

**GOVERNING WITHOUT THE STATE: A STUDY OF  
WATER IN RESIDENTIAL AREAS OF GURGAON**

*Thesis submitted to Jawaharlal Nehru University  
in fulfillment of the requirements  
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**DOCTOR OF PHILOSOPHY**

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**2016**



**DECLARATION**

I hereby affirm that the work for this thesis, "**Governing without the State: A Study of Water in Residential Areas of Gurgaon**", being submitted to as a part of the requirements of the **Ph.D Programme** of the Jawaharlal Nehru University, was carried out entirely by myself. I also affirm that it was not part of any other programme of study and has not been submitted to any other institute/university for the award of any degree.


01/08/2016

  
Rakesh Kumar Singh**CERTIFICATION**

We recommend that the thesis be placed before the examiners for evaluation.

  
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*Dedicated to my beloved Maa, & Late Babuji*

*“Gurgaon is a disaster, a horror story of how urbanisation should not happen. When these monstrosities were being developed, did anyone think about where the water for them would come from, and where the waste generated by them would go? Now they exist and answers have to be found. I have nothing to say except to say that this isn’t development, but mal-development.” (Iyer, in Kumar and Misra, 2012)*

## Table of Contents

Contents	Page
<i>Acknowledgements</i>	<i>i</i>
<i>List of Tables, Graphs and Maps</i>	<i>ii</i>
<i>List of Abbreviations</i>	<i>iii-v</i>
<i>Abstract</i>	<i>vi</i>

### Introduction

I	Background of the Study	1-2
II	Research Problem Background	2-3
III	Research Objectives	3-4
IV	Research Questions	4
V	Approach of the Study: The Research Methodology	4-5
VI	Chapter Scheme and Organisation of the Thesis	5-6

### Chapter 1

#### Issues in the Governance of Urban Residential Water: Setting the Research Framework for the Study of Gurgaon

1.1	The State Mechanism of Urban Water Supply	7-8
1.2	Contemporary Urban Water Problems: Challenges before the State	8-11
1.3	Water Crisis or Water Governance Crisis	11-14
1.4	Contextualising Gurgaon in Residential Water Governance: Rationale for the Study	14-20
1.5	Institutional Mapping of Water Provision to Residents of Gurgaon	20-24
1.6	Gurgaon City's Governance in Practice	24-25
1.7	Water Demand and Supply in Gurgaon: Some Arithmetic	25-28
1.8	Groundwater: Alternate Source of Water in Gurgaon	28-31
1.9	Groundwater in Gurgaon: Easy Access to Water	31-32
1.10	Incentives for Private Provision of Water in Gurgaon	32-33
1.11	The Quality of Water in Gurgaon: Can it be ignored?	33-35
1.12	Limitations of the Present Study	35

### Chapter 2

#### Understanding Gurgaon as a Special Setting in NCR: Sources of Water Scarcity

2.1	NCR: An Overview	36-38
2.2	Urbanisation: Basic Premises	38-39
2.3	Urbanisation in NCR	40-41
2.4	Urban Sprawl: Meaning, Spread and Consequences	41-43
2.5	Urban Sprawl in NCT-D	43-44
2.6	The DU Model of Delhi-NCR	44-45
2.7	Urbanism and Urbanisation in Gurgaon	45-46
2.8	Trends and Patterns of Urbanisation in Gurgaon	46-47

2.9	Level of Urbanisation in Gurgaon	47-48
2.10	Implications for Gurgaon in Water	48-49
2.11	Water Resources of NCR	49-50
2.12	Groundwater as an Alternate Source of Water in NCR	50-51
2.13	Gurgaon as a Separate Entity in NCR in Urban Water Governance	51-52
2.14	Concluding Note	52

### Chapter 3

#### **Governance Linkages to the Residential Water Scarcity in Gurgaon: A Media Content Analysis**

3.1	Gurgaon's Transformation: Planned/Unplanned or Flexibly Planned	53-56
3.2	The Monopolist State or the Passive State	56-58
3.3	Lack of Accountability, and Coordination among the State Agencies	58-59
3.4	Water Shortages in Gurgaon in Media Reports	60
3.5	What is Content Analysis?	61-62
3.6	Media Content Analysis: The Methodology	62-63
3.7	Media Content Analysis of Residential Water in Gurgaon: The Data	63
3.8	Analysis and Inferences from the Media Content Analysis	63-66
3.9	Concluding Note	66-67
<b>Appendix: Newspaper Images for Water Shortages in Gurgaon</b>		68-71

### Chapter 4

#### **Determinants of Water Demand of Residents of Gurgaon: A Comparative Case Study with Delhi**

4.1	Introduction	72-73
4.2	Comparing Gurgaon with Delhi	73-74
4.3	Need and Purpose of Primary Survey	74-75
4.4	Identifying Water Beneficiaries of HUDA Piped Water Supply	75-76
4.5	Primary Survey Methodology: Data and Survey Design	76-77
4.6	Sample Size and HH Sampling	77-80
4.7	Field Reports	80
4.7.1	Field Report I	80-83
4.7.2	Field Report II	83-85
4.7.3	Field Report III	85-87
4.8	Primary Survey Details	87-90
4.9	Scope for Coping Costs	90
4.10	Water Reliability Index of HUDA Water	91
4.11	Visualising Water-Rent Economy in Case of Community A	91-92
4.12	Gurgaon and Delhi: Case Studies in Contrast	92-96
4.13	Inferences from the Primary Survey on Water Governance of Gurgaon	96-97

4.14	Concluding Note	97
	<b>Appendix: Sources and Location of Drinking Water in Gurgaon in 2011</b>	98

## **Chapter 5**

### **Lessons from Gurgaon and The Way Forward in Residential Water Governance**

5.1	Core Research Findings	99-100
5.2	Lessons from Gurgaon	100
5.3	Policy (Solutions) to Mitigate Residential Water Scarcity in Gurgaon	101
5.3.1	The Supply Side Policy	101-102
5.3.2	The Demand Side Policy	102-105
5.3.3	Role of Law and Governance	105-107
5.4	Can PPP be a Panacea for all Urban Water Related Problems?	107-108
5.5	Major Conclusions: The Way Forward	109
	<b>Annex: Questionnaire on Household Survey on Water Supplies in the Residential Areas of Gurgaon</b>	110-114
	<b>Bibliography</b>	115-127

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## List of Tables, Graphs and Maps

S No.	Tables	Page
1(a)	Water Supply in Gurgaon, 2011-12	25
1(b)	Treated (Total) Water Production and Supplied in Gurgaon in, 2011-12	26
1(c)	Comparative Projected Figures for Gurgaon Water	27
1(d)	Recommended and Actual Groundwater Utilisation in 2009	29
2(a)	NCR Constituent Areas	36
2(b)	Population Growth Rate in NCR, 1981-2011	40
2(c)	Urban-Rural Composition of Population in NCR, 1981-2011	40
2(d)	Trends in Urbanisation in NCT-D, 1951-2011	45
2(e)	Growth Rate of Urban Population in Gurgaon, 1971-81 to 2011-21	47
3(a)	Media Content Analysis of Residential Water	63
3(b)	Perceptions Explicit from the News Reports	64
3(c)	Quotes used in the News Reports	66
4(a)	Area-wise Distribution of Total Samples	79
4(b)	Monthly Income of the Sampled HHs	79
4(c)	Community-wise Sources of Domestic Water	87
4(d)	Domestic Water Source	88
4(e)	Average Monthly Water Bill of HUDA Water, Community-wise	89
4(f)	Average Monthly Expenditure of Communities on Other Water Sources	89
4(g)	Water Reliability Index of HUDA Water, Community-wise	91
<b>Graphs</b>		
2(A)	Level of Urbanisation in Gurgaon, 1971-2021	47
<b>Maps</b>		
1(i)	Location of Gurgaon District in NCR	15
1(ii)	Modern Gurgaon City	17
1(iii)	Drainage Pattern in and around Gurgaon	21
1(iv)	Drainage System within Gurgaon	22
1(v)	Rate of Falling Groundwater Table in Gurgaon	30
2(i)	Urbanisation – Its Impact on Natural Resources	39
2(ii)	Urban Footprint Density of Delhi-NCR	43
2(iv)	Water Resources of Delhi-NCR	49
4(i)	Areas Suffering Water Scarcity the Most	77

## **List of Abbreviations**

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A M C	Aurangabad Municipal Corporation
A C W U C L	Aurangabad City Water Utility Company Limited
B O D	Biological Oxygen Demand
B I S	Bureau of Indian Standards
B P O	Business Process Outsourcing
C A P	Central Arizona Project
C C S	Centre for Civil Society
C G W A	Central Ground Water Authority
C G W B	Central Ground Water Board
C N C R	Central National Capital Region
C P H E E O	Central Public Health and Environmental Engineering Organisation
C W C	Central Water Commission
C S L G	Centre for the Study of Law and Governance
C S E	Centre for Science and Environment
C O D	Chemical Oxygen Demand
C M O	Chief Minister's Office
C P R	Centre for Policy Research
D C B	Delhi Cantonment Board
D J B	Delhi <i>Jal</i> (Water) Board
D L F	Delhi Land and Finance
D M A	Delhi Metropolitan Area
D T C P	Department of Town and Country Planning
D U	Differential Urbanisation
D O	Dissolved Oxygen
D D M P	District Disaster Management Plan
G D P	Gross Domestic Product
G W P	Global Water Partnership
G W S	Gurgaon Water Supply
H H	Household
H S I I D C	Haryana State Industrial and Infrastructure Development Corporation
H T	Hindustan Times
H U D A	Haryana Urban Development Authority
I A R	India Assessment Report
I E G	Institute of Economic Growth
I G I (A)	Indira Gandhi International (Airport)
I I H S	Indian Institute for Human Settlements
I I R	India Infrastructure Report
I L O	International Labour Organisation
I T	Information Technology
I T E S	Information Technology Enabled Service
J A F R A	Joint Association of Federation of Residents' Welfare Associations

J J	Jhuggi Jhopri
J N U	Jawaharlal Nehru University
K P O	Knowledge Process Outsourcing
km	Kilometre
l p c d	litres per capita daily
L P G	Liberalisation, Privatisation and Globalisation
M C M	Million Cubic Metre
M C G	Municipal Corporation of Gurgaon
M G D	Million Gallons Daily
m	Metre
mg/l	Milligram per Litre
M L D	Million Litres Daily
M N W S	Malviya Nagar Water Services
M. Phil	Master of Philosophy
N C A E R	National Council of Applied Economic Research
N C R	National Capital Region
N C R P B	National Capital Region Planning Board
N C T-D	National Capital Territory Delhi
N E P	New Economic Policy
N G O	Non Governmental Organisation
N G T	National Green Tribunal
N H	National Highway
N O I D A	New Okhla Industrial Development Authority
N S S	National Sample Survey
N S S O	National Sample Survey Organisation
O E C D	Organisation of Economic Cooperation and Development
P R I	Panchayati Raj Institution
Pop <sup>n</sup> .	Population
P H E D	Public Health Engineering Department
P I L	Public Interest Litigation
P P P	Public Private Partnership
P R I	Panchayati Raj Institution
P U B	Public Utilities Board
R & D	Research and Development
R W A	Residents' Welfare Association
S T P	Sewage Treatment Plant
S E Z	Special Economic Zone
Sq. km.	Square Kilometre
T D S	Total Dissolved Solids
U A	Urban Agglomeration
U L B	Urban Local Body
U K	United Kingdom
U N	United Nations

U. P.	Uttar Pradesh
U S	United States
U S E P A	United States Environmental Protection Agency
W T P	Water Treatment Plant
W Y C	Western Yamuna Canal
W-t-P	Willingness to Pay
w. r. t.	with respect to
W F P	World Food Programme
W W F	World Water Forum
@	at the rate of
%	Percentage
₹	Indian National Rupee
μS/cm	micro-Seimens per centimetre
mg/l	milligrams per litre
approx.	approximately

### **Decoding units**

1 Kilolitre = 1 000 litres

1 UK Gallon  $\approx$  4.55 Litres or 1 US Gallon  $\approx$  3.78 Litres. In UK terms, suppose, 1 Tank has a capacity 5 000 Litres, then it means 900 Tanks of 5 000 Litres each = 1 MGD or 4 500 000 Litres = 1 MGD. In other words, 4.55 MLD = 1 MGD (*HT*, Gurgaon edition, 5.3.2014, p.12).

## *Abstract*

Gurgaon is one of the fastest growing mega cities of India under the wave of globalisation and private capital. With the unprecedented rate of urbanisation accompanied by massive population growth, it becomes no less than Herculean task for the State to provide safe and adequate water to the residents of Gurgaon. Unreliable, intermittent, and contaminated piped water supply by HUDA in most of the residential areas of Gurgaon has become a common phenomenon in recent times. Gurgaon has been a witness to poor infrastructure of civic amenities, especially the residential water supply by the State.

The present thesis shows that there are factors beyond water supply deficit by HUDA that culminates into the general residential water scarcity in Gurgaon. The thesis addresses these factors both theoretically and empirically. Theoretically, causes for the residential water scarcity are attributed to exogenous factors such as urbanisation and expansion of Delhi and Gurgaon, relative to water shortages with the growing demand of the increased population. Moreover, the thesis is partly based on secondary evidences and shows how governance of Gurgaon in totality leads to dearth of basic civic amenities.

Empirically, the primary survey of the selected residential areas of Gurgaon shows multi-faceted dimensions of urban water governance and related scarcity. The lack of governance on part of the State has been identified as the major endogenous reason for residential water scarcity in Gurgaon. Apart from these, the media content analysis shows the gravity of residential water deficiency from residents' perspectives.

At policy level, the thesis suggests a series of interventions by the State to mitigate residential water scarcity on multiple fronts. Broad policy interventions include the improvement in governance of residential water on both supply and demand side. On demand side, especially the coping costs of residents due to unreliability of HUDA water, indicate rationalising institutional water tariffs to create infrastructure for effective water governance in Gurgaon. Co-ordinated with supply and demand interventions, scrutinising the existing law and governance regarding judicious use of groundwater is paramount in Gurgaon for its sustainable growth. Eventually, the thesis strongly advocates that the State needs to acknowledge and correct its urban policy failures to prove Gurgaon a true global city.

## **Introduction**

### **I Background of the Study**

Water, a scarce resource, is pre-requisite for socio-economic prosperity of any society and the nation at large. Water has multiple uses and users. Though water is a replenishable (natural) resource, its availability is finite, and its characteristics concerning “form, volume, reliability and usability vary greatly across space reflecting differences in climate, geography, hydrology and geological conditions” (Vaidyanathan, 2006:132; emphasis added). As anthropologically viewed, water is a unique entity as it touches various cultural spheres of humankind. “As a resource central to life and livelihood, water has always been the locus of social action and social stability” (Baviskar, 2007:1).

“Provision, planning and management, and creating necessary infrastructure of basic civic amenities primarily rest with the State” (Bedi, 2014:3). It is generally maintained that “water, though a scarce resource, is a necessary good (if not economic good), in fact a basic human need, ideally should be provided by the State at a subsidised rate to the consumers” in order to attain maximum economic efficiency and social welfare in distribution (Roach et al. 2015:3; emphasis added).

“Improved water supply, erratic electricity, proper sanitation, solid waste disposal and sewerage system, along with public transport facilities to citizens are the basic civic amenities which make an urban space a liveable space” (Vaidyanathan, 2011:5; Saxena, 2013:97). In urban areas, water is primarily demanded and supplied for three basic end uses, namely, residential or domestic, commercial (including construction) and industrial. “Clean, adequate and reliable water supply to residents is an essential component of the basic civic infrastructure of urban settlement” (Economic Survey of Delhi, 2012-2013:178).

“There are acute shortages of basic civic amenities in Gurgaon, despite been categorised as a world class city” (CSE Report, 2011:117-18; 2012:25). “Water is Gurgaon’s most pressing problem which needs immediate attention by the State” (Rich, 2014 in Deamer, 2014:180). In present study, Gurgaon as a sample district in the state of Haryana has been chosen for the case study because of the “paradoxes of development emerging in its growth from a small sleepy village to a global city in a

small period of ten years” (Singh, 2006:661). “One such developmental paradox is the growing water insecurity among the residents of Gurgaon” (Singh, 2006:661).

Evident from various secondary sources, the preliminary impression with the researcher is that the residential water<sup>1</sup> governance in Gurgaon revolves around the growing notion of the ‘passivity of the State’ in water delivery. In other words, it appears to be more of ‘governance invisibility’ in providing domestic water. Consequent to this fact is the evidences of growing residential water shortages in Gurgaon.

These propositions, therefore, stimulates the researcher to study the general residential water scarcity in Gurgaon from various perspectives and dimensions. In a broader sense, the thesis studies the causes of the widespread residential water scarcity in Gurgaon.

The phrase ‘governing without the State’ in water delivery to the residents of Gurgaon is not a critique of the State *per se*. It is rather an endeavour to understand the governance discourse of residential water delivery in Gurgaon. The thesis, studies the reasons for the lack of governance in Gurgaon, leading to the emerging instances of residential water shortages. The study, thus, looks into this issue of water crisis vis-à-vis governance crisis, both theoretically and empirically.

## **II Research Problem Background**

Following the facts and figures in the various secondary sources (discussed in subsequent analyses), one of the problem seems to be the under-provisioning of residential water by the State in Gurgaon due to growing urbanisation and increasing expansion. Parallely, on the other hand, the locally available groundwater has been used at an alarming rate by multiple users in Gurgaon (CSE Report, 2011:118). The research problem, therefore, is to understand the reasons that account for such scenario.

The under-provisioning of essential civic amenity such as domestic water to residents have interconnectedness with the governance apparatus of water service delivery. Therefore, a major research problem in hand is to explore the reasons for the

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<sup>1</sup> By the term ‘residential water/domestic water’, the researcher refers to potable water which is primarily demanded by residents for drinking, cooking and personal hygiene, and is supplied by the State.

lack of responsibility on the part of public water authority of Gurgaon in water delivery, and which eventually leads to lack of water to residents.

In situations when there is inadequate piped water supply by the formal agencies, the problem that explicitly reaches out to the researcher is the institutional incapacity of the State, which then voluntarily gives incentives, and in a way, passive authority to the informal suppliers. The development of private water markets is inevitable if the residents find unreliable water supply by the State agencies. This practice would gradually become a pervasive trend as the residents have to depend inadvertently upon the informal or the privately managed water supplies. This situation typically contests the States' role in the provision of residential water. In other words, the research problem is the problem of understanding the intention of the State in residential water supply.

In situations when there is deficit in water supply by the State, it becomes pertinent to execute an empirical study of water management methods of households in residential areas of Gurgaon. Therefore, one of the research problems in hand is to understand the determinants of residential water demand of the residents of Gurgaon, thus, knowing the households' coping strategies and responses on the subject under study.

### **III Research Objectives**

This thesis aims at exploring causes of the lack of residential water vis-à-vis lack of governance in Gurgaon. Thus, the major research objectives of the current study are the following.

- (i) To understand the general residential water scarcity of Gurgaon from various perspectives and dimensions.
- (ii) To study the problem of water scarcity in Gurgaon as a part of the problem of urbanisation and expansion in NCT-D and Gurgaon.
- (iii) To study the governance structure of Gurgaon in relation to the provision of civic amenities including residential water.
- (iv) To study the various coping strategies of the residents of Gurgaon in case of official water deficit from the State.



- (v) To explore feasible and pragmatic solutions to the residential water problems in Gurgaon.

#### **IV Research Questions**

The current study broadly investigates the following identified research questions.

- (i) How the residential water shortages in Gurgaon are linked to urbanisation in NCT-D and Gurgaon?
- (ii) How the linkages between the governance structure of Gurgaon and the State's under-provisioning of water to residents can be explained?
- (iii) Can there be a methodology to understand the residents' attitudes and perceptions regarding the 'passivity/invisibility of the State' in residential water governance in Gurgaon?
- (iv) What policy arguments can be built up to mitigate water insecurity of residents in Gurgaon?

#### **V Approach of the Study: The Research Methodology**

There is no substantive primary information regarding household's attitudes, perceptions and responses towards the deficit water supply *via* State agencies in Gurgaon. Till the commencement of the present study, no primary empirical work was found by the researcher on the Gurgaon's residents demand for water and related issues. It is evident from the secondary sources that no comprehensive empirical work is available to assess the ground reality of residential water supply management in Gurgaon.

It has been found that most literature on water issues in Gurgaon are based on rhetorical or prescriptive arguments, which often lacks clarity and coherence on the depth of the issue of residential water governance and the implications arising thereof. It, therefore, requires an empirical investigation into the ground reality of the problem of water insecurity from residents' perspective in Gurgaon. The present study, therefore, studies residential water governance in Gurgaon, employing the following methodology.

- (i) Theoretical survey of secondary sources with an objective to understand the reasons for the unprecedented growth and expansion of Gurgaon, consequent urban

sprawl in NCT-D and emerging water scarcity in Gurgaon. The analysis shall prove to be helpful in comprehending the drivers of the model of success of Gurgaon and its linkages to water scarcity.

(ii) As secondary sources indicate, there are instances of chronic problem of frequent water shortages in residential areas of Gurgaon. The present work looks into the governance structure of the State in water delivery to residents of Gurgaon, in line with the transformation of Gurgaon. This exercise would then lead one to understand the reasons for the lack of responsibility on the part of State in water delivery. This is partly accomplished through the technique of media content analysis using data collected from various newspaper reports.

(iii) Collection of purposive<sup>2</sup> (non-randomised) household level data, that is, the primary field survey through intended structured questionnaire. One part of the present study looks at, precisely and specifically, residents' attitudes, perceptions and responses towards HUDA's piped water supply deficit in the selected residential areas of Gurgaon. This would give an impression of the various household coping strategies being employed to procure domestic water needs by the households.

Additionally, the attempt is to construct a 'water reliability index' to give substance to further discussion on residential water scarcity in Gurgaon. The 'water reliability index' constructed using the data from the primary survey will be useful in assessing the institutional loopholes from the residents' perspective.

(iv) Secondary sources such as the Census Data Reports, NSSO Data, and published Reports from CGWA, CGWB, CWC and NGOs on the status of tapwater/groundwater in Gurgaon, are used as supplementary to the analysis.

## **VI Chapter Scheme and Organisation of the Thesis**

The present thesis, broadly, is an endeavour to study the State's capacity in water supply to the residents of Gurgaon in light of the HUDA model of economic development and expansion of Gurgaon. Accordingly, and as said before, the thesis studies the 'invisibility of the State' in general residential water supply in Gurgaon, from various perspectives and dimensions. The entire thesis is, thus, broadly structured into the following chapters.

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<sup>2</sup> Reasons for choosing purposive sampling have been explained in chapter 4.

**Chapter 1** *Issues in the Governance of Urban Residential Water: Setting the Research Framework for the Study of Gurgaon.* This chapter will be an elementary exercise to understand and bring forth the critical issues in the governance of residential water in contemporary times, emphasising the case of Gurgaon. This chapter will provide the various perspectives and dimensions of water shortages in residential areas of Gurgaon.

**Chapter 2** *Understanding Gurgaon as a Special Setting in NCR: Sources of Water Scarcity.* This chapter will look at the drivers of Gurgaon's development and its unprecedented expansion. The objective of this chapter is to understand the sources of water scarcity consequent to unprecedented urban expansion of NCT-D and Gurgaon.

**Chapter 3** *Governance Linkages to the Residential Water Scarcity in Gurgaon: A Media Content Analysis.* One part of this chapter will be a critical evaluation of the governance structure of Gurgaon, taking evidences from the literature, and how residential water scarcity can be linked to it. The other part of this chapter intends to study the lack of any agency taking on responsibility for the lack/problems of urban infrastructure found in Gurgaon through the technique of media content analysis.

**Chapter 4** *Determinants of Water Demand of Residents of Gurgaon: A Comparative Case Study with Delhi.* This will be an empirical chapter devoted to understand the determinants of water demand, water usage and pattern and so on, of the residents of Gurgaon in a case-study fashion. Another part of this chapter will look at the various strategies residents are in practice to procure domestic water in Gurgaon in light of scarcity, and what would be the implications for such arrangements.

Additionally, the chapter, based on the primary survey results, will try to compare the governance structure of residential water of Gurgaon with that of Delhi (the author's own work in the form of M. Phil Dissertation, now published).

**Chapter 5** *Lessons from Gurgaon and The Way Forward in Residential Water Governance.* This chapter will first summarise the core findings of the study which accounts for the general water scarcity in residential areas of Gurgaon. Also, the chapter looks at the lessons that can be learnt from the study of Gurgaon, and therefore, apart from conclusions, the researcher will try to provide pragmatic policy arguments for effective and sustainable residential water governance in Gurgaon.

## **Chapter 1**

### **Issues in the Governance of Urban Residential Water: Setting the Research Framework for the Study of Gurgaon**

#### ***Outline of the Chapter***

*This chapter gives an elementary exposition to various issues surrounding the urban residential water governance in contemporary cities in general and Gurgaon in particular. In a sense, it is a prelude to the thesis. It tries to highlight the main pillars on which the thesis work has been built upon. It brings all the relevant information of the case-study of residential water in relation to Gurgaon, and eventually tries to bring forth a roadmap for the subsequent analyses. In other words, the chapter is a preliminary treatment of the major ingredients of the subject and the research area under the current study.*

#### **1.1 The State Mechanism of Urban Water Supply**

Traditionally, in urban India, the State public utilities/agencies have been assigned the responsibility of delivering domestic water, qualitatively fit, and quantitatively desirable to the residents. In common parlance, public water supply through the media of State institutions (such as Municipal Corporations or the State Water Boards) of water governance is a ‘State’ subject, constitutionally speaking, in India. “Water is placed in ‘state’ list in the Schedule VII of the Constitution of India; thereby giving each State government the prerogative to establish its own system of water supply” (Vora et al. 2013:149).

More precisely, water supply for various purposes is a ‘State’ responsibility under the Constitution of India, and following the 73<sup>rd</sup> and 74<sup>th</sup> Constitutional Amendment Acts, 1992, the State may give the responsibility and powers to the PRIs and the ULBs. At present, the State governments generally plan, design and execute (and often continue to operate) through their PHEDs or as in the case of some states – the Panchayati Raj Engineering Departments or the Rural Development Engineering Departments, and Water Boards (IAR, 2002:23). The CPHEEO, at the central level, acts as an advisory to the concerned State government agencies and ULBs in implementation, operation and maintenance of urban water supply utility, sanitation and solid waste management projects and helps to adopt latest technologies in these

sub-sectors.<sup>3</sup> The institutionalised water demand prescribed norms for domestic consumption in Indian cities are as follows: (a) NCT-D is @ 225 lpcd, (b) Towns having population  $\geq$  1 Lakh is @ 200 lpcd, and (c) Towns having population  $<$  1 Lakh is @ 135 lpcd respectively (Koundanya and Gupta, 2011:220).

## **1.2 Contemporary Urban Water Problems: Challenges before the State**

Urban areas in contemporary times are in the midst of the socio and economic transformations. The IAR (2002:16) states that, “in the era of economic reforms in the package of LPG, cities and towns are fast emerging as centres of economic growth.” It has become a common experience that the anticipation of higher and higher economic growth in urban areas has been materialising at the expense of local groundwater depletion, contamination of precious natural resource like drinking water, widespread sewage problem, water logging, and increasing salinity levels in consumable water, affecting the population inhabiting large urban areas in different ways.

Specifically, “authorities in developing countries face ever increasing challenges in improving access to potable water in today’s era of globalisation” (Rudra, 2011:772). McKenzie et al. (2009) opine that “a large number of households in cities in developing world do not have access to one of the most basic of human needs – a safe and reliable supply of drinking water.” McKenzie et al. (2009) however, maintain that “State’s intermittent water supply, with predominantly low tap water pressure, and unpredictable service impose additional coping costs for the unreliability on households.”

Public water utilities or agencies in developing countries are routinely criticised for failing to provide satisfactory water service delivery. “Public water utility – a natural monopoly (often large and inefficient), struggle as institution to remedy failed State-led planning models” (Connors, 2005:201). Quite often the civic authorities find it increasingly difficult to manage water supply distribution on account of resource constraints, both in terms of water as a scarce resource on one hand, and financial constraint in the operation and maintenance of the water utility in question on the other hand.

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<sup>3</sup> <http://www.cpheeo.nic.in> accessed on 9.8.2014.

These inherent bottlenecks in the operation and management of water utility can be labelled as the fundamental as well as universal reasons for inefficiency in water service delivery in urban areas. *It is therefore, a general interest in academic research in areas of residential water governance, to look at the impact of inefficient State's water utility in relation to the alternative strategies of procuring domestic water by the households.*

Generally, the critical resource constraint becomes a barrier before the State authorities in its effort to extend water provision services, and that too of acceptable quality to the vast majority of its citizens. Schuebeler (1995), World Bank (1999) in Estache and Kouassi (2002:2) suggest that “the inefficiency of water utilities in their operation is often identified as the major factor for the slow progress, and the many recurrent setbacks in the process of improving access to water and water distribution.” The potential efficiency of public water sector in supplying quality water to residents, therefore, is significantly portrayed as the major challenge in terms of its governance.

In addition, changes in the demographic structures and transitions of cities due to rapid urbanisation, massive rural to urban migration, and globalisation in recent years have made the prediction of the future of water a hazardous business. Prominent among the determinants affecting the demographic set-up of a place are the population outgrowth and the urbanisation process, which in turn, greatly demands new, improved and superior infrastructure for the effective delivery of social goods, such as clean household water.

“The population-water imbalance, widening over the years, is turning into a full-blown water crisis” (Reddy, 2009:17). “It is no wonder then that water conflicts across competing uses and users of water are growing by the day” (Joy et al. 2008 in Shah, 2013:40). Equally important is the fact that “the quality of both surface and groundwater is declining rapidly” aggravating further water crisis in cities (Ballabh, 2008:3; emphasis added). Given the fact that water is a finite resource with multiple uses and users, and with competition among different users intensifying, “the task of balancing different claims and ensuring its efficient, equitable, and sustainable use has become a major problem of our times” (Vaidyanathan, 2006:132).

Further, given the level and the rate of urbanisation taking place in the cities in present times, it has been advocated that, “without dramatic technological

innovations, institutional change, and substantial new investment in water sector, cities today are projected to face an even more sizeable ‘water gap’ than that of today” (Conca, 2006:1).

India’s finite and fragile water resources are stressed and fast depleting, while sectoral demands (domestic, industrial, commercial, construction and others) are growing rapidly in line with ‘urbanisation, population increase, rising incomes and industrial growth’ (IAR, 2002:15; emphasis added). The general situation of water availability for the domestic purposes has become quite precarious in recent years, especially in the coming up of the new cities and mega cities in India (IAR, 2002:15).

“Water security is indispensable for addressing inter-regional and intra-regional as well as inter-household inequalities in growth and development and sustaining the ecological balance” (Reddy, 2009:239). The ‘water security’ in the urban areas has gradually been converted into a remote dream for the majority of the human population. Water security means that “communities have reliable and adequate access to water to meet their different needs, present as well as in future, are able to take advantage of the different opportunities that water resources present, are protected from water related hazards and have fair recourse where conflicts over water arise” (Soussan, 2002 *in* Reddy, 2009:18).

“Such water security ensures equity and sustainability” (Reddy, 2009:18). However, equity and sustainability in water distribution to the end-users of public water are increasingly becoming a far-fetched dream in the contemporary urban settings. The problem of water scarcity is aggravating across space and it is more so happening in the urban areas. The most common experience in the urban cities in India today is the limited water supply with “intermittent and unreliable water supply, poor water quality, unresponsiveness and helpless administration, a grossly inequitable distribution of available water over different areas and among consumers” (Iyer, 2007:22).

Especially, the inadequate coverage of the water beneficiaries under the public water system is a case in point. According to Iyer (2007:22), “due to inadequate coverage of the water consumers through the institutionalised piped network the urban citizens are often forced to buy water at much higher rates from the private sources.” This phenomenon is not only confined to the rich, even the poorer sections

of society are accustomed to the practice of buying expensive water from the non-State agencies.

The flourishing of the non-State or the private/informal domestic water suppliers in terms of providing domestic water to residents has gradually becoming a pervasive trend in the contemporary urban scenario. The new urban set-up is increasingly allowing the co-existence of both the formal and the informal water supplies to the consumer end. The situation of informal water trade that is frequently observed in urban areas requires a holistic approach towards scrutinising the State policies and planning regarding public water supply.

### **1.3 Water Crisis or Water Governance Crisis**

“The world is facing a serious and worsening global water crisis, and so is India” (Vaidyanathan, 2013: ix; Iyer, 2003:2). The crisis in water leads to the genesis of the governance of water. “Water governance means the combination of political, social, economic and administrative systems targeted at developing and managing water resources, and the delivery of water services, at different levels of society” (GWP, 2002 *in* Rogers and Hall, 2003:7).

“The understanding of governance of water begins with defining the crisis and dilemma of water resources development” (Iyer, 2003 *in* Ballabh, 2008:8). At the 2000 WWF in The Hague, the GWP stated that “the water crisis is often a crisis of governance, and making water governance effective as one of the highest priorities for action” (Rogers and Hall, 2003:15).

According to Ballabh (2008:45), “water scarcity, has been traditionally understood as being primarily a natural disaster caused by lower than expected precipitation.” “It is God given – as is argued – and, thus, beyond our control” (Ballabh, 2008:45). “This greatly puts physical limits to the quantum of water available for tapping” (Ballabh, 2008:45). It cannot be however denied that water scarcity is more generally created by the contribution of human induced factors – factors that interfere with nature or ecology and mismanagement of available water for consumption.

“It is often maintained that looming water scarcity in the face of urbanisation and rapidly industrialising economy has come up at a time when the potential sources



of augmenting supply is limited, water tables are fast falling, and water quality issues have increasingly come to the fore” (Shah, 2013:40). “A general perception of geographers and of urban planners is that agencies in urban areas would not be able to expand supply to meet the growing demand because of inherent poor governance structure or inadequate co-ordination among relevant agencies” (Kumara, 2013:203). As a matter of fact “as cities grow and thrive without adequate water supply, these gradually become reliant on groundwater, or face frequent water shortages, stifling further growth” (Kumara, 2013:203).

“Groundwater systems have become the ‘lender of last resort’ and depletion of groundwater stocks consequently becomes the first indicator of water scarcity” (Shah and Indu, 2004 *in* Shankar et al. 2011:37) in cities today. “Beyond a certain level of urban growth, a lack of water resources could slow down development and constrain further urbanisation, a carrying-capacity based threshold which some call a water resources constraint” (Srinivasan et al. 2012:230).

The water scarcity problem in urban areas, as said earlier, is often traced in the inherent institutional set-up, that is observed in the form of unsatisfactory water delivery mechanism in the form of poor and dilapidated infrastructure and technical and managerial bottlenecks in water distribution. The mismanagement of water resources certainly causes water scarcity on the part of the ‘State’ in terms of its delivery system. “The growing scarcity and ineffective institutional arrangement in order to capture, allocate/distribute water compounds the water crisis” (Ballabh, 2008:10). Water crisis, therefore, is the maximum extent at which the water scarcity can occur.

“There are several aspects or dimensions to understand the concept of water crisis” (Iyer, 2007:41). To prove his point, Iyer (2007:41) cites a set of rather unfortunate developments (in terms of State policy and planning) in the water sector that culminates into the full-fledged water crisis situation. These are: (a) “grossly inequitable distribution of the available water” (b) “the distressed state of our rivers and groundwater aquifers” (c) “the decline of traditional water management and conservation systems” (d) “the disappearance of once-numerous water bodies” (e) “the damage to ecological systems from the interventions in the form of water resource development – it happens not merely from the wrong notion of development

and ecological blindness, but also from centralised, techno-centric, non-democratic, non-consultative decision-making” (f) “decisions inflicted in the form of inequity and injustice in the provision of water to poor, disadvantaged communities, women, tribals and others”, and (g) “the uncontrollable, unmanageable generation of waste of all kinds, and the consequent reduction in the availability of water” (Iyer, 2007:41).

Strongly enough, from the reasons put forth by Ramaswamy R. Iyer, the causes of the water scarcity are apparently humanly constructed, and hence water crisis is not a ‘natural’ crisis. With the rapid urbanisation and massive migration of population to cities subordinated by the lack of proper city planning, there is the case of simultaneous enlargement of water demand and destroying supply sources.

The notion of ‘water crisis or crises’ could have different perceptions for institutions and individuals. For instance, for a public water utility, it could be the crisis of availability of water for the distribution. Iyer (2007:42) enlists multiple perceptions of the water crisis. According to Iyer (2007:42) “to a neo-liberal economist the crisis is one of the failures to recognise water as an ‘economic’ good and the absence of a clear delineation of property rights in water.” This leads economists to look at the water demand management policies including optimal pricing for the demanded water; with the rational expectation that consumers will adopt certain domestic methods for judicious use of public water. Iyer (2007:42-43) mentions a number of interpretation of water crisis.

Iyer refers to Vandana Shiva’s opinion on the issue of water crisis. According to Vandana Shiva (Iyer, 2007:42), “the central crisis is one of the loss of control over natural resources both by the civil society and the State to corporate interests, the conversion of a common pool resources and a basic need and right into commodity governed by market forces, and the intrusion of the profit motive into an area where it has no legitimacy.” She completely deplores the absence of “water democracy” (Iyer, 2007:42). To Sunita Narain (Iyer, 2007:42), “it is the crisis of the criminal waste of a precious resource, and an indefensible subsidisation of the rich.” “There is also a crisis of dying wisdom, that is, the decline of traditional ways of managing natural resources” says Sunita Narain (Iyer, 2007:42).

“The popular perception of a citizen is that urban areas are fairly better governed with regard to water supply, sanitation and other public amenities”

(Kumara, 2013:203). However, the perception of well serviced cities hides the harsh reality of gross inequalities. According to the NSS Report 2002, of the Government of India on 'Housing Conditions in India', 22 cities with more than a million people, had slum population ranging from 10 to 54 per cent of their total population, lacking basic amenities including water. "There are large gaps among demand and supply of urban services such as water, sanitation, sewage disposal, solid waste management, public transport, and similar other civic provisions by the State" (Kumara, 2013:203).

It can be said at this point, that supply of water to residents often fails to meet the demand, therefore producing a situation of water scarcity that can be localised or is more geographically widespread. However, "without denying the important climatic, geological and hydrological factors, the primary cause determining scarcity is the way water is actually managed" (Rees, 1982 *in* Ioris, 2011:613). Yet in other words, "water scarcity is a relational condition that arises out of socio-natural interactions in time, space and scale" (Ioris, 2011:613).

It is rhetorically valid to argue that water scarcity is in the first place a supply problem, which can be diagnosed and remedied by "improving governance structure through reforming the managerial institutions in the water sector – like the government departments, instituting water user organisations, urban water utilities, and so on" (Ballabh, 2008:4). The observed pattern of frequent water shortages in cities is however, a function of the larger set of water scarcity.

Therefore, "water scarcity is synergistically connected with multiple other material and socio-political deficiencies which concurrently produce the total experience of scarcity" (Ioris, 2011:613). *The persistence of water scarcity in any area-specific location provides an important entry point to look into the failures of governance policies and socio-economic developmental paradigm in practice.*

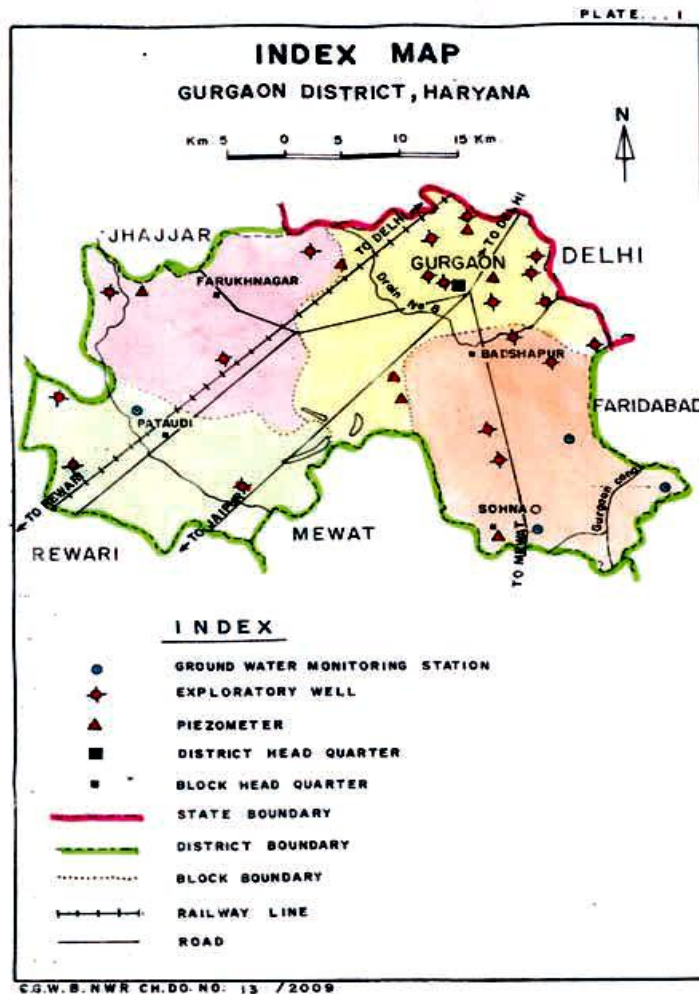
#### **1.4 Contextualising Gurgaon in Residential Water Governance: Rationale for the Study**

Gurgaon district with headquarter at Gurgaon, falls in the southernmost region in the Indian State of Haryana. Geographically, "it lies between 27° 39' and 28° 32' 5" N latitude, and 76° 39' 30" and 77° 20' 45" E longitude" (Kait, 2013:192). "Haryana, as a sub-regional entity of the broader NCR, is primarily a water deficient State whose water requirement is dependent to a large extent on its scare surface water sources and

external water sources outside the state” (Sub-Regional Plan for Haryana NCR, 2021). Additionally, the Sub-Regional Plan for Haryana NCR, 2021 reports that Haryana State is partly dependent on its groundwater source for the state’s water demand for all purposes; agriculture, industrial, commercial or domestic needs.

At present, “Gurgaon comprises of three sub-divisions namely Gurgaon (North), Gurgaon (South), and Pataudi, and five *tehsils*: Gurgaon, Sohna, Patuadi, Farukh Nagar, and Manesar” (Kait, 2013:192). Apart from these administrative divisions, Gurgaon district is categorised into four major blocks: Gurgaon (36 villages/34 *panchayats*), Sohna (72 villages/57 *panchayats*), Farukh Nagar (48 villages/48 *panchayats*) and Patuadi (72 villages/71 *panchayats*) (DDMP Report, Gurgaon, 2015:1). The location map of Gurgaon district with adjoining areas in NCR is shown in map 1(i).

Map 1(i): Location of Gurgaon District in NCR



(Source: Narain, 2011:3)

Gurgaon is one of the nine districts of Haryana included in the NCR. The location of Gurgaon district in NCR is considered economically and strategically significant given the fact that it adjoins Delhi, the national capital and the mega city of India. Being proximity to IGI (A), New Delhi, added with a predominantly better rail and Delhi metro rail connectivity with adjoining areas, Gurgaon has witnessed a rapid industrial as well as commercial development. As a result of the NEP of the Government of India initiated in 1991-92, Gurgaon has increasingly become the IT and ITES hub, and centre of a plethora of various BPO and KPO companies (Prakash et al. *in* IIR, 2011:164).

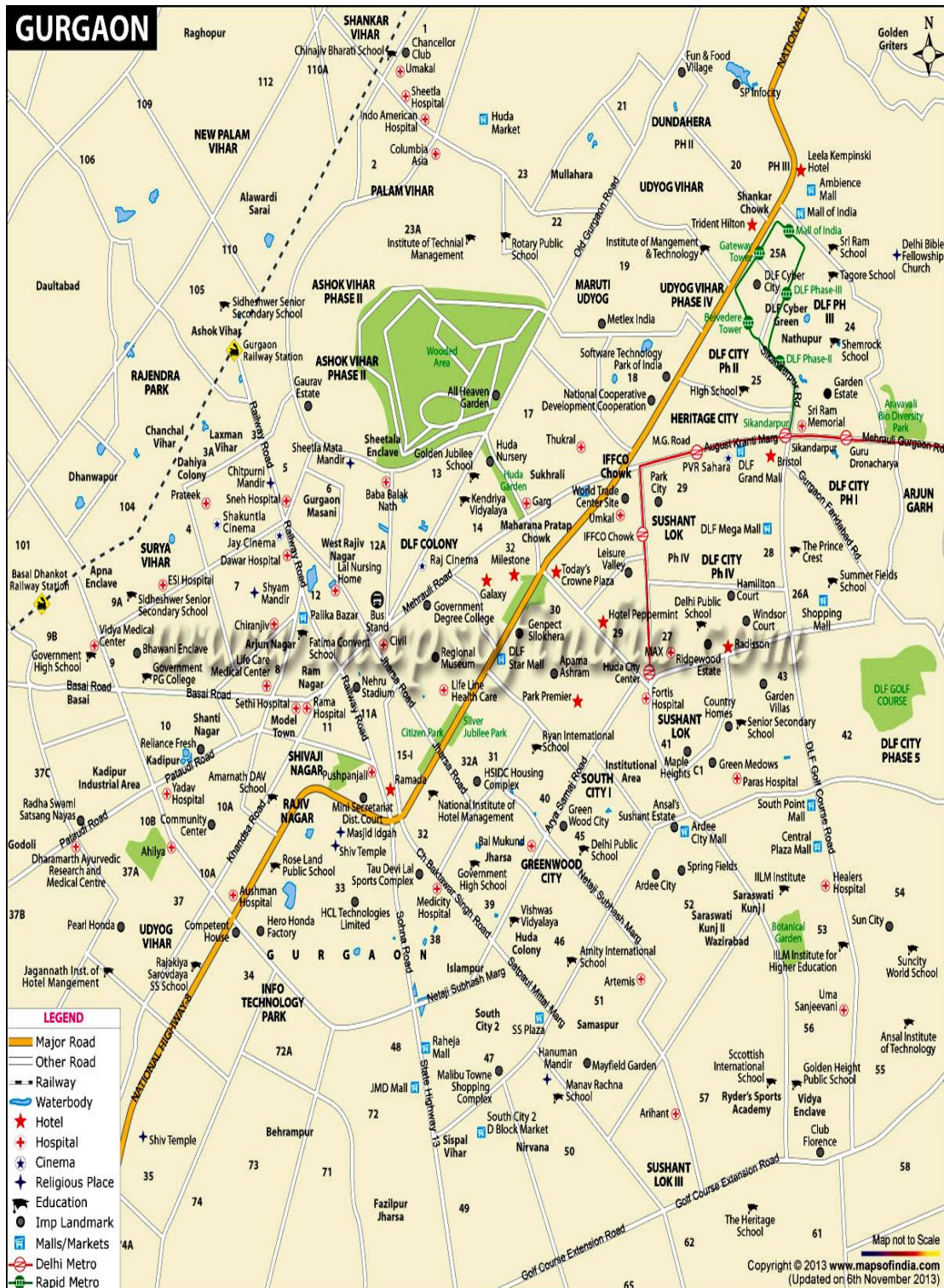
Gurgaon has been on a faster track of economic development and has consequently emerged as a leading destination of industrial and financial activities over more than the last two decades. Gurgaon is the headquarters of the two biggest automobile manufacturers in India – Hero Honda and *Maruti Udyog*. Gurgaon city symbolises Haryana's increasing prosperity in contemporary times, and therefore, Gurgaon is synonymous with the notion of sustained economic growth and increased productivity. This is obvious from the fact that “the per capita income of the residents of Gurgaon is the third highest in India, after Chandigarh and Mumbai” (Bhel, 2009 *in* Singh, 2013:12).

In present times Gurgaon has witnessed to an unparalleled expansion within itself and towards its peripheries. This has become possible because, Gurgaon has become one of India's biggest financial centres on the back of easier land acquisition and with the private initiatives undertaken mainly by the DLF, one of the largest commercial real estate developers in India, “making all attempt to make its residential and commercial complexes as independent as possible” (Singh, 2013:2).

The DLF is fundamentally engaged in developing private residential apartments, shopping malls, commercial establishments, office buildings and other centres of public recreation in Gurgaon. Over the years, apart from DLF, other private developers like the Ansal Housing, The Eros Group, The Unitech Group and many others joined in the race of privately nurturing Gurgaon city. Therefore, there has been an advent of a series of private players/developers in the real estate sector leading to a boom in the construction sector business in Gurgaon. Today, Gurgaon is an “urban landscape of 43 malls, golf courses, a dozen five-star hotels, 30 of

Haryana’s 34 ITs and bio-tech SEZs, and over a hundred Fortune 500 companies, apart from a vast majority of residents,” (*Gurgaon Calling*, 2011; Ahuja, 2011 in Cowan, 2015:64). Modern Gurgaon is shown in map 1(ii) below.

Map 1(ii) Modern Gurgaon City



(Courtesy: Google Maps, <https://www.google.co.in/maps/Gurgaon> accessed on 24.2.2014)

Undoubtedly, the private induced investment in creating world class infrastructure in Gurgaon is impressive, and therefore, Gurgaon is apparently recognised worldwide as the ‘Singapore of India’. Gurgaon model of development is exemplary in itself in bringing up a township where the State’s initiative of involving private sector in the process of urban development has been successful. The drivers of urban growth of Gurgaon could be safely attributed to a plethora of endogenous factors such as “the favourable tax policy by the Haryana government, improvement in the city’s infrastructure by the HUDA, and most importantly, the need to create a world class business centre close to IGI (A), New Delhi” (Prakash et al. *in* IIR, 2011:164).

The model of HUDA under which a number of integrated cities have been developed through PPP, “Gurgaon has emerged as the most successful of these, with the country’s largest private sector integrated township DLF City being established here” (Gupta, 2012:92; emphasis added). “Gurgaon, infact, is two cities living in a bigger ecosystem – the Old Gurgaon and the New Gurgaon areas” (Kait, 2013:192). “While the Old Gurgaon has poor infrastructure and is very congested, New Gurgaon is a complete contrast with skyscrapers and well planned development” (Kait, 2013:192). The present Gurgaon is more of a metropolitan city than a modern township, encompassing settlements around the original city, and expanding even further in neighbourhood.

Gurgaon, which is often portrayed as ‘globalised city’, and also referred to as the ‘millennium city’ or the ‘mall city’ or the ‘medicity’ or the ‘satellite city’ or the ‘cyber city’ of NCR of India, is grappling with acute water shortages subordinated with inadequacies of other civic amenities (CSE Report, 2011:117; Singh, 2006:644). The CSE Report, 2011 maintains that “the government authorities in Gurgaon itself have failed to keep pace with the growth led by the private sector and develop first class civic infrastructure.”

Therefore, when the question of provision of basic civic amenities like water and sanitation, sewage and solid waste disposal system, garbage dumping, public transportation, electricity, roads and so on, parallel to the rate of urbanisation in Gurgaon, it embraces one to look into the State urban planning and governance more closely. *The intricacies of the local circumstances of Gurgaon, serve as a compelling*

*case study for questioning the conceptual and empirical treatment of water scarcity more generally.*

Narain (2010:2) says that “due to massive increase in population along with rapid urbanisation in the Gurgaon region, there is considerable expansion of the city toward its boundaries leading to changes in the land use pattern.” Narain (2010:2) points out that “while studying water use and access in Gurgaon, one must be able to see how it has been impacted upon by the processes of urbanisation.” “Most of this expansion has taken place in areas which were earlier scrubland, pastures, water bodies, land susceptible to water-logging with a high water table, or agricultural land” (Prakash et al. 2011:167).

Prakash (2011) while contextualising Gurgaon in the study of water maintains that, “the expanding boundaries of a city like Gurgaon often grow on land where the natural water cycle occurred once, such as forests, meadows, or wetlands” (Prakash et al. 2011:168). “Such expansion of cities harm the recharging of the groundwater table, and often affect local water bodies” (Prakash et al. 2011:168), leading to future unsustainability of water as a resource.

Therefore, the carrying capacity of the cities in terms of resource sustainability is highly affected in the process of urbanisation and development. According to Mehta (2009:7) “a sustainable water system should maintain a level of service provision over the long term by adapting to and coping with dynamic interlocking processes like, increases in users and intensified urbanisation.” “Most of the time this pattern of urbanisation becomes inequitable, conflict-ridden, and unsustainable” (Prakash et al. 2011:171).

Commonly, “the State’s delivery of water has been complemented by the private water vendors and tanker-truck supplies over the years in Gurgaon” (CSE Report, 2011:118). Ballabh (2008:5) points out that “the development of water markets has a positive impact and water is made available to those who do not have the capacity to invest in deep tube wells” or, are unable to access public water. Further Ballabh (2008:5) maintains that, however, it (water markets) also has adverse consequences. “The discourse on development of water markets in the Indian context has largely ignored the impact of water markets on the sustainability of the resource base” (Ballabh, 2008:5).



In other words, “this has taken the form of ‘contracting out’ of service delivery to the private and voluntary water sectors, and could be a case of outright privatisation” (Batley and Larbi, 2004:49). Batley and Larbi (2004:15) further say that in the “contemporary times, the role of the State in context of public services has been redefined.” To put in their words, the underlying shift has been described as one of the government’s move from ‘a concern to do, towards a concern to ensure that things are done’ by collaboration with other non-State actors.

Following this principle, responsibility for arranging a service to be delivered is separated from the actual production of the service. According to this argument, governments could, in principle, “usually achieve their objectives without getting involved in the direct production or delivery of service” (Batley and Larbi, 2004:49). These issues emanate directly from a situation where State’s role in providing basic civic amenities like household water could be diminishing, leading to alternative arrangement of water supply – that is, informalisation of domestic water.

*The rationale for the study of water in Gurgaon therefore rests upon the basic premise of how the residents of Gurgaon are coping up with domestic water needs given the inadequate provision of water by the State agencies and probably fulfilling this gap of demand-supply by other privately managed diverse sources.*

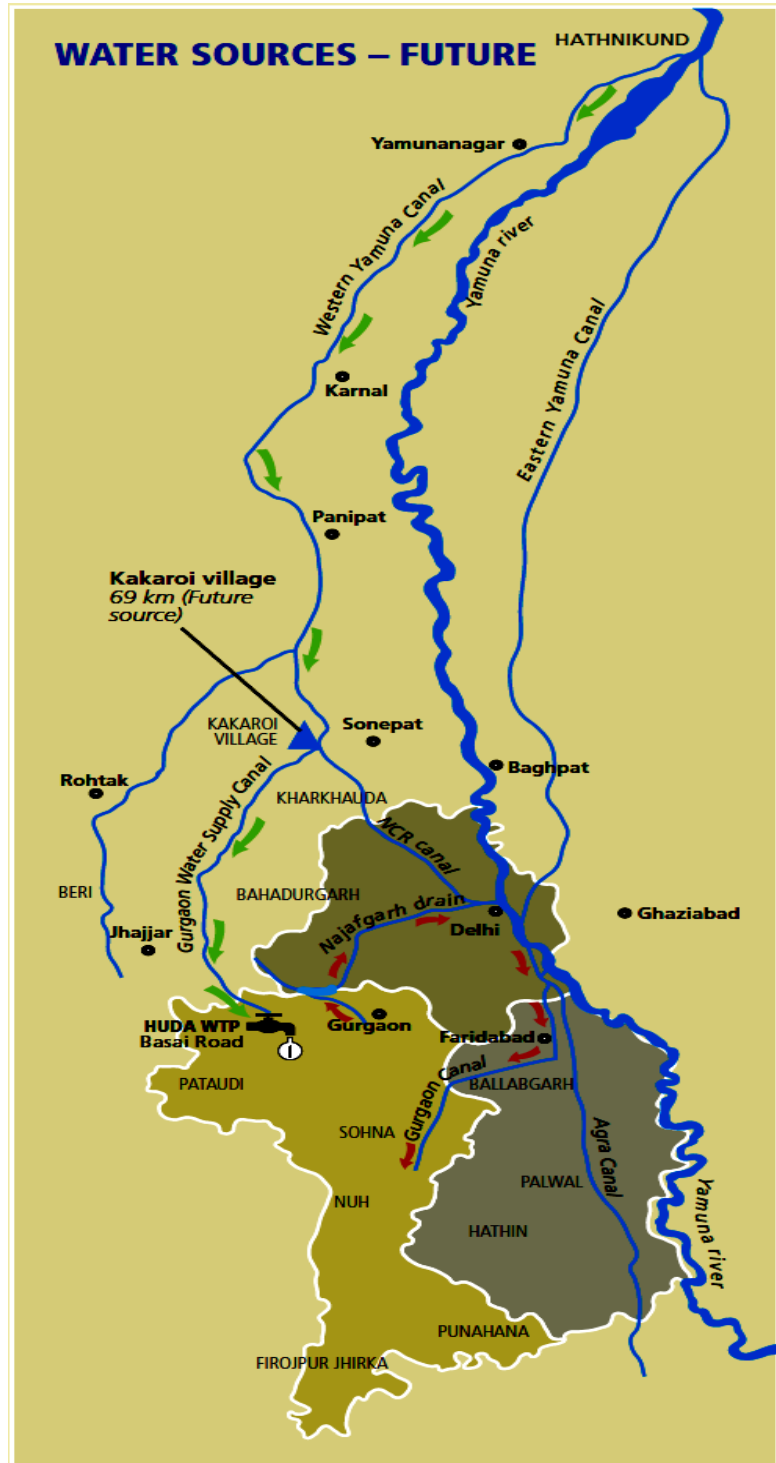
## **1.5 Institutional Mapping of Water Provision to Residents of Gurgaon**

The *topography* of the Gurgaon region is irregular and of diverse nature (DDMP Report, Gurgaon, 2013:3). The height above the mean sea level varies between 190 and 280 m. The district comprises of hills on the one hand and depressions on the other. Two ridges, namely, the *Firojpur Jhirka-Delhi* ridge forms the western boundary, and the Delhi ridge forms the eastern boundary of the Gurgaon. These ridges are the northern continuation of Aravalli hills (DDMP Report, Gurgaon, 2013:3).

The DDMP Report, 2013, on Gurgaon maintains that the drainage of the district is typically of the arid and semi-arid areas. Basically, it comprises of large depressions and streams. The drainage is peculiarly complex owing to most of the streams tending to converge towards inland depressions instead to flowing into the river Yamuna. The important depressions in the level of district in this region

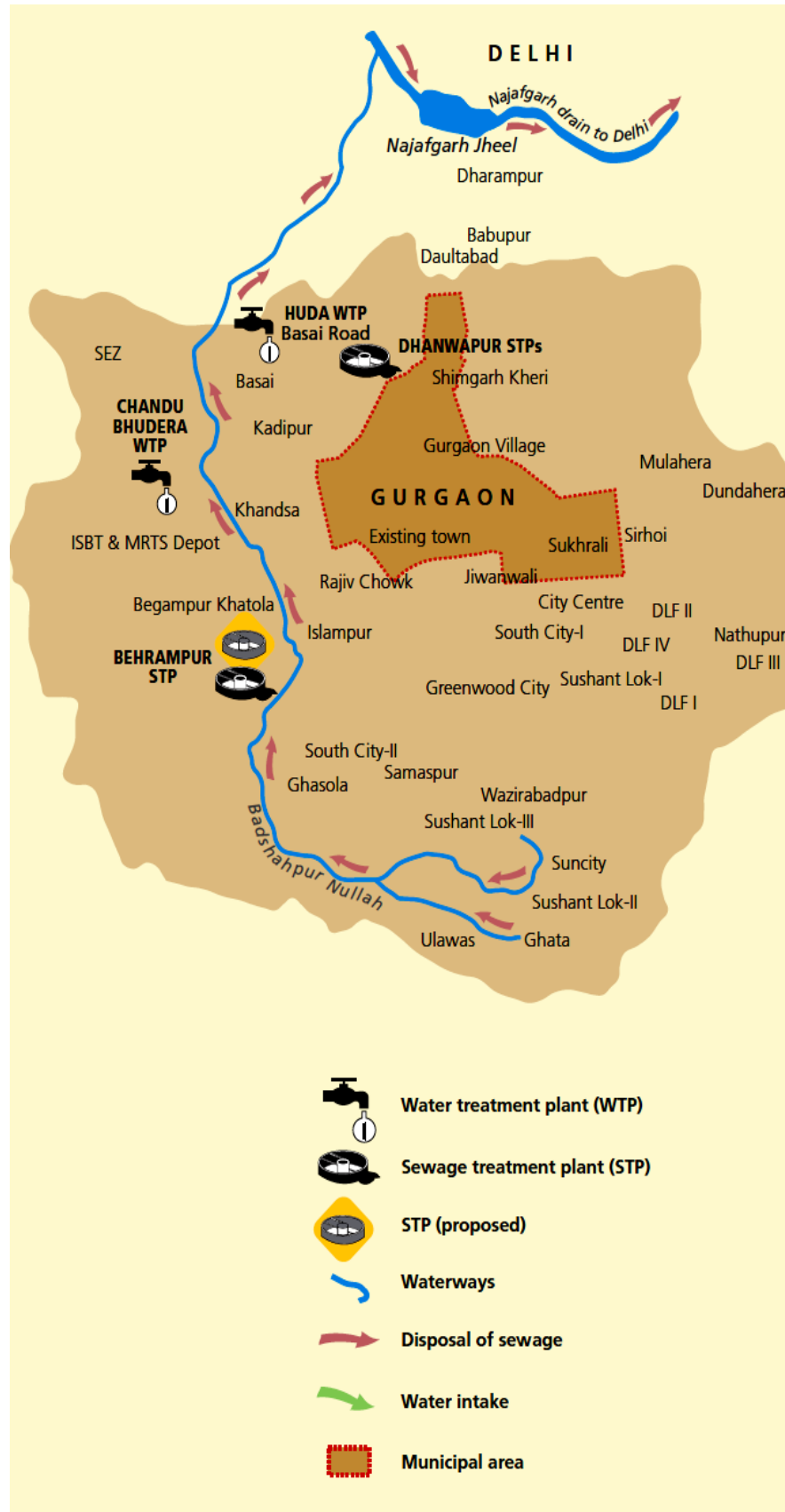
(Gurgaon) are *Khalipur, Chandaini, Sangel-Ujina, Kotla Dahar Jheels*, and the *Najafgarh Lake*. *Sahibi* and *Indrani* are two important seasonal streams of the district (DDMP Report, Gurgaon, 2013:3). The *drainage* pattern in and around, and within the Gurgaon district have been shown in maps 1(iii) and 1(iv) respectively.

**Map 1(iii): Drainage Pattern in and around Gurgaon**



(Courtesy: CSE-Anon Report, 2011)

Map 1(iv): Drainage System within Gurgaon



(Courtesy: CSE-Anon Report, 2011)

Gurgaon *sources of water* as shown in the maps 1 (iii) and 1 (iv) above, essentially comes from the Yamuna River Tajewala headworks near *Yamunanagar*. The water comes through the WYC near *Sonepat* and then through the 70 km GWS Canal from *Kakaroi* village to *Basai* village in Gurgaon (CSE Report, 2011: 118). *Basai* village has HUDA's WTPs. Apart from *Basai* WTPs; there exists an additional WTP in *Chandu Bhudera* village. The GWS Canal is designed to carry almost 245 MLD of water at the head at *Kakaroi* village. Around 50 percent of the transported water is lost in transit through evaporation and diversion to villages and a township *en route* (CSE Report, 2011: 118).

At this stage it becomes apparent to explore the *institutional* arrangements of residential water supply in Gurgaon. Originally, according to CSE Report (2011:117), the residents of Gurgaon receive water from two main agencies depending on the administrative divisions. These are: (i) The PHED, responsible for the old city area (municipal limits) water supply, and (ii) The HUDA takes care of water supply in the new city (HUDA sectors and other private colonies). These two agencies shared water supply to Gurgaon's residents in a symbiotic relationship. "HUDA is the sole authority for the raw water sourcing, treatment and distribution to the HUDA Sectors" (CSE Report, 2011:117). "HUDA gets its water directly from the State authority, and PHED used to get bulk water transfers from HUDA" (CSE Report, 2011:117).

HUDA has geographically divided the city into three sub-jurisdictions with respect to residential water supply. These are – (i) Phase 1 covers Ansal's *Palam Vihar* and the HUDA Sectors to the west, including Gurgaon town, (ii) Phase 2 covers the major colonies and HUDA Sectors in the east, and (iii) Phase 3 covers DLF IV and DLF V colonies, *Sushant Lok* colonies II and III, the South City II, and HUDA Sectors 45, 55, 56 and 57. According to the information received in 2011 from HUDA (CSE Report, 2011:118), water was being supplied to individual households through a 506 km piped network. About 0.6 to 0.7 million people availed this supply and around 95 percent of the connections were metered as claimed by HUDA (CSE Report, 2011:118). The PHED, while functioning, on the other hand, had divided its areas into 11 water supply zones (about 400 km of pipelines) (CSE Report, 2011:118). After the year 2000, HUDA developed some more sectors, from 57 to 115 (*HT*, Gurgaon edition, 5.3.2014, p.12).

“On 1 October, 2013, the MCG took over the water supply of Gurgaon from the PHED.” (Rajagopalan and Tabarrok, 2014:210). “The MCG will now be responsible for the water supply in the entire MCG area, excluding HUDA sectors, private builder areas/colonies, and the HSIIDC areas” (Rajagopalan and Tabarrok, 2014:210). Of late, the MCG was constituted in June 2008; the elections of the Municipal Corporation first took place in 2011, and therefore, people representatives were elected in May 2011<sup>4</sup>. “The MCG is divided into four Zones, namely, Zone 1, 2, 3, and 4 (known as West, North, East and South respectively) and 35 wards. “Apart from these zonal divisions, there are 28 villages under the jurisdiction of the MCG for infrastructural maintenance and development.”(Kait, 2013:192).

### **1.6 Gurgaon City’s Governance in Practice**

Thomas Cowan (2015:64) *cites* Searle (2010), “...rather than consisting of any public, unitary whole; today, Gurgaon is constitutive of a variety of fragmented and divided zones where residents live in deep yet distant co-dependence.” Further, Thomas Cowan (2015:64) says that “the city (Gurgaon) is divided between territorially distinct sovereigns; the private developers govern, with the assistance of the RWAs within the boundaries of their colonies predominately to the South-East of NH-8, the HUDA is responsible for their own colonies along with service infrastructure to the boundaries of the private colonies, industrial areas are the responsibility of the HSIIDC, while existing villages are largely governed by the MCG.” “The private developer sections of the city are also serviced by a network of premium infrastructure including private water supplies etc.”(Cowan, 2015:64).

Interestingly, the presence of too many civic agencies in Gurgaon is problem in itself rather than ‘problem-solving’ oriented institutions. Kumar (2014) reports that “multiplicity of (civic) authorities in Gurgaon’s urban areas like the MCG, the HUDA, the HSIIDC, and the DTCP – affiliated to HUDA, with overlapping jurisdiction, is more frequently used as a tool to evade responsibility and accountability, eventually creating a civic mess in the city” (*The Hindu* e-paper<sup>5</sup>, 24.11.2014). Eventually, “the multiple civic deficiencies plague Gurgaon, be it lack of water, decreasing water table, poor infrastructure maintenance and planning, poor

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<sup>4</sup> MCG: [www.mcg.gov.in](http://www.mcg.gov.in) accessed on 5.8.2014.

<sup>5</sup> <http://thehindu.com/gurgaon> accessed on 15.12.2014.

protection or conservation of natural resources” (CSE Report, 2011). *It can therefore be inferred here that the civic governance in Gurgaon has no clarity on its urban planning and policies, and looks totally directionless in the proper provision of civic amenities when there is large scale expansion of Gurgaon.*

### **1.7 Water Demand and Supply in Gurgaon: Some Arithmetic**

Specifically, the official figures put forth by the Gurgaon authorities during 2011-12 (CSE Report, 2011:117-118), which were also considered as the latest figures for the current study, are the following.<sup>6</sup>

- (i) Total estimated water demand as per the city agency = 184 MLD.
- (ii) Total water demand in Gurgaon as per the CPHEEO is @ 150 lpcd = 123 MLD.
- (iii) The official estimate of Gurgaon’s water demand per capita =  $1.5 \times$  CPHEEO norm of 150 lpcd, which is 225 lpcd.
- (iv) The per capita water demand as per the city agency is @ 225 lpcd (which is equal to the water demand norm for the NCT-D). The following table 1(a) gives an elaborated description of the water supply to the residents of Gurgaon.

**Table 1(a): Water Supply in Gurgaon, 2011-12**

<b>S No.</b>	<b>Sources and Supply of Water</b>	<b>Figures/Description</b>
1	Water Sources	River Yamuna (WYC), Groundwater
2	Water sourced from surface sources, WYC	94 %
3	Water sourced from groundwater	6 %
4	Total water supplied	107 MLD
5	Per capita water supply	130 lpcd
6	Leakage loss (standard)	15 %
7	Actual supply (after deducting leakage loss)	91 MLD
8	Per capita water supply (after deducting leakage loss)	111 lpcd
9	Population served by water supply system	64 %
10	Per capita availability in the served area	157 lpcd
<b>Demand-supply gap (after deducting leakage loss)</b>		<b>{(184 MLD – 107 MLD) + 15 % of 107 MLD} = 93.05 MLD</b>

(Source: CSE-Anon Report, 2011:117)

<sup>6</sup> No figures for the current official water supply in Gurgaon were found from any source.

**Observation on Table 1(a):** It is evident enough from the above aggregate data that there is a plausible mismatch between demand and supply of water in absolute terms in Gurgaon. It should also be noted here that the per capita availability reported in the served area turns out to be 157 lpcd; whereas the per capita supply is 130 lpcd only. Further, per capita supply (after deducting the unaccounted leakage loss) stands out to be only 111 lpcd. This figure of 111 lpcd is clearly lesser than the estimated per capita demand of 225 lpcd (almost 50 percent) by the Gurgaon’s city water agencies.

Moreover, the aggregate demand and supply gap of household water stands out to be 93.05 MLD, which is a huge figure to arrive at. Supply is not in conformity with the estimated demand. In terms of percentage, the demand-supply gap turns out to around 42 percent. Therefore, it implies that there is apparent problem of water deficit in Gurgaon. It also becomes important to note that the total population of Gurgaon served by the water system is 64 per cent only, which is contrary to the coverage of piped water network as claimed by HUDA. It becomes essential at this stage to look at the data pertaining to the treated (total) water production and supplied by various civic agencies in Gurgaon during 2011-12. This is illustrated in table 1(b).

**Table 1(b): Treated (Total) Water Production and Supplied in Gurgaon, 2011-12 (in MLD)**

<b>Water Sources and Installed Capacity</b>	<b>Treated Water Production</b>	<b>Water Supplied</b>
Surface Water (installed capacity 182)	HUDA 91	77
	PHED 28	22
	HSI IDC 1.5	1
	<b>Total 120.05</b>	<b>100</b>
Official Groundwater (installed capacity 9)	PHED 7	6
	HSI IDC 2	1
	<b>Total 9</b>	<b>7</b>
<b>Total installed capacity (191)</b>	<b>130</b>	<b>107</b>

(Source: Same as Table 1a)

**Observation on Table 1(b):** This table also signifies the fact that the total water supplied after leakage loss of 15 percent is mere 107 MLD which falls short of the estimated demand in Gurgaon. It does not show how much water is allocated to different sectoral demand. The CSE Report, 2011, maintains that HUDA has three WTPs at *Basai* village near *Sultanpur*, the first commissioned in 1995 with a capacity of 91 MLD, the second became operational in 2005 again with a capacity of 91 MLD,

the total capacity went upto 182 MLD, and a third plant with a capacity of 91 MLD followed which could augment the total supply of treated water upto 273 MLD.

The total carrying capacity of the GWS canal is 245 MLD as mentioned earlier. With that standard, and with the assumption that there are no water loss in transit, the water treatment capacity of these three plants exceed the total volume of raw water supplied to them for treatment, at least in principle (273 MLD >245 MLD). The data for the quantum of raw water that is supplied daily for treatment purpose are however not available, and the figures just mentioned are standard figures.

As mentioned above, and as a matter of fact, about 50 percent of raw water supply (through the GWS canal, carrying water from the WYC) to these treatment plants is lost while in transit from the main source. Added to this is the fact that there is another 15 percent leakage loss of the treated water through pipes during distribution. Another aspect of looking at this gap is to say that these WTPs could not be utilised in their maximum capacity. Hence, without much analytical wisdom Gurgaon water deficit is more of a supply deficit problem.

Apart from the above facts and figures, the projected aggregate future demand for household water in Gurgaon is also estimated w.r.t. the population growth of the city. A comparative analysis of the projected figures by Gurgaon authorities and the JAFRA Gurgaon, an umbrella organisation of Gurgaon citizens taking the year 2007 as the base till 2021, is depicted in table 1(c).

**Table 1(c): Comparative Projected Figures for Gurgaon Water**

Estimating Agency	Population (in Million)		Total Water Demand (in MLD)	
	2007	2021	2007	2021
Official Figures	0.9	3.7	162	666
JAFRA	1.8	6	324	1 080

(Source: CSE-Anon Report, 2011:118)

**Observation on Table 1(c):** There is a huge inconsistency in the projected figures for both population growth and total water demand. The kind of methodology being employed by respective agencies to arrive at these figures however is not clear to the researcher. Interestingly, the JAFRA claims that its surveys on water demand w.r.t. population growth indicate clearly that the estimates provided by the State agencies are faulty and tend to understate almost all figures (CSE Report, 2011:118).



Moreover, the Gurgaon residents also claim official figures are all wrong (CSE Report, 2011:118).

### **1.8 Groundwater: Alternate Source of Water in Gurgaon**

“In recent times, continuous pressure on available groundwater resources has increased the groundwater overdraft leading to acute water scarcity for people, especially the poor and marginalised in Gurgaon” (Prakash et al. 2011:170). “In Gurgaon, Delhi’s prosper neighbour, there is a huge groundwater crisis” (Vasudevan, 2013:119). “The deficit created by the State in water supply is fulfilled by extracting groundwater in Gurgaon” (Vasudevan, 2013:120).

“There have been instances of persistent demand for water in Gurgaon as urbanisation rate has gone up, and to cater the increasing gap of demand and supply of public water, illegal groundwater extraction is rampant” (Prakash et al. 2011:170, Vasudevan, 2013:119). “Each private construction digs deep into the earth through the tube-wells, many of them illegal, to procure its own water” (Vasudevan, 2013:120). According to Vasudevan (2013:120), “all of Gurgaon’s shopping havens run on groundwater.”

As per the CSE Report (2011), “the drawing of groundwater in Gurgaon accelerated at a faster rate, after the Haryana government invited private enterprises to set-up base in the city.” “Housing and office complexes came at dizzying speed, guzzling even larger amounts of groundwater – all free of cost – using better water mining technologies.” “The housing boom is why the groundwater here has been tanked,” says Nitya Jacob, Director of the Water Programme at the CSE. So far the residential water is concerned, “private developers promise the residents with 24 X 7 Water, so they create underground aquifers to deliver on that promise” (Vasudevan, 2013:120).

“With everyone depending on groundwater in Gurgaon, the large-scale extraction of groundwater by private tube-wells has led to the city’s fast depleting groundwater table” (CSE Report, 2011:118; Vasudevan, 2013:120). As mentioned above, “Gurgaon does suffer from an unequal distribution of water – only 64 per cent of the Gurgaon’s population has access to institutionalised piped water network in 2011, against HUDA claim of 95 per cent” (CSE Report, 2011:118).

“Most colonies and commercial buildings in Gurgaon depend on private bore-well or community wells because of inadequate public piped water supply.”(CSE Report, 2011:118). “There are more than 30 000 bore-wells across the city and almost half of them are illegal” (CSE Report, 2011:118). “Almost 70 percent of Gurgaon’s water supply comes from ground sources, assuming a minimum discharge of 3 000 litres per hour” in order to meet all needs (CGWB in CSE Report, 2011:118).

With this figure, it can be estimated that about 54 MLD of groundwater is being extracted daily, which is an overwhelming figure and is approximately 50 percent of the total public water supply. It is also worthwhile to mention the data put forth by CGWB for the recommended and the actual groundwater utilisation in different blocks of Gurgaon during 2009.

**Table 1(d): Recommended and Actual Groundwater Utilisation in 2009  
(in MCM)**

<b>Block</b>	<b>Groundwater Draft/Extraction (Recommended)</b>	<b>Actual Extraction</b>	<b>Stage (in %)</b>
Gurgaon	59.85	186.10	311
Farukh Nagar	39.90	59.09	148
Patuadi	48.18	108.99	222
Sohna	53.23	82.25	155

(Source: *HT*, Gurgaon edition, 5.3.2014, p.12)

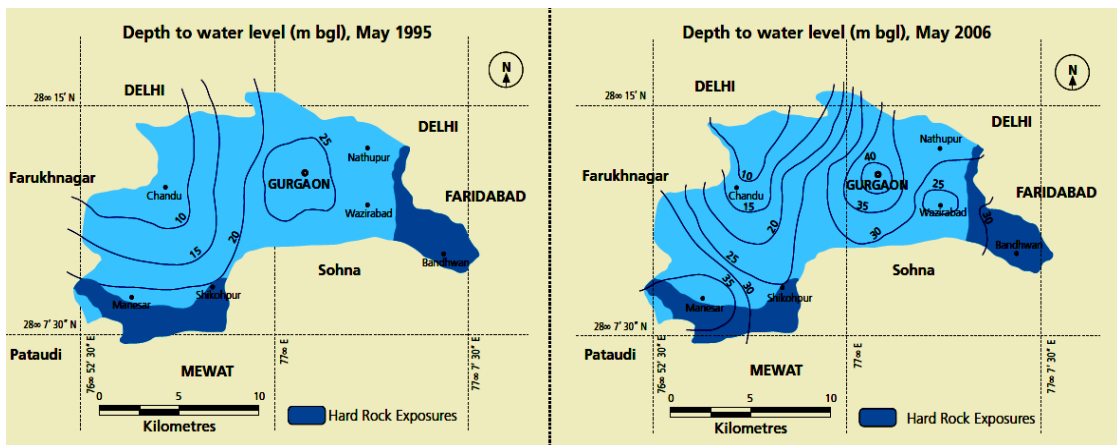
**Observation on Table 1(d):** It is clearly visible that the recommended capacity of groundwater extraction has already been exhausted in all four major blocks of Gurgaon district. Perusal of the estimates reveal that the overall stage of groundwater development of four blocks is of the order of 209 percent, which has exceeded the available recharge and thus the whole district has been categorised as over exploited.

According to a press release by *The Times of India* on 17.7.2012<sup>7</sup>, “the raw water supply to the city - already insufficient – shrunk, all the way to 40-45 MGD, whereas it is estimated that the daily requirement at the time reached its seasonal high of 200 MGD.” “Residents in several areas complained of getting as little as 15 percent of their usual day-to-day demand. And most were left with no choice except to go for the only viable alternative – the fast depleting groundwater reserves” (Vasudevan, 2013:120).

<sup>7</sup> [www.timesofindia.com](http://www.timesofindia.com) accessed on 12.11.2014.

The repercussions of unprecedented and massive exploitation of groundwater are then apparent. It cannot be environmentally sustainable in the first place. This is the basic reason why the CGWA declared “Gurgaon a notified area, deeming Gurgaon’s water table ‘over-exploited’, and declaring this a part of the semi-arid belt.” According to D Uma Kumar (2007) “the groundwater table has been falling at a rate of 1 to 1.2 metre/year in Gurgaon” (CSE Report, 2011:119). Map 1(v) shows the rate of falling of groundonwater table over the ten years, from 1995 to 2006.

**Map 1(v): Rate of Falling Groundwater Table in Gurgaon**



(Courtesy: D Uma Kumar (2007) CGWB, Faridabad in CSE Report, 2011:119)

“Further studies by the CGWB show that Gurgaon’s groundwater supply has dropped roughly 6 metres in the past two years” (Rich, 2014 *in* Deamer, 2014: 180). “In the year 2000, the CGWA banned the digging of new wells in Gurgaon” (Vasudevan, 2013:120). “That ban did not work, so responding to the two PILs, the High Court of Punjab and Haryana ordered the Haryana government to completely clamp down on illegal bore-wells and banned the use of groundwater for industrial and commercial purposes” (Vasudevan, 2013:120).

Shockingly, “there is no concrete data on the number of bore-wells currently functional in Gurgaon or how much quantity of groundwater is actually being extracted in a time series framework” (CSE Report, 2011:118).

“It means groundwater in Gurgaon is under stress” (Lohani, 2014:247). “Majority of the privately developed townships meet their water demand with groundwater as HUDA has been able to supply just 10 MGD” (*HT* e-paper, Gurgaon edition, 5.3.2014, p.12). This implies that groundwater which is the major alternate

source of water in Gurgaon is also fast dwindling. Therefore, it is a matter of grave concern for the civic authorities of Gurgaon. This challenges the “institutional capacities and governance structures to overcome, respond to the water governance processes in a positive way” (Shaw, 2005:130).

### **1.9 Groundwater in Gurgaon: Easy Access to Water**

From the ongoing analysis, large-scale over-exploitation of groundwater by multiple users is widespread in Gurgaon. One of the apparent reasons would be residents’ lesser dependence on State’s supply of water in the face of rapid urbanisation, industrialisation and population growth in Gurgaon, and consequent over-demand for water. Residents, private suppliers and other competing demanders of water have resorted to easily available groundwater for their day-to-day needs. The water economy of Gurgaon ultimately thus revolves around ‘groundwater’ as an easy source of water supply. As mentioned, groundwater has extensively been utilised for construction and commercial uses in Gurgaon. The residential and commercial demand for water need the biggest share of both the surface and the groundwater, as these demands are spreading in a cumulative way in response to the urbanisation rate.

The general inclination, therefore of utilising groundwater for different motives has apparently led to groundwater crisis. This proposition is indeed valid as water is an intermediate input in the processes of generation of wealth of corporate through profits in lucrative activities that are undergoing in Gurgaon. Because groundwater is tied to the very land it possesses, which is appropriated for a particular use, the right to use groundwater circumstantially goes into the custody of the individual owner of the land, and without any much legality goes explicitly for easy access to the user.

This advantage of using groundwater for construction activities is something not bestowed directly upon the individuals by the State, or for that matter, by any ‘law’ *per se*, rather it has occurred in the very processes of urbanisation and city expansion, and simultaneously growing demand for water, which the State has significantly undermined costs of such environmental degradation. Therefore, this already established *norm* of water usage is something that becomes inherent to profit-maximising model of accumulating higher and higher capital by private individuals *via* profit-seeking institutions in Gurgaon. The State has, of course, its own vested

interests in promoting such paradigm of development probably because Gurgaon model of realising higher potential economic growth is the best. As long as Gurgaon does not get water from other networks, it would continue to depend on its groundwater stock that has multiple users and stakeholders. Consequently, the non-State supply has led to the exhaustion of the groundwater.

### **1.10 Incentives for Private Provision of Water in Gurgaon**

“One of the wealthiest suburbs in India, Gurgaon brings roughly 45 percent of the state of Haryana’s property related revenue, yet most of the city’s functioning amenities are privately operated through developers, as a result of leaving huge gaps in service and infrastructure provision by the State” (Hosagrahar, 2007 in Sorensen and Okata, 2011; Goldstein, 2015:2).

In Gurgaon, “since the private developers have been almost entirely responsible for the construction of this city, a new type of urban condition has emerged: an archipelago of private zones, with little public fabric holding them together.” (Rich, 2014 in Deamer, 2014: 173). “Private companies provide basic services like water and electricity” (Rich, 2014 in Deamer, 2014: 173). To put it simply, “Gurgaon’s story is one of privatisation” (Rich, 2014 in Deamer, 2014: 173). “It (Gurgaon) represents a frontline of a nation that is increasingly reliant on private companies to provide public services” (Rich, 2014 in Deamer, 2014: 173).

For instance, the website ([www.spaze.in](http://www.spaze.in)) of a luxury residential complex called *Spaze Privy* “promises to protect its residents from Gurgaon’s scarce resources such as drinking water to be provided by onsite tankers and cisterns, among other facilities” (Rich, 2014 in Deamer, 2014: 179). “This type of disconnection in public services between the State and the residents occupying private residential spaces are everywhere in Gurgaon” (Rich, 2014 in Deamer, 2014: 179). “In Gurgaon, the private players have stepped into the arena of public goods provisioning, though with mixed results” (Rajagopalan and Tabarrok, 2014:210).

Private sector in Gurgaon, therefore, traditionally has been able to address many of the failures of the public sector. Specifically, private water providers have been covering the shortages of water since long, but it comes through an exorbitant price. “On an average 40 to 45 percent of residents living in private residential

colonies now pay a huge price for the water trucked in by the private companies” (Rich, 2014 *in* Deamer, 2014: 180). “Because Gurgaon has no functioning public infrastructure, resources are re-routed, protected, and hoarded to serve a selected few” (Rich, 2014 *in* Deamer, 2014: 179).

Theoretically, if public goods such as household water are privatised, it changes the overall characteristics of the ‘good’ in question, that is, the propositions of ‘excludability and rivalness in consumption’. With water as a private good, the targeted consumers can easily be identified and supplied water to, simply with the ‘capacity to pay’ criterion. “The residents of Gurgaon are paying for private water provision” (Rajagopalan and Tabarrok, 2014:210). The private provision of water has of course long-term social and environmental costs associated with it, and the question of equity in distribution and sustainability of the resource base remains unanswered in such a scenario.

### **1.11 The Quality of Water in Gurgaon: Can it be ignored?**

The deficient water supply by the State accompanied by poor quality of water can make the urban water systems even more unreliable and hence problematic. Good water quality is of paramount importance as deteriorated water quality leads to huge personal economic costs and other health related hazards. The population of any area is very much vulnerable to the kind of water they consume. Several scientific studies have been executed in Gurgaon in order to assess the quality of water the residents are consuming for the day to day activities.

According to a randomised experimental study in Gurgaon by Jyotsna Jalan and E. Somanathan (2008) to measure the demand for environmental quality, conducted a laboratory test for approximately 1 000 randomly selected households’ drinking water for the presence of bacteria of fecal origin. They found that about 60 percent of the treated water supplied by authorities (before any domestic purification) was ‘dirty’ or positive or contaminated for the presence of fecal bacteria (Somanathan, 2010:11). Further, half of the 1 000 randomly selected households were provided with the information about their water quality. “These were termed as the ‘treatment group’ while the rest half were termed as the ‘control group” (Jalan et al. 2009:668).

Initially, 40 percent of the selected households were using home purification. Revisiting the same households after two months, the researchers found that conditional on initially not purifying, the frequency of purification had increased by 11 percentage points more among households that had received positive test results (contaminated) than among the 'control' households (Jalan et al. 2009:668).

A similar study, this time for assessing the quality of Gurgaon canal water in Haryana was conducted by Meena Bhandari, Promilla Ahlawat and S. K. Garg in 2010. They selected six different sampling sites along the Gurgaon canal including *Silani* village and *Kiranj* village in Gurgaon. They evaluated the canal water to assess the qualitative changes and possibility of point and non point pollution loads. Various physico-chemical properties like pH, TDS, DO, BOD, and COD, alkalinity, hardness, chloride, nitrate, nitrite, sulphite, sulphate, fluoride and metal ions were analysed.

“Values of these parameters have been found to be within range but comparatively high values of BOD and COD reveal that significant amount of oxygen demanding wastes are entering into canal water” (Bhandari et al. 2010:814). “DO along with BOD and COD are the measure of contamination of water” (Bhandari et al. 2010:814). The above study further concluded that since Gurgaon is an industrial hub, the canal passing through the industrial area, a lot many industries dispose off their untreated water, garbage and solid waste into the canal. Moreover, “there is unauthorised domestic sewage disposal by the *JJ* clusters along the bank of the canal. In the long run this results in the contamination of the water table” (Bhandari et al. 2010:814).

In addition to the above, Meenakshi Lohani has an excellent work on the impact of land use change on Hydrology of Gurgaon city in 2014. Her study maintains that the shallow groundwater of Gurgaon district is alkaline in nature (pH 7.25 to 8.13) and is moderate to highly saline (Electrical Conductivity 805 to 3410 $\mu$ S/cm) (Lohani, 2014:249). When compared the concentration values of major ions with the recommended desirable and permissible concentration limits for drinking water as per the BIS, the author found that groundwater is mostly unsuitable for drinking in 88 percent of wells mainly due to high nitrate and fluoride contents that exceed the maximum permissible limits for these parameters which are 45mg/l and 1.5 mg/l respectively (CGWB Gurgaon District, Haryana in Lohani, 2014:249).

*In Gurgaon, therefore, one can infer at this point that, not only the public water delivered to the household is of pathetic quality, it is also reported that the groundwater quality is very poor and the quality is further declining day by day.*

### **1.12 Limitations of the Present Study**

Conceptually, managing residential water is a multidimensional and complex subject to deal with. Specifically, water management in cities in contemporary times has varied and has diverse nature and form. In academia, the extensive nature of water distribution and management calls forth a wide variety of perspectives to tackle the water scarcity problems in urban areas.

The literature on urban water management, hence, is also comprehensive, for it takes into account the various feasible water management tools such as the effective demand management policies, such as altering domestic water rates/tariffs or rationalisation of water tariffs, so that people become aware of the judicious use of the precious resource and/or, engineering innovations to augment water supply at the broadest level, along with framing a *law* to deal with issues such as illegal groundwater extraction.

In current study, however, the author has found scant literature on the subject and the research area chosen. The study of water in Gurgaon, in particular, has not been done at the level desired for any kind of further investigation into the subject. This is the major methodological constraint identified in the present study. *Therefore, a full analysis of literature on the subject of study could not be done in isolation in the current study.* The researcher is indebted to the scholars who have done scholarly work on the public water supply management and allied problems in Gurgaon. Their works have been included in this study as the background literature at the specific points accordingly.

Further, the deficiency of micro-level household data has in fact given an opportunity to the researcher to conduct a primary survey of the residential areas of Gurgaon. The field work takes into account some essential parameters to observe the status of water security at the household level. This in fact broadens the research foci for minutely evaluating the problem of water scarcity from the residents' perspective. This in turn, increases endeavour for empirical work and scope for policy arguments.



## Chapter 2

### Understanding Gurgaon as a Special Setting in NCR: Sources of Water Scarcity

#### *Outline of the Chapter*

*This chapter is an attempt to bring forth the exogenous factors responsible for the growth and expansion of Gurgaon. Simultaneously, it tries to show how the unprecedented urbanisation in NCT-D in general, and Gurgaon in particular, contributes to the emergence of the sources of water scarcity Gurgaon UA.*

#### **2.1 NCR: An Overview**

Gurgaon, as a self-contained entity, can have localised water governance problems. Any study on Gurgaon, however, cannot be conceived in isolation from NCR, therefore, a NCRPB was set up in 1985 under Section (10) of the NCR Planning Board Act of the Parliament to deal with the contemporary regional development problems and their long-term solutions in the national capital region. It calls forth an enactment of the NCRPB Act by the Union Parliament, with the concurrence of the participating States of Uttar Pradesh, Haryana and Rajasthan, through which the NCR Planning Board was constituted.<sup>8</sup> The NCR constituent areas are shown in table 2(a).

**Table 2(a): NCR Constituent Areas**

<b>NCR Sub-Region</b>	<b>Name of the District/Unit</b>	<b>Area (in Sq. km.)</b>
Haryana	Gurgaon, Faridabad, Mewat, Rohtak, Sonapat, Rewari, Jhajjhar, Panipat and Palwal	13 428
Uttar Pradesh	Meerut, NOIDA, Ghaziabad, Gautam Buddha Nagar, Bulandshahr, Hapur and Baghpat	10 853
Rajasthan	Alwar	8 380
Delhi	NCT-D	1 483
<b>Total Area of the NCR Sub-Region</b>		<b>34 144</b>

(Source: <http://www.ncrpb.nic.in> accessed on 22.2.2015)

“NCR constitutes about 1.06 percent of the land area of the country” (Nirmal, 2014:251). “NCR is a unique example of inter-state regional development planning for a region with NCT-D as core” (Nirmal, 2014:251). One of the core policies and strategies of the NCRPB has been the development of the core urban infrastructure

<sup>8</sup> NCRPB: <http://ncrpb.nic.in/history.php>

like transport, power, water supply, sewerage, drainage in NCR towns.<sup>9</sup> As mentioned in Chapter 1, Gurgaon city is a larger sub-set of NCR. Gurgaon is one of the four satellite cities of NCR. The other three are NOIDA, Faridabad and Ghaziabad.

“The nomenclature ‘satellite city’ means that these ‘cities are consciously planned cities to act as dormitory towns” (Nirmal, 2014:250). A ‘satellite city’ is basically defined as “a city designed to house the overspill population of any major city in neighbourhood, but located well beyond the limits of that city, and operating as a discrete, self-contained entity” (Nirmal, 2014:250).

Conceptually speaking, “satellite cities could be self-sufficient communities outside of their larger metropolitan areas.”(Nirmal, 2014:250). “Functioning as a part of mega city, a satellite city experiences the cross-commuting, that is, residents commuting out of the city and employees commuting into the city” (Nirmal, 2014:250). Gurgaon, acting as a successful venture of a satellite city in the vicinity of NCT-D, the domain of the city however is limited to accommodate the phenomena of over-urbanisation of NCT-D.

The unprecedented growth of urban population of NCT-D has apparently contributed to increasing urban congestion and acute shortages of basic civic amenities to the citizens. One of the main causes for this spurt in the growth of population of Delhi is the unprecedented migration into the city not only from the adjoining states but also from other economically poor states like Bihar, West Bengal, Jharkhand, Uttar Pradesh, and Odisha. It has been felt that as Delhi grows, its problems of land, housing, transportation and management of infrastructure like water supply and sewerage would become more acute.<sup>10</sup>

Categorically, Gurgaon can be looked as a peripheral city created to decongest the urban sprawl arising in the neighbouring Delhi, as a interim solutions to the growing urban congestion in Delhi. It is maintained that by creating satellite cities, the major problems arising out of urban sprawl such as the affordable housing with adequate basic amenities for human habitat, more free space for recreational purposes and so on can be remedied smoothly, so the “satellite cities in every way, be it financial, economic, ecological, ethical or even for social needs, become the natural

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<sup>9</sup> <http://www.ncrpb.nic.in> accessed on 22.2.2015.

<sup>10</sup> <http://www.ncrpb.nic.in> accessed on 22.2.2015.

cure of mega cities over-demand for amenities for better and descent human life” (Nirmal, 2014:251; emphasis added).

As a result of this theory of urban expansion, NCR has emerged as the largest residential market in India, with more number of units compared to the other five metros of Mumbai, Chennai, Bengaluru, Kolkata and Hyderabad put together (CSE Report, 2012). Gurgaon infact caters the needs of local as well as global residential consumerism since its inception.

## **2.2 Urbanisation: Basic Premises**

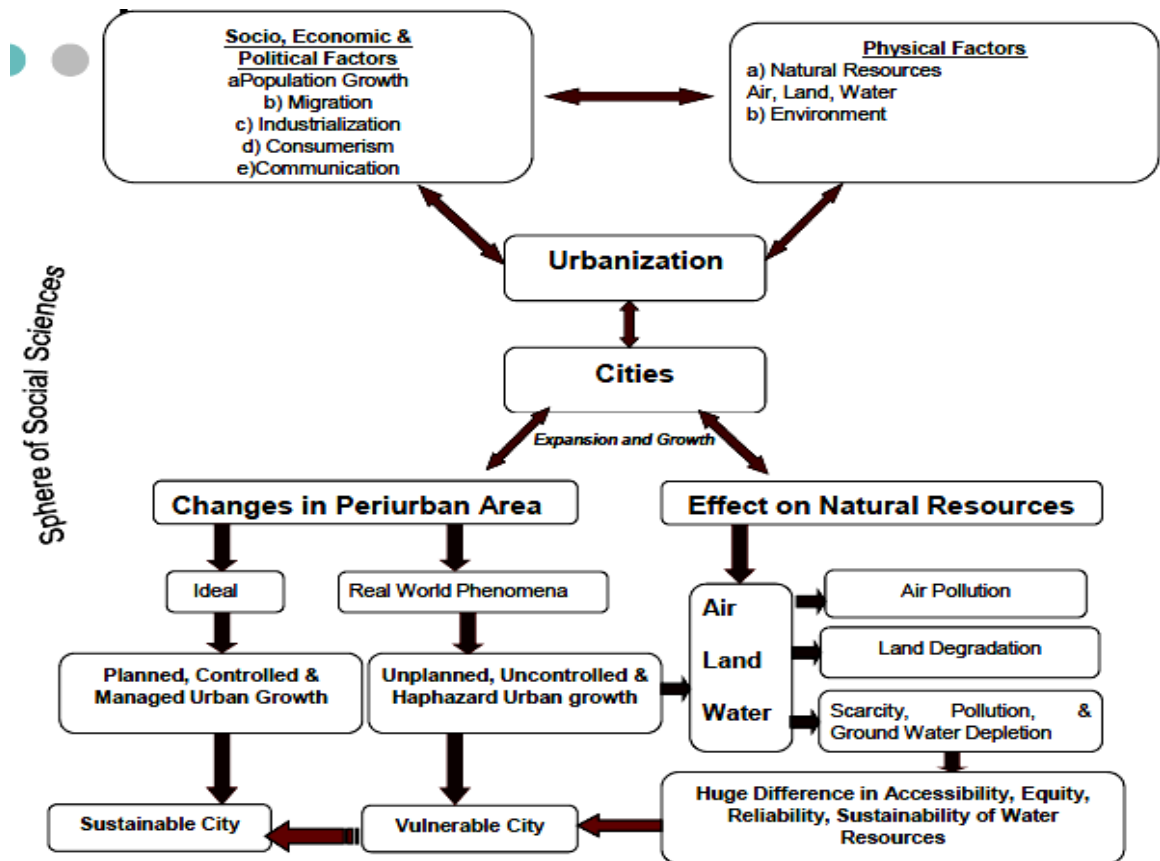
“Urbanisation is the index of transformation from traditional rural economies to a more industrial one” (Davis, 1965). “...it is a progressive concentration of population in urban units with well-defined socio-economic objectives” (Kingslay Davis, 1965 *in* Bala, 2014:115). Urbanisation and economic growth are inextricably linked. Urbanisation and the provision of basic civic amenities to the population inhabited in a particular geographic and demographic location are inseparably linked in cities today because it is maintained that “cities are the leading edge of economic dynamism in modern times” (Rao and Bird, 2010:1; emphasis added).

The economic dynamism in cities can morphologically be interpreted in terms of concentration of large enterprises and wealth and the processes which embeds these transformations. “Cities generate externalities which could enhance and facilitate business transactions, productivity, subordinate in attaining higher degrees of knowledge and skills, improved services, infrastructure growth, and better performing institutions and so on” (Rao and Bird, 2010:1). “It has been predicted that by the year 2030, cities in India would account for around 70 percent of India’s GDP” (Urban News Digest, 2012:2). Therefore, cities are known as the engine of economic growth.

However, the extent to which modern cities succeed in realising their potential to galvanise innovation and accelerate economic growth, not only a function of whether the cities are able to cope up with the required (adequate) urban infrastructure in public amenities but also to a large extent to a set of strategised urban planning and policies with the behest of high quality institutional innovations, both public and private. The velocity with which the urbanisation in India has been accelerating, the challenges are apparent in the dynamics of cities’ economy transformation. Precisely,

one can visualise ideal and real picture of the impact of urbanisation on natural resources including water, illustrated schematically in the map 2 (i).

**Map 2(i): Urbanisation – Its Impact on Natural Resources**



(Courtesy: Punia, 2015, <http://www.censusindia.gov.in/2011Census/Presentation/Digital-Mapping.pdf>, accessed on 22.8.2015)

**Observation on Map 2(i):** The map, on the one hand, is self-explanatory in the sense that it conveys if the urbanisation process is carried out in a planned, controlled and managed manner, it yields sustainable cities – an ideal cities with minimum adverse impact on the utilisation of scarce natural resources.

On the other hand, it shows the harsh reality of urbanisation process, growth and expansion. If not properly planned, managed or controlled, it will lead to vulnerable cities, with deteriorating impact on available natural resources. The map shows, that how in case of vulnerable cities, they eventually have the problems of accessibility, equity, reliability and sustainability of water resources along with other problems of land and air pollution.

### 2.3 Urbanisation in NCR

According to the Census 2011 of the Government of India, over the decade from 2001, Indian cities, towns and urban agglomerations added 91 million people, registering a decadal growth of 31.8 % (Urban News Digest, 2012:2). As per the Census of India 2011, 31.2 percent of the total population of the country lives in urban areas. The NCR contains about 7.6 percent of the total urban population and 2.1 percent of the total rural population of India. About 4.4 percent of the India's urban population resides in NCT-D alone (Regional Plan 2021-NCR, 2013:1). The population growth rate in NCR over the last three decades is depicted in table 2(b).

**Table 2(b): Population Growth Rate of NCR, 1981-2011**

NCR Sub-region	(in %)		
	1981-91	1991-01	2001-11
NCT-D	51.4	47	21
Haryana	34.5	30.8	27.1
Rajasthan	30.8	30.3	22.7
U. P.	29.2	28.5	26.1
<b>NCR</b>	<b>37.6</b>	<b>35.6</b>	<b>24.1</b>

(Source: Census of India, 1981-2011 in Regional Plan 2021-NCR, 2013:22)

**Observation on Table 2(b):** The decadal population growth rate of NCR clearly has a downtrend over the period from 1981 to 2011. The Regional Plan Document of NCR-2021 however, maintains that although the growth rate is declining, there was an absolute increase in the aggregate population in the NCR sub-region over the period (Regional Plan 2021-NCR, 2013:23). Another significant aspect of the population growth in NCR sub-region is to look at the urban to rural composition of population. The following table 2(c) illustrates this fact from 1981 to 2011.

**Table 2(c): Urban-Rural Composition of Population in NCR, 1981-2011**

Urban-Rural Composition	(% Share in Different Years)			
	1981	1991	2001	2011
Urban NCR	45.9	50.2	56.4	62.5
Rural NCR	54.1	49.8	43.6	37.5
Urban NCR excluding NCT-D	16.9	19.3	21.6	27

(Source: Census of India, 1981-2011 in Regional Plan 2021-NCR, 2013:23)

**Observation on Table 2(c):** The percentage share of urban to rural population in NCR shows an increasing trend from the year 1981 to 2011. There is a considerable

decline in the population composition of rural NCR during these periods from 54.1 percent in 1981 to 37.5 percent in 2011. It is also worthwhile to mention here that the urban NCR *minus* NCT-D urban-rural population composition has also increased from 16.9 percent to 27 percent. India is fast urbanising and this trend is fully visible in NCR. NCR is even more urbanised with 62.5 percent of its total population living in urban areas.

However, excluding NCT-D, NCR is less urbanised (27 percent) (Regional Plan 2021-NCR, 2013:1). Out of 53 million plus cities in India, 4 cities, namely, Delhi, Meerut, Ghaziabad and Faridabad are in the NCR, and Gurgaon UA is on the verge of becoming a million plus city (Regional Plan 2021-NCR, 2013:1). NCR is a multi-state region in the country. It is one of the largest inter-state rural-urban regions in the world with an urbanisation level of 62.5 percent. It is no wonder that this level of growth in urbanisation could lead to a highly congested urban infrastructure.

The complexity of the region due to its vastness and spatial expanse over three states, namely, Haryana, Uttar Pradesh and Rajasthan along with the NCT-D is a challenge before the State for integrated regional development, and specifically, the integrated water management in the region (Regional Plan 2021-NCR, 2013:6, emphasis added). Before arriving at arguments for reasons for the expansion of NCR towards its peripheries, it is foremost important to comprehend the basics of urban sprawl in present times.

#### **2.4 Urban Sprawl: Meaning, Spread and Consequences**

“An urban landscape may be viewed as an urban ecosystem that integrates physical, social, economic, ecological, environmental, infrastructure, and institutional subsystems; where urban growth and sprawl is an outcome of change in the performance /functioning of these subsystems” (Bhatta, 2010:6). Sudhira and Ramachandra (2007) have stated that “urban sprawl refers to the outgrowth of urban areas caused by uncontrolled, uncoordinated and unplanned growth.”

“This outgrowth seen in the periphery of cities, along highways, and along roads connecting a city, lacks basic amenities like proper sanitation, treated water supply, primary health care and so on, as planners were unable to visualise such growth during planning, policy and decision-making” (Bhatta, 2010:9). Urban centres

in metropolitan cities or mega cities are often laden with urban congestion because of spatial and demographic shifts caused by natural growth of population, inter-region net-migration for various social and economic reasons, which eventually lead to urban sprawl.

The USEPA defined urban sprawl in 2001 as “at a metropolitan scale, sprawl may be said to occur when the rate at which land is converted to non-agricultural or non-natural uses exceeds the rate of population growth” (Barnes et al. 2001 *in* Bhatta, 2010:9). The Oxford Dictionary (2000) defines urban sprawl as “a large area covered with buildings, which spreads from the city into the countryside in an ugly way” (Bhatta, 2010:8).

“Urban sprawl makes intensive demands on environmental resources and poses problems by eating into valuable natural habitats of their hinterland” (OECD 1990 *in* Adesina, 2007:2; IIR, 2011:162). “It is associated with loss of natural wetlands along with loss of forest habitat, loss or damage of prime farmland and increase of impervious surface” (Hasse and Lathrop, 2003 *in* Prakash et al. 2011:162-63). This is a process emerging out of development activities that are manifested in changing social and economic interactions and increasing mobility of production factors, such as capital, labour, technology, and information to the urban fringe near mega cities. “An urban fringe/suburb comprises of small farmers, informal settlers, industrial entrepreneurs, and urban middle class and elite classes all co-existing with varied interests, practices and perceptions” (Allen, 2003; Iaquinta and Drescher, 2000; Narain and Nischel, 2007 *in* Prakash et al. 2011:163).

“The causes and catalysts of urban growth which may result in sprawl are plethora of factors as highlighted by several researchers” (Burchfield et al. 2006; Squires, 2002; Harvey and Clark, 1965; and so on) are summarised by Bhatta (2010). Some of these factors are – “population growth, economic growth, industrialisation, and speculation of land appreciation, more living space, living and property cost, choice of single-family home, credit and capital market, lack of affordable housing in mega cities, among other factors of better living like green environment in surroundings” (Bhatta, 2010:18).

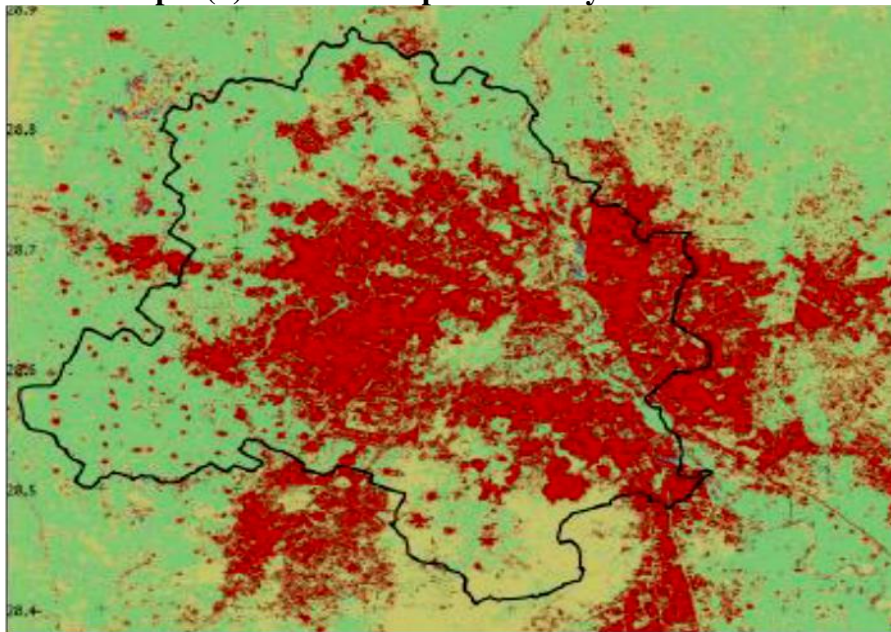
As far as the consequences of urban sprawl are concerned, it is generally observed that in many mega cities of developing countries, a substantial amount of

city dwellers live in slums within the city or in urban periphery in poverty and degraded environment, often lacking urban amenities like drinking water and proper sanitation facilities. “Not only the poor but the affluent sections’ quality of life also degrades primarily because of dearth of quality and sufficiency of public services, leading to higher environment and economic cost of living” (Bhatta, 2010:29; emphasis added).

## **2.5 Urban Sprawl in NCT-D**

“The conditions of city sprawl are associated with urbanisation and are correlated with population density and built-up area<sup>11</sup>” (Torrens and Alberti, 2000 *in* Singh and Yadav, 2012:7). One of the major objective of the satellite city, as said before, is to “decongest the main parent city and in-house the overspill population of the core in the peripheral areas” (Nirmal, 2014:254), as has been highlighted in map 2(ii) below. This process is called “density optimisation” (Nirmal, 2014:254).

**Map 2 (ii): Urban Footprint Density of Delhi-NCR**



(Source: Urban India 2011-Evidence, IIHS Report *in* Nirmal, 2014:254).

“Delhi, in particular, enjoys a specific position in the Indian institutional system” (Maria, 2008:5). “It is highly urbanised mega city in India at present whose

<sup>11</sup> “Built-up area includes the carpet-area and the thickness of external walls, internal walls and columns, where, carpet area is the area within the walls of an apartment that is for the exclusive use. It is typically 10-20% more than the carpet area and is also sometimes known as the plinth area.” ([http://articles.economictimes.indiatimes.com/2012-09-24/news/34062116\\_1\\_carpet-area-built-up-area-premium-fsi](http://articles.economictimes.indiatimes.com/2012-09-24/news/34062116_1_carpet-area-built-up-area-premium-fsi) accessed on 12.2.2015)



consequent urban sprawl has been felt in the immediate neighbourhood, mostly in the four cities namely, Gurgaon, Faridabad, NOIDA and Ghaziabad” (Maria, 2008:5). Therefore, the administrative limits of the NCT-D have ever been expanding historically.

## **2.6 The DU Model of Delhi-NCR**

“The spatial configuration and the dynamics of urban growth are important topics of analysis in the contemporary urban studies.”(Bhatta, 2010:3).The differential urbanisation model propounded by Geyer (1996), Geyer and Kontuly (2003, 2008) examines the “successive stages of concentration and dispersal of population in a set of hierarchy of cities at national scale” (Mookherjee and Geyer, 2009:88). In other words, the DU model postulates that the “urbanisation process occurs over a series of stages of concentration and de-concentration of population over space and time” (Mookherjee, 2002:38).

“Such empirical exploration as the DU model helps monitor the spatial and temporal complexities of the dynamics of urbanisation and provide guidance toward regional development planning, especially for a developing country at different stages on the developmental continuum” (Mookherjee and Geyer, 2009:88).

As Kontuly and Geyer (2003:5) noted, the DU model conceptually extended the link between various stages of urbanisation processes “across the developmental spectrum in the First and the Third Worlds”, while distinguishing the mainstream and sub-stream migration patterns in the context of a “core-periphery spatial framework” (Mookherjee and Geyer, 2009:89). It also explores the concept of “productionism and environmentalism” as put forward by Hart (1983) and suggested variations in the “productionism-concentration vs. environmentalism-deconcentration hypothesis” in national migration patterns (Mookherjee and Geyer, 2009:89-91).

Mookherjee and Geyer (2009:89-91) maintain that the NCR of India provides an excellent case study of a sub-national region to test the applicability of the DU model for its dramatic growth, as well as the geographical scale for urban and regional planning. As said before, NCRPB was constituted to defuse growth from the regional core – NCT-D to the peripheries like Gurgaon and Faridabad. Another aspect of viewing this development is to look at the “set of planning and strategies devised to

mitigate the adverse effects of concentrated growth in and around Delhi” (NCR Directory 2000 in Mookherjee and Geyer, 2009:91). The urbanisation trend of NCT-D is shown in table 2(d).

**Table 2(d): Trends in Urbanisation in NCT-D, 1951-2011**

Year →	1951	1961	1971	1981	1991	2001	2011
Percentage of Urban Population	82.4	88.8	89.7	92.7	89.9	93.2	97.5

(Source: Census of India, 1951-2011 in Regional Plan 2021-NCR, 2013:26)

**Observation on Table 2(d):** The trend of urbanisation in NCT-D has almost been positive and has been consistently increasing since 1951, except the year 1991, when it went down with some percentage. During the last six decades, the percentage of urbanisation has gone up from 82.4 to 97.5. The total population of NCT-D as well as the percent of urban population is growing but with declining rates. During 2001-11, the total population of NCT-D grew by 21 percent while urban population grew by 26.6 percent. The rapid decline in the rural population during 2001-11 is due to the fact that most of the NCT-D have now been earmarked as ‘urbanisable’ area as per the Master Plan for Delhi-2021 (Regional Plan 2021-NCR, 2013:26).

According to the Census of India 2001, the reasons for the increased urbanisation is majorly two-fold – better employment opportunities in the whole of NCR (37.6 percent), and shifting of residence/moved with household (36.8 percent) (Regional Plan 2021-NCR, 2013:27) apart from other push-pull factors of migration. In Haryana sub-region, and at the district level in entire NCR, Faridabad and Gurgaon are the most urbanised of all, with the level of urbanisation of 79.4 percent and 69 percent respectively (Regional Plan 2021-NCR, 2013:24). There has been shifting pattern of population already inhabited in the larger NCR to the UAs like Faridabad and Gurgaon.

## **2.7 Urbanism and Urbanisation in Gurgaon**

Scholars like Bijender Kumar (2013) talks about the role of ‘urbanism’ in the judicious growth of urbanisation in the context of Haryana by carrying out a district-wise study taking qualitative and quantitative parameters of urbanism into account. He conducted his empirical study based on Census data and the field observation of

69 villages of 21 districts of Haryana. The basic objective of the author's study was to correlate 'urbanism' with 'urbanisation'.

"The term 'urbanism' was first used by the German-American Sociologist, Louis Worth in 1938" (Kumar, 2013:135). "Urbanisation characteristically is a process of change of residence from rural to urban, whereas, urbanism is defined as the adoption of urban ways of living in rural areas itself" (Kumar, 2013:135). In other words there is a connotation of geographical mobility in urbanisation, while urbanism do not relate to spatial movement of population.

Kumar (2013:135) observes that the sound agricultural and industrial base has given rise to both urbanism and urbanisation in almost all pockets of Haryana, though with considerable degree of regional disparity. His major findings are – (a) the overall correlation coefficient between urbanism and urbanisation in all districts of the state is + 0.59, (b) Gurgaon, Faridabad, Rohtak and Panipat are the four districts having the high level of urbanism as well as high level of urbanisation. The correlation value for this category is +0.52.

This means that growth of industrial activities in these four districts has given considerable growth of urbanism and urbanisation within these districts (Kumar, 2013:144). Kumar (2013:135) further maintains that "the whole NCR has experienced a considerable growth of urbanism and urbanisation within NCR districts of Haryana". Therefore, one can safely conclude that the economic prosperity is the basis for giving rise to high degree of urbanism-urbanisation in Gurgaon.

## **2.8 Trends and Patterns of Urbanisation in Gurgaon**

Rapid urbanisation and migration into Gurgaon accompanied by further outgrowths in continuation of the municipal boundaries of the city, better known by the Census of India 2001 as the Gurgaon UA (Prakash et al. 2011:165). "The total population of Gurgaon UA was 228 820 in 2001, which was 62 percent of the total urban population of the district" (Narain, 2011:4).

Narain (2011:4) maintains that a calculation of the population growth from 1971 to 2001 has declined, but a projected figure from 2001-2011 till 2021 shows that the growth rate is above 300 percent. This is represented in table 2(e).

**Table 2(e): Growth Rate of Urban Population in Gurgaon, 1971-81 to 2011-21**

Year	1971-81	1981-91	1991-01	2001-11	2011-21*
Urban Population	76.51	34.7	68.39	302.12	302.12

(Source: Calculated and compiled by the DTCP, Haryana in Narain, 2011:4; IIR 2011:165)

\*projected figure

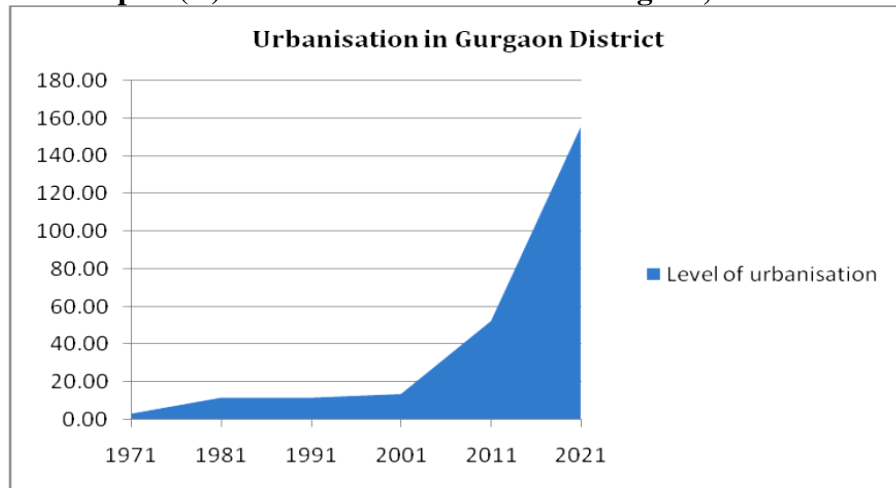
**Observation on Table 2(e):** Prakash et al. (2011:165) opine that “the maximum growth of population has occurred in central Gurgaon town, which forms the industrial hub, contiguous to Delhi and therefore the hub of multinational corporations’ expansion” (Director General of Census Operations, 2004:36,40,51 in Singh, 2004 *re-cited in* Prakash et al. 2011:165).

“The NCRPB, the Master Plans for urban areas and the Census of India have projected that the population of Gurgaon city would reach above 3 million by 2021” (Prakash et al. 2011:165). It points toward a massive increase in population since 1971 till 2011, from the data given above. According to Thomas Cowan (2015:64), “while the city’s population has increased 2-fold over the past 10 years, some 8-10 lakh population of predominately migrant industrial and manufacturing workforce are unaccounted for, living off-the-map in the city’s urban villages.”

## 2.9 Level of Urbanisation in Gurgaon

The level of urbanisation in Gurgaon is graphically shown in graph 2(A) below.

**Graph 2(A): Level of Urbanisation in Gurgaon, 1971-2021**



(Source: Prepared by the DTCP, Haryana in Narain, 2011:4-5; Prakash et al. 2011:165)

“The percentage of Gurgaon UA to the total population of Gurgaon district increased from 3.35 percent in 1971 to 13.8 percent in 2001” (Narain, 2011:4). In

other words, the level of urbanisation has gone up by a mere 3.35 percent in 1971 to 13.8 percent in 2001. According to an estimate in 2011 the projected level of urbanisation was 52.53 percent, which is likely to go up to 155 percent (approx.) by 2021, indicating a very steep rise in the level of urbanisation in Gurgaon as whole (Narain, 2011:4-5; Prakash et al. 2011:165). However the actual level of urbanisation in Gurgaon turned out to be 69 percent, which is greater than the projected figure of 52.53 percent in 2011, according to the Regional Plan 2021-NCR Document. As per the Census Data 2011, the total population of Gurgaon stood at 15 14 085, out of which 10 42 000 were urban, which is 68.8 percent of the total population (Regional Plan 2021-NCR, 2013:39).

The reasons put forth by the urban experts for this surge in the level of urbanisation are “the dominant nature of migration for employment and a sound investment destination in realty sector” (Narain, 2011:4). In other words, higher population means greater provision of basic amenities including water for all fractions of society.

## **2.10 Implications for Gurgaon in Water**

Apparently, from the ongoing analyses, the scarcity of resources in Gurgaon would be a natural outcome of the urbanisation and development process that has been executed in the NCT-D. The repercussions of which is inflicted on residents residing in its peripheries, and Gurgaon region as a whole is not an exception to the development process carried out, considering NCT-D as the core. The economic restructuring and demographic changes that has taken place in the process of transformation of NCT-D has been felt to a greater degree especially in Gurgaon over the last seven to eight years, which is evident from the fact that population of Gurgaon has almost doubled in these years.

This also means that huge demand for water for construction and industrial uses may to a large extent dependent on locally available groundwater. Such arguments are in consonance with the “theory of urban continuum”<sup>12</sup> (Shah, 2015),

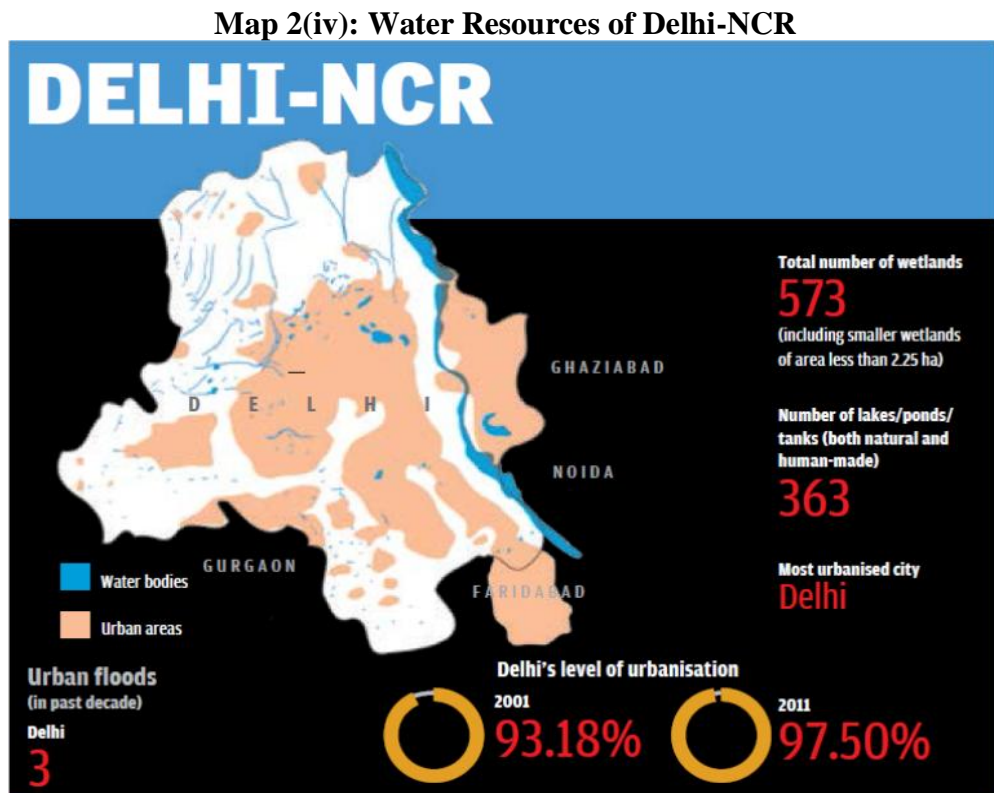
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<sup>12</sup> According to Mihir Shah (2015), the theory of urban continuum decides the four transitional stages of urban water systems, namely, Stage I or *Nucleus*, Stage II or *Growth*, Stage III or *Expansion*, and finally, Stage IV or *Agglomeration*. The common culminating point of these stages is the varied level of groundwater use according to the level of development taking place, and primarily due to population growth and urbanisation.

where he talks about the stage of agglomeration ...where many large cities like “Gurgaon and Delhi merge to create an UA” (Shah, 2015:12). The significant feature of ‘agglomeration’ is that “practically the poor service provision of public water implies various levels of reliance on groundwater” (Shah, 2015:12).

## 2.11 Water Resources of NCR

The traditional water bodies within Delhi-NCR have been shown in map 2 (iv) along with other facts.



(Courtesy: [www.downtoearth.org.in](http://www.downtoearth.org.in) accessed on 22.3.2016)

It is very much visible from the map shown above that Delhi-NCR has very limited traditional water bodies. The NCRPB claims that the NCR is endowed with four perennial rivers namely, the Yamuna, the Hindon, and the *Kali* passing through it and the river Ganga skirting its eastern boundary. Main sources of water supply in the region are surface and ground water (rivers, canals, tube-wells, hand-pumps and open wells).

While U. P. sub-region has abundant groundwater, the western areas of the river Yamuna comprising districts of Gurgaon, Rohtak, Sonapat, Jhajjar and most part of Faridabad districts in Haryana sub-region, Alwar in Rajasthan in sub-region and

large part of NCT-D have insufficient groundwater, which is often brackish in colour rendering it to be unpalatable for domestic consumption. There is a wide demand-supply gap of water in NCR and the problem becomes acute in summer months.

The water resources to meet the thirst of cities of NCR are limited. A concerted effort and action plan, therefore, has been envisioned by the government to make an integrated regional scheme for augmentation of drinking water supply, both surface and ground, considering the entire NCR (both urban and rural) as a single entity to minimise the demand-supply gap. Pragmatically, this would mean recharging the groundwater, which is the critical source of water in the region, recharge of aquifers and other traditional water bodies and so on.

## **2.12 Groundwater as an Alternate Source of Water in NCR**

In the NCR, the water resources were found to be totally inadequate to meet the demand of even the domestic sector with limited availability of piped water supply. The NCRPB review therefore suggested reducing the norms and standards to make them more realistic and feasible/achievable (Regional Plan 2021-NCR, 2013:5). All the major urbanised cities in the Delhi periphery (including NCT-D) such as NOIDA, Ghaziabad, Faridabad and Gurgaon are dependent on groundwater. In this direction, researcher's own work on Delhi gave an impression on how groundwater has been in domestic consumption or construction by digging illegal private borewells, especially in areas such as *Mehrauli*, in South Delhi.

From various media releases<sup>13</sup> it becomes evident that the entire NCR is predominantly dependent on groundwater as State's substitute to tap water supply, and is able to cope up with the rising demand for water in the region. All these press reports revolve around the rampant groundwater extraction and the consequent critically depleting water tables in the NCR. These media reports comprehensively give insights into the level and extent of groundwater usage in the whole of NCR in general.

The immediate impact of urban sprawl in NCT-D would undoubtedly lead to larger share of groundwater among users and could become a source of potential

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<sup>13</sup> For instance, please see reports published in *Hindustan Times*, Delhi edition, 27.6.2014; *The Hindu*, Delhi edition, 1.5.2015; *Hindustan Times*, Gurgaon edition, 4.3. 2014. These reports show how the groundwater is an important source of water demand in the NCR.

water conflicts in inter-sectoral demands in Gurgaon in times to come. The inter-sectoral increase in demand for water is due to the fact that the real estate industry or construction sector needs a large amount of groundwater for the construction purpose, leaving less for residential consumption, which is already in case of Gurgaon.

### **2.13 Gurgaon as a Separate Entity in NCR in Urban Water Governance**

NCR does not have a sole public water utility for the whole region because of the separate jurisdictions of city governance. Therefore, it does not have any stake in the governance crisis in water in other parts of the region. Gurgaon city characteristically has different set of water governance issues. From the analysis of the previous chapter and the present chapter, it is apparent that Gurgaon has localised institutional loopholes in water service delivery to residents. At present it appears more of a lack in the governance mechanism in dealing the water woes in Gurgaon.

Gurgaon water institutions are distinct and unique because they do not have a centralised public utility for water provision, and, at the same time, not a single authority is there to address the residents' grievances, generally which may not be the case with other cities. For example, Delhi has a central public water delivery institution called DJB. NOIDA has a sole authority on water and sewerage<sup>14</sup>. In case of Delhi and NOIDA, their respective websites clearly show the governance of water and sewerage management with all relevant data and information, whereas in case of Gurgaon, no such information is visible on the websites of either HUDA or MCG. Apparently, Gurgaon can be looked as a separate entity in NCR as a special setting in urban residential water governance.

No city in NCR has multiple water service providers than Gurgaon, which makes the present study interesting. None of the agencies in Gurgaon however provide data on water availability and distribution in their respective areas of jurisdictions. No data or information is available to water consumers on status of water supply in Gurgaon from the multiple Gurgaon authorities on their respective websites or in any other print form.

Therefore, one can infer at this point that despite State's involvement in water provision, the mechanism is not clear for the accountability of residential water

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<sup>14</sup> Please see [www.noidaauthorityonline.com](http://www.noidaauthorityonline.com) on water and sewerage.



management in Gurgaon. *The role of State in water governance thus appears rather suspicious in Gurgaon.*

## **2.14 Concluding Note**

From the analysis of current chapter, one can understand that how the urbanisation process in the core NCT-D would eventually lead to dearth of civic amenities in periphery cities such as Gurgaon. It is now evident that the urban sprawl *or* urban congestion in NCT-D has acted as an exogenous source for the emergence of water scarcity in Gurgaon.

This also shows simultaneously that the State has no concrete urban planning measures to tackle such unprecedented, uncontrolled, unmanageable and unsustainable urbanisation in terms of limited water resources, both at NCT-D and its periphery cities like Gurgaon. Given the scarce water sources, the analysis suggests that the general water scarcity is inevitable at one point of time or the other in Gurgaon. This chapter clearly shows that residential water scarcity in Gurgaon is an inevitable outcome of the massive expansion and urbanisation process that have been carried out in the entire NCT-D in general, and Gurgaon UA in particular, in absence of concrete State's urban policy and planning for the sustainable development of the region.

### **Chapter 3**

## **Governance Linkages to the Residential Water Scarcity in Gurgaon: A Media Content Analysis**

### ***Outline of the Chapter***

*One part of this chapter attempts to minutely examine the governance apparatus of Gurgaon, more so, in a historical framework. The other part tries to look at how the governance structure can be linked to the lack of basic amenities including water. Simultaneously, the media content analysis will try to understand how the State agencies lack the responsibility of water provisioning to the residents.*

### **3.1 Gurgaon's Transformation: Planned/Unplanned or Flexibly Planned**

From a rural non-descript prior to 1977 to a fastest growing urban centre in contemporary India, Gurgaon has been able to thrive in the midst of the wave of post-liberalisation economic growth and has increasingly become the major commercial hub of the country. “The key element in Gurgaon’s explosive growth was the State of Haryana’s lifting of restrictions on the land acquisition process and the unusual lack of local government in Gurgaon” (Rajagopalan and Tabarrok, 2014:201). “The land acquisition was meant primarily for non-agricultural uses” (Palit and Bhattacharjee, 2008; Morris and Pandey, 2009 *in* Rajagopalan and Tabarrok, 2014:201).

The process of “conversion of agricultural land to non-agricultural ones follows directly from the colonial-era Land Acquisition Act of 1894, which allows the Federal or the State governments or parastatal agencies to acquire land through the doctrine of ‘Eminent Domain’ for any ‘public purpose or for a company’ under Section 4(1)” (Rajagopalan and Tabarrok, 2014:201; Chatterji, 2013:274). “Similar provisions also exist in the recently introduced Land Acquisition Act of 2013.”(Rajagopalan and Tabarrok, 2014:201).

It should however be noted that “the term ‘public purpose’ is not defined in the Act, though such ‘public purpose’ is illustrated by heads such as provision of land for village sites, planned development, public offices, education, health and other schemes sponsored by the government...” (Singh, 2004:20).The public purpose of

land acquisition in Gurgaon by the State is preferably for the planned development in the NCR region.

“The State government of Haryana passed several laws, like the Haryana Development and Regulation of Urban Areas Act of 1975 and the Haryana Urban Development Act of 1977, to enable large-scale land acquisition for private firms to develop modern townships” (Rajagopalan and Tabarrok, 2014:203). “Since the land in Gurgaon was considered mostly unproductive and sparsely populated, few objected to converting it into non-agricultural use” (Debroy and Bhandari, 2009 *cited in* Rajagopalan and Tabarrok, 2014:203).

“Gurgaon’s recent development is well known as the brainchild of visionary real estate developer *Kushal Pal Singh*, founder CEO of DLF Universal” (Mital, 2007:49), “who in the early 1980s took advantage of developer-friendly building regulations (the Haryana Ceiling on Landholdings Act, 1972, and the Haryana Development and Regulation of Urban Areas Act, 1975) and ambiguous, malleable zoning controls, to acquire vast tracts of land directly from villagers in the then agricultural region of Haryana” (Gururani, 2013:12-13; Cowan, 2015:64). “Later the Haryana SEZs Act, 2005, made further exceptions and relaxation in the land acquisition process” (Rajagopalan and Tabarrok, 2014:203). “From the perspective of the State, the Haryana Urban Development Act, 1977, led to the establishment of HUDA, a unified agency that would co-ordinate town and estate planning” (Rajagopalan and Tabarrok, 2014:203).

In the contemporary times, “Gurgaon is a city which shows a sketch of rural-urban dichotomy” (Gururani, 2013:119). “The entire city of Gurgaon is materially and symbolically under construction, waiting to be developed, mapped, and unmapped” (Gururani, 2013:119). “As anyone will tell you, Gurgaon has been noticeably under construction for almost three decades now” (Gururani, 2013:119). This postulates the kind of urban planning that is under execution in Gurgaon. This also connotes the notion of the state of urban planning affairs in Gurgaon.

Shruti Rajagopalan and Alexander Tabbarak (2014) maintain that “Gurgaon was built without benefits of planning, and its failures – most notably poor and inefficient provision of water, sewage and electricity – are a warning.” According to them, “the failures all stem from high transaction costs, Gurgaon’s private developers

have simply not managed to ‘Coasean bargain’<sup>15</sup> and internalise externalities.” (Rajagopalan and Tabarrok, 2014:203). “It is clear from Gurgaon that cities need advance planning – a reservation of rights of way of water, sewage and electricity at the very minimum – but does the planning have to be provided by government which is often incapable of such foresight?” (Rajagopalan and Tabarrok, 2014:203).

Gurgaon, as described by Tathagat Chatterji (2013:274), “is a graphic manifestation of ‘fragmented-praxis’ emerging out of the selective ‘first-worlding’ of the urban space in developing cities, occurring as a result of the contemporary processes of neo-liberal globalisation.” According to a *New York Times* article, “...it is a miniature representation of post-liberalisation India, epitomising dynamism amidst civic dysfunction” (Chatterji, 2013:274).

Chatterji (2013:275) adds that “research on Gurgaon thus provides a different perspective – a more nuanced view on the role of non-State actors in India’s urban governance.” “To a considerable extent, pressing day-to-day problems due to planning and infrastructure deficiencies have differentiated the engagement pattern between the middle class residents of Gurgaon and the State authorities from other rapidly globalising cities of India”(Chatterji, 2013:275). “The graphic manifestation of tensions and conflicts is evident in the transformation of Gurgaon from a rural hinterland to the northern India’s prime elite ‘lifestyle’ destination, but this makeover is not linear, rather marked by place-specific social and political dynamics” (Chatterji, 2013:275).

Scholars like Shubhra Gururani, asserts that “Gurgaon manifests a different sort of planning that incorporates flexibility and systematically accommodates the desires and demands of the wealthy and political elites” (Gururani, 2013:121). By flexible planning, she means “a planning encompasses a range of political techniques through which exemptions are routinely made, plans redrawn, compromises made, and brute force executed” (Gururani, 2013:121). “It is not a random act, but a cultural logic that offers access to material and discursive maneuvers of State power, legal and extra-legal networks, and relations of influence”(Gururani, 2013:121). “Flexible

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<sup>15</sup> This term says that “if one assumes rationality, no transaction costs, and no legal impediments to bargaining, *all* misallocations of resources would be fully cured in the market by bargains.” Calabresi, 1968:68.

planning is a critical component of urban governmentality and is readily deployed to inscribe the social geographies of cities like Delhi and Gurgaon” (Gururani, 2013:121).

“Gurgaon as a whole, from the perspective of the plan (flexible) is an illegal settlement, not because it is surreptitiously occupied by the urban poor, but because it is boldly secured through class power, political allegiances, and more recently, global capital” (Gururani, 2013:121). Gururani (2013:121) termed Gurgaon settlement as “sanctioned illegality”. Gurgaon, in Anna Tsing’s (2005:28) words, “a frontier, an edge of space and time; a zone of not yet – not yet mapped, not yet regulated. It is a zone of unmapping; even in its planning.” “It is being imagined as it is being planned and unplanned” (Gururani, 2013:120). In a nutshell, according to Gururani (2013:120), “Gurgaon is a frontier of liberal capitalism.” According to Bhattacharya and Sanyal (2011), “Gurgaon is an experiment in city-making through PPP, a project which seeks to bypass the everyday obstructions and subversions of existing urban settlements and produce rational spaces for fertile for the production of global identity and capital” (Cowan, 2015:63).

### **3.2 The Monopolist State or the Passive State**

The Schedule 12 of the Constitution of India, created by the 74<sup>th</sup> Amendment Act, 1992, granted statutory status to ULBs as the third-tier in representative democracy and gave them authority over urban planning, including “regulating land use, developing roads and bridges, managing water supply and solid waste apart from other local governmental activities” (Rajagopalan and Tabarrok, 2014:203-204; emphasis added).

Gurgaon was administratively split from the Faridabad district in 1979. At that time, “Faridabad had a sound industrial base, had a municipal government, while Gurgaon had largely been barren, with no local government, public utilities or public transportation” (Rajagopalan and Tabarrok, 2014:201). Originally, therefore, “Gurgaon did not have either municipal government or any other ULB, responsible for the urban planning and public goods provisioning.”(Rajagopalan and Tabarrok, 2014:203-204).

Bibek Debroy and Laveesh Bhandari talks about – “Why no Municipal/ULB was created in Gurgaon in the initial years of its growth?” (Debroy and Bhandari, 2009:19). Based on the 1991 Census of the Government of India, Gurgaon did not meet the criteria of the Ministry of Urban Development for a ULB, nor did the State government of Haryana declared Gurgaon as an urban area – that is, “population of over 50 000 between the two consecutive Censuses of 1991 and 2001” (Rajagopalan and Tabarrok, 2014:204; Debroy and Bhandari, 2009:19). Therefore, “Gurgaon slipped through the cracks and was not categorised as an urban area until 2001, when the new categorisation mandated that Gurgaon create a Municipal body only in the year 2008” (Rajagopalan and Tabarrok, 2014:204).

The end result: In the absence of an ULB in Gurgaon, the CMO has the key veto power in all development activities in Gurgaon, “ranging from allowing land conversion to granting licenses to private land developers, which consequently landed in unwarranted nepotism, lobbying and rent-seeking practices” (Rajagopalan and Tabarrok, 2014:204). Importantly, the Chief Minister is also the chairman of HUDA. Hence, Gurgaon was governed by a monopolist, the CMO. “Centralised control reduced transactions costs and also incentivised the CMO not to raise the toll rates so high as to kill the goose” (Rajagopalan and Tabarrok, 2014:203-205).

Rajagopalan and Tabarrok (2014:203-205) maintain that this kind of institutional framework in Gurgaon has only resulted in monopoly corruption and serial, competitive corruption, ultimately landed into the institutional inefficiency and crisis, demands greater legitimacy and accountability of the State of its responsibility towards citizens (emphasis added). “This has eventually resulted in filing several public interest litigations and day-to-day protests by citizen groups such as residents’ welfare associations in Gurgaon” (Gururani, 2013:120).

It is maintained otherwise that “wise and forward-thinking political institutions and actors can greatly reduce the cost of the urban transition by planning and reserving, in advance of development, space for future streets, sewage, electricity, water and public parks” (Rajagopalan and Tabarrok, 2014:199). Shruti Rajagopalan and Alexander Tabarrok’s study of Gurgaon in 2014, account for the “failure of the State to provide essential public goods and urban planning and the extent to which the private sector can take over such provisioning in context of Gurgaon” (Rajagopalan

and Tabarrok, 2014:200). They assert that in Gurgaon, the private sector has been filling many gaps in civic amenities left by the failure of the State. Nevertheless, “gaps in water provision might be too large to be filled by the private sector.”(Rajagopalan and Tabarrok, 2014:200).

Debroy and Bhandari (2009:22) argues that “the high incomes of the residents of Gurgaon cannot solve some of the fundamental public infrastructure requirements like water, sewage, roads, transport, power” and so on, as the passive nature of the democratic governance institutions could not be substituted entirely by the private sector. Debroy and Bhandari (2009:22) add that “monopolistic markets cannot yield optimal outcomes”.

One basic reason is the absence of the competition in the private provision of public good in other areas/regions/states adjacent to Gurgaon. Therefore, such markets solutions cannot be efficient. On the other hand, the existence of a democratic institution such as the MCG, would also not have been necessarily a ‘first best solution’ if it was characterised by poor practices, lack of internal or external coordination with other civic bodies, low responsiveness to changing economic conditions and so on (Debroy and Bhandari, 2009:22; emphasis added).

### **3.3 Lack of Accountability, and Coordination among the State Agencies**

To begin this section in the words of K.C. Sivaramakrishnan, “in any city (in India), big or small, if the question is asked ‘who is incharge of this city’, the answer is painfully simple, ‘no one’.” (Choudhury, 2012:1). And such is the case with Gurgaon city. “In terms of ‘governance’ presence, Gurgaon falls into the jurisdiction of several planning agencies, namely, HUDA and DTCP at the state level, and MCG at the city level” (Goldstein, 2015:13).

As mentioned earlier, the MCG was created in 2008, however its authority and area of jurisdiction is limited. Only the old Gurgaon (about 35 Sq. km), which was previously under the Municipal Committee, and 37 village pockets, which were previously under the *panchayats* are now under the direct control of MCG (Rajagopalan and Tabarrok, 2014:206).

Rajagopalan and Tabarrok (2014:206) along with Goldstein (2015:13) reports that “on paper, once HUDA or private developers build civic infrastructure, they hand

over it to the MCG for its future maintenance, however there is no time-frame or agreement between the different civic bodies on how to account for the civic work undertaken.” According to Goldstein (2015:13) “...while there have been plans in the works to transition many of the responsibilities of the DLF Developers to the MCG, there is no set time-frame for when this will take place.” There is no clear link between the HUDA and the citizens on development and maintenance of HUDA areas.

Singh (2012) in Rajagopalan and Tabarrok (2014:207) writes that “if citizens wish to complain about the lack of water or sanitation, garbage disposal, and other infrastructure demands in HUDA areas, they have no redress mechanism, while the MCG has a clear redress mechanism, but no authority.” “HUDA is only creating new water boards and MCG to have more bodies to blame.”(Rajagopalan and Tabarrok, 2014:210). “It is always unclear in Gurgaon; which agency or department is the real responsibility of public utilities infrastructure maintenance lies upon” (Rajagopalan and Tabarrok, 2014:207; Goldstein, 2015:13).

“All planning appear to be overlapping, which has created governance crises for residents and the developers, seeking ‘an accountable’ public agency to enforce disputes” (Goldstein, 2015:13). “Ultimately, the State is most visible in the petition office and the courts” (Goldstein, 2015:13). Cowan (2015:63) maintains that “the State in Gurgaon utilises informal governmental logics to flexibly inscribe value to particular citizenships within a fragmented space, outsourcing authority to *de facto* sovereign actors who arbitrarily administer ‘conditional...situational’ (Ong, 2006) urban citizenships.”

Eventually, there is a haphazard nature of Gurgaon civic authorities which often culminates into inter-institutional conflicts and ends into ‘absolute no coordination’ on public goods provisioning, among which “water and sewage management are the biggest problems faced by Gurgaons’ residents” (Rajagopalan and Tabarrok, 2014:207; emphasis added). Therefore, the theoretical understanding of governance of Gurgaon reasonably points towards an urban space with improper vision of planning and lack of public services.



### **3.4 Water Shortages in Gurgaon in Media Reports**

From the literature just presented on the governance mechanism of Gurgaon, one can evidently observe the governance crisis in creating basic infrastructure in Gurgaon in line with the politico-economic transformations that have been taking place in Gurgaon, and continues to do so. The lack of civic amenities can undoubtedly be linked to lack of civic governance in Gurgaon that is manifested in one form or the other, which is also apparently evident from the literature.

Concerning these phenomena of unusual lack of governance visibility in Gurgaon, numerous media releases have appeared over a considerable time frame on the looming residential water scarcity. It has been observed that the numbers of such media reports mostly in the form of print media are innumerable. Interestingly, the researcher notices that no other city in India has been able to produce such insurmountable level of media-stressed reports on residential water insecurity in a fast urbanising city like Gurgaon.<sup>16</sup>

This, in a way fascinates the researcher to carry out an innovative social research methodology of media content analysis on water related problems of Gurgaon. The objective is to gain further insights into the governance linkages to water supply shortages.

The media reports in various forms have the tendency to not simply apprise the citizens the nature and seriousness of the problems of water (and other socio-economic, political issues or environmental hazards of emergent nature for immediate redressal by the State), but also to bring forth attitudes, voices, opinions and responses of various stakeholders in water governance.

Precisely, the most important stakeholder is the residents or the water beneficiaries of HUDA piped water supply in the present case. Henceforth, in the present chapter, the endeavour is to present a content analysis on water problems in Gurgaon, precisely taking inputs from a lot of newspaper reports on the issue. Before doing that, the basic content analysis is defined as follows.

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<sup>16</sup> A list of select media reports across prominent newspapers on growing residential water scarcity in Gurgaon has been provided in the bibliography section of the thesis.

### **3.5 What is Content Analysis?**

“Content analysis is described as the scientific study of the content of communication” (Prasad, 2008:1). Neuendorf (2002) describes content analysis as “the primary message-centered methodology” (Macnamara, 2005:1). At the best, “content analysis is a method of social research that aims at the analysis of the content; qualitative and/or quantitative of documents, books, newspapers, magazines and other forms of written material” (Ahuja, 2002:273). “Media content analysis is a specialised sub-set of content analysis, a well established research methodology” (Macnamara, 2005:1).

Berelson’s (1952) definition of ‘content analysis’ is considered the first definition of its kind. Berelson (1952:489) defines ‘content analysis’ as “a research technique for the objective, systematic and quantitative description of the manifest content of communication” (Krippendorff, 2013:19; Ahuja, 2002:273). “The word ‘communication’ here refers to available written material or print media...and the word ‘manifest’ means which is presented outwardly...and thus excludes implied meaning” (Ahuja, 2002:273). The word ‘manifest’ refers to “the visible actual parts of the texts in the document, that is, words, terms, phrases, sentences, paragraphs and so on” (Ahuja, 2002:274). “It involves counting frequencies of appearance of such context/research unit” (Ahuja, 2002:274).

Neuman (1997:272-273) elaborates ‘content analysis’ as a “key non-reactive (that is, non-intrusive) research methodology, and describes it as ‘a technique for gathering and analysing the content of the text.’” “The ‘content’ refers to words, meanings, pictures, symbols, ideas, themes or any message that can be communicated. The ‘text’ is anything written, visual, or spoken that serves as a medium of communication” (Macnamara, 2005:2).

Yet, in the words of Eckhardt and Ermann (1977), “as a qualitative technique, content analysis is directed towards more subjective information such as attitudes, motives, values...and thus “makes inferences about conduct, intentions, ideologies, sentiments and values of individuals and groups” (Ahuja, 2002:274).

In nutshell, usually basic content analysis first notes the frequency of certain terms - gathered from a lot of newspapers, and the analyser comments on the way

things are perceived by looking at certain patterns of word/phrase usage, also sometimes looking at changes or disappearance of certain phrase or words over time.

### **3.6 Media Content Analysis: The Methodology**

At the best, content analysis in the present analysis has been used to point to a discourse that emphasises the lack of any agency taking the responsibility of the lack/problems of urban infrastructure in water delivery in Gurgaon. The endeavour here is to draw a pattern in order to obtain inferences, objectively and systematically, by foregrounding the intention, attitudes and perceptions of the residents of Gurgaon regarding the domestic water provision by the State agencies.

For the purpose of carrying out the content analysis, a set of four prominent newspapers, which released news clippings/articles on the water shortages problems in Gurgaon were chosen. A sample of such newspaper reports (mostly from archives) have been drawn from the four widely circulated dailies, namely, *The Hindu (H)*, *The Times of India (ToI)*, *Hindustan Times (HT)*, and *The Indian Express (IE)*, exclusively utilised by the researcher.

The researcher has tried to collect ‘texts’ from these newspapers from the last five years (from the year 2011 till the end of May 2016) on growing water deficiency issues in Gurgaon. For the purpose of current analysis, from each of these newspapers, the sample has been limited to 10 (news clippings). Therefore, in total the number of such news items stands 40.

Further, on the methodological front, it is important to understand certain attributes of the ‘news’ that have been captured through newspaper reporting. For instance, the language of the news reports – whether it is critical or pro-State, who are the people addressing the problem (for example, poor or middle or urban elite class) and who are the people being addressed (for example, the State or the administrators, lawmakers or policymakers and so on).

Moreover, how the problem has been addressed (for example, by giving data or figures) and what has been highlighted? What is the authenticity of such news reports (for example, news supported by visual image/photography or not)? Which are the sections of audiences who read the news? Further, it is apparent that the researcher should have *a priori* knowledge on the subject of the news being reported, for

example, familiarity with cultural, social, economic, environmental, or ethical facets of the issue being highlighted.

### **3.7 Media Content Analysis of Residential Water in Gurgaon: The Data**

Various words/terms/phrases that have been used in the print media (2011-2016) on problems of water are tabulated in the following table 3(a).

**Table 3(a): Media Content Analysis of Residential Water**

Terms/Words/Phrases <i>Cluster: Residential Water</i>	Frequency of Context/Research Units				
	H	ToI	HT	IE	Total
Multiple agencies	4	3	3	6	16
Civic mess	5	4	6	5	20
Governance crisis	4	4	3	6	17
Accountability	4	3	6	3	16
Groundwater	5	7	8	6	26
Water shortage	5	6	5	8	24
Ban construction	2	3	6	4	15
Groundwater depleted	3	6	6	7	22
Agitation	2	3	1	1	7

(Source: Selected newspaper reports)

#### **Observation on Table 3(a)**

This tabular representation of the frequency of research units signify overall replicability of the words/terms/phrases across various newspapers chosen over the time. These words/terms/phrases cluster around the problems of residential water in Gurgaon. The table gives sufficient information to the researcher about the water related problems in relation to the area of case study, that is, Gurgaon.

If the reader looks at the frequency of occurrence of these words, it is clear that ‘water shortage’ and ‘groundwater’ followed by ‘groundwater depleted’ are most common in all reports. Further analysis will add to the understanding of how the lack of responsibility or governance leads to lack of water in Gurgaon. In this direction, the researcher studies various manifests of the words, or terms which have been repeatedly used across print media.

### **3.8 Analysis and Inferences from the Media Content Analysis**

(i) In the first place, researcher has tried to find out, who are the people addressing these words/terms. The researcher while gathering the ‘texts’, found that

mostly the residents, irrespective of various localities and socio-economic status have similar kind of perceptions on water problems in Gurgaon.

The news reports equally captured the voices on water problems from all segments of residents in Gurgaon, be it people residing in elite colonies like DLF Phases or *Shushant Lok* Phases or residents of HUDA Sectors, or those living in urban villages. In other words, residents living in both the Old and the New Gurgaon areas have similar resentment towards the State agencies.

(ii) Next, what kind of *perceptions* of these terms and words will be there on the mind of analyser while analysing the news reporting. In other words, it refers to the kind of impact on the mind of the analyser of the nature of words or terms that are consistently used in newspaper clips. On the basis of a comprehensive study of these news reports, the researcher categorises the respective words, terms and so on, through the following table 3 (b). This has been done as perceived by the researcher as either yes or no.

**Table 3(b): Perceptions Explicit from the News Reports**

<b>Terms/ Words/ Phrases</b>	<b>Social</b>	<b>Economic</b>	<b>Political</b>	<b>Environ- -ment</b>	<b>Admini- -strative</b>	<b>Planning</b>	<b>Ideolo- -gical</b>
Multiple agencies	no	no	yes	no	yes	yes	no
Civic mess	no	no	no	no	yes	yes	no
Governance crisis	no	no	no	no	yes	yes	no
Accountability	no	no	no	yes	yes	yes	no
Groundwater	yes	yes	no	yes	yes	yes	no
Water shortage	yes	yes	no	yes	yes	yes	no
Ban construction	yes	yes	yes	yes	yes	yes	no
Groundwater depleted	yes	yes	no	yes	yes	yes	no
Agitation	yes	yes	yes	yes	no	no	yes

(Source: Contents of the selected newspaper reports)

**Observation on Table 3(b)**

The researcher realises that most words/terms/phrases point towards the administrative and planning mechanism of the State. In other words, the water problems in Gurgaon could be more attributed to the State’s governance structure rather than other aspects of scarcity given in the table.

(iii) The researcher observes the *language* of the content of the news. Mostly the language is critical and is projected towards the lack of responsibility of the agencies, in the sense that people who are addressing their grievances are apparently not satisfied with the governance of water supply in their areas of residence. To put it differently, the residents' attitude regarding water shortage problems point out towards the incapacity of the State to create sufficient infrastructure for the water delivery. Therefore, these words/terms/phrases are used to address the problems of water to the State.

(iv) The *authenticity* of these keywords in the news report has been supplemented with various images of reality of water shortages. However, the researcher notes that not all news clippings were supported by a related image/photography.<sup>17</sup> The appended images are self-explanatory in nature and in content. These set of images signify various aspects of water scarcity in relation to Gurgaon, in the sense, that right from procuring water from tankers to raising voices against the administration to resolve the water problems.

(v) Finally, the most demanding part of the content analysis is to draw a *pattern* of these words/terms/phrases used in various newspaper reports. On minutely evaluating the news clippings on water problems, the researcher gains the insights on the pattern of certain words appearing again and again or for that matter words/terms/phrases disappearing over the time.

It has been found that as the researcher starts reading these news reports in chronological order across the newspapers chosen for the study, the term, 'water shortage' has consistently been used over time. Apart from it, terms like 'groundwater' and 'groundwater depleted' follow a regular pattern and appear in all newspapers. Also, words such as 'multiple agencies', related with another word 'civic mess' do feature regularly in almost all reports. Another word, 'ban construction' has regularly been used.

Interestingly, the researcher has found that none of these words/terms disappear in the said time frame. A very rare word 'agitation' has recently started appearing, which might be result of residents losing patience in conveying their

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<sup>17</sup> Some images related to water shortages in Gurgaon as appeared in the news clipping have been depicted as Appendix to the Chapter.

message to State about the growing water shortages. The pattern of these words/terms etc. infact, show the gravity of water related problems in the development space of Gurgaon.

To enrich and enhance the content analysis further in order to have a deeper understanding of seriousness of water problems in Gurgaon, the quotes often used in the news reports have been analysed by the researcher. The reason is that the researcher observes that the quotes carried by the news clippings conveyed a serious message about the plight of governance in Gurgaon w.r.t. public water. A few of the striking quotes are tabulated as follows.

**Table 3(c): Quotes used in the News Reports**

<b>H</b>	<b>ToI</b>	<b>HT</b>	<b>IE</b>
“Ill-mannered growth”	“Gurgaon on its deathbed”	“Gurgaon a concrete jungle”	“Haphazard development”
“Groundwater sucked”	“Insecure future”	“Parched Gurgaon” “Dark zone”	“Water crisis”

(Source: Contents of the selected newspaper reports)

**Observation from Table 3(c)**

These quotes have consistently been visible in most of the newspaper reports over the time. Infact, these are very strong words which indicate the kind of development space Gurgaon provides in contemporary times. In a sense, these prominent words are in conformity with the governance loopholes, which also show how the urban planning design fails to take care of the provision of amenities to residents. Interestingly, the researcher observes that the use of such harsh words to show the actuality of lack of governance in Gurgaon has never been used in any other water scarcity studies.

It is also interesting to note that Gurgaon, otherwise known by various epithets<sup>18</sup> mentioned in chapter 1, the quotes cited in above table 3(c) above just say the contrary. In other words, these quotes strikingly say in actuality that Gurgaon does not qualify to be one of these.

**3.9 Concluding Note**

This chapter clearly indicates that the transformation of Gurgaon and the simultaneous lack of resources while it grows were not envisioned by the State. The

<sup>18</sup> Millennium city, satellite city, globalised city, Singapore of India and so on.

underlying reasons are well established while analysing the governance structure and the methods of governance. Ideally, the story of Gurgaon presents how the State through its various actors of local governance have acted otherwise to make it a city of vested interests of the elites – be it the administrators or the private builders. More importantly, the media content analysis gives a clear picture to a reader of the repercussions of such unwarranted transformation of Gurgaon. On such repercussion is the residential water scarcity in light of abnormal growth of State functionaries.

Consequent to this is the fact that the multiple agencies has led to the creation of civic mess in Gurgaon. The discourse analysis also additionally indicates that residents of Gurgaon are not contented with the way civic managers are functioning. The residents aptly feel that there is no accountability of governance of civic amenities. In a sense, this chapter concludes that the lack of responsibility in provision of water to residents leads to water shortage crisis in Gurgaon. Further, it also shows how the development discourse of Gurgaon has been highly challenged by the governance linkages in creating infrastructure for its normal and sustained growth.

The chapter, therefore, indicates that there is a series of linkages which get manifested in one form or the other, rather originates in the very processes of governance mechanism of Gurgaon, to the growing residential water scarcity. This chapter eventually seeks an answer to the question, what will happen to a city which builds itself, and accommodates only the vested interests of a few. The answer lies first and foremost, with the way governance structure of the city is build upon, and the intention of the State in proper planning and execution in nurturing it.



Appendix

Newspaper Images for Water Shortages in Gurgaon



(Source: *HT*, Gurgaon edition, 27.3.2016, accessed on 22.6.2016)



(Source: *HT*, 12.5.2015, accessed on 22.6.2016, Photo courtesy: Praveen Kumar)



(Source: *The Hindu*, 29.3.2014, accessed on 22.6.2016)



(Source: *The Indian Express*, 2.10.2012, accessed on 22.6.2016)



(Source: *The Hindu*, 14.8.2015, accessed on 23.6.2016)



(Source: *HT*, 31.5.2016, accessed on 23.6.2016)



(Source: *HT*, Gurgaon edition, 24.5.2016, accessed on 25.5.2016, Photo courtesy: Praveen Kumar)



(Source: *HT*, Gurgaon edition, 24.5.2016, accessed on 25.5.2016, Photo courtesy: Praveen Kumar)

## **Chapter 4**

### **Determinants of Water Demand of Residents of Gurgaon: A Comparative Case Study with Delhi**

#### ***Outline of the Chapter***

*This chapter studies empirically, the HH water management methods and coping strategies in case of unreliability of HUDA piped water supply through a primary survey of selected residential areas of Gurgaon. Additionally, this chapter also attempts to understand water unreliability and coping costs of residents of Gurgaon and Delhi in a comparative framework.*

#### **4.1 Introduction**

From the analyses of preceding chapters, it is evident that the domestic water provisioning in Gurgaon is rather a complex phenomena. Water supply to residents of Gurgaon is surrounded by multiple institutions and sources (both public and privately managed). HUDA is the nodal agency of the State engaged in water delivery to residents of Gurgaon.

One should, however, remember that HUDA is not an exclusive water utility or water board, rather it is a State-sponsored city development agency of Gurgaon, with water delivery to residents as one of its various assumed roles. On one hand, ‘supply deficit’ is one of the problems identified in maintaining prescribed norms and standards of water supply to residents, which is at standard, should be 225 lpcd. On the other hand, understanding water demand management strategies by residents is necessary, while scrutinising effectiveness of urban water governance methods of the State in Gurgaon.

Apparently, institutional bottlenecks in water provisioning of residential water would lead residents to procure domestic water from alternate source(s). The present chapter is an attempt to explore the domestic water management alternatives of residents of Gurgaon in case of deficit water supply by the State, in a case-study fashion. At the outset, a broad picture of sources of household water and location of sources of water in the Gurgaon district is presented from Census data of 2011.<sup>19</sup>

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<sup>19</sup> Please see Appendix to the Chapter.

It has been observed from Census data of 2011 of Gurgaon district on basic amenity – water, that 60.3 percent of the HHs in Gurgaon has access to treated tap water supply source, which is not impressive, given the rate of urbanisation and population growth that have taken place. While the urban Gurgaon has 66.6 percent of treated water supply from tap water, it is 43.8 percent in rural Gurgaon. Characteristically, a significant percentage of 23.5 in urban and 25.3 rural Gurgaon are dependent on tube-well/bore-well.

Location wise, 80.2 percent of the drinking water sources are within the premises of the residents in Gurgaon, out of which 86.6 percent are in urban Gurgaon and 64.3 percent are in rural Gurgaon respectively. The data for sub-regions in Gurgaon is also presented in table. These aggregate figures however neither reveal the pattern of water usage by residents nor does it convey the reasons of widespread phenomenon of water deficiency in Gurgaon. There is, therefore a need to generate primary data to arrive at any kind of policy arguments.

#### **4.2 Comparing Gurgaon with Delhi**

Gurgaon and Delhi, as mentioned in chapter 1, have separate jurisdiction of water governance in NCR. It has also been deduced that water governance methods in each of these cities are entirely different from each other despite being part of the larger NCR. For instance, Delhi has a centralised water utility/board called DJB, while Gurgaon has multiple agencies. In current study, researcher feels that, it would be analytically fruitful to understand residential water governance problems in these adjoining two cities.

This exercise would primarily be based on the results of researcher's earlier endeavour in the form of M. Phil Dissertation (2011-12), taking Delhi as the case study in residential water governance. The researcher did a primary survey in selected residential areas of Delhi, in order to understand whether the residents are responsive to price/tariff changes in terms of various coping costs to make DJB piped water supply reliable (both quality wise and quantity wise).

In this direction, the researcher believes that the primary survey findings from the case studies of Gurgaon and Delhi (though sampling methodology is different, as explained in subsequent analysis) will aptly lead to understand the nature and

magnitude of coping costs at times when there is water supply unreliability created by respective public agencies. In other words, to communicate the results of Gurgaon survey, Delhi case has been taken as the best alternative for developing a larger framework for effective water governance in Gurgaon.

The comparison of Gurgaon and Delhi is, therefore, based purely on the researcher own primary work on both the cities related to residential water shortages. The details of the comparison of a set of essential parameters on the demand-side of Gurgaon and Delhi have been presented in section 4.11 onwards. For now, the researcher focuses on the primary field study of Gurgaon.

### **4.3 Need and Purpose of Primary Survey**

Occasionally, in several media releases, certain official figures regarding quantum of water supply are constantly being released by Gurgaon authorities. These figures as appeared in newspaper clippings/articles show the instances of water shortages, advocate State's presumed role in water governance in Gurgaon<sup>20</sup>, also, at the same time show the State's negligence of the gravity of water scarcity, from residents' perspective. The researcher understands that in current study, it is important because the fragments of information received through this route (media reports) only give the factual picture of residential water scarcity in Gurgaon.

While studying 'residential water' in Gurgaon, it is found that there is dearth of aggregate official data on the volume of treated water availability for distribution, and coverage in different parts of the city, the broad water supply and demand estimate for the current population and also the projected/estimated figures for future population of Gurgaon and so on. The official websites of HUDA, MCG or erstwhile PHED, or DTCP, or any other official report, did not reveal/release concrete data on current and future water supplies in location specific Gurgaon. Significantly, there is no official published information on water tariffs the residents are being charged for water by HUDA. Therefore, the basic purpose of understanding the depth of water

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<sup>20</sup> From the analysis of several news reports it appears that HUDA is normatively trying to reduce the scarcity burden on its water beneficiaries. For instance, the researcher has found that HUDA is all set to boost water supply to the New Gurgaon areas by additional supply of 5-6 MGD by installing 16 new boosting stations as on 28.5.2013 (*HT*) or the new pipelines of 1 200 mm will cater water needs of five lakh HHs by augmenting the water supply by 60 MGD from the existing 43 MGD as on 27.12.2015 (*ToI*).

scarcity from the residents' point of view would not be fulfilled if there is no availability of household level data.

However, the collection of HH data of all the households in various residential areas was not feasible in the present study due to constraint of time and the monetary costs associated with the field survey. Therefore, for the purpose of this study, a purposive or selective, non-random sampling was designed and carried out. For the field work, only a few areas/colonies of Gurgaon, based on certain characteristics of the population of these areas, were selected.<sup>21</sup>

The study of water in Gurgaon poses another challenge as most of the colonies are developed either by HUDA or by other private builders or are individual housing colonies. In between these huge multi-storey's private residential enclaves, there are cluster of settlements inhabited by the native people of the region, better classified as urban villages, along with other private un-regularised/un-authorized migrant colonies. It implies different residential typologies.

#### **4.4 Identifying Water Beneficiaries of HUDA Piped Water Supply**

The present analysis of water governance in Gurgaon is centred on water supply and demand and distribution of HUDA piped water to residents. It is utmost important to identify the beneficiaries of HUDA piped water, and thus also to identify the areas being served by HUDA piped water network system. In this context, it should be noted that not all blocks of Gurgaon district are served by the HUDA piped water network (CSE Report, 2011:119; 2012:69).

Accordingly, therefore, the residential areas within Gurgaon for the purpose of study have been deliberately selected by the researcher. The selection is based on the fact that HUDA supplies domestic water through piped networks in Old Gurgaon areas, and in New Gurgaon areas where much of the city's growth and expansion have been taking place over the years, either by the HUDA, or otherwise by private developers, and where the instances of water shortages occur more frequently.<sup>22</sup>

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<sup>21</sup> The field work was carried out from November 2014 and continued (in phase-wise) till the half of March 2016.

<sup>22</sup> This is evident from the media content analysis in the preceding chapter.



More precisely, major residential typologies – namely, HUDA Sector colonies, MCG administered areas (Old Gurgaon and Urban villages), and Private elite colonies (New Gurgaon) areas, that is, South-East of NH-8, and migrant colonies are taken into consideration while studying the impact of water shortages upon residents. The analysis would enable one to look at how different segment of residents in respective residential areas are managing water or coping up with water shortages.

#### **4.5 Primary Survey Methodology: Data and Survey Design**

An attempt has been made to obtain primary data from the residents of Gurgaon for a set of parameters through framing ‘structured questionnaire-based-interviews’<sup>23</sup> of residents by the researcher. The questionnaire is characteristically divided into two parts. The first part is about HH socio-economic and demographic profile. The other part is precisely about the HH water amenities and water-use behaviour. The set of broad parameters for empirical analysis are as follows.

- (a) Information on residents’ current source/access to water.
- (b) Average consumption of water per HH daily.
- (c) HH monthly income.
- (d) HH average monthly water bill for consumption of water from HUDA.
- (e) HH average monthly expenditure on all other sources of household water demand.
- (f) HH coping strategies for the deficit water from the State, if any.
- (g) HH domestic water purification technologies.
- (h) Residents’ awareness of water scarcity in Gurgaon.
- (i) Residents’ attitude and perception against the ‘State’ in water provisioning.

The field survey has been designed to include samples from four different sets of distinct and visible residential areas in Gurgaon, namely, (i) the private builders’ colonies like DLF City Phases, (ii) HUDA residential sectors, (iii) urban villages, and (iv) the private un-regularised/migrants colonies. The selected private builder’s

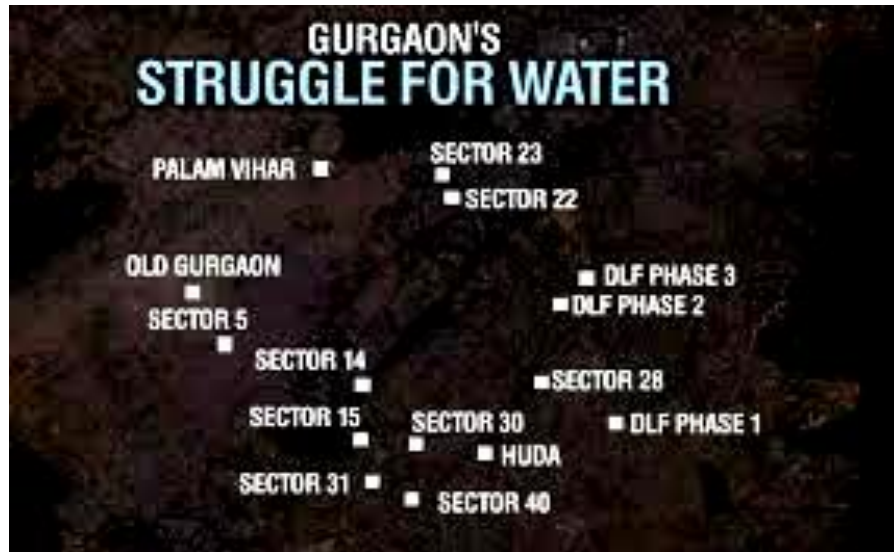
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<sup>23</sup> Please see Annex.

colonies for the purpose of carrying out field surveys are – (a) DLF City Phase I, (b) DLF City Phase II, and (c) DLF City Phase III.

These areas or localities are selected on the basis of the results of media content analysis, where household water shortage issues appear more frequently in media press releases. Map 4(i) shows the areas which have been suffering water scarcity the most in recent times.

**Map 4(i): Areas Suffering Water Scarcity the Most**



(Courtesy: <http://www.ndtv.com/gurgaon-news> accessed on 12.9.2014)

This map indicates severe water scarcity right from Old Gurgaon areas to New Gurgaon areas, adjoining Delhi. Apart from these, a few HUDA residential Sectors like 4, 23 and 104, have been selected for the field study. Urban villages like *Dhanwapur* and *Nathupur* (both under the jurisdiction of MCG) are also chosen for primary survey as part of the case study. The reasons for selecting HUDA localities and these two urban villages are provided in detail in field reports.

#### **4.6 Sample Size and HH Sampling**

In present analysis, as said before, purposive or selective or judgmental or non-random sampling technique has been used. To put in other words, the empirical study is qualitative research oriented study as “*qualitative data are often textual observations or categorical that portray attitudes, perceptions or intentions of*

*affected communities.*”<sup>24</sup> “Purposive sampling, though, is not statistically representative of the entire population, could provide arguments for the deeper understanding of the impact of amenities shortages upon communities and generalisable for the entire population” (Palys, 2008:697-8). “This method is usually used to choose no more than 30 units from each area of selection.” (Elder, 2009:6).

In present study, purposive sampling technique has been used primarily for two reasons, (i) the population listing of private colonies like DLF Phases and unregularised migrant colonies are not available to the researcher at the time of field study, which restricts researcher to carry out probability sampling, (ii) there is ample prior knowledge and information with the author of water shortages in various residential areas of Gurgaon being served by HUDA water supply. On a prior judgmental basis, the researcher feels that even if the population listing is not available, the study of water in various residential areas is important to understand how different segments of population perceive HUDA water supply.

For the purpose of sampling, the researcher has considered respondents from all the chosen areas for the study as one universe – as water demanders of HUDA piped water. Broadly, residents from four heterogeneous classes of residential communities have been identified as water demanders for the purpose of extracting primary data.

That is, for the purpose of sample collection, *first*, residents living in private builder’s posh colonies, like DLF blocks/colonies, are classified as homogenous community, *second*, residents of urban villages like *Dhanwapur* and *Nathupur* have been classified as one community, *third*, residents of privately developed unregularised areas mostly by migrants, like *Surat Nagar Part II* as one community, and *finally*, the HUDA Sector colonies as one community.

On an experimental basis in the primary survey, the total number of HH surveyed was 270 in all from the areas chosen for the study. Equal number of samples, that is,  $n=30$ , has been collected from each one of these areas chosen. Many HHs, especially in the posh-DLF Phases were found reluctant in sharing information

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<sup>24</sup> WFP, *Emergency Food Security Assessments, Technical Guidance Sheet No.8*, Introduction to qualitative data and methods for collection and analysis in food security assessments. February 2009. p.2.

with the researcher, and refused outrightly to give responses. After repeated visits and delayed appointments, some residents in these elite colonies were able to cooperate.

Most of the residents in posh private builders' colonies advised the researcher to meet private civic maintenance bodies meant for water and waste management in these colonies. The private security agencies functioning in the various blocks of DLF Phases and the RWAs coordinated with researcher by convincing the residents to seek appointments.

It was indeed difficult to convince residents about the usefulness of such studies. In areas like urban villages and private un-regularised colonies, the researcher himself filled-up the questionnaire on behalf of residents after having personal interactions, interview sessions, focused group discussions with the respondents and on-site observation.

(i) The area-wise distribution of the respondents has been given in table 4(a) as follows.

**Table 4(a): Area-wise Distribution of Total Samples**

S No.	Areas Surveyed	Community	No. of HHs
1	Various Blocks of Posh-DLF City Phases I, II and III	A	30×3=90
2	HUDA Sectors 4, 23 and 104	B	30×3=90
3	Urban Villages ( <i>Dhanwapur</i> and <i>Nathupur</i> )	C	30×2=60
4	<i>Surat Nagar</i> Part II (Un-regularised)	D	30
<b>Total</b>			<b>270</b>

(Source: Field Survey, 2014-15, 16)

(ii) Data on monthly HH income has been depicted in table 4(b). Income of HHs are specifically categorised into four class-sizes or income-brackets, provided in the questionnaire, calculated and tabulated as follows.

**Table 4(b): Monthly Income of the Sampled HHs**

S No.	HH Income (in ₹)	No. of HHs, Community-wise				Total HHs
		A	B	C	D	
1	0 - 50 000	5	19	23	30	77
2	50 000 - 100 000	15	39	37	0	91
3	100 000 - 150 000	40	22	0	0	62
4	150 000 - 200 000	30	10	0	0	40
<b>Total HHs</b>		<b>90</b>	<b>90</b>	<b>60</b>	<b>30</b>	<b>270</b>

(Source: Calculation using data from the field survey)

**Observation on Table 4(b):** It is evident that community A has the highest monthly income in the highest two income class size. Community B has a moderate income distribution relative to different income classes, followed by Community C, and finally Community D has the least monthly income. However, “it is maintained that expenditure on domestic water is a very small proportion of the HH total budget” (Osei-Asare, 2004:51). Also, “how much the maximum expenditure can a HH bear on domestic water, say monthly, will typically depends upon the maximum W-t-P for water” (Osei-Asare, 2004:51).

Another way of looking at the homogeneity in classification of a particular community of residents is based on their HH’s monthly income in terms of various income brackets – a *proxy variable* for standard of living, on the assumption that HHs having higher income would have higher propensity to spend on necessities like water. Accordingly, one way of classifying various communities in the present study could be based on income.

#### **4.7 Field Reports**

Since the primary survey has been planned and carried out in different areas based on four major residential communities (*classified as urban villages, HUDA sectors, private builders’ colonies, and private un-regularised colonies*) of Gurgaon, separate field reports have been prepared accordingly, and are eventually integrated to arrive at conclusions drawn from the field study. The objective was to enquire about the mechanism and management of domestic water from the residents living in these areas. A secondary objective was to understand the changing pattern of household water usage in these areas in the wake of urbanisation in Gurgaon. The detailed field reports are as follows.

##### **4.7.1 Field Report I**

In the first phase, a primary field survey was carried out in the following areas of Old Gurgaon. These areas are, namely, *Dhanwapur* village (under the jurisdiction of the MCG, Ward no. 8, Zone-1/West), HUDA Sector 4, 104 (Zone-1/West), and 23 (Zone-2/North), and *Surat Nagar* Part II (Zone-1/West) (*private un-regularised colony*). HUDA Sector 4 is the first and the oldest sector of Gurgaon. These areas lie in the

westernmost part of Gurgaon region, which are accessible from the Gurgaon Railway Station.

*Dhanwapur* village is very close to *Basai* village where the HUDA's WTP is in operation, linked to the GWS canal. Apart from WTPs at *Basai*, there is a sewage canal leading to STP in *Dhanwapur* village. *Dhanwapur* village was chosen as a part of case study because of this primary reason.

The *Dhanwapur* village has been witnessing changing pattern of settlements over the years. From a rudimentary rural settlement to glittering new buildings coming up over the years, no major signs of agriculture or animal husbandry were seen. It is therefore an urban village. One can see the massive constructions going on in and around *Dhanwapur* by private builders. Geographically, as revealed by the residents of *Surya Vihar* (*Dhanwapur* village), these areas are low-lying areas and close to HUDA's WTPs at *Basai*. Naturally enough, by the virtue of closeness of this village, it has the natural advantage of appropriating water first from the HUDA pipelines, with high water flow in pipes. The residents of *Dhanwapur* exposed that they have illegally connected to HUDA main pipeline with a community initiative, with no water metering so far done by the government.

The residents of *Dhanwapur* village have also installed private submersible pumps in their homes to access groundwater. The groundwater however is not utilised for drinking and cooking because of increased salinity. The groundwater is put to other uses like washing clothes, utensils, cleaning homes, washing cars and so on. The researcher asked the residents about the causes of high salinity of groundwater. They said that Gurgaon has received negligible precipitation over the last 30 to 35 years.

As a result, unlike people in earlier days used to extract groundwater for all purposes including agriculture and allied activities, the rate of groundwater extraction was much higher than the natural recharge of groundwater, and therefore, the water level has gone down much below. Further the quality of soil in these areas naturally makes groundwater saline. The groundwater has become saline over these years. However, as the residents claim, the degree of salinity varies from zones to zones. Another reason is the HUDA's STP in *Dhanwapur*. The sewage water passing through the sewage canal naturally gets mixed up with the groundwater making it

more saline. Moreover, though the water level has gone up, that water cannot be used for drinking or cooking.

The private un-regularised colony, developed by migrant workers, *Surat Nagar Part II*, is inhabited mostly by the people from other states, like West Bengal, Uttar Pradesh, Odisha and Bihar. These colonies are in the process of regularisation by the government. Therefore, these areas will also be provided with the basic civic amenities like electricity, water and sewerage system if regularised. These colonies are highly populated, mostly dominated by the daily wage-earning poor households or small businesses. Most of the households in these colonies have submersible pumps in their houses to meet water requirements, or otherwise they have to transport water from neighbours. *The groundwater again here is saline but used for all purposes.*

HUDA Sector 4, 23 and 104 on the other hand are connected with HUDA's water pipeline network and are mostly metered connections, or otherwise pay flat rates on unmetered connections. Most residents have installed RO system of water purification. The residents pay monthly water bills to HUDA. HHs have constructed underground or roof-top water tank storages. In times of water shortages they call private suppliers to meet the additional demand.

*However, the residents of Sector 4, stressed on the fact that the private water suppliers in the area supply water through tanker trucks, who illegally procure water from GWS canal, and have their private WTPs and supply drinking water in the form of packaged drinking water bottles as per the demand across areas and localities.*

The residents claim that such private suppliers are numerous and can be easily contacted in case of emergency. "The emergency occurs basically in summer months as the rate of treated water supply falls short of demand, due to evaporation rate increase of the canal water, erratic power supply leading to suboptimal utilisation of the WTP, and hence short supply" says *Dilbag Singh*, a resident of HUDA Sector 4.

Residents say that the upcoming new private residential/commercial complexes in the area will be requiring additional water from HUDA. Each of these huge residential buildings would accommodate around 50-70 families, which is as good as creating a new urban village in just one building. Like this there would be

many such buildings in the area that would require more water from HUDA with additional burden on water supply in future.

**Observation from the Field:** The study of residential water governance in and around *Dhanwapur* is full of complexities. It has been observed from the field survey that these areas covering around 4 to 5 km radius have mixed blend of public and private and/or community water governance. The natural advantage of these low lying areas being adjacent to HUDA's WTP makes them less water scarce. However, the other methods of water procurement cannot be ignored.

Though the State authority –HUDA's distribution of water to its Sectors 4, 23 and 104 is in place, the researcher notes a few striking points in this regard. *First*, not all the HHs are connected to HUDA water supply pipelines. *Second*, the residents at the community level, primarily of *Dhanwapur* are resorting to procure water directly from HUDA's main water pipelines, without any metering of the consumption by the State. *Third*, there is illegal appropriation of water *en route* by private suppliers from the GYS canal towards the *Basai* WTPs, and *fourth*, residents will demand water from HUDA in future due to massive residential expansion currently seen in the areas surveyed. Added to these is the fact that there is a clear case of *free riding* in HUDA supplied water by some groups in these areas.

#### **4.7.2 Field Report II**

In the next phase of the field study, *Nathupur* village was considered for the purpose. *Nathupur* village is located to the South-East of the New Gurgaon (NH-8) areas and lies in vicinity of DLF Phase III. So the location of *Nathupur* village is located completely opposite to *Dhanwapur* village in Gurgaon. It comes under the jurisdiction of MCG (Ward 35, Zone-3/East). The village comes under the Gurgaon *Mandal* of the Gurgaon district. It is a large village comprising various socially heterogeneous population. The researcher enquired about the subject of interest through an interaction with the residents of the village and simultaneously accomplished the objectives of the study through the filled-in questionnaires. *Nathupur* village presents altogether different picture of water management by residents in Gurgaon.

For instance, *Sartar Gujjar*, who was also an *ex-sarpanch* (head) of the village, says that "*Nathupur* village is sandwiched between the developed posh areas



like the DLF City Phases, face perennial problems of potable water among other civic deficiencies.” The residents claim that not only *Nathupur*, but also neighbouring villages like *Chakkarpur*, *Sikanderpur*, and *Badshahpur* lack serious civic amenities. *Sartar Gujjar* further says that “the government lacks planning for the improvement in basic infrastructure in these villages.” The villagers feel that they have been grossly neglected and have been pushed to shrinking peripheries with over-populated villages as compared to their other urban counterparts, the private developers’ colonies.

The residents say that their major source of livelihood is the income that comes from renting their properties (land and buildings). Therefore, one can visualise ‘rent economy’ in this village. However, they also maintain that their high rental income cannot solve the problems of water as the population of the area is growing at a rapid rate, and adding more and more housing every year. Unchecked and unauthorised housing in *Nathupur* and adjoining areas are spreading at a very fast pace relative to water availability. The government is simply not able to stop illegal constructions. Therefore, MCG cannot monitor or control water delivery to residents because there are many illegal water connections in the area.

Some elderly residents said that the groundwater in *Nathupur* and adjoining areas to the South-East of NH-8 right from the *Sukhrali* village is sweet and fit for drinking. The private builders however have transported all the groundwater in the area initially for the creation of real estate over the years, and now they transport water to satisfy the thirst of residents living in posh colonies, leaving water table depleted to about 300 feet. *Rajesh*, another resident of the village, informs that though some of the HHs currently are connected with the HUDA water supply network, but complain of the intermittent supply with low tap pressure is frequent. Moreover, he also added that they are mainly dependent on tanker-truck water supply (sometimes 2 water tanker in one day), or groundwater access through bore-wells, and those residents who do not have bore-wells have to transport water from neighbours.

The residents further said that groundwater in the village used to be fit for drinking (not saline). But, now the scenario is different, as access to groundwater becomes difficult simply because no water is available at several depths. The residents claim that the village is expanding fast and new buildings are coming up at a

fast rate. Therefore, they feel that in future no water will be available unless the State intervenes.

**Observation from the Field:** At this juncture, few points are important to be understood, which explicitly emanate from the study of the *Nathupur* village. The researcher observes the following. *First*, the HUDA piped water supply is inadequate to fulfill residents demand. *Second*, the water shortages in *Nathupur* village have linkages to the development of posh private developers' colonies. *Third*, groundwater, initially fit for drinking and cooking, has been over-exploited. *Fourth*, the study of *Nathupur* shows water conflicts in the sense that the construction industry has left little groundwater for the original inhabitants of the village areas. And *finally*, the residents want the State to intervene to stop further *free-riding* by the private developers in the limited groundwater stock in the area.

#### **4.7.3 Field Report III**

In the last phase of the field survey, information from the residents of the private developer's colonies – DLF City Phases I, II (under MCG, Ward 34, Zone-3/East), and Phase III (under MCG, Ward 35, Zone-3/East) were taken for the study. Water in these areas is provided by the State through HUDA.

As mentioned earlier, these areas are governed by private civic bodies for nearly all purposes – be it water supply, power supply, garbage disposal and so on, and have strong RWAs for redressal of residents' grievances. *Navin Raj Khosla*, CEO of an MNC in Gurgaon and President of RWA of block E of the DLF City Phase I said "The main problem in Gurgaon civic governance is that there is no single window readdressal authority for resolving residents' day-to-day civic related issues."

He further said that "Once the RWAs make any complaint or proposal for improvement in water, power or sewage, there is no time-frame and not a single authority to resolve it, rather bureaucratic lapses lead to absolute no solutions to the problem addressed." A resident of block M of DLF City Phase II told the researcher that water shortages are very common problem in the area. Most of the time, the problem arises because of the maintenance and repair works undergoing in HUDA pipelines, and in summer due to inadequate supply by HUDA WTPs.

A resident of DLF City Phase III informs the author that “the incapacities of the government towards the proper functioning and service delivery of amenities has led to creation of a number of alternate city improvement initiatives such as, *I am Gurgaon, Gurgaon First, We the People, Gurgaon Citizens’ Council, Mission Gurgaon Development* instituted by various RWAs of Gurgaon, and independent citizen groups.”

Specifically, with respect to water provisioning in these areas, some residents reveal the fact that, “they have enough capacity to buy water for their needs, but the concretisation of Gurgaon has left no water, had absolutely no idea of water shortages while shifting to Gurgaon from Delhi a decade back, amongst other problems.” However, the residents emphasised that the private maintenance bodies in the respective blocks have taken the responsibility to look into the matters related to any shortages of water. Therefore, they hardly care for the water deficit from HUDA, because the private body fills-up the deficit gap from other sources. For consuming water, the residents pay a *lumpsum* amount to the private agency on monthly basis. The private agencies in these colonies are sponsored by DLF (in respective blocks) for the convenience of the flat dwellers.

The researcher enquired about the alternate source of water supply in times of crisis in these posh enclaves, the private agencies did not give any conclusive answer. The agencies inform the researcher that each housing flat across blocks are connected with water pipes with a big underground water storage tank meant for storing the HUDA water, and is supplied to HH in each block. In times of chronic shortage of water, the agencies call tanker water for meeting the needs of the residents, for which the residents are bound to pay additional amount. Private tanker water is mainly used for laundry, pantry and cleaning floors as found in the primary survey in these colonies.

**Observation from the Field:** The study of water procurement and management by residents in these elite colonies leads the researcher to the following observations. *First*, the private block maintenance bodies functioning in these areas were not willing to reveal it clearly that besides HUDA water, that the residents are also provided with water from bore-wells (groundwater) and from private tankers (in emergency times).

*Second*, the water bills that the residents pay every month to their private (block) maintenance bodies, is a *lumpsum* amount, and are unaware of how much they actually pay or should actually pay to HUDA. *Third*, the field study gives interesting water governance in these areas – HUDA water flows till the filling up of the storage tanks, and beyond that the water supply is controlled and supplied by the private agency. And, *finally*, the residents demand ‘accountable’ governance authority for seeking their civic amenities related grievances.

On the basis of three separate phases of field works and subsequent field reports, the researcher has integrated the intricacies of domestic water management in all the areas surveyed. That is, the researcher has tried to find out common/uncommon in all these distinct residential settlements with respect to water procuring methods *vis-a-vis* institutional arrangements.

*First*, among all these surveyed areas, most communities are currently resorting to groundwater for their water needs in one way or the other; the HUDA water is not adequately or uniformly available to all communities. *Second*, one can infer here that there are existing intra-areas/zonal water conflicts in the same region (Gurgaon).

It is due to the fact that, on one side there exists *free riders* of water (the case of areas in the vicinity of *Dhanwapur* village), and on the other side, the residents want State to intervene to control *free riding* in water or to stop water transport from village areas towards the private builders’ colonies (the case of *Nathupur* village).

#### 4.8 Primary Survey Details

(i) Based on the results of primary survey, a summary of community-wise source(s) of domestic water has been presented in table 4(c) below.

**Table 4(c): Community-wise Sources of Domestic Water**

S No.	Sources	Community			
		A	B	C	D
1	HUDA	yes	yes	yes*	no
2	Groundwater	yes	yes	yes	yes
3	Private tanker	yes	yes	yes	yes
4	Packaged drinking water	yes	yes	yes	no

(Source: Calculation using data from the field survey)

\*Non-uniformity in HUDA piped connections to all the HHs surveyed.

**Table 4(d): Domestic Water Source  
(%) of Sampled HHs**

<b>S No.</b>	<b>Source</b>	<b>HHs</b>
1	Within residence HUDA tap water supply (metered + unmetered connections) (inclusive of all areas)	52
2	Groundwater through bore-wells (inclusive of all areas)	28
3	Private water tankers (inclusive of all areas)	12
4	Packaged drinking water bottles from open market (inclusive of all areas)	8
<b>Total</b>		<b>100</b>

(Source: Calculation using data from the field survey)

**Observation on Table 4(c) and 4(d):** It should be noted at this point that the primary survey characteristically distinguishes between the perennial source and the occasional source (s) of HH water. For instance, in principle and in practice, HUDA water supply has been taken as perennial source of residential water in Gurgaon, while others are subsidiary sources, only demanded in deficit of HUDA water.

A significant proportion of total HHs surveyed have access to HUDA piped water supply, except the community D. Interestingly, most depend heavily on other mentioned sources as well. This corresponds to the fact that the State's supply of water is inadequate or unreliable. Therefore, at times, the HUDA water supply is not satisfactory, the private water supply complements with the public water supply.

Groundwater contributes 28 percent of water supply according to the primary survey within the sampled communities. It should be noted that though groundwater is fast dwindling, it contributes an appreciable percentage of the total water supply to various communities. In addition, 20 percent of residents also access water from secondary sources like private water tankers and packaged drinking water purchased from markets (combined).

(ii) It becomes important to evaluate the *average* monthly water bills of the communities on HUDA piped water supply. It is noted that Community A pays water bills to HUDA *via* private block maintenance bodies, and therefore pays a certain proportion of their water bills as maintenance charges to private civic bodies. It is worthwhile to mention here that Community A does not have clarity on how much water bill they actually pay to HUDA. From the primary data collected, it has been calculated for all communities as follows.

**Table 4(e): Average Monthly Water Bill of HUDA Water<sup>25</sup>, Community-wise (in ₹)**

Agency	Community			
	A	B	C	D
HUDA	3 000	158.5 or 52	154.62 or 52	n. r.

(Source: Calculation using data from the field survey)

**Notes:** n. r. stands for not reporting HHs. For Communities B and C, both the volumetric rates, and the flat rate, currently exist.

**Observation on Table 4(e):** Relative to the incomes of the HHs, monthly expenses on HUDA water is negligible. Community B revealed that they pay water bills on monthly basis to HUDA. Not all the residents in community C have metered connections, and hence the estimate given for HUDA water bills in table 4e is exclusive of residents of *Nathupur* and *Dhanwapur* combined. Infact, the water bills stand ‘0’ for *Dhanwapur* residents and a proportion of the *Nathupur* residents. For community D, water bill is ‘0’.

(iii) Next, an attempt has been made in the primary survey to estimate the average expenditure of the communities on supplementary sources of domestic water monthly. This has been calculated as follows.

**Table 4(f): Average Monthly Expenditure of Communities on Other Water Sources<sup>26</sup>**

S No.	Secondary Source	Community’s Expenditure (in ₹)			
		A	B	C	D
1	Private water tanker	1 200	750	1 000	0
2	Packaged drinking water bottles	800	500	700	0
3	Groundwater	0	0	0	0
	<b>Total</b>	<b>2 000</b>	<b>1 250</b>	<b>1 700</b>	<b>0</b>

(Source: Calculation using data from the field survey)

**Observation on Table 4(f):** The HH expenditure on other sources is an average of expenditures inclusive of summer and winter months. In Community C,

<sup>25</sup> Existing ₹ 1.25 per Kilolitre on metered connection, and a flat rate of ₹ 52 on unmetered supply (since 2001), likely to be increased to ₹ 3.25 per Kilolitre, in order to bridge the gap between cost of producing potable water and revenue receipts of HUDA (Jha, *Times of India*, City/Gurgaon, 18.1.2016).

<sup>26</sup> Here, packaged/bottled drinking water has been taken as a 20-litre volume standard, number of units of which HH purchases from open market. It was found in the primary survey that a volume of 20-litre bottle costs ₹150. In case of Community D, water tankers are provided by the local politicians to residents free of cost (primary survey).

especially the residents of *Nathupur* village demand these categories of water given the fact that HUDA water is not sufficient in the area for drinking and other uses. Moreover, Community C residents, especially of *Nathupur* demand and pay for private tanker water on shared basis.

Interestingly, no community pays anything for the consumption of groundwater which contributes about 28 percent of total water supply to all communities. Groundwater, which is also the source of private tanker water and packaged/bottled water supplies, has no State-regulated price and comes as a monopoly price to water consumers. Residents in relevant areas reveal that in summer months their average expenditure on tanker water and bottled water goes up manifold for increased frequency of such sources of water demand.

#### **4.9 Scope for Coping Costs**

The scope for coping costs of the communities has been explicit from the table 4f. The coping costs of the communities with respect to deficit HUDA water can be understood in the first place as spatial unequal access to HUDA piped water in the sampled areas of Gurgaon.

*Additionally, coping costs, here, has been defined as the difference between what the residents would like to pay to HUDA in terms of their average expenditures incurred on the source(s) of domestic water other than the HUDA piped water supply, and the amount of water bills currently being paid to HUDA, monthly, ideally to make HUDA water reliable.*

In other words, coping costs are simply the costs that are incurred by the residents to make domestic water improved and reliable regardless of the source. Yet, in other words, coping costs signify the averting behaviour of the respondents towards the risk involved in unreliability of piped water from HUDA.

In this direction, the researcher further found that instead of asking each respondent's W-t-P for improved HUDA water, this could be a loose criterion in establishing a sound reasoning for any kind of justification on water tariff rationalisation. At the best, the coping costs in monetary terms could be one way of revisiting the water tariff structure for rationalisation.

#### 4.10 Water Reliability Index of HUDA Water

A ‘water reliability index’ of HUDA piped water supply has been constructed in order to understand residents’ perceptions on reliability of HUDA’s water supply. Here, ‘reliability’ includes availability and sufficiency of HUDA piped water, frequency and flow of tap water supply daily.

**Table 4(g): Water Reliability Index of HUDA Water, Community-wise  
(%) of HHs**

Reliability Scale	Communities			
	A	B	C	D
5	0	0	0(N, D)	n. a.
4	49	33	12(N), 84(D)	n. a.
3	37	39	66(N), 10(D)	n. a.
2	0	15	22(N), 1(D)	n. a.
1	14	13	0(N), 5(D)	n. a.
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>n. a.</b>

(Source: Calculation using data from the field survey)

**Notes: Water Reliability Index in the Scale of 1 to 5; 5-Highly reliable, 4-Reliable, 3-Unreliable, 2-Highly unreliable, 1-Can’t say.**

Here, ‘N’ stands for *Nathupur* village and ‘D’ stands for *Dhanwapur* village, n. a. stands for not applicable.

**Observation on Table 4(g):** The table is self-explanatory. It shows the significant proportion of HHs, inclusive of all the communities that believe that the HUDA piped water supply is unreliable. It justifies that HHs would like to pay more for improving HUDA water supply. This justification is imbibed in their coping costs structure, which is manifold amount they are currently paying in the form of water bills to HUDA. In case of Community C, those who are not currently resorting to HUDA piped water, especially in the *Nathupur* area, have shown willingness to get connected with HUDA pipelines, as they have no groundwater option left. For community D, of course, this kind of justification is not permissible, as it is not so far connected to HUDA piped network.

#### 4.11 Visualising Water-Rent Economy in Case of Community A

An interesting theory, which directly follows from the field survey of the residents of Community A, which is the posh (elite) private colonies, is that they pay an amount which is much higher than the water bills of HUDA on monthly basis. *This amount the residents are paying can be understood in terms of coping costs of making water*



*reliable and affordable*. In other words, the HUDA water ‘unreliability’ has been ‘rented out’ to the private civic authority in these colonies. This is evident from the primary data that 49 percent of all the respondents of Community A, feel that HUDA water is reliable. However, the *average* amount of ₹ 3 000, is much higher than what they would be paying, for instance, ₹ 160 or so on volumetric prices, had there been individual metering.

The ‘water-rent’ *vis-à-vis* private supplier of HUDA (public) water has been collected by private bodies. It is interesting case; because it has not been clear to researcher that how much the private agencies pay back to HUDA. Nevertheless, the residents keep paying more for regular water supply. This kind of theory has moreover nothing to do with spatial inequity in water distribution of HUDA water, because these areas have strong foundation of private civic monitoring agencies. Therefore, the case study of water in case of Community A is characteristically different from the other communities as visible from the primary survey.

#### **4.12 Gurgaon and Delhi: Case Studies in Contrast**

This section is a comparative study of residential water governance in Gurgaon and Delhi, as a part of NCR. The researcher compares the governance structures of residential water delivery of both the cities based on the results of the primary survey of the respective cities.

To begin with, and as said before, Delhi has a centralised public water utility, namely, DJB. The researcher at that point of time, while studying water governance in Delhi, found from the secondary evidences that there is the problem of inequitous, intermittent/unreliable, and/or non-availability of DJB water which is not compatible with the “domestic water supply norms and standards prescribed by the DJB of 172 lpcd”<sup>27</sup> (Economic Survey of Delhi, 2012-13:96) in many areas of Delhi.

“Urban water governance in Delhi presented an interesting study because residents in areas like DCB enjoy reliable water supply in excess of 172 lpcd, that is 509 lpcd (excess of 337 lpcd), while others in areas like *Mehrauli* were deprived of it,

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<sup>27</sup> Institutionally, the water supply standard is @ 225 lpcd in NCT-D, but in the study of Delhi, the DJB norm of 172 lpcd was preferred for better understanding of the water availability at this standard. In case of Gurgaon, however, the standard of 225 lpcd was followed while doing primary survey.

only 29 lpcd (deficit of 143 lpcd)” (Singh, 2015:103). The researcher, therefore, tried to study the impact of non-uniform water availability on water consumers, based on intra-areas water variability in the DJB’s piped water supply, with the major objective of quantitatively understanding the determinants of residents’ water demand and the coping strategies in case of unreliability.

A secondary objective was to statistically estimate the demand function in order to arrive at price and income elasticities. The numerical coefficients of price and income elasticities were then taken to show whether the residents were responsive to alteration or rationalization of water tariffs, they were currently paying to DJB for improved supply. A total of 200 HHs were sampled across the selected areas using the simple random sampling technique. A log-linear econometric model was used to study the residential demand for water of the sampled households of selected localities of Delhi, thus estimating the water demand function to derive price and income elasticities.

The econometric results show that (i) “the parameter estimate of (-0.127) for the price elasticity of water demand in absolute terms (*in the model, prices were set to approximately cover the coping costs*<sup>28</sup>) indicates that residential water is fairly *inelastic* in its demand.” (Singh, 2015:113), (ii) “the estimate for the income elasticity of water demand of 0.295 (statistically significant) confirms that residential water demand is a normal good – as income increases consumption demand for water goes up and *vice-versa*.” (Singh, 2015:113).

*In nutshell, the coefficients of price and income elasticities are taken as key policy variables in answering the question of unreliability (quantity and quality) of DJB water supply in terms of coping costs of meeting alternate domestic technology of procuring water by the sampled residents. The econometric estimation results reveal that residents are responsive to price/tariff changes for improved and reliable water supply from DJB* (Singh, 2015:96).

Coping costs in the study of Gurgaon is simply the amount of money that various communities are incurring on other diverse sources, is an *average* monthly

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<sup>28</sup> The *coping costs* in case of unreliability of DJB tap water supply was defined as “Coping costs of HH = Explicit costs {(HH investment in water storage facility + Domestic water treatment costs) + Monetary costs of making municipal water reliable}” (Singh, 2015:108).

monetary sum. The question therefore, is whether a policy-maker can choose the average of these coping costs to determine the correct prices/tariffs for HUDA water, ideally to make it a reliable supply. Such policy has been discussed in next chapter.

Further, while comparing the results of the primary survey and the subsequent statistical analysis in the case of Delhi, Gurgaon case study is characteristically and categorically different, which leads to a unique set of water governance patterns. These are discussed as follow.

*First*, methodologically, there stands a fundamental difference in which the HH sampling methodology has been carried out in each case. Delhi's case study is based on probability sampling, whereas Gurgaon's case study is primarily qualitative. The treatment of unreliability of the DJB tap water was quantitatively feasible in case of Delhi, as the cross-section data encompasses all the variables on the demand-side fit for any kind of econometric testing.

For instance, the water bills, that residents were paying to DJB on monthly basis based on volumetric-pricing model, was readily made available to the researcher by the respondents. This is due to larger coverage of DJB piped water network and better metering. The primary survey in residential areas of Gurgaon indicates that metering has not been done in all the areas under study. Therefore, pricing of water can only make sense if water consumption is effectively and uniformly metered and if residents pay water bills in given period of time.

Some housing in the residential areas, like the HUDA Sectors and the urban villages are metered connections, while the residents of posh private apartments pay *lumpsum* amount for water to their respective private agencies. There is co-existence of both flat rates and volumetric rates for domestic consumption. *Such a scenario would give a distorted measurement of price elasticity of water demand and therefore, cannot be true demand management tool for effective water governance in Gurgaon.*

*Second*, if one looks at the water governance-delivery mechanism in each of these cities, it is visible that in Delhi's case, DJB is the sole authority of water delivery and management public body, while in the case of Gurgaon, there are multiple overlapping public agencies. It is no wonder that, 'co-ordination problem' in the management of water supply will lead to 'institutional crisis' in service delivery,

which will further lead to ‘accountability crisis’ in resolving water shortages (also evident from previous analyses).

*Third*, the water unreliability in Gurgaon is not only due to insufficient water supply by HUDA, but also due to the existence of *free riding* externalities in one form or the other, such as freely appropriating public water without any kind of monitoring by the State. In case of Delhi, on the other hand, the water unreliability was more or less due to spatial variation in DJB’s water supply.

*Fourth*, it was reported in case of Delhi that residents there were also dependent on the groundwater as one of the many alternative source of domestic water, through digging bore-wells, or using submersible handpumps. But, the degree and percentage of groundwater usage is comparatively less than Gurgaon (maximum of 11.5 per cent, taking all sampled areas together, while maximum of 28 per cent in Gurgaon; primary data).

“To compensate water supply deficit of the DJB, residents of Delhi depend on four major alternative sources of procuring water. They are: (i) private tube-wells/bore-wells, (ii) private water tankers, (iii) packaged drinking water bottles from open market or from DJB’s JAL in *jars* through *Jal Suvidha Kendras*<sup>29</sup>, at a price, and (iv) DJB water tanker supply, free of cost basically to the poor in *JJ* clusters, designated slums and other unauthorised colonies. Interestingly, the first two sources are dependent on the locally available groundwater. It indicates that groundwater is the ‘lender of last resort’ in resolving the institutionalised ‘demand-supply’ gap.” (Singh, 2015:101-102).

Therefore, Gurgaon and Delhi have some kind of similarities when it comes to groundwater as a domestic source of water. The level and extent of groundwater exploitation, however, in case of Gurgaon exceeds from the case of Delhi, which is at a dangerously alarming level.

*Fifth*, the residents’ attitudes and perceptions regarding institutionalised piped water supply is entirely different in each case. In case of Delhi, the prime concern of the residents was to expect a reliable DJB water supply, whereas, in case of Gurgaon, there are multiple issues related to water governing public agencies, for example,

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<sup>29</sup> No such institutional arrangements were found in Gurgaon.

from stopping *free riding* in water to the problem of redressal mechanism of grievances of water beneficiaries. Therefore, in case of Gurgaon, one can observe a pattern of governance deficit in water provision to residents. That is, from the supply deficit to the governance deficit.

*Sixth*, Gurgaon case study suggests how the elite have prioritised 'water-rent economy' to make HUDA water supply reliable. This is where one segment of the residents (Community A) has contracted-out 'HUDA water unreliability' to private agencies by paying an exorbitant price for 'reliability'. This situation is typically different from the case of Delhi, where this tendency of residents has not been observed.

And, *finally*, in case of Delhi, no significant water conflicts among the intra-households were observed, whereas, in Gurgaon, community's unrest over water can be clearly noticed. For instance, residents of the urban villages like *Nathupur*, have a great objection to the creation of posh private colonies, because they feel that their claim over the groundwater has been highly traded-off in the process of expansion of Gurgaon over the period of time.

#### **4.13 Inferences from the Primary Survey on Water Governance of Gurgaon**

The primary survey gives comprehensive insights into the real issues pertaining to governance of residential water from the residents' perspective. The inferences that can be drawn from the field work clearly indicate the multiplicity of governance issues in water. Revisiting the field reports in the different residential typologies, one can evidently observe that there is a serious case of 'governance deficit' in water delivery. On one hand, there is a case of water deficit from the State agencies, and on the other hand, the State apparatus in residential water delivery has institutional loopholes. The institutional bottlenecks have culminated into aggravated water shortages.

It has also been observed in the primary survey that groundwater consumption by nearly all the communities is due to insufficient water supply or no water supply by HUDA. The rise in cumulative governance deficit has further allowed residents to solely depend on groundwater over the years. The governance deficit can also be seen in terms of controlling illegal housing in the urban villages. Thus, the primary survey

is in compliance with the secondary sources regarding the institutional crisis in water delivery.

#### **4.14 Concluding Note**

Without becoming too defensive about the question of what determines the water demand of the residents, the researcher has found that the residents demand for HUDA water, is not a linear function of the water bills they pay for consumption, rather it is a function of a series of alternative domestic water procurement sources. This chapter also throws light on the fact that deficit of HUDA water for the growing demand is not the only compelling factor. The determinants of water demand of residents are a function of multiple inter-zonal or inter-community water procurement methods.

The chapter clearly highlights some of the deeper insights of the gravity of residential water scarcity in the sampled areas of Gurgaon. The field reports and the subsequent analyses evidently show that the State has not been able to deliver reliable piped water supply to the affected communities. Given the massive expansion undergoing towards the village areas of Gurgaon, unchecked and unmonitored housing constructions would only invite further water deficiency.

The residents' resentment towards HUDA for not providing sufficient water is clear in their attitudes and perceptions. This chapter is an eye-opener to urban policy makers of how not to build a city, if the planning is not envisioned and executed properly on ground by the State. The unreliability of water availability to communities has been mostly institutionally created and is thus not natural.

The primary survey apparently shows that the State has increasingly failed to deliver uniform water supply to different communities as urbanisation rate grew. As it is evident from field surveys that there is availing of HUDA water for free by some residents and private agencies, and hence an inherent *free riding* externalities in water consumption is created by the State itself. Eventually, *free riding* externalities will only create inter-zonal water scarcities. Further, comparing the case studies of residential water governance in Gurgaon and Delhi, provide ample scope for revisiting the governance structure of Gurgaon to urban planners, urban water economists, or civic agencies in order to understand the roots of governance deficit.

Appendix

Sources and Location of Drinking Water in Gurgaon in 2011

(% of HHs)

Area Name	Rural/ Urban	Main Source of Drinking Water										Location of Drinking Water Source		
		Tapwater from Treated Source	Tapwater from Un-Treated Source	Covered Well	Un-covered Well	Handpump	Tube-well /Bore-hole	Spring	River/ Canal	Tank/ Pond/ Lake	Other Sources	Within Premises	Near Premises	Away
District - Gurgaon	Total	60.3	8.1	0.2	0.2	3.9	25.3	0	0.1	0.4	1.5	80.2	13.7	6
District - Gurgaon	Rural	43.8	16.4	0.2	0.2	7	30	0	0	0.3	2	64.3	23.4	12.3
District - Gurgaon	Urban	66.6	5	0.2	0.2	2.8	23.5	0	0.1	0.4	1.3	86.3	10.1	3.6
Sub-Dist - Pataudi	Total	59.3	24.1	0.1	0	2.4	12.3	0	0	0.1	1.4	66.1	24.4	9.5
Sub-Dist - Pataudi	Rural	50.3	29.8	0.1	0.1	3	15.7	0	0	0.2	0.7	56.7	30	13.3
Sub-Dist - Pataudi	Urban	77.8	12.6	0.1	0	1.3	5.2	0	0	0	2.9	85.3	12.9	1.8
Sub-Dist - Gurgaon	Total	65.5	4.9	0.1	0.2	3.2	24.3	0	0.1	0.5	1.3	86.4	10.1	3.5
Sub-Dist - Gurgaon	Rural	54.1	9.2	0.1	0	7.7	27.5	0	0	0	1.4	82.1	12.5	5.3
Sub-Dist - Gurgaon	Urban	66.2	4.6	0.1	0.2	2.9	24.1	0	0.1	0.5	1.2	86.6	9.9	3.4
Sub-Dist - Farrukhnagar	Total	51.2	15.9	0.3	0.1	3.7	25.7	0	0.1	0.6	2.5	61.7	22.7	15.5
Sub-Dist - Farrukhnagar	Rural	47.1	17.3	0.3	0.1	4.1	27.8	0	0.1	0.7	2.6	61.5	24	14.5
Sub-Dist - Farrukhnagar	Urban	89.2	2.2	0.1	0.6	0.2	6.5	0	0	0	1.2	63.8	10.8	25.5
Sub-Dist - Manesar	Total	37	8.4	0.5	0.1	3.8	49	0	0	0.2	1	75	19.1	5.9
Sub-Dist - Manesar	Rural	37.3	9.3	0.3	0	4.2	47.6	0	0	0.2	1.1	72.8	20.8	6.4
Sub-Dist - Manesar	Urban	35.7	3.3	1.5	0.5	1.6	57	0	0	0	0.4	87.7	9.3	3
Sub-Dist - Sohna	Total	46.9	14.1	0.2	0.6	11.4	23.8	0	0	0.1	3	63.1	22	14.9
Sub-Dist - Sohna	Rural	33.9	17.1	0.3	0.9	16.8	26.9	0	0	0.2	3.9	51.7	27.7	20.5

(Source: Census of India, 2011)

## **Chapter 5**

### **Lessons from Gurgaon and The Way Forward in Residential Water Governance**

#### ***Outline of the Chapter***

*The basic question that this chapter seeks to address is, 'Has the Gurgaon experiment failed on part of the State in residential water delivery?' To answer this question, the chapter looks at the core research findings of the thesis and the lessons that can be drawn thereof. Additionally, the chapter tries to frame policy arguments in order to mitigate the water scarcity problems in relation to Gurgaon. Eventually, the chapter ends with the major conclusions drawn from the thesis.*

#### **5.1 Core Research Findings**

The reasons for the residential water scarcity in Gurgaon are multifaceted in nature, form and character. The supply side bottlenecks of the State agencies explicitly correlate with the poor status of water supply infrastructure in Gurgaon relative to the rate of urbanisation and expansion. The general residential water deficiency in Gurgaon, however, cannot merely be seen as 'water supply deficit' problem in the first place, but can mainly be accounted to the 'governance deficit' in water supply management and distribution. The thesis has been able to show that the residential water shortage/crisis in Gurgaon is less of resource (water) constraint and more of water governance chaos.

The governance chaos can be seen in terms of lack of responsibility on the part of the State in resolving water problems and creating an ambience for the advancement of certain norms or rules for effective water governance. The thesis aptly shows the fact that there is a serious 'governance crisis' in water service delivery to the residents of Gurgaon. The thesis has been able to indicate that this 'governance crisis', is both endogenous and exogenous to Gurgaon.

The endogenous and exogenous factors responsible for the lack/shortage of domestic water have been captured and presented throughout the thesis. Re-visiting these factors, the researcher has found that both the factors are inherent to the urban planning failures of the State. Particularly, the actuality of the governance machinery of Gurgaon, analysed from the media content analysis as well as evident from the



field work, projects the ‘passivity/invisibility of the State’ in public service delivery. These findings indeed give leads to the researcher in asserting the proposition ‘governing without the State’ in residential water in relation to Gurgaon.

## **5.2 Lessons from Gurgaon**

The study of residential water in Gurgaon provides one way of looking the fallacies of the State’s urban planning paradigm currently in practice. Gurgaon cannot be a role model city for other cities to follow; rather the researcher finds Gurgaon a classic example of development paradox.

On one hand, it is known by various epithets such as ‘Singapore of India’, but unlike Singapore<sup>30</sup>, Gurgaon has failed to create even basic infrastructure for water provision for its residents. The success of Singapore’s experiment in tackling water scarcity in terms of its demand and supply sides innovations has enabled the State to deliver safe, efficient and effective water supply in order to meet present and future water demand projections.

In the study of residential water delivery, one of the many civic components of urban governance, questions the sustainability of contemporary cities such as Gurgaon. The haphazard development of Gurgaon challenges the future carrying capacity of the city in terms of sustained growth and development. Thus, the researcher observes that Gurgaon provides an excellent case study of a city where the State’s experiment in making it a global city at a global standard has failed at several local fronts.

Precisely, State’s failure in providing a basic civic amenity (water) to citizens is one indication of its planning failure. Gurgaon experiment reveals many lessons to be learnt at various stages of civic governance or rather mis-governance for a wide variety of stakeholders for deep introspection.

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<sup>30</sup> Singapore, once a water scarce nation, used to import water from Malaysia, exemplifies others facing water shortages, by devising a holistic approach towards securing a safe and sustainable water supply. In order to tackle Singapore’s water shortage, the State through its Public Utilities Board (PUB), felt the need to revamp and rejuvenate its capabilities and investment in water research and development to introduce “new technologies, innovative and large-scale water solutions, best management practices along with a fine balance of water supply and demand management tools”, <http://centres.insead.edu/innovation-policy/events/documents/Singapore-WaterShortage.pdf> accessed on 4.7.2016.

### **5.3 Policy (Solutions) to Mitigate Residential Water Scarcity in Gurgaon**

The researcher puts forth feasible and pragmatic policies in order to mitigate water problems in Gurgaon based on the findings of the thesis. Since, the thesis comes out with the idea that residential water scarcity in Gurgaon is an outcome of multiple causes, thus, the solutions apparently should be at the multiple levels. Primarily, at the minimum, the researcher would like to provide following policy arguments/recommendations to mitigate residential water scarcity in Gurgaon.

To find solutions to the water problems related to Gurgaon, the researcher basically concentrates upon two major elements in the current thesis, that is, *firstly*, the governance linkages to residential water deficiency, and *secondly*, the coping cost structure of the residents in case of deficit supply by HUDA. In other words, these are the supply side and the demand side oriented water solutions respectively. Apart from these, the role of law and governance in resolving water problems will be provided, at the broadest level.

#### **5.3.1 The Supply Side Policy**

The supply side policy would include a number of recommendations in order to make HUDA piped water supply reliable and improved. *First*, Gurgaon needs a centralised public water utility/board such as DJB in adjoining Delhi or Municipal water boards in cases of NOIDA and Faridabad and so on. A centralised water utility could enhance the performance in water delivery, in terms of a single monitoring authority for all purposes, namely, water collection, treatment and storage, operation and maintenance, water distribution and tariff collection from residents. This could reduce the transactions costs unnecessarily involved in water supply through multiple agencies and thus minimise the civic mess, which currently exists in Gurgaon.

*Second*, the State in Gurgaon needs to boost investment in water infrastructure. Gurgaon, if considered 'Singapore of India', then, it also needs to follow what Singapore did in terms of securing water for its citizens. In other words, the State must show willingness on its part to invest in water R&D, water innovations, search for newer or potential sources of water, and absorbing newest technologies for minimising water loss both during capture and transportation, and also at the distribution levels.

*Third*, and more importantly, the State in Gurgaon needs to be more responsible and accountable towards the water beneficiaries. It needs to restructure its governance apparatus for public services delivery. The governance of residential water is more close to the manner in which the authorities are functioning. In Gurgaon's case, it is unfortunately a harsh reality that the State, on its part, has failed to a greater degree because of its governance inefficiency. This is a case in point where one can argue for bringing efficiency in water bureaucracy in Gurgaon. The researcher feels that, it is paramount on the supply side improvements for the sustainable development of Gurgaon.

And, *finally*, a city like Gurgaon, which is fast urbanising and expanding, needs a concrete planning in civic amenities. Ad hoc planning measures would only make the urban life of citizens miserable, even if there is enough W-t-P for public services. The urban planning methodology should encompass opinion of all the stakeholders in urban governance – primarily, the State and the civil society, water engineers, geographers, economists and so on. This needs a further coordination of the residents and the State for an integrated urban water management programmes. Eventually, a concrete and envisioned planning would reduce inter-zonal water conflicts and unwarranted externalities of one form or the other.

### **5.3.2 The Demand Side Policy**

The demand side policy could be much more comprehensive. To begin with, *first*, the need is to universalise water metering in all the residential areas. To argue such policy, the researcher advocates that since water is scarce in Gurgaon', water metering on consumption enhances uniform water demand and minimises water loss at the consumer end. Metering water consumers would then lead economists to understand the quantity of water demanded by the consumers over the period of time; which could lead in turn, in determining correct water tariffs chargeable to the consumers.

For example, in the empirical study of water demand in case of Delhi, the researcher was able to determine the coefficients of the price and income elasticity of water demand, and hence reached a conclusion that the residents are responsive towards rationalization of water tariffs, in case water supply is made reliable by the DJB. Ultimately, the criterion of economic efficiency and social welfare could be attainable for different segments of citizens. This exercise, unfortunately, has not been

possible in the case of Gurgaon, except the fact that residents W-t-P is revealed implicitly in their coping costs for any kind of tariff alterations.

*Second*, re-visiting the coping costs of the residents of Gurgaon, it yields one way of tackling water shortage problems in relation to Gurgaon, specifically in terms of raising infrastructure. The manifold amount of coping costs relative to what residents are currently paying for water bills to HUDA (not all the residents) is a linear function of water supply unreliability. In a functional form, the coping costs can be given as follows.

*Coping costs of residents of Gurgaon = f (Unreliability of HUDA tap water)*. This means, more the unreliability, higher the coping costs to be borne by the residents. Therefore, coping costs correlate with unreliability of HUDA water. Now as a policy intervention, the State should understand that the coping costs are entirely borne by the residents themselves for securing domestic water regardless the source of it. This can be used as a demand side policy instrument in the following way.

If one looks at the HUDA water bills corresponding to the coping costs of the communities A, B, and C, currently in practice, it is a minimal fraction table, 4(e) and table 4(f) respectively, in chapter 4, except the case of community D, for which it stands zero. The researcher has accordingly, to make arguments more sound, takes coping amounts of various communities as the amount the residents would like to pay as the maximum reservation price for HUDA water, monthly, in case it becomes reliable. However, this coping amount cannot be the lower bound for determining any water pricing policy. The water pricing policy, in case the State decides to improve the water supply, would then depend on differential water pricing method based on social, economic and demographic characteristics of the population.

As a pricing policy, the State can decide an initial reservation price for the anticipated consumption, precisely using the increasing block-rate pricing method. The researcher has tried to devise rather a hypothetical domestic tariff policy for the community A, in Gurgaon as follows.

Community A, which is paying an appreciable amount for HUDA water through the private agencies, the State can devise a tariff structure as follows. This

exercise is apparent because, the researcher realises that community A is paying a huge amount and is still uncertain in accessing HUDA supplied tap water.

Coping costs saving on domestic water of the community A = {Coping costs of the community A - User charges paid to HUDA currently + (the volumetric consumption of HUDA water on metered connections @ 225 lpcd + 50% of water bills as sewage maintenance charges to private bodies)} = Water tariff on HUDA water consumption, monthly.

*For example, for community A, savings of the residents monthly = { ₹ 2 000 - ₹ 3 000 = ₹ 1 000<sup>31</sup>. Now, ₹ 1 000 can also be understood as the base price/fixed cost to the water consumers monthly. For instance, from the data obtained from the primary survey, ideally and on standard, community A would like to consume at the institutional quantity of 225 lpcd. With the existing volumetric rate of ₹ 1.25 per Kilolitre, theoretically the following tariff structure can be possible.*

*Now, 225 lpcd × 30 days = 6 750 litres per month. Since 1 Kilolitre = 1 000 litres, therefore, it implies, 6 750 litres = 6.75 Kilolitre × ₹ 1.25 = ₹ 8.4 + ₹ 1 000 = ₹ 1 016.8, water user charges, monthly. Adding 50 % of ₹ 1 016.8 as sewage maintenance charges, this will be ₹ 508.4. Therefore, the total water bills for the residents of community A will be ₹ 1 016.8 + ₹ 508.4 = ₹ 1 525.2, monthly.*

Interestingly, the amount of ₹ 1 525.2 is a transitional amount between what the community A has been incurring currently as coping costs and the HUDA water bills on average monthly, had there been individual house metering. In order to make such tariff pragmatic, the State has to relook at the governance of water delivery in the elite colonies (community A), and try to minimise the involvement of private intermediaries in water supply. For rest of the communities such as B and C, the block-rate pricing is advisable on metered connections, instead of both the flat rates and the block rate currently. For community D, unless it is regularised, there is no meaning to cover residents under such tariff justification.

Taking the coping costs as a demand management instrument, HUDA can rationalise its current tariff structure to raise the finance of new infrastructure for better water delivery (at the best HUDA can do presently). However, to an economist,

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<sup>31</sup> Prices cannot be negative.

it is favourable to design a differential (based on income) and acceptable water pricing taking into the consideration the poorer section of the society.

This could be worked out by engaging economists to draw a framework in which all the aspects (primarily, the social and economic impact) of water pricing can be assessed at the institutional level. The researcher believes that rationalising tariffs rate through better metering and coverage will result in better infrastructure with larger coverage of water beneficiaries under HUDA piped supply network, and in turn, it will definitely increase the potentiality for better access to HUDA supplied tap water.

Next, the 'cost savings of the State' in terms of reducing the non revenue water loss of the total volume of water supplied could be explained. To make the water supply system better, the prerequisite is to minimise the non revenue loss of the State. Metering would enable the State in the detection of illegal tapping of water. "The State through the impact of metering would enable it to find out how much of water is lost in theft, thereby able to detect illegal connections and regularise them, using volumetric pricing method." (Kumar, 2014:186). This is what the State can do in areas in *Dhanwapur* and *Nathupur* villages, where there are illegal water connections.

### **5.3.3 Role of Law and Governance**

The emphasis on the role of law and governance could be one of the most important segments of the policy intervention that can be suggested in the current scenario. According to Vaidyanathan (2006:141), "lacunae in the legal framework are compounded by organisational deficiencies and weak governance." The need is actually to correct the gaps, weaknesses, and inconsistencies in existing laws and regulations related to water resources, and importantly of the groundwater.

As evident from the preceding analyses, residents of Gurgaon are in actuality, the victims of real estate business or the large scale construction work, because this sector has been the biggest violator of the groundwater laws. Here the negligence of the State is towards its duties in terms of enforcing laws to stop over-extraction of groundwater. This is where the State should revisit its ways of governance in the implementation of legal procedures for the sustainable use of limited groundwater.

Here, the role of law and governance can be seen, *first and foremost*, in the context of conserving groundwater aquifers as a resource meant for sustainable use, and *secondly*, the legal institutions should promote the awareness to conserve or rejuvenate the dying traditional water bodies such as lakes, ponds, streams, groundwater aquifers and so on, and *thirdly*, as a State's move to promote rain water harvesting<sup>32</sup> compulsory for all the city dwellers of Gurgaon.

Several PILs<sup>33</sup> have been filed to the Honorable Supreme Court of India, to the High Court of Punjab and Haryana and to the NGT in the past years by individuals and independent citizen groups to stop further illegal and rampant extraction of groundwater in Gurgaon. Finally, in the year 2012, the High Court of Punjab and Haryana banned the use of bore-wells at the construction site and instructed HUDA to provide sewage treated water to private builders.<sup>34</sup> However, in reality, it has been reported that illegal extraction of groundwater by private builders is still going on in Gurgaon, despite Court's ban.<sup>35</sup>

This means that the State should become more vigilant to the violators of groundwater extraction and focus more on the governance of sewage treated water for the construction industry. The researcher strongly favours constitution of a separate board for the monitoring of groundwater reserves in Gurgaon, and penalty for those who violates the laws related to groundwater conservation. Additionally, the State should strongly enforce existing laws to ensure that the private builders' meet their water requirements from the STPs water supply. Thus, the water demand for the construction industry could be sorted out.

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<sup>32</sup> Rainwater is collected on the roof and transported with gutters to a storage reservoir, where it provides water at the point of consumption or is used for groundwater recharge, <http://www.sswm.info/category/implementation-tools/water-sources/hardware/precipitation-harvesting/rainwater-harvesting-u>, accessed on 26.7.2016.

<sup>33</sup> M. C. Mehta vs. Union of India, Writ Petition (Civil), No. 4677, 1985, Judgment 18.3.2004. The Apex Court maintained that NCT-D and Gurgaon with its adjoining areas are water stressed, and had put the regulatory measures on the groundwater development under The Environment (Protection) Act, 1986, and through The Environment Assessment Report on construction work in Delhi-NCR.

<sup>34</sup> After Mukesh Sharma vs. State of Haryana, 2010, on the violation of the norms of The Environment (Protection) Act, 1986, and CGWA guidelines relating to illegal extraction of groundwater for construction in Gurgaon areas.

<sup>35</sup> Vikrant Tongad filed affidavit with the NGT, when he did not find a reasonable answer from the developers regarding the details of the source of water used in construction work (*ToI*, City/Gurgaon, 14.3.2016).

The State should revisit its rights and duties towards satisfactory service delivery to the residents. This could be initiated by improving the governance apparatus of delivering civic amenities by the State. The State should involve various multi-stakeholders (residents/civil society/policy makers and so on) for an effective policy on improving the current mal-governance of Gurgaon in public services. In other words, there should be participatory governance in matters related to water delivery in Gurgaon.

#### **5.4 Can PPP<sup>36</sup> be a Panacea for all Urban Water Related Problems?**

The success of PPP in public service delivery is a contestable subject, because there are evidences in India that it has been a failed model of managing urban water supply. One such recent case of the failure of the PPP model in municipal water delivery has been seen in *Aurangabad* district of Maharashtra state in India. What went wrong with the PPP model in *Aurangabad*?

In *Aurangabad*, the civic authority, namely AMC under the PPP project, assigned the job of improving and maintaining the city's water supply system in form of a 20-year contract of ₹ 792-crore project to a private water company called ACWUCL, under the '*Samantar Jal Wahini*'<sup>37</sup> scheme, in the year 2013. Originally, the PPP agreement was aimed to assign the responsibility to ACWUCL to provide the water supply by lifting water from *Jayakwadi* dam to meet city's population for a period of 20 years. This PPP was designed to meet the water thirst of the city's projected population of 24.5 lakh till 2041. In 2014, the civic authority discovered discrepancies and anomalies in the project execution and in the concessioner agreement signed between the two.

Moreover, owing to the sluggish water works by the company in delaying the laying of main pipeline, construction of elevated water storage reservoirs, construction of WTPs and inflated water tariffs, also the growing resentment of citizens toward the private water company for the inordinate delay, led the AMC to finally scrap the PPP and again take over the responsibility of municipal water supply

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<sup>36</sup> "PPP in infrastructure refer to the provision of a public asset and service by a private partner who has been conceded the right (the 'Concession') for the purpose, for a specified period of time, on the basis of market-determined revenue streams, that allow for commercial return on investment" *Committee on Revisiting and Revitalising PPP Model of Infrastructure, Government of India (2015, p. ix)*.

<sup>37</sup> Parallel water supply pipeline project.



to the citizens of *Aurangabad* in June 2016 (Chinchkhede, *Times of India*, City/Aurangabad, 26.6.2016).

Based on this recent evidence of the failure of the PPP model in managing urban water, the researcher, therefore, strongly rejects the idea of PPP for making better public water supply system in Gurgaon. This is because PPP could work when the governance structure is conducive in order to contract out services to a private company, which unfortunately is not the case with Gurgaon presently. Water projects based on PPP model would rather invite corruption in management and aggravates governance mess, looking at the current governance scenario of Gurgaon.

More recently, DJB initiatives of PPP model of improving urban water supply is a case to be noted. “The water utility has launched a water service improvement programme in 2012, and signed a contract with a private company called MNWS Private Limited<sup>38</sup> under PPP scheme.” (Sharma, *HT*, 27.7.2016, p.7). Initially, the residents of *Malviya Nagar*, South Delhi, were unhappy with DJB for contaminated and intermittent water supply. The DJB has arranged with MNWS to repair leakages for improving the potable water supply.

“The private company basically locates the leakages along with replacing old pipelines, and engages to revamp the water network to reduce contamination and water losses.”(Sharma, *HT*, 27.7.2016, p.7). The MNWS was also given the task of laying new pipelines from the *Malviya Nagar* underground reservoir (water supplied into by DJB), thus improving the overall utility’s efficiency. Sharma (*HT*, 2016:7) reports that now the residents of *Malviya Nagar* are satisfied with the new arrangement under the PPP scheme.

The researcher finds reasonable reasons for the success of PPP in Delhi. This is due to the fact that the government of Delhi provides atmosphere for such an arrangement that meets the people’s expectation regarding improved water supply from the State. Gurgaon, on the other hand, needs to gain consciousness and hence to create such governance space to if it wants to invite private water companies to subordinate the State agency in water supply under PPP. Therefore, PPP can be panacea for urban water problems if the State corrects its own water institutions.

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<sup>38</sup> MNWS is a consortium of French company Suez and infrastructure company SPML Infra Ltd.

## **5.5 Major Conclusions: The Way Forward**

The study of water in residential areas in Gurgaon shows that the State has lost the track of residential water delivery with urbanisation and population growth. There is a clear indication of absence of any concrete urban water management planning and policy for the Gurgaon as a region, when it is water scarce, and a separate entity in NCR. Without any doubt, the researcher maintains that the Gurgaon experiment has failed as a model of global city.

There are institutional/governance gaps that need to be filled-up by the State so that the governance of water should be effective, efficient, satisfactory and sustainable. Foregrounding advances in water innovations and sustainable urban water management strategies in Gurgaon requires a holistic approach to deal with the governance deficiency. The problems of institutional fragmentation, bureaucratic inefficiencies, lack of willingness or incentives and undefined organisational mess need to be corrected. Without addressing the institutional loopholes, it becomes futile to improve the water supply system in Gurgaon. Till these issues are resolved, Gurgaon would continue its 'water governance without the State'.

The researcher strongly argues for a comprehensive 'water policy' that is inclusive of all kinds of interventions (mentioned above) by the State on all fronts, to make residential water governance in Gurgaon effective and efficient. Pragmatically, the way forward in water governance in Gurgaon should be that the State must rather act as 'Interventionist State' instead of 'invisible State' to mitigate water scarcity in Gurgaon. Optimistically, this would mean 'governance with the State' in urban water supply in Gurgaon.

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**Annex**

*Questionnaire on*

**Household Survey on Water Supplies in the Residential Areas of Gurgaon**

*Dear Respondent,*

*I, Rakesh Kumar Singh, am pursuing Ph.D under the Supervision of Prof. Jaivir Singh, at the Centre for the Study of Law and Governance, Jawaharlal Nehru University, New Delhi, on the Topic – **Governing without the State: A Study of Water in Residential Areas of Gurgaon.** I, therefore, seek your kind cooperation and request you to spare your valuable time for filling up this questionnaire. This field study is being conducted strictly for the academic purposes. Thank you.*

*Respondent No.....*

*Date of Survey .....*

*Name of the Residential Area/ Colony .....*

*Sector (if any).....*

**[Please Tick (√) for the appropriate response. Please also note that at certain places, open-end responses are expected]**

**PART A: Household Socio-Economic and Demographic Profile**

1. Number of members in the family
  - (i) Single
  - (ii) 2
  - (iii) 3
  - (iv) 4
  - (v) More than 4
2. Type of family (i) Nuclear  (ii) Joint
3. Number of Adults in the family
  - (i) Self
  - (ii) 2
  - (iii) 3
  - (iv) 4
  - (v) More than 4
4. Number of Children/Minors in the family
  - (i) 0
  - (ii) 1
  - (iii) 2
  - (iv) More than 2
5. How many members in the family are employed?
  - (i) 0
  - (ii) 1

- (iii) 2
- (iv) 3
- (v) All
6. What is your *average* monthly household income?
- (i) 0-₹50 000
- (ii) ₹50 000-₹100 000
- (iii) ₹100 000-₹150 000
- (iv) ₹150 000-And Above
7. Educational level of household head
- (i) Not literate
- (ii) Elementary
- (iii) Secondary
- (iv) Higher Secondary
- (v) Undergraduate
- (vi) Higher Degree
8. Principal occupation of household head
- (i) Self employed
- (ii) Business
- (iii) Regular employee in government sector
- (iv) Regular employee in unorganised/private sector
- (v) Casual wage earner
- (vi) Pensioner
9. What is the type of housing ownership?
- (i) Living in own house
- (ii) Private Rented Flats
- (iii) Government Flats
- (iv) Others
- If \_\_\_\_\_ others, \_\_\_\_\_ please \_\_\_\_\_ specify
- 
10. What is your approximate monthly expenditure on the following utility services? (i) Electricity ₹ \_\_\_\_\_ (ii) Water from all sources ₹ \_\_\_\_\_
11. How long you have been living in the area? \_\_\_\_\_

**PART B: Household Water Amenities and Water-use Behaviour**

12. What is/are the principal source(s) of your household water supply? (*Note: Multiple responses are possible*)
- (i) Piped (direct) within house/residence water supply
- (ii) Piped water to yard/plot
- (iii) Public tap/standpipe
- (iv) Private tube-well/bore-well (groundwater)
- (v) Community well

- (vi) Shared tap water
- (vii) Bottled water from market
- (viii) Private water tanker-truck
- (ix) Water from neighbours
- (x) Others  , please specify \_\_\_\_\_
13. If your response to Q.12 is (i) and/or (ii) and/or (iii) then please specify the following
- (i) Do you know the name of the public agency which supplies you water?
- (a) Yes
- (b) No
- (c) If Yes, please write the name of the public agency:
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- (ii) What is the frequency of the piped water supply daily?
- (a) 24-hour supply
- (b) Twice a day
- (c) Once a day
- (d) Irregular supply
- (iii) How is the pressure of tap water?
- (a) Very High
- (b) High
- (c) Moderate
- (d) Low
- (iv) Do you think that you receive adequate water for all your needs from the agency?
- (a) Yes
- (b) No
- (v) Are you satisfied with the quality of water?
- (a) Yes
- (b) No
- (vi) Do you think that the water supply is intermittent and unreliable?
- (a) Yes
- (b) No
- (vii) Do you think that the agency in question is efficient in providing household water to residents of Gurgaon?
- (a) Yes
- (b) No
- (viii) Do you have a water meter connection?
- (a) Yes
- (b) No

- (ix) If 'yes' in above question, then how much *average* monthly water bill you pay for water on metered connection?  
\_\_\_\_\_
- (x) Do you think you pay the correct water bill?  
(a) Yes   
(b) No   
If No, give reasons.  
\_\_\_\_\_  
\_\_\_\_\_
14. If the response to Q. 13 (v) above is 'no', what methods do the household employ domestically to make water safe for drinking, cooking etc?  
(a) \_\_\_\_\_  
(b) \_\_\_\_\_
15. Is water from your main source available throughout the year?  
(a) Yes   
(b) No
16. What is the major source(s) of water for drinking, cooking and for personal hygiene for members of family?  
\_\_\_\_\_  
\_\_\_\_\_
17. Do you treat your water in any way to make it safe for drinking?  
(a) Yes   
(b) No
18. What is your daily approximate household consumption of water in litres?  
(a) For drinking \_\_\_\_\_  
(b) For cooking \_\_\_\_\_  
(c) For all other purposes (for example; washing utensils, laundry, lawn etc.)  
\_\_\_\_\_
19. If the major source of household water is private tube-well/bore-well, whether the household is aware about the depleting water table of the locally available groundwater in Gurgaon?  
(a) Yes   
(b) No
- 19 (i) Do you pay any price for the groundwater consumption? (a) Yes  (b) No
20. If 'yes' in Q. 19 above, do you think that rampant groundwater extraction in Gurgaon is environmentally sustainable for the city?  
(a) Yes   
(b) No
21. How often you call the private tanker-truck for supplying water?  
(a) Regularly

(b) Sometimes

(c) Rarely

How much monthly expenditure you incur on it on an average?

\_\_\_\_\_

22. Do you purchase packaged drinking water bottles?

(a) Yes

(b) No

If 'yes' how much approx. monthly expenditure you incur on it on an average? \_\_\_\_\_

23. Do you think that the government should provide direct-home piped water to residents in Gurgaon instead of any alternative water agency involved in arrangement of water?

(a) Yes

(b) No

24. Do you think that there is water crisis in Gurgaon?

(a) Yes

(b) No

25. Do you have any specific grievances with the Gurgaon authorities on water supply? *(Please do not overstate)*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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