hrs
8	Rent	3+1	-	15k-30k	IPH	Yes	Specific	Sum/Mon	7< (15)	4-5 D	4<
9	Privately Owned	4+2		2 30k-50k	IPH	Yes	Rarely	Sum	3-5 D	3-4 D	4<
10	Rent	1+2		1 8k-15k	IPH	No	-			4-5 D	<2 hrs
11	Rent	2+2		2 30k-50k	IPH	Yes	Rarely	Sum	3-5 D	3-4 D	2-4 hrs
12	Privately Owned	1+7		3 30k-50k	MC	Yes	Specific	Sum/Mon	3-5 D	Daily	-
13	Rent	1+0	-	8k-15k	MC	Yes	Specific	Sum	5-7 D (7<)	2-3 D	2-4 hrs
14	Rent	1+1		1 15k-30k	MC	Yes	Specific	Sum	7< (10)	Alt	2-4 hrs
15	Privately Owned	1+2	-	15k-30k	MC	Yes	Always	Sum/Mon	5-7 D	1-2 D	< 2hrs
16	Rent	3+3		30k-50k	MC	Yes	Always	Sum/Mon	5-7 D	2-3 D	2-4 hrs
17	Privately Owned	2+3		2 8k-15k	MC	Yes	Always	All seasons	7<	3-4 D	2-4 hrs
18	Privately Owned	2+2		2 15k-30k	Both	Yes	Specific	Sum	2-3 D	Alt	2-4 hrs
19	Rent	3+1	-	15k-30k	IPH	Yes	Specific	Sum/Mon	7< (15)	4-5 D	4<
20	Privately Owned	4+2		30k-50k	IPH	Yes	Rarely	Sum	3-5 D	3-4 D	4<
21	Rent	1+2		8k-15k	IPH	No	-			4-5 D	<2 hrs

Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21
Monitorin	Water Pur	Capacity	SLD	ADWS	Notified	Complaint	W Reuse	Causes	Remarks
W Metre	No	1500 L	1-2 D	NS	Yes	Keyman	No	-	
W Bill	No	2000 L	1-2 D	NS	No	Landlord	Yes	Pop. Growth	
W Bill	-	500 L	1-2 D	-	-	Landlord	-	Lack of supply	
W Metre	No	1500 L	2-4 D	WT/NS	-	-	No	IODS	
W Bill	No	5000 L	1-2 D	WT	-	-	No	Pop. Growth	
W Bill	No	5000 L	2-4 D	WT/ UG	-	-	No	-	
W Metre	No	25000 L	2-4 D	NS	Yes	Keyman	No	WOW	
W Bill	-	2500 L+Drum		WT/NS			Yes		
W Bill	Yes	2200 L		-			Yes	OTH	Lack of govt. awareness
W Bill	-	2000 L							
W Bill	No	1000 L		WT	No	Keyman	No		
W Metre	No	1500 L	1-2 D	NS	Yes	Keyman	No	-	
W Bill	No	2000 L	1-2 D	NS	No	Landlord	Yes	Pop. Growth	
W Bill	-	500 L	1-2 D	-	-	Landlord	-	Lack of supply	
W Metre	No	1500 L	2-4 D	WT/NS	-	-	No	IODS	
W Bill	No	5000 L	1-2 D	WT	-	-	No	Pop. Growth	
W Bill	No	5000 L	2-4 D	WT/ UG	-	-	No	-	
W Metre	No	25000 L	2-4 D	NS	Yes	Keyman	No	WOW	
W Bill	-	2500 L	1-2 D	WT/NS	Yes		Yes		
W Bill	Yes	2200 L	1-2 D	-	No		Yes	OTH	
W Bill	-	2000 L	1-2 D		No				

DATA ANALYSIS TABLE
POPULATION: 2868
NO. OF BUILDINGS : 576

WARD NO. 5 LOWER BAZAR

QUESTION:	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
RESPONSE:	Ownership S	M+F	Employe	Income (	Source of Wat	Water Shortage	When	Season	WRD (Shorta	WRD (Gener	Receiving I	Monitorin
1	Rented	2+4			MC	Yes	specific	Sum	5-7D	2-3D	1-2hr	Meter
2	Rented	1+3			MC	Yes	specific	Sum	7D	7D	2-4hr	Bill
3	Privately ow	1+2			MC	Yes	specific	Sum	3-5D	7D	2hr	Meter
4	Privately owned				Mc	Yes	specific	Sum	5-7D	3D	1hr	Meter
5	Rented				MC	No	Rarely	Sum	2-3D	1D	2-6hr	Meter
6	Privately owned				MC	Yes	specific	Sum	3-4D	1D	2hr	Meter
7	Privately owned				MC	Yes	specific	sum/mo	5-6d	1D	2-4hr	Meter
8	Privately owned				MC	Yes	specific	Sum	5-6D	1-3D	2hr	Meter
9	Rented				MC	Yes	specific	Sum	7D	7D	2-4hr	Bill
10	Privately owned				MC	Yes	specific	Sum	4-5D	3D	2hr	Meter
11	Rented				Mc	Yes	specific	sum/mo	3-5D	3D	3hr	Bill
12	Privately owned				MC	No	Rarely	Sum	2-3D	1D	2-6hr	Bill
13	Rented				MC	Yes	specific	Sum	3-4D	1D	2hr	Meter
14	Rented				MC	Yes	specific	sum/mo	5-6d	1D	2-4hr	Meter
15	Privately owned				MC	Yes	specific	Sum	5-7D	2-3D	1-2hr	Meter
16	Rented				MC	Yes	specific	sum/mo	7D	7D	2-4hr	Bill
17	Rented				MC	Yes	specific	Sum	3-5D	7D	3hr	Meter
18	Privately owned				Mc	Yes	specific	Sum	5-7D	3D	4hr	Meter
19	Privately owned				MC	No	Rarely	Sum	2-3D	1D	2-6hr	Bill
20	Privately owned				MC	Yes	specific	Sum	3-4D	1D	2hr	Meter
21	Rented				MC	Yes	specific	sum/mo	2-4D	3D	2-4hr	Meter
22	Privately owned				MC	Yes	specific	sum/mo	3-5D	7D	2-4hr	Bill
23	Rented				MC	Yes	specific	Sum	3-5D	7D	3hr	Meter
24	Rented				MC	Yes	specific	sum/mo	5-6d	1D	2-4hr	Meter
25	Privately owned				MC	Yes	specific	Sum	5-6D	1-3D	2hr	Meter

Q13 Water Pur	Q14 Capacity	Q15 SLD	Q16 ADWS	Q17 Notified	Q18 Complai	Q19 W Reuse	Q20 Causes
No	5000L	3D		No		Yes	WOW
No	4000L	3-4D	WT	Yes	MC	Yes	IODS
No	4000L	4-5D	WT	No		Yes	WOW
No	3000L	4-5D	NS	No			
	1000L	2-3D	NS				
No	5000L	2-3d	WT	Yes	MC	Yes	OTH
No	2000L	3d	WT	Yes	MC	No	PG
No	3000L	2D	NS	No		Yes	WOW
No	4000L	3-4D	WT	Yes	MC		IODS
No	5000L	4-5D	WT	No		Yes	WOW
No	3000L	4-5D	NS	No			PG
	1000L	2-3D	NS				
No	5000L	2-3d	WT	Yes	MC	Yes	OTH
No	2000L	3d	WT	Yes	MC	No	PG
No	5000L	3D		No		Yes	WOW
No	4000L	3-4D	WT	Yes	MC	Yes	IODS
No	4000L	4-5D	WT	No		Yes	WOW
No	3000L	4-5D	NS	No			
	1000L	2-3D	NS				
No	5000L	2-3d	WT	Yes	MC	Yes	OTH
No	2000L	3d	WT	Yes	MC	No	WOW
No	4000L	3-4D	WT	Yes	MC	Yes	IODS
No	4000L	4-5D	WT	No		Yes	PG
No	2000L	3d	WT	Yes	MC	No	PG
No	3000L	2D	NS	No		Yes	WOW

DATA ANALYSIS TABLE
POPULATION : 2567
NO. OF BUILDINGS : 721

WARD NO. 6 JAWAHAR PARK

QUESTION:	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
RESPONSE:	Ownership Statu	M+F	Employed	Income Group	Source of Wate	Water Shortag	When	Season	NRD (Shortage	WRD (General	Receiving Hr	Monitoring
1	Rent	2+1	1	8k-15k	MC	Yes	Always	All Seasor	3-5 D	2-3 D	<2 hrs	W Bill
2	Privately Ownec	2+1	-	Above 50K	MC	Yes	Specific	Sum	3-5 D	1-2 D	-	W Metre
3	Privately Ownec	4+2	-	15K-30K	MC	No						
4	Rent	0+2	-	15k-30k	MC	Yes	Specific	Sum	3-5 D	1-2 D	Irregular	W Bill
5	Privately Ownec	3+1	-	30k-50k	MC	Yes	Specific	Sum/Mon	5-7 D	3-4 D	Irregular	W W Bill
6	Privately Ownec	2+4		1 30k-50k	MC	Yes	Specific	Sum	5-7 D	2-3 D	<2 hrs	W Bill
7	Rent	1+0	Retd.	8k-15k	MC	Yes	Specific	Sum/Mon	7<	Alt	<2 hrs	W Bill
8	Rent	1+0	-	8k-15k	MC	No						
9	Rent	3+1		4 Above 50K	MC	No						
10	Privately Ownec	3+3	-	Above 50K	MC	Yes	Specific	Sum	3-5 D	Alt	2-4 hrs	W Bill
11	Rent	2+1		1 8k-15k	MC	Yes	Always	All Seasor	3-5 D	2-3 D	<2 hrs	W Bill
12	Privately Ownec	2+1	-	Above 50K	MC	Yes	Specific	Sum	3-5 D	1-2 D	-	W Metre
13	Privately Ownec	4+2	-	15K-30K	MC	No						
14	Rent	0+2	-	15k-30k	MC	Yes	Specific	Sum	3-5 D	1-2 D	Irregular	W Bill
15	Privately Ownec	3+1	-	30k-50k	MC	Yes	Specific	Sum/Mon	5-7 D	3-4 D	Irregular	W W Bill
16	Privately Ownec	2+4		1 30k-50k	MC	Yes	Specific	Sum	5-7 D	2-3 D	<2 hrs	W Bill
17	Rent	1+0	Retd.	8k-15k	MC	Yes	Specific	Sum/Mon	7<	Alt	<2 hrs	W Bill
18	Rent	1+0	-	8k-15k	MC	No						
19	Rent	3+1		4 Above 50K	MC	No						
20	Privately Ownec	3+3	-	Above 50K	MC	Yes	Specific	Sum	3-5 D	Alt	2-4 hrs	W Bill
21	Privately Ownec	2+4		1 30k-50k	MC	Yes	Specific	Sum	5-7 D	2-3 D	<2 hrs	W Bill
22	Rent	1+0	2+1	8k-15k	MC	Yes	Specific	Sum/Mon	5-7 D	Alt	<2 hrs	W Bill
23	Rent	1+0	-	8k-15k	MC	No						
24	Privately Ownec	2+4		1 30k-50k	MC	Yes	Specific	Sum	5-7 D	2-3 D	<2 hrs	W Bill
25	Rent	1+0	Retd.	8k-15k	MC	Yes	Specific	Sum/Mon	7<	Alt	<2 hrs	W Bill

Q13 Water Pump	Q14 Capacity	Q15 SLD	Q16 ADWS	Q17 Notified	Q18 Complain	Q19 W Reuse	Q20 Causes	Q21 Remarks
No	500 L	2-4 D	WT	No	Owner	No	Pop. Growth	Water Sharing during Shortage
Yes	2000 L	2-4 D	WT	No	MC	No	Pop. Growth	Tourist Season
	500 L							
No	2500 L	4-6 D	-	No	No	No	Pop. Growth	
Yes	6000 L	2-4 D	WT	No	Keyman	No	WOW	
No	2000 L	2-4 D	OTH	No	MC	No	NS	More Connections, Less Capacity
No	2000 L	4-6 D	-	Yes	-	No	Pop. Growth	Outdated Tanks
	1000 L							
Yes	3500 L	1-2 D	WT	No	Keyman	No	WOW	
No	500 L	2-4 D	WT	No	Owner	No	Pop. Growth	
Yes	2000 L	2-4 D	WT	No	MC	No	Pop. Growth	
	500 L							
No	2500 L	4-6 D	-	No	No	No	Pop. Growth	
Yes	6000 L	2-4 D	WT	No	Keyman	No	WOW	
No	2000 L	2-4 D	OTH	No	MC	No	NS	
No	2000 L	4-6 D	-	Yes	-	No	Pop. Growth	
	1000 L							
Yes	3500 L	1-2 D	WT	No	Keyman	No	WOW	
No	2000 L	2-4 D	OTH	No	MC	No	NS	
No	2000 L	4-6 D	-	Yes	-	No	Pop. Growth	
No	2000 L	2-4 D	OTH	No	MC	No	NS	
No	2000 L	4-6 D	-	Yes	-	No	Pop. Growth	

DATA ANALYSIS TABLE
POPULATION : 2880
NO. OF BUILDINGS : 770 (As per MC)

WARD NO. 7 THODO GROUND

QUESTIONS / RESPONSES	Q1 Ownership Status	Q2 M+F	Q3 Employed	Q4 Income Group	Q5 Source of Water	Q6 Water Shortage	Q7 When	Q8 Season	Q9 WRD (Shortage)	Q10 WRD (General)	Q11 Receiving Hrs
1	Privately Owned	4+2		2 50k<	MC	Yes	Specific	Mon	1-3 D	Alt	2-4 hrs
2	Privately Owned	3+2		5 30k-50k	MC	Yes	Always	Mon	1-3 D	Alt	2-4 hrs
3	Govt./Company Q	4+2		3 50k<	MC	Yes	Sometimes	Sum	1-3 D	2-3 D	2-4 hrs
4	Rent	3+0	-	-	MC	Yes	Rarely	Sum	3-5 D	Alt	<2hrs
5	Rent	1+2		1 30k-50k	MC	Yes	Specific	Sum	3-5 D	1-2 D	<2hrs
6	Rent	2+0	-	8k-15k	MC	Yes	Specific	Sum	3-5 D	1-2 D	2-4 hrs
7	Rent	1+2		1 15K-30K	MC	Yes	Rarely	Sum	5-7 D	2-3 D	<2 hrs
8	Rent	3+0	-	-	MC	No	-	-	-	Alt	2-4 hrs
9	Rent	4+2		1 30k-50k	MC	Yes	Specific	Sum	3-5 D	2-3 D	4< hrs
10	Privately Owned	2+3		2 30k-50k	MC	Yes	Specific	Sum	5-7 D	1-2 D	2-4 hrs
11	Rent	3+1		1 30k-50k	MC	Yes	Specific	Sum	5-7 D	3-4 D	2-4 hrs
12	Rent	3+1		4 50k<	MC	Yes	Specific	Sum	3-5 D	1-2 D	2-4 hrs
13	Privately Owned	2+2		8k-15k	MC	Yes	Specific	Sum	7<	1-2 D	2-4 hrs
14	Privately Owned	2+1		1 30k-50k	MC	Yes	Specific	Sum	5-7 D	1-2 D	<2hrs
15	Rent	2+0	-	8k-15k	MC	Yes	Specific	Sum	1-3 D	2-3 D	<2 hrs
16	Privately Owned	5+2		2 50k<	MC	Yes	Specific	Sum	5-7 D	3-4 D	<2 hrs
17	Privately Owned	2+2	Retd.	50k<	MC	Yes	Specific	Sum	7<	2-3 D	2-4 hrs
18	Privately Owned	1+7		1 30k-50k	MC	Yes	Specific	Mon	1-3 D	2-3 D	<2 hrs
19	Privately Owned	1+2+R7		1 15K-30K	MC	No	-	-	-	1-2 D	4< hrs
20	Privately Owned	3+1		1 30k-50k	MC	Yes	Specific	Mon	3-5 D	1-2D	2-4 hrs
21	Privately Owned	2+3		1 50k<	MC	No	-	-	-	2-3 D	All Day
22	Privately Owned	2+2		4 8k-15k	MC	Yes	Specific	Mon	3-5 D	2-3 D	All Day
23	Privately Owned	2+2		3 50k<	MC	Yes	Rarely	Mon	1-3 D	Everyday	2-4 hrs
24	Privately Owned	1+4	Retd.	8k-15k	MC	No	Specific	Sum/Mon	5-7 D	1-2 D	All Day
25	Rent	2+1		1 15K-30K	MC	Yes	Specific	Mon	3-5 D	Alt	All Day
26	Rent	0+3		0 8k-15k	MC	No	Specific	Sum/Mon	3-5 D	1-2 D	2-4 hrs
27	Privately Owned	2+5		3 30k-50k	MC	Yes	Specific	Sum/Mon	3-5 D	1-2 D	All Day
28	Rent	0+3		1 30k-50k	MC	Yes	Specific	Sum	5-7 D	2-3 D	2-4 hrs
29	Privately Owned	2+2		2 -	MC	Yes	Specific	Mon	3-5 D	Everyday	All Day
30	Privately Owned	2+2+R4		1 15K-30K	MC	Yes	Specific	Sum/Mon	5-7 D	Everyday	<2hrs
31	Rent	2+0		2 15K-30K	MC	Yes	Specific	Sum	1-3 D	1-2 D	-
32	Privately Owned	4+1+R6		4 50k<	MC	Yes	Specific	Sum/Mon	1-3 D	Everyday	2-4 hrs
33	Privately Owned	4+6		2 -	MC	Yes	Specific	Sum	3-5 D	Everyday	2-4 hrs
34	Rent	1+3		1 15K-30K	MC	Yes	Specific	Sum	3-5 D	2-3 D	<2hrs
35	Privately Owned	3+2		2 50k<	MC	Yes	Specific	Sum	5-7 D	Alt	<2hrs

Ward no 9 Madhuwan Colony

Data Analysis Table
Population:2765
NO.OF BUILDINGS:090760 (As per MC)

QUESTIC	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21
RESPON	Ownership Sta	M+F	Employe	Income (	Source o	Water Sl	When	Season	WRD (Shorta	WRD (Gı	Receivin	Monitor	Water Pu	Capacity	SLD	ADWS	Notified	Complai	W Reuse	Causes	Rema
1	Privately owne	4+1			MC	Yes	specific	summer	3-5D	3-5D	2-4hr	Meter	No	4000L	5D		No		Yes	WOW	
2	Rented				MC	Yes	Rarely	summer	3-5D	1-3D	<4hr	Bill	Yes	3000L	5D		No	MC	Yes	IODS	
3	Privately owne	1+2			MC	Yes	specific	summer	3-5D	3-5D	2hr	Meter	No	2000L	3-4D		Yes		Yes	WOW	
4	Privately owned				Mc	Yes	specific	summer	5-7D	3-5D	1hr	Meter	No	4000L	5D		Yes			WOW	
5	Privately owned				MC	No	Rarely	summer	3-5D	1-3D	2-4hr	Meter		5000L	5-7D		Yes			IODS	
6	Privately owned				MC	Yes	Rarely	summer	3-5D	1-3D	2hr	Meter	No	5000L	3-4D		No	MC	Yes	OTH	
7	Privately owned				MC	Yes	Rarely	summer	3-5D	1-3D	2-4hr	Meter	Yes	2000L	3-4D	WT	Yes	MC	No	PG	
8	Privately owned				MC	Yes	Rarely	summer	3-5D	1-3D	2hr	Meter	No	4000L	5D		Yes		Yes	WOW	
9	Privately owned				MC	Yes	Rarely	summer	3-5D	3-5D	2-4hr	Meter	No	1500L	3-4D		Yes	MC		IODS	
10	Rented				MC	Yes	specific	summer	4-5D	3-5D	2hr	Bill	No	4000L	4-5D		No	Owner	Yes	WOW	
11	Privately owned				Mc	Yes	specific	sum/mo	3-5D	3-5D	3hr	Meter	No	6000L	4-5D		No			PG	
12	Privately owned				MC	No	Rarely	summer	2-3D	1-3D	3-5hr	Meter		1000L	3-4D					PG	
13	Privately owned				MC	Yes	specific	summer	3-4D	1-3D	2hr	Meter	Yes	5000L	2-3d		Yes	MC	Yes	OTH	
14	Rented				MC	Yes	specific	summer	3-5D	1-3D	2-4hr	Bill	No	2000L	3d		Yes	Owner	No	PG	
15	Privately owned				MC	Yes	Rarely	summer	3-5D	1-3D	1-2hr	Meter	No	5000L	3D		No		Yes	WOW	
16	Privately owned				MC	Yes	specific	sum/mo	5-7D	5-7D	2-4hr	Meter	No	4000L	3-4D		Yes	MC	Yes	IODS	
17	Privately owned				MC	Yes	Rarely	summer	3-5D	1-3D	3hr	Meter	No	4000L	4-5D		No		Yes	WOW	
18	Privately owned				Mc	Yes	specific	summer	5-7D	1-3D	<4hr	Meter	Yes	3000L	4-5D		No			PG	
19	Privately owned				MC	No	Rarely	summer	2-3D	3-5D	3-4hr	Meter		1000L	2-3D					WOW	
20	Privately owned				MC	Yes	Rarely	summer	3-4D	1-3D	2hr	Meter	No	5000L	2-3d		Yes	MC	Yes	OTH	
21	Rented				MC	Yes	specific	sum/mo	2-4D	3-5D	2-4hr	Bill	No	2000L	3-4D		Yes	MC	No	WOW	
22	Privately owned				MC	Yes	Rarely	summer	3-5D	5-7D	2-4hr	Meter	No	4000L	3-4D		Yes	MC	Yes	IODS	
23	Privately owned				MC	Yes	Rarely	summer	3-5D	3-5D	3hr	Meter	No	4000L	4-5D		No		Yes	PG	
24	Privately owned				MC	Yes	specific	summer	5-6d	5-7D	2-4hr	Meter	No	2000L	1-2D		Yes	MC	No	PG	
25	Privately owned				MC	Yes	Rarely	summer	5-7D	3-5D	2hr	Meter	No	3000L	3-4D		No		Yes	WOW	

DATA ANALYSIS TABLE
POPULATION : 2700
NO. OF BUILDINGS : 715 (As per MC)

WARD NO. 10 CHAUNRIGHATI

QUESTION Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
RESPONSE Ownership Statu	M+F	Employee	Income Grou	Source of Wat	Water Shorta	When	Season	WRD (Shortag	WRD (Genera	Receiving Hr
1 Privately Owned	2+1+R3		1 50k<	MC	Yes	Specific	Mon	7<	Alt	4<
2 Privately Owned	3+2+R4	-	8K-15K	MC	Yes	Specific	Mon	7<	Alt	Irregular
3 Rent	0+7		5 -	MC	Yes	Specific	Sum/Mon	5-7 D	Alt	Irregular
4 Rent	1+1	-	8K-15K	MC	No	Rarely	Mon	1-3 D	Alt	Irregular
5 Privately Owned	3+3+R2		2 50k<	MC	Yes	Specific	Mon	7<	1-2 D	All Day
6 Rent	3+2	-	15k-30k	MC	No	-	-	-	2-3 D	All Day
7 Rent	2+1		1 15k-30k	MC	Yes	Specific	Mon	7<	3-4 D	Irregular
8 Privately Owned	2+1	-	15k-30k	MC	Yes	Specific	Sum	3-5 D	1-2 D	4<
9 Privately Owned	2+2		1 -	MC	Yes	Rarely	Mon	3-5 d	2-3 D	All Day
10 Privately Owned	2+1		1 50K<	MC	Yes	Rarely	Sum	1-3 D	Everyday	All Day
11 Rent	2+0	-	8K-15K	MC	Yes	Specific	Sum/Mon	1-3 D	2-3 D	All Day
12 Rent	1+0	-	15k-30k	MC	Yes	Specific	Mon	7<	2-3 D	2-4 hrs
13 Rent	2+0	-	8K-15K	MC	Yes	Specific	Sum	3-5 D	3-4 D	<2 hrs
14 Privately Owned	1+1		2	MC	Yes	Specific	Sum	5-7 D	2-3 D	< 2hrs
15 Rent	1+3		1	MC	Yes	Specific	Sum	1-3 D	3-4 D	< 2hrs
16 Rent	1+0	-	-	MC	Yes	Specific	Mon	3-5 D	3-4 D	< 2hrs
17 Rent	1+1		1	MC	No	-	-	-		
18 Rent	2+1			MC	Yes	Specific	Sum	3-5 D	3-4 D	< 2hrs
19 rent	M-4			MC	Yes	rarely	sum	1-3D	1-2D	2-4hrs
20 Rent	2+1		1	MC	Yes	Specific	sum	5-7D	3-4D	2-4hrs
21 Privately Owned	5+2		3	MC	Yes	Specific	sum	3-5 D	3-4 D	<2 hrs
22 Rent	1+1		1	MC	Yes	Specific	Sum	3-5 D	1-2 D	<2 hrs
23 Rent	M-1			MC	Yes	Specific	sum	1-3 D	1-2 D	2-4 hrs
24 Privately Owned	3+1		2	MC	Yes	Specific	sum	5-7 D	2-3 D	2-4 hrs

Q12 Monitorin	Q13 Water Pur	Q14 Capacity	Q15 SLD	Q16 ADWS	Q17 Notified	Q18 Complaint	Q19 W Reuse	Q20 Causes	Q21 Remarks
W Metre	Yes	7000 L	2-4 D	NS	No	MC	Yes	-	
W Metre	No	5000 L	1-2 D	-	Yes	MC	No	Wastage	
W Metre	No	8000 L	2-4 D	OTH	No	Keyman	Yes	OTH	Sharing of Water, Judicious use fair
W Bill	-	1000 L	-	-	Yes	Landownei	No	-	
W Metre	No	10,000 L	4-6 D	OTH	No	-	Yes	IODS	Sharing of Water, Blockage in Supply
W Bill	No	1000 L	-	-	-	-	-	-	
W Bill	No	1100 L	-	W Tanks	No	Landownei	Yes	Pop. Growth	As per usage SLD, More Schemes
W Metre	No	4000 L	-	-	No	MC	Yes	IODS	As per usage SLD
W Metre	-	6000 L	6<	-	No	-	No	-	
W Metre	-	4000 L	2-4 D	W Tanks	Yes	-	Yes	OTH	Silt Blockage
W Bill	Yes	1000 L	1/2 D	NS/ WT	No	Landownei	No	OTH	Mainline
W Bill	No	500 L	1-2 D	OTH	No	Landownei	Yes	OTH	Filteration, Buy Water during scarcity
W Bill	No	6000 L	2-4 D	NS	No	MC	No	OTH	
W Bill	Yes	8000 L	4-6 D	W Tanks	Yes	MC	Yes	OTH	
W Metre	No	1500 L	2-4 D	NS	No	Owner	No	Pop. Growth	
W Bill	No	2000 L	2-4 D	NS	No	Owner	No	-	
W Bill	Yes	3000 L	1-2 D	NS	Yes	Owner	No	IODS	
W metre	No	4000L	1-2D	NS	No	Owner	No	Wastage	
W Bill	No	4000L	2-4D	NS	Yes	Owner	No	Wastage	
W Metre	No	5000L	4-6 D	NS		MC	Yes		
W Metre	No	4000L	2-4 D	NS	Yes	Owner	No	Wastage	
W Bill	No	1000L	2-4 D	NS	No	Owner	Yes		
W Bill	No	3000L	2-4 D	NS	No	MC	No	IODS	

DATA ANALYSIS TABLE
POPULATION : 2645
NO. OF BUILDINGS : 308

WARD NO. 11 DEGREE COLLEGE WARD

QUESTION Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
RESPONSE Ownership Statu	M+F	Employee	Income Grou	Water source	Water Scarci	When	Season	WRD (Shortage)	WRD (Genera	Receiving ho	Monitorin
1 Rented	F-2	1	8k-15k	MC	Yes	specific	summer	1-3 days	2-3 days	2-4 hours	Bill
2 Rented	2+2	1	8k-15k	MC	Yes	specific	Monsoon	3-6 days	2-3 days	2-4 hours	Bill
3 Privately Owned	4+2	2	Above 50k	MC	Yes	Always	All season	3-6 days	Once a week	2-4 hours	Bill
4 Rented	F-3	0	15k-30k	MC	Yes	Rarely	Monsoon	1-3 days	2-3 days	2-4 hours	Bill
5 Rented	M-1	0	8k-15k	MC	Yes	specific	summer	1-3 days	Once a week	<2 hours	Bill
6 Rented	F-2	0		0 MC	No						
7 Rented	F-2	0		0 MC	Yes	Rarely	summer	5-7 days	1-3 days	< 2 hours	Bill
8 Privately Owned	1+2	1	Above 50k	MC	Yes	specific	Sum-Mon	1-3 days	1-3 days	> 4 hours	Meter
9 Privately Owned	4+4	2	Above 50k	MC	Yes	specific	Monsoon	3-6 days	Once a week	2-4 hours	Meter
10 Rented	2+2	1	8k-15k	MC	Yes	Always	Sum-Mon	6-9 days	2-3 days	<2 hours	Bill
11 Rented	3+3	1	15k-30k	MC	Yes	specific	summer	6-9 days	Once a week	<2 hours	Bill
12 Rented	2+3	1	15k-30k	MC	No						
13 Privately Owned	2+3	0	30k-50k	MC	Yes	specific	summer	3-6 days	Once a day	2-4 hours	Bill
14 Rented	F-2	2	15k-30k	MC	Yes	sometim	Monsoon	1-3 days	2-3 days	2-4 hours	Bill
15 Privately Owned	1+1	2	8k-15k	MC	Yes	specific	summer	1-3 days	2-3 days	<2 hours	Bill
16 Rented	2+2	1	8k-15k	MC	Yes	Always	Sum-Mon	6-9 days	Once a week	<2 hours	Bill
17 Rented	M-3	1	8k-15k	MC	Yes	sometim	summer	1-3 days	2-3 days	<2 hours	Bill
18 Privately Owned	2+3	0	30k-50k	MC	Yes	specific	summer	1-3 days	Once a week	2-4 hours	Meter
19 Rented	2+1	1	8k-15k	MC	Yes	specific	summer	3-6 days	2-3 days	2-4 hours	Bill
20 Rented	1+1	1		MC	Yes	specific	summer	1-3 days	3-5 days	2-4 hours	Meter
21 Rented	1+1	0		MC	No						
22 Privately Owned	1+5			MC	Yes	specific	summer	5-7 days	3-5 days	2-4 hours	Meter
23 Rented	M-1	1		MC	Yes	specific	summer	3-6 days	3-5 days	2-4 hours	Bill
24 Rented	2+1	1		MC	Yes	specific	summer	3-6 days	1-3 days	<2 hours	Bill
25 Rented	1+1			MC	Yes	specific	Sum-Mon	5-7 days	1-3 days	<2 hours	Bill
26 Rented	2+2			MC	No						

Q13 Water Purr	Q14 Capacity	Q15 SLD	Q16 ADWS	Q17 Notified	Q18 Complain	Q19 W Reuse	Q20 Remarks
Yes	4000	4-6 days	UW	Yes	Owner	Yes	OW
No	8000	4-6 days	UW	Yes	Owner	No	IODS
No	5000	2-4 days	UW	NO	None	Yes	IODS
No	10000	2-4 days	WT	Yes	Owner	No	IP
	8000	1-2 days	NS	Yes	Counselo	No	IODS
No	8000	1-3 days	NS	Yes	Owner	Yes	IODS
No	4000	5-7 days	WT	No	MC	No	IODS
No	7000	4-6 days	NS	No	MC	No	IODS
No	2500	2-4 days	NS	No	Owner	No	IODS
No	8000	2-4 days	NS	Yes		No	Pipelines
No	5000	4-6 days	NS	Yes	MC	No	IODS
No	4000	2-4 days	Other	No		No	IP
Yes	2500	2-4 days	NS	No	MC	Yes	IODS
No	2000	2-4 days	NS	No	Owner	No	IODS
Yes	10000	2-4 days	NS	No	Owner	Yes	IODS
No	7000	2-4 days	NS	No	MC	No	IODS
No	2500	4-6 days	NS	Yes	Owner	Yes	OW
No	9000	4-6 days	Other	Yes	Owner	Yes	OW
No	6000	4-6 days	Other	No	MC	No	OW
No	8000	4-6 days	Other	No	Owner	No	OW
No	9000	1-2 days	Other	No	Owner	No	IP
No	1500	1-2 days	WT	No	Owner	No	OW

DATA ANALYSIS TABLE
POPULATION : 2512
NO. OF BUILDINGS : 1040 (As per MC)

WARD NO. 12 SUNNY SIDE WARD

QUESTION Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
RESPONSE Ownership Statı	M+F	Employe	Income Grou	Source of Wat	Water Shorta	When	Season	WRD (Shortag	WRD (Genera	Receiving Hr
1 Privately Owned	2+2		2 30k-50k	MC	Yes	Rarely	Sum	3-5 D	2-3 D	4<
2 Privately Owned	1+1	Retd.	30k-50k	MC	No				Daily	All Day
3 Rent	1+4	-	-	MC	Yes	Specific	Sum	7<	2-3 D	2-4 hrs
4 Rent	2+2		1 15k-30k	MC	Yes	Specific	Sum/Mon	3-5 D	2-3 D	2-4 hrs
5 Privately Owned	5+1		2 30k-50k	MC	Yes	Rarely	Sum	5-7 D	2-3 D	2-4 hrs
6 Rent	1+2	-	-	MC	No				Daily	Irregular
7 Privately Owned	-	-	-	MC	Yes	Specific	Sum	3-5 D	2-3 D	<2 hrs
8 Privately Owned	1+2		1 15K-30K	MC	Yes	Specific	Sum	3-5 D	2-3 D	<2hrs
9 Privately Owned	3+1		2 30k-50k	MC	Yes	Specific	Sum	3-5 D	2-3 D	2-4 hrs
10 Privately Owned	2+2		2 30k-50k	MC	Yes	Rarely	Sum	1-3 D	Daily	-
11 Privately Owned	2+2		2 30k-50k	MC	Yes	Rarely	Sum	3-5 D	2-3 D	4<
12 Privately Owned	1+1	Retd.	30k-50k	MC	No				Daily	All Day
13 Rent	1+4	-	-	MC	Yes	Specific	Sum	7<	2-3 D	2-4 hrs
14 Rent	2+2		1 15k-30k	MC	Yes	Specific	Sum/Mon	3-5 D	2-3 D	2-4 hrs
15 Privately Owned	5+1		2 30k-50k	MC	Yes	Rarely	Sum	5-7 D	2-3 D	2-4 hrs
16 Rent	1+2	-	-	MC	No				Daily	Irregular
17 Privately Owned	-	-	-	MC	Yes	Specific	Sum	3-5 D	2-3 D	<2 hrs
18 Privately Owned	1+2		1 15K-30K	MC	Yes	Specific	Sum	3-5 D	2-3 D	<2hrs
19 Privately Owned	3+1		2 30k-50k	MC	Yes	Specific	Sum	3-5 D	2-3 D	2-4 hrs
20 Privately Owned	2+2		2 30k-50k	MC	Yes	Rarely	Sum	1-3 D	Daily	-
21 Rent	3+0		2 30k-50k	MC	No				2-3 D	-
22 Rent	0+2	-	15k-30k	MC	Yes	Rarely	Sum	1-3 D	2-3 D	< 2hrs
23 Privately Owned	2+2		2 30k-50k	MC	Yes	Rarely	Sum	3-5 D	2-3 D	4<
24 Privately Owned	4+1		2 30k-50k	MC	Yes	Specific	Sum/Mon	3-5 D	2-3 D	2-4 hrs

Q12 Monitorin	Q13 Water Pur	Q14 Capacity	Q15 SLD	Q16 ADWS	Q17 Notified	Q18 Complaint	Q19 W Reuse	Q20 Causes	Q21 Remarks
W Bill	No	3000 L	2-4 D	-	Yes	Mayor	-	Pop. Growth	Lack of storage
W Bill	No	5000 L	-	-	Yes	-	Yes	Overflow	Lack of storage
W Metre	Yes	500 L	2-4 D	NS	No	Owner	No	-	
W Metre	No	1000 L	2-4 D	WT	No	-	No	-	
W Metre	No	6000 L	6<	NS	Yes	Keyman	No	OTH	Pipe Blockage, Late Repair and processing
W Bill	No	1000 L	-	-	-	Landlord	No	OTH	
W Metre	No	1500 L	-	NS	-	MC	Yes	Pop. Growth	
W Metre	Yes	4000 L	-	WT	Yes	-	No	Pop. Growth	Constructions, Less Rainfall
W Metre	No	4000 L	2-4 D	OTH	No	Councillor	Yes	OTH	Rain water Harvesting
W Metre	Yes	2000 L	4-6 D	-	Yes	-	Yes	OTH	Tenants, More Connections
W Bill	No	3000 L	2-4 D	-	Yes	Mayor	-	Pop. Growth	
W Bill	No	5000 L	-	-	Yes	-	Yes	Overflow	
W Metre	Yes	500 L	2-4 D	NS	No	Owner	No	-	
W Metre	No	1000 L	2-4 D	WT	No	-	No	-	
W Metre	No	6000 L	6<	NS	Yes	Keyman	No	OTH	
W Bill	No	1000 L	-	-	-	Landlord	No	OTH	
W Metre	No	1500 L	-	NS	-	MC	Yes	Pop. Growth	
W Metre	Yes	4000 L	-	WT	Yes	-	No	Pop. Growth	
W Metre	No	4000 L	2-4 D	OTH	No	Councillor	Yes	OTH	
W Metre	Yes	2000 L	4-6 D	-	Yes	-	Yes	OTH	
W Bill	No	2000 L	1-2 D	WT	Yes	Landlord	Yes	Overflow	
W Bill	No	1000 L	1-2 D	WT	Yes	Landlord	No	OTH	
W Bill	No	3000 L	2-4 D	WT	Yes	MC	Yes	Pop. Growth	
W Metre	No	4000 L	2-4 D	WT	No	Keyman	Yes	Pop. Growth	

QUESTIONNAIRE

Water Scarcity and Management in Solan City

Name :

Age :

Ward No. :

Gender : Male / Female

Level of Education :

☐ Matric ☐ Secondary ☐ Graduate ☐ Higher than Graduation

Housing and Residents

1. What is the ownership status of your dwelling ?
☐ Privately Owned ☐ Provided by Employer (Govt./Company) ☐ Rented

2. What is the total number of residents ?
☐ 1-3 ☐ 4-6 ☐ 7<

3. Number of males..... and females.....

4. Number of residents employed.....

5. What is the income group of your household per month ?
☐ 8k-15k ☐ 15k-30k ☐ 30k-50k ☐ Above 50k

Water Problem

6. Do you face water shortage ? ☐ Yes ☐ No
if Yes then when ?
☐ Always ☐ Rarely ☐ In Specific Conditions ☐ Sometimes

7. When do you face water shortage specifically?
☐ In Summers ☐ In Winters ☐ In Monsoon ☐ In Autumn

8. Water Shortage remains for how many days on average ?
☐ 1-3 days ☐ 3-5 days ☐ 5-7 days ☐ More than 7 days

9. During shortage how you fulfill your water demand ?
☐ Natural Sources (Stepwells/ Water Springs) ☐ Paid Water Tanks
☐ Underground Water (Borewells/ Handpumps) ☐ Others

10. Are you early notified for water shortage ? ☐ Yes ☐ No

11. Whom do you complaint for shortage ? .....

12. What is the main source of water supply for your household ?
☐ Municipal Corporation ☐ Jal Shakti Vibhag ☐ Both ☐ None

13. How frequently do you receive water ?
☐ 1-3 days ☐ 3-5 days ☐ 5-7 days ☐ More than 7 days

14. What is water receiving time in hours on average?
☐ Less than 2 hours ☐ 2-4 hours ☐ More than 4 hours ☐ Irregular

15. How do you monitor your water usage ?
☐ Water Metre ☐ Water Bill ☐ No Monitoring

Water Storage and Consumption

16. What is the total number of tanks for your household ? .....

17. What is the average capacity per tank ? .....

18. How many days your storage lasts ?
☐ 1-2 days ☐ 2-4 days ☐ 4-6 days ☐ More than 6 days

19. Any alternative storage of water - Yes / No
if Yes then how ? ☐ Underground Water Reserves ☐ Small Containers ☐ Others

20. Do you have water pump for lifting water ? ☐ Yes ☐ No

21. Where is the maximum consumption of water in your household ?
☐ Kitchen (Drinking, Cooking, Washing)
☐ Bathroom (Toilets, Bathing, Washing) ☐ Gardens and Others

22. Do you reuse water ? Yes / No ; if Yes then how ?

Miscellaneous

23. According to you what are causes of water scarcity in Solan ?
☐ Overuse and Wastage of Water ☐ Lack of adequate Storage
☐ Improper and Outdated Distribution System ☐ Population Growth
☐ Others, Specify.....

24. What are your considerations on Water Problem faced by Solan ?

Table: Sources of Pollution in the catchment of Ashwani Khad falling in District Shimla

Sr. No.	Sources of Pollution of Ashwani Khad and its tributary	Sub Catchment area of Ashwani Khad	Jurisdiction of Centralized treatment schemes existing and proposed at
1	Industrial (Hotel industry) and Domestic Habitation	➢ Upper spur on the hill near Dhalli, Dhalli Bazar and surroundings ➢ Mundaghat ➢ Janedghat ➢ Jagroti Nallah and Churat Nallah	Common Sewage Treatment Plant at Dhalli and individual septic tank and STP
2	Industrial (Hotel industry) and Domestic Habitation	➢ Engine Ghar ➢ Sanjauli Bazar ➢ Part of Nav Bahar ➢ Bhatta Kuffer ➢ Dhingu Devi Temple ➢ Cemetry ➢ Housing Board Colony	Common Sewage Treatment Plant at Malyana and individual septic tank and individual ETP
3	Industrial and Domestic Habitation Drain carrying the waste water/ run off from Shimla Town	➢ Ridge ➢ The Mall ➢ Lower Bazar ➢ Middle Bazar ➢ Ram Bazar ➢ Bus Stand ➢ Winter-field ➢ Jakhoo ➢ US Club	Common Sewage Treatment Plant at Lalpani and individual septic tank and individual ETP and Proposed STP at Panthaghati

4/1

		➢ Bemloe ➢ Western Commend ➢ Panthaghat ➢ Nabla ➢ Phagli ➢ Ram Nagar ➢ Chaura Maidan ➢ Ghoda Chowky ➢ Tutikandi ➢ Boileauganj ➢ Lalpani ➢ Krishna Nagar ➢ Indian Institute of