SOCIO-POLITICAL ECOLOGY OF WATERSCAPES: A CASE STUDY OF WATER ACCESSIBILITY IN DISTRICT SONBHADRA, UTTAR PRADESH

Dissertation submitted to Jawaharlal Nehru University
in partial fulfillment of the requirements for
award of the degree of

MASTER OF PHILOSOPHY

SONALI BHATIA

CENTRE FOR THE STUDY OF REGIONAL DEVELOPMENT
SCHOOL OF SOCIAL SCIENCES
JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI-110067
INDIA
2018

जवाहरलाल नेहरू विश्वविद्यालय
JAWAHARLAL NEHRU UNIVERSITY
Centre for the Study of Regional Development
School of Social Sciences
New Delhi-110067

23 JULY 2018

DECLARATION

I, Sonali Bhatia, hereby declare that the dissertation entitled "**Socio-political Ecology of Waterscapes: A Case Study of Water Accessibility in District Sonbhadra, Uttar Pradesh**" submitted by me in partial fulfillment of the requirements for the award of the degree of **MASTER OF PHILOSOPHY** is my bonafide work and that it has not been submitted so far in part or in full, for any degree or diploma of this university or any other university.

(SONALI BHATIA)

CERTIFICATE

It is hereby recommended that the dissertation may be placed before the examiners for evaluation.

Prof. Sachidanand Sinha

(Supervisor)

Centre for the Study of Reg. Dev.
School of Social Sciences
Jawaharlal Nehru University
New Delhi - 110067

Prof. Sachidanand Sinha

(Chairperson)

Chairperson
Centre for the Study of Reg. Dev.
School of Social Sciences
Jawaharlal Nehru University
New Delhi - 110067

Office Tel: 26704466/26704463; Office.E-mail: csrd.jnu@gmail.com

Dedicated to my mother

For her love and kindness to all

ACKNOWLEDGEMENTS

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List of Abbreviations

BDC	Block Development Councils
BJP	Bhartiya Janta Party
GOI	Government of India
BSP	Bahujan Samaj Party
GPS	Global Positioning System
IHDS	India Human Development Survey
IWRM	Integrated Water Resource Management
MLA	Member of Legislative Assembly
MNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
NDVI	Normalized Differential Vegetation Index
OBC	Other Backward Castes
PVC	Polyvinyl Chloride
SC	Scheduled Castes
SP	Samajwadi Party
ST	Scheduled Tribes

Introduction

1.1 Introduction:

Since last two decades, water has been in the focus of global political agenda. Everybody is discussing about the water problem and at the same time, trying hard to 'fix' the problem. Suddenly, water has become more precious than oil which has shaped international politics in a significant way for quite some time. Thus, we can say, water is at least receiving its deserved attention at global scale. However, it seems water problem is getting bigger in spite of innovative technological interventions, institutional mechanisms, and huge foreign aids by multinationals.

The question is why, even after doing so much for water, water scarcity remains a problem? Is it really possible to fix this problem by changing water policies, governance, and integrating social and physical nature of water which is much present in the current practice? All these questions have led to an extensive research in water domain and several scholarships have questioned the current approach to 'deal' with water problem.

To approach a solution of a given problem, it becomes important to ask few questions; what, why, where, who and how? These questions unlock many mysteries which show us a way forward. In water research, mainly drinking water; many have explored such questions and found that water scarcity is just not the limited or unavailability of water but has much to do with accessibility to water. The emphasis is now shifted to whatever water is available to how it is made accessible to people.

This work is aimed at exploring such complicated relations of water, society and ecology. The main focus is to understand that in a given fragile ecology where water is already 'scarce', how it is distributed among people? Who gets what share? Is it distribution equitable? If not, why? These questions disengage the complicated processes of water control, use and access. But, rather than trying hard to simplify these problems, this work proposes that to understand such problems, we need to be subsumed in such given complicated relations. For that, we need holistic and interdisciplinary approach with all the freedom without getting trapped into any kind of limitations.

In Indian context, the problem of accessibility to drinking water is further complicated by its diverse ecology and entrenched social, cultural, economic and political inequality. In addition to this, how water problem is approached at global, national and regional scale has significant impact on distribution and accessibility to drinking water. Moreover, water a limited resource, is not merely an object or material but possess power to change the existing system around it. All these complexities makes struggle for water as a struggle for power creates tensions and conflicts among different groups of people.

These struggles have close relation with caste, gender, class, religion and ethnicity does not ends with having control over water. Instead, creates further space for maintaining those power hierarchies and make it more rigid as a reaction to whenever water becomes/made scarce or any visible/invisible threat to their power and control over water. These complex processes involved in control of water resources vis-à-vis to maintain power structure in villages becomes dynamic and a continuous cycle which produces and (re)produces the power hierarchies making water inaccessible for some groups of people.

1.2 An Overview of Literature:

Water has always been a highly contested resource as it is essential for survival and has no substitution. Wittfogel commented in 1950s that "control of water is inevitably control of life and livelihood"[1]. Several literature talks about how water accessibility, use and control is shaped by different factors such as social institutions, political, economic, ecological and cultural context in different society. Such analysis is crucial to understand the processes involved in the overall outcome of water accessibility. However, such analyses often get trapped into looking at constituting factors as an external factor which triggers the overall water-society relation and this, in turn, treats water as merely a material resource. Here, I argue that water and the other constituent factors involved interact in a way that it 'produces' a kind of water which internalizes those very constituent factors and creates hybrid spaces. And, this process has both temporal and spatial dimensions.

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[1]Strang, Veronica. "Taking the waters." *Gender, water and development* (2005): 21-38.

To begin, I explore the shifting paradigm towards acknowledging the social and political nature of water itself which is ignored in the traditional approach of addressing and understanding water problem. Second, I draw on literature to understand the nature-society relations and how it interacts with water to create hybrid society or waterscapes. Third, I attempt to conceptualize hydro-social cycle which incorporates water-society relation and, then, to explore it's spatial and temporal dimensions. Fourth, I draw on several case studies from different literature in order to develop a perspective and understand how unique waterscape mediates particular kinds of water for particular kinds of society.

The last section discusses drinking water scenario in India and critically analyses the evolving institutions for drinking water management in India which would provide a context to study how drinking water resource is governed, distributed and its implication on water outcomes in special reference to Indian villages.

1.2.1   Shifting Paradigm from Hydrologic cycle to Hydro-social cycle:

"The relationship between water and society is as complex as historical, sociological and regional problem as any that can be imagined"[2]. It has attracted several scholarly attentions to not only to understand the society's relationship with water but also to critically analyze its own 'social nature'[3]. This entails that water can not only be regarded as "material object of social processes but as a nature that is both shaped by, and shapes, social relations, structures and subjectivities"[4]. Jamie Linton's monograph, *What is water?* provides a wonderful approach built on political ecology, critical geography and associated fields to develop the concept of hydro-social cycle. It has contributed to advance the hydro-social cycle as a framework to understand the socio-natural process by which "society make and remake each other over space and time"[5]. Linton and Budds (2014) have conceptualized hydro-social cycle by disregarding the concept of hydrologic cycle which is popularly used to explain the

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[2]Mosse, David. *The rule of water: statecraft, ecology and collective action in South India*. Oxford University Press, 2003: 1.

[3]Linton and Budds (2014) refer social nature of water as water which 'internalizes social relations and politics as opposed to being merely the object of politics'. In this conception, the dualistic categories of water and society are transcended and employ a 'relational-dialectical approach to demonstrate how instances of water become produced and how produced water reconfigures social relations'.

[4]Linton, Jamie, and Jessica Budds. "The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water." *Geoforum* 57 (2014): 170-180.

[5]*ibid*

water flows within the cycle[6]. The dominancy of hydrologic cycle as a tool to understand the water flows in the society has been rejected as it does not address the social nature of water flows and completely ignores its agential role played by water. Linton argues that hydrologic cycle is not only a neutral political concept but a social construct with political consequences. The purpose of hydrologic cycle has not been only to explain the hydrological processes but also "to create a separate field of scientific enquiry and a community of technical experts known as hydrologists"[7]. Here, one cannot ignore the fact that the acceptance of hydrologic cycle and the monopoly of scientists, geologists, hydrologists and other technical fields to manage water resources have served the society for some for quiet sometime in the history. But, now the global community is rejecting the very idea as it is not serving us anymore. And, this calls for the change in paradigm as it has started to expose the major drawbacks in the traditional approach to manage water resources. To understand clearly that why the traditional 'technical fix' for water problem is redundant, the British approach to water management in colonial India provides an excellent example. Their main focus was to enhance the productivity of land by increased provision of water for irrigation in the regions with less rainfall or located away from the rivers[8]. Unsurprisingly, this approach continued even after independence. These interventions however, brought huge benefits to the farmers in the areas receiving less rainfall by building up canals and dams which was unthinkable before. But, what we missed here is that how these interventions have created long-term pressure on water resources. There have been numerous studies on the social and ecological cost of such interventions including the green revolution (see Vandana Shiva, 2016)[9]. But, my focus in this particular section is on how these traditional 'technical interventions' in water management field has created space for 'water conflict' which has been 'constructed' historically, socially and politically. And, therefore, it becomes important to work under interdisciplinary framework to conceptualize the 'nature of water'. For example, Lyla Mehta (2003)[10] showed in her

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[6]*ibid*

[7]Linton, Jamie, and Jessica Budds. "The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water." *Geoforum* 57 (2014): 170-180.

[8]Bandyopadhyay, Jayanta. *Water, ecosystems and society: a confluence of disciplines.* SAGE Publications India, 2009.

[9]Shiva, Vandana. *Water wars: Privatization, pollution, and profit.* North Atlantic Books, 2016.

[10]Mehta, Lyla. "Contexts and constructions of water scarcity." *Economic and political weekly* (2003): 5066-5072.

study that how the 'manufactured' dream of water flow in the semi-arid water scarce region of Kutch that after building of main canal on Narmada River will solve all the water-problems has actually led to an increased over-exploitation of ground water and bad rain-water harvesting. And, in turn, it further creates water scarcity in the region. She explains, how this propaganda machinery that is being used by the state to 'manufacture' myths that justifies their obsession with the 'technical fix' i.e. Sardar Sarovar Project. It has been a century; water has still not reached to the thirsty land. She highlights the anthropogenic dimensions of the naturalized water scarcity in the region. Such rhetoric has led to "silted-up dams, broken hand pumps and defunct pipelines schemes which indicate the bad management practices and/or a failure to encourage or create supportive institutional arrangements to govern water supplies"[11].

The hydrologic cycle is therefore represents water that "emerged within a certain historical context and served particular political ends"[12]. However, the historical set of conditions that supported hydrologic cycle as an approach is changing. Hydrologic sciences are more concerned with "the integration of hydrological with ecological processes"[13]. And, the idea which treats water as a discrete activity is absurd in present context as it does not covers water's social dimensions. As a response to this, Integrated Water Resource Management (IWRM) has become the "dominant paradigm for managing water resources"[14]. This emerging new framework got an early name IWRM much before it got a clear description[15]. The urgency that is shown by the global community to deal with the water resources made this convenient term in order to "integrate" economical, ecological and cultural characteristics of water with the traditional paradigm. However, Linton and Budds (2014) highlights the problem with the current approach in their paper, saying,

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[11]Mehta, Lyla. "Contexts and constructions of water scarcity." *Economic and political weekly* (2003): 5066-5072.
[12]Linton, Jamie, and Jessica Budds. "The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water." *Geoforum* 57 (2014): 170-180.
[13]Nuttle, William K. "Is ecohydrology one idea or many?." *Hydrological Sciences Journal* 47, no. 5 (2002): 805-807.
[14] Bandyopadhyay, Jayanta. *Water, ecosystems and society: a confluence of disciplines*. SAGE Publications India, 2009.
[15]*ibid*

"It is precisely this idea of integrating the hydrologic and the social as if they were a priori separate and unconnected". (pp. 172)[16]

Before conceptualizing hydro-social cycle as a powerful approach to understand the 'socio-natural processes by which water and society make and remake each other over space and time', we need to look at relevant geographical interests in theorizing nature-society relations through water. Alex Loftus (2011)[17] in his review on Linton's "*What is Water?*" recapitulates geographical work in this field way back from Semple's[18] (1911) deterministic work "*Influences of geographic environment*", which is about '(Hu)Man's relation to water. Wittfogel's (1957) "*Oriental Despotism*" has also attempted to theorize the relationship of water and social power. Hence, water and society relationship has been always central to geographical concerns. Most recently, cultural geographers such as Cosgrove and Petts (1990) have considered the symbolic aspects of water infrastructures[19]. Pierre Cornut and Erik Swyngedouw (2000) in their paper, "*Approaching the society-nature dialectic: a plea for a geographical study of the environment*" have suggested that the political-ecology approach is "one of the perspectives which attempts to illuminate the particular way in which social affairs interpenetrate with physical processes"[20].

"Although there is by no means any consensus as to what exactly constitutes 'political-ecology', its practitioners nevertheless share a concern with demonstrating how relations of social power infuse with natural processes and, in doing so, produce particular 'environments' that are characterized by a distinct configuration of natural elements as well as distinct configuration of human attributes". (pp. 39)[21]

Here, what they are trying to imply is that both the social power as well as the natural processes work together to produce unique assemblage of both social and natural attributes. In fact, both the attributes work together internally as opposed to earlier understanding where nature and society were seen as separate entities. To make it

[16]Linton, Jamie, and Jessica Budds. "The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water." *Geoforum* 57 (2014): 170-180.

[17]Loftus, Alex. "Thinking relationally about water: review based on Linton's What is water?." *The Geographical Journal* 177, no. 2 (2011): 186-188.

[18]Linton, Jamie, and Jessica Budds. "The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water." *Geoforum* 57 (2014): 170-180.

[19]Loftus, Alex. "Thinking relationally about water: review based on Linton's What is water?." *The Geographical Journal* 177, no. 2 (2011): 186-188.

[20]Cornut, Pierre, and Erik Swyngedouw. "Approaching the society-nature dialectic: a plea for a geographical study of the environment." *Belgeo. Revue belge de géographie* 1-2-3-4 (2000): 37-46.

[21] *ibid*

clearer, we go back to Lyla Mehta's work (2003) in Kutch semi-arid region, where the fragile ecological condition of drought and 'regularly irregular' rainfall infused with over-exploitation of groundwater aquifers by 'water lords' (rich irrigators in rural areas) has created a new configuration of water space. Due to this, the response to 'constructed' scarcity, such as dry land agriculture by low caste people and who has no capacity to irrigate their small fields as most of the water is taken by water lords changes and presents a new unique set up of strategies and responses which was not there before[22].

1.2.2 Revisiting Nature-Society relations:

The term 'nature' has been usually used as 'the environment', the term which indicates the distance, "a separation between that 'world' and the social sphere"[23]. Cornut and Swyngedouw (2000)[24] cite N. Smith (1994) to explain the dual nature of the '*ideology of nature*'.

> *"On the hand, nature is seen as external to society, at times wild and uncivilized or as embodying healing, spiritual and a moral superiority. While nature has to be tamed and controlled, it is often invoked as the source of revival re-creation and for legitimizing all manner of moral acts (varying from competition to mutual aid). On the other hand, of course, nature is seen as universal, as possessing and expressing general applicable laws and dynamics to which everthing and everyone is inevitably subject to".* (pp. 39)[25].

This *ideology of nature* has been majorly accepted and made concerted efforts to advance the nature-society split by science and engineering fields. However, as Cornut and Swyngedouw (2000) argues that it is very ironical that as the scientist community "re-enforced the nature-society split, the world started getting filled with more things that were more '*hybrid*' in character"[26]. The effort that was being put to master the nature in order to free the humankind from the hold of nature, in fact has

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[22]Mehta, Lyla. "Contexts and constructions of water scarcity." *Economic and political weekly* (2003): 5066-5072.
[23]Cornut, Pierre, and Erik Swyngedouw. "Approaching the society-nature dialectic: a plea for a geographical study of the environment." *Belgeo. Revue belge de géographie* 1-2-3-4 (2000): 37-46.
[24]Cornut, Pierre, and Erik Swyngedouw. "Approaching the society-nature dialectic: a plea for a geographical study of the environment." *Belgeo. Revue belge de géographie* 1-2-3-4 (2000): 37-46.
[25]*ibid*
[26]*ibid*

produced 'new forms of nature' (as Swyngedouw calls it hybrid worlds) which still hide serious consequences from humans[27].

Karl Wittfogel's (1957) seminal work on 'hydraulic society' based on dialectical relations of labor process given by Karl Marx cites Marx describing this as:

> *"...a process between man and nature, a process by which man, through his own actions, mediates, regulates, and control the metabolism between himself and nature. […] He sets in motion the natural forces which belong to his own body, his arms, legs, head, and hands, in order to appropriate the materials of nature in the form adapted to his own needs. Through this movement he acts upon external nature and changes it, and in this way he simultaneously changes his own nature."* (Marx, 1971 (1867, p. 283), cited in Linton and Budds (2014, p. 173)[28]

Wittfogel based his study on this dialectical relationship showed how hydraulic society in China, Egypt, Mesopotamia and Indian civilizations transformed due to "dialectical relationship between large-scale irrigation systems and centralized state power"[29]. Here, Marx has built up this dialectical relationship between nature and (hu)mans and put emphasis on the role of nature in the overall production systems. However, as Swyngedouw argues that Marx end up looking at nature as a substratum upon which humans acts and produce. Under such framework nature remains an external factor rather than working internally as Swyngedouw defines nature in hydro-social hybridity (discussed in detail in the next chapter).

1.2.3 Socio-Natural Hybrids

Swyngedouw's contribution on the hydro-social dialectics is imperative in water-society research. He argues that "the components of the process i.e. water and social power is related internally rather than externally"[30]. And, these two components create and thus are considered as *hybrids* rather than the two separate entities falling under either nature or society. This has been a major shift in the geographical understanding of nature and society relations. Here, Swyngedouw makes it clear that there is a difference in the way we look at the relations *between* things and "the

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[27]*ibid*
[28]Linton, Jamie, and Jessica Budds. "The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water." *Geoforum* 57 (2014): 170-180.
[29]*ibid*
[30]Linton, Jamie, and Jessica Budds. "The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water." *Geoforum* 57 (2014): 170-180.

relations *constituting* things – such as the cultural, economic and political processes that constitutes the particular characteristics of desalinated water, treated drinking water or holy water"[31].

A Socio-natural hybrid is a conceptual framework which explores the internal relations which regards things as "constituted in the process of their relation with other things, rather than in and of themselves"[32].

1.2.4 Defining Hydro-social cycle:

Hydrosocial cycle defined by Linton and Budds (2014) as:

"Hydrosocial cycle is a socio-natural process in which water and society make and remake each other over space and time." (pp. 175)[33]

There are three main key ideas that are incorporated in this theoretical work:

a) A cyclic process:

"The hydrosocial cycle represents the process by which alteration or manipulation of water flows and quality affects social relations and structure, which in turn affect further alteration or manipulation of water"[34]. Any intervention or change in the hydrosocial cycle is always "preceded or presupposes the social structure"[35]. For example, a particular kind of social relations are produced when any new technological interventions (dam construction, canal constructions, piped water supply or change in water governance can be viewed as the outcome of a specific kind of social arrangements. This cyclic process has no beginning or the end but a process once put in place, the produced water wields its own social and political effects.

b) A socio-natural process:

The socio-natural processes in hydrosocial cycle implies what Swyngedouw argues that things like "water, society and social power are related internally rather than maintaining independent entities interacting with each other"[36]. To understand this, Linton (2010) explains with an example that how particular intervention such as

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[31]*ibid*

[32]*ibid*

[33]*ibid*

[34]*ibid*

[35]Linton, Jamie, and Jessica Budds. "The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water." *Geoforum* 57 (2014): 170-180.

[36]*ibid*

"technology is internally related to a particular kind of water for a particular kind of society"[37]. The fountain water's nature which is public and everybody has equal accessibility with the shared responsibility of its management changes when its water is diverted for commercialized bottled water vending machine. This illustrates that how the kinds of water changes in different hydrosocial configurations. In one configuration it is public while in the other, the same kind of water becomes private.

c) *Water is not just water:*

"...Water is the symbolic and material power linking time, space and place, by connecting origin, life, destruction and regeneration..."

-(Rutgerd Boelens, pp. 234)[38]

Water is not at all taken for granted in hydrosocial cycle. In this cycle, water is not just H_2O but is constituted within the social, political, ecological, cosmological circumstances at a given space and time. Hence water, which is being produced, represents the imbued socio-natural processes. The power of water or say how different kinds of water holds particular meanings for a particular situation can be understood by taking 'holy' Ganga river as an example. The Ganga river water is so polluted but still holds the power of healing and rejuvenation. Water has the power of making new social structures, shaping livelihood patterns, institutions as well as disrupting (in case of flood) them. For example, the water-society relation around piped water supply is totally different from contaminated ground water.

Linton and Budds (2014) define water in the hydrosocial cycle as:

" ...Instead of treating water as homogenous, the hydrosocial cycle directs analysis towards the hybrid nature of different waters by attending to water's different states, forms and qualities, which make it act and give it meaning in distinct ways..." (pp. 178)[39].

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[37]Linton, Jamie. *What is water?: The history of a modern abstraction*. UBC Press, 2010.
[38]Boelens, Rutgerd. "Cultural politics and the hydrosocial cycle: Water, power and identity in the Andean highlands." *Geoforum*57 (2014): 234-247.
[39]Linton, Jamie, and Jessica Budds. "The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water." *Geoforum* 57 (2014): 170-180.

1.2.5 Understanding spatial and temporal dimensions of hydro-social cycle:

In this section, I attempt to theorize a spatial and temporal dimension of water which interplay with nature-society relations and creates unique '*waterscape*'[40]. Tuan (1997) theorized space as "an abstract area tied to location, but allows movement"[41]. Doreen Massey in one of her interviews reflects upon the spatial dimensions, says,

> "*...I got really annoyed with the rest of the social sciences, and indeed with philosophers, paying so much attention to time. And space became a kind of residual dimension: it's always 'time and space'. So time is the dimension of change, and of dynamism and of the life we live, and all the rest of it; and space became the dimension that wasn't all of that. And a lot of us, I think, implicitly think of space as a kind of flat surface out there -we 'cross space' - and space is therefore devoid of temporality: it is without time, it is without dynamism, it is a kind of flat, inert given. Foucault wrote in the later part of his life that, yes, he thought we'd often been thinking of space like that and that was wrong, and I agree with Foucault in that later moment*" (podcast on space)[42].

Here, I want to go with the idea that water and society relations are constructed and co-constructed by social, ecological, political and cultural processes with spatial and temporal dimensions and creates unique configuration known as 'waterscape'. The spatial and temporal dimensions "actually provide a "structuring mediums" through which nature-society relations unfolds"[43]. With the waterscape approach, here, I want to make myself clear that, to understand the relational process which is internally intertwined within the dynamic hydrosocial cycle is actually a snapshot of how the processes of specific cultural, political, ecological and social context is uniquely tied to particular geographies or locations and creates unique waterscape. In order to develop this perspective and understand how unique waterscape mediates particular kinds of water for particular kinds of society, I draw on different case studies that are collected from different literature.

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[40]'Waterscape', the term used for hybrid socio-natures as conceptualized by Swyngedouw's seminal paper on the water history of Spain (1999).
[41]Thompson, Jennifer A. "Intersectionality and water: how social relations intersect with ecological difference." *Gender, Place & Culture* 23, no. 9 (2016): 1286-1301.
[42]https://www.socialsciencespace.com/2013/02/podcastdoreen-massey-on-space/
[43]Thompson, Jennifer A. "Intersectionality and water: how social relations intersect with ecological difference." *Gender, Place & Culture* 23, no. 9 (2016): 1286-1301.

The case studies which are selected in this section are mostly concerned with the specific situated heterogeneous entities such as caste, gender, local politics, water governance, ecological conditions, cosmological beliefs, technology and economy and livelihood which mediate water accessibility *internally* within their unique waterscapes. There can be only one dominant process or multiple processes which is working over space and time and thus, creates unique case of water-society relation.

Vishal Narain (2014)[44] carried out a study in two villages (Mandhana and Dhamala) of northwest India situated in Panchkula district of Haryana. His study has showed that how often the policy focus on 'women' to provide piped water supply for drinking water miss out the implications on broader gender-relations. However, if we look at his findings, we can actually relate it to how the change in the existing water supply system changes the whole dynamics of the water-society relations. Thus, in a newly created waterscape, the roles and responsibilities related to water collection transforms the constituting character of water, social, political and ecological relations within the dynamic processes of water-society relations.

In Mandhana village, women collected water from the *bawdis* (springs) in the hills with steep elevation. These springs are located at 3-5 kms from their homes. Installing new pipelines in this village actually reduced the burden women to walk such longer distance at such steep slope. As one of them responded, "Earlier the whole day would go simply in getting water… We are better off than the previous generation… Our future generation will be better off still…"[45]. Although now women have to walk shorter distance to collect water, the volume they use to carry has now increased which is mostly 'not as visible' as decreased water source distance. "This is because, several activities that were previously performed at traditional public water sources such as *bawdis and Johads* are now performed at home, and water must be carried home for these relocated activities"[46]. Earlier men use to bathe regularly at *bawdis*, but today they do it rarely. As a consequence of this, women have to carry more buckets of water. Since, as we know women are not a homogenous entity, *different*

[44]Narain, Vishal. "Shifting the focus from women to gender relations: Assessing the impacts of water supply interventions in the Morni–Shiwalik hills of northwest India." *Mountain Research and Development* 34, no. 3 (2014): 208-213.
[45]*ibid*
[46]*ibid*

women get affected *differently.* Also, with the limited duration of water supply, the conflicts based on caste have also increased in Mandhana village.

More interestingly, what is more crucial here to understand is the changing relationship among different groups of people. Men in the village after piped water supply typically responded, *"now there is no problem in getting water...Earlier they had to walk steep slopes... and all this time was used to socialize...Now it is a short walk away, Why should not we bathe in our homes now?"*[47]. In addition to this, commenting on daughter-in law, the older generation of women said, *"We have seen the drudgery in water collection...Their life is easy."*[48] Many men also echoed such sentiments, saying, *"Hard times were seen by my mother... These ladies only sit and gossip"*[49].

Another important observation in Mandhana village is regarding the indigenous practice of *bawdis/ johads* maintenance. With the new piped water supply system in the village, the institution of *bawdis/ johads* has been devastated. "Earlier, when villagers' houses were *kutcha* (made of mud), women would desilt the *johads* and take the mud for their homes"[50]. However, today, as *kutcha* houses are replaced by *pakka* houses, the practice of maintaining and desilting the *johads* have died out. Also, with the arrival of new system, the people's concern to maintain their integrated system of *johads* has disappeared.

The second case study is from Bundelkhand region which includes seven districts of Uttar Pradesh and the six districts of Madhya Pradesh. This region is plagued by drought conditions since the last decade. Most commonly the reason for drought condition is given as absence or irregular rainfall. But, the study found that the distress in the region cannot be simply explained by "hydrologic" reasons but it should be sought in the "historically determined social relations of production, the intimate correlation of caste and landownership in the region as well as the neglect of

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[47]Narain, Vishal. "Shifting the focus from women to gender relations: Assessing the impacts of water supply interventions in the Morni–Shiwalik hills of northwest India." *Mountain Research and Development* 34, no. 3 (2014): 208-213.
[48] *ibid*
[49]*ibid*
[50]*ibid*

traditional water management systems and the push towards cultivation of water-intensive commercial crops"[51].

From this perspective, it is clear that the present condition of water availability and accessibility in the region is mediated by historical and geographical conditions with internal processes of social institutions, ecological conditions, economic, local politics and cultural practices. What we are witnessing as the present condition of the region is actually the 'snapshot' version of the entire dynamic processes that are operating over time and space. In this particular 'waterscape', caste-relation which is historically shaped is one of the dominant factors in shaping the water accessibility in the region. Dalit women are not allowed to take drinking water until and unless upper caste women are done with their water needs. And, when there is scarcity of water, these lines of conflict deepens. This study shows that villagers of Adhiyana had to take water from the pond used by their cattle when there is severe shortage of water. Many women reported to the team that they were abused by Thakurs when they went to fetch water from their private wells. The rich farmers who are mostly upper caste landowners, they don't have to bother about the region's water scarcity as it is not affecting them equally as others. They continue to grow water intensive crops to make money and to do so; they continue to exploit groundwater and refrain to share with others. These kinds of attitude is just not given but has been acquired over time and space. They are able to create space for themselves in such water distress region through continuously changing the water-society relation over time and space according to their own needs.

The fragility of the ecological condition of the region is further challenged by excessive mining and deforestation practices. Mining adversely affects the water resources of the region. "Such ecologically destructive practices further affect the rainfall patterns, declining ground water recharge and worsen the overall water scarcity in the region"[52]. Rutgerd Boelens rightly explains it as, "In such settings, water rights simultaneously embody power relations and reveals how common

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[51]Perspectives. "Drought by Design: The Man-made Calamity in Bundelkhand." *Economic and Political Weekly*(2010): 33-38.
[52]Perspectives. "Drought by Design: The Man-made Calamity in Bundelkhand." *Economic and Political Weekly*(2010): 33-38.

'hydraulic property' is reaffirmed and how contested notions of 'identity' and 'community' are given their actual substance"[53].

The third case has been taken from William James Smith's study in the Chuuk state which is a rural, remote and less wealthy small island of Federated States of Mircronesia. Here, I am emphasizing only one part of the entire study to show that how local politics and unexpected barriers can lead to the failure of the proposed 'fix' for water problem without clearly understanding the internal processes of making of the water-society.

Winter and Stephenson (1981)[54] found that how particular dating habits and jealousy can ruin their water improvement project in Western Pacific. William Smith explains, that, Winter thought, 'logically' and 'scientifically valid' to outsiders, building a simple system to bring water to a village would be widely appreciated. But what Winter missed that, "the need to walk into the high island's upper watershed for water has been traditionally provided an opportunity for young women and men to get together without family being present"[55]. The young men countered furiously to this cultural intrusion. They hacked up the pipes with machetes. In other case, the PVC pipes which were going through the villager's land did not get the connection and in reaction to this, he put dried coconut shells around the pipes and and set them on fire. William Smith argues that,

> "…Arranging a form of contract with communities well ahead of time for a given project is frequently helpful. However, determining who to approach, and how many commitments would constitute sufficient 'consensus', can be challenging. This is especially true if indigenous political hierarchies have become weak; if they have not become weak, simply applying Northern/Western assumptions regarding the virtues of democratic governance, and not appreciating the traditional power vested

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[53]Boelens, Rutgerd. "Cultural politics and the hydrosocial cycle: Water, power and identity in the Andean highlands." *Geoforum*57 (2014): 234-247.
[54]This example is taken from Winter S and Stephenson RA (1981) cited in Smith, William James. "The place of rural, remote and least-wealthy small islands in international water development: the nexus of geography–technology sustainability in Chuuk State, Federated States of Micronesia." *Geographical Journal* 174, no. 3 (2008): 251-268.
[55]*ibid*

in local hierarchies, may undo plans regardless of how well intentioned, 'logical' or 'scientifically valid' to outsiders..." (pp. 255)[56]

The next case study is taken from Rutgerd Boelens'[57] study in the remote Peruvian district of Molepata, Cusco (1988). The area is characterized with uneven rainfall and dry area which made peasant families' life extremely difficult. They were all dependent on agriculture on subsistent level whilst herding their cattle in the *puna*[58]. In early 20th century, the local landlord ordered the five (semi) serf communities from his local area to build two canals. The community delivered their free labour, as in return, they were permitted to use a restricted amount of water for irrigating their small landholdings.

During land reforms (1968), the people were subdivided among community members who have individual titles within community property and third parties. For the reason of the unexpected organizational void, the community members had upholded a large organization to fix the canal system. But, the reconstruction of canal posed many problems. Throughout this construction effort, the 2 km stretch from the main intake, crossing the steep slope of gravel and stones, repeatedly collapsed. This work became more difficult as this place is eight hours walk far from the communities. Each time, right after some construction work, new landslide would destroy it again.

Under such situation, what is interesting to note is that Rutgerd got several explanation for the same 'water problem'. The first explanation was '*technical* and *biophysical*'. They explained that the canal slope was very steep and unstable without rock and vegetation. On top of that, the canal's hydraulic and concrete structural design was not appropriate for the canal construction. The second explanation pertains to *socio-legal* and *organizational-managerial*. They explained that the major issue is the "lack of strong organization with transparent leadership, clear roles and responsibilities"[59]. The third perspective is *political* and *economic*. This is explained by the prevailing practices of power abuse by elite local landlords and fear that newly

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[56]Smith, William James. "The place of rural, remote and least-wealthy small islands in international water development: the nexus of geography–technology sustainability in Chuuk State, Federated States of Micronesia." *Geographical Journal* 174, no. 3 (2008): 251-268.
[57]Boelens, Rutgerd. "Cultural politics and the hydrosocial cycle: Water, power and identity in the Andean highlands." *Geoforum* 57 (2014): 234-247.
[58]The highest zone
[59]Boelens, Rutgerd. "Cultural politics and the hydrosocial cycle: Water, power and identity in the Andean highlands." *Geoforum* 57 (2014): 234-247.

created water rights might eventually be taken by force and legal manipulations after putting a lot of effort in building the canal.

However, many in the community believed that these explanations only partially explained the 'water problem'. Since the rehabilitation of canal started, workers discussed the call for the human sacrifice to the mountain god, the *Apu*[60], to appease him. This way, the god of mountain would "give permission to work on his body and release his blood as irrigation water"[61]. "Some felt a basic component of the 'water problem' was the distorted relationship between community and deities"[62]. Earlier, whenever water became scarce, the community members would gather for tribute to *Apu*. However, this tradition has been lost which is the reason for heavy cloudburst and rain- and hailstorms causing landside which in turn breaks the canal. Nevertheless, the water problem got solved after the stretch was covered with concrete slabs. They also carefully protected and lined the canal. And, water flowed smoothly through the stubborn zone for the first time.

Several groups explained this successful construction of canal based on their own observations and beliefs. But, here, I want to specifically emphasize on cosmological explanation as it is important to understand that how water knowledge and truth is created intrinsically that shapes the perception of reality and thus, defines the socio-natural reality itself[63]. People said that the *Apu* again showed his anger and the canal once again collapsed shortly before the problem was solved. This time a peasant leader was buried under the debris. The labourers somehow managed to take him out. The community said that *Apu* released him and that's why he is still alive. So, they interpreted this entire event as "*Apu* did not demand a permanent offering, but settled for the temporary human sacrifice"[64]. And, since then there were no problems seen in the stretch. Basically, in short, "the various 'groups' not only analysed the 'water problem' according to their own perspectives but also placed 'water solutions' in their own truth domain"[65].

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[60]'Apu' or 'Womani': main protector of the local territory.
[61]Boelens, Rutgerd. "Cultural politics and the hydrosocial cycle: Water, power and identity in the Andean highlands." *Geoforum*57 (2014): 234-247.
[62]*ibid*
[63]*ibid*
[64]*ibid*
[65]*ibid*

The cosmological explanations which shape the perception of water truth and reality cannot be neglected especially in the Indian context. Jai Pal Singh and Mumtaz Khan (1999) wrote a paper which presented "a cultural analysis of the directional orientation and segregation of castes in villages in a part of the north-western plains of India"[66]. They argue that "the Hindu cosmological schema is the language that communicates the social order of the built environment"[67]. Therefore, the study of Cosmological schema is important for understanding the morphology of settlements and thereby, shaping the socio-natural relations. They have shown how the morphology of the village is a manifestation of "integration of social order into spatial order"[68]. In this study, they have more emphasized on directional orientation of settlements which is often missed out in the village morphological analysis. They found that in most of the villages they studied, the occupied space is hierarchically divided into numbers of quarters. The position of each quarter in the hierarchy depends on which guardian deity controls it. Therefore ritually, the gradient of the village slopes down from the high quarters to low quarters.

The above figure shows the guardian deities allotted to different directions that not only guards the quarters they represent but also set specific values to them. As they explained in their paper, "the eastern quarter is allotted to 'Indra' the god of rain who fights *Vritra,* the demon of drought. In fact, the drought-prone western region of India receives rainfall from easterly monsoon winds. The three south quarters are considered as hot, and, allotted to Agni (fire), Yama (son of the sun) and, in some formulations, Surya (sun). The reason behind it comes from the assumed north-western genesis of the cosmology which would also mean that in the sun's daily march it will always remain to the south of zenith. The southwestern quarter is allotted to goddess Nirrti (the goddess of decay) which is explained as the southern frontier of the first Aryan homeland in India impinged upon a region known as Marusthali (desert) area which is hot and inhospitable"[69].

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[66] Singh, Jai Pal, and Mumtaz Khan. "Hindu cosmology and the orinetation and segregation of social groups in villages in Northwestern India." *Geografiskaannaler: Series B, human geography* 81, no. 1 (1999): 19-39.
[67]*ibid*
[68]*ibid*
[69]Singh, Jai Pal, and Mumtaz Khan. "Hindu cosmology and the orinetation and segregation of social groups in villages in Northwestern India." *Geografiskaannaler: Series B, human geography* 81, no. 1 (1999): 19-39.
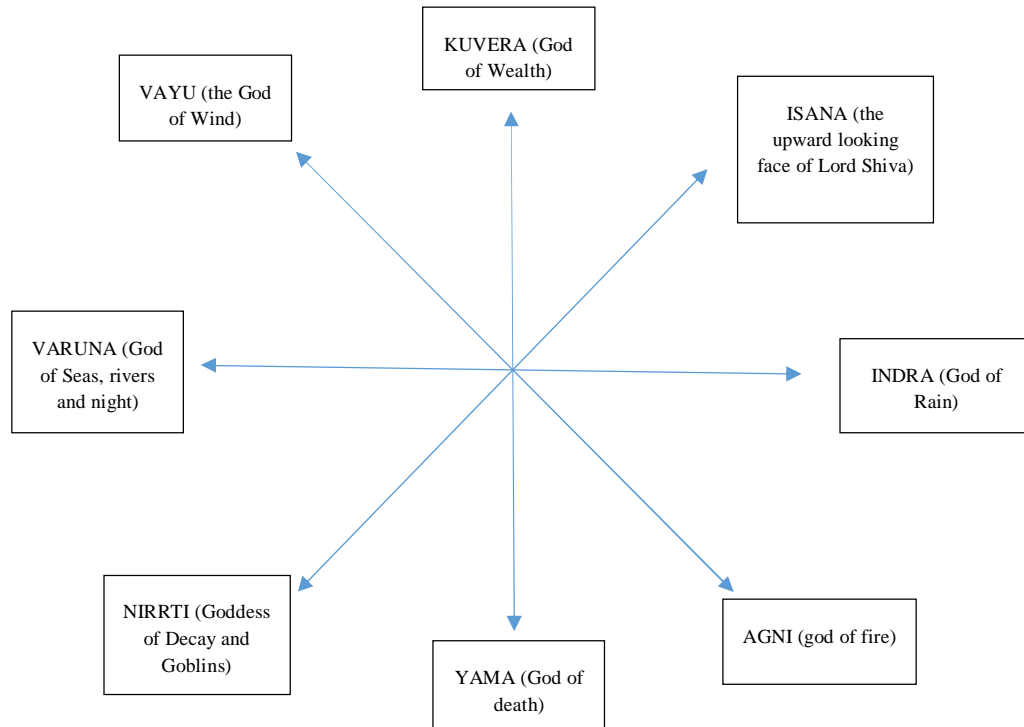
Fig. 1.1: Hindu Cosmology

Source: Jai Pal Singh and Mumtaz Khan (1999)

The second important aspect of Hindu cosmology is that how the regional ecology is partially linked to the orientation of castes in rural settlements. Since, the study is based on north-western villages; the westerly wind becomes an important factor in this region. Therefore, the western part of the village receives unpolluted fresh air, while the eastern part receives polluted air. In this region, it is evident that the upper caste and/or dominant caste occupy the western quarter while untouchables who are mostly in 'unclean' occupations which produces foul smell are confined to the southern sector.

Here, the fragmented social order is reflected on segmented spatial order. The four villages they studied followed almost the same pattern with little variations. There can be variations as we move to different villages or regions based on their own beliefs and interpretation of the cosmological knowledge. In many cases, the ecological, historical and religious factors could explain the spatial representation of social order[70]. Thus, understanding the spatial order of the region particularly in Indian

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[70]Desai, AkshayakumarRamanlal. *Rural sociology in India*. Popular Prakashan, 1994.

context where caste is the 'steel frame of Hinduism'[71] is of utmost importance. And, one of the most important features of the caste system is the notion of 'purity' and 'pollution'. So, water has a crucial role to play in this regard as it has always been used as a medium of exclusion[72]. Therefore, it cannot be neglected while studying the socio-natural processes.

The last case study is taken from Ben Page's work in small Cameroonian town of Tombel. In his study, he focuses on the historical role played by women in the production of water and how the meanings of water changes in the contemporary Cameroon with the change in water supply systems and thus, alienating women from as an active participant in the production and management of water. He argues that "the production of water is a historical and geographical processes that weaves together physical changes with the changing ideas"[73]. He shows that how the meanings of water changes as the kind of water changes. Piped water which is taken from the river immediately becomes the engineered production of water and is already a produced substance. At the same time, the social meanings attached to water also changes. Thus, "with the material transformation of water, the meanings of water are co-produced"[74].

Historically, when women used to collect water from the community springs, they solely took responsibility to manage their water needs. They were involved in the building and maintaining the path to the springs. Since, domestic water is always taken as women's responsibility under the patriarchal structure; they were also the part of the preparations of communal eating and drinking which was also the part of production of water. However, in the contemporary Cameroon with the introduction of much celebrated water resource management through building up piped water supply incorporating community participation (self-help) has led to their labor exploitation on the premise that they are the water consumers and at the same time snatching their control over water resources. The changing nature of waterscape from public sources of water to tap water supply in which water users have to pay price; women have actively participated in the project in the hope that it would solve all

[71]See, Desai, A. R. "Social Background of Indian National Movement." (1948): 387-389.
[72]Kulkarni, Seema. "Women and decentralised water governance: Issues, challenges and the way forward." *Economic and Political Weekly* (2011): 64-72.
[73]Page, Ben. "Naked power: Women and the social production of water in anglophone Cameroon." *Gender, water and development* (2005): 57-76.
[74]*ibid*

their water woes. But the project failed to deliver on its promises and it created anger among women in Cameroon.

However, this story does not end here, as the local women responded fearlessly when they realized that the control over water is being taken away by external interventions. A woman stripped herself naked when she was asked to vote in the upcoming elections saying:

> *"…Women would like to vote for him, but they were ashamed to go to vote for because they were dirty. They were dirty because there was no water for them to wash once they come back from their farms…"*[75]

Drawing on several literatures, I have explored the water-society relations and how different processes constituting several entities creates and (re)creates hybrid space over time and space and thus, understanding how water distribution, access, use and control is mediated and/or shaped in such unique hybrid space. Here, as we have already discussed in this chapter, that the hybrid space which is being created and (re)created historically and geographically is a continuous dynamic process. But, 'waterscape' as an approach provides an opportunity to represent the complex 'hybrid space' in such a way that it becomes 'static' carrying all the attributes of the internal dynamic processes at a given time. So, it is kind of 'snapshot' approach to look through the processes that are creating or transforming the water-society relation and hence, shaping water accessibility.

1.2.6 Drinking Water Scenario in Indian Villages:

In India, the exclusion of some groups of people on the basis of caste, gender, class, religion and ethnicity is embedded in societal interrelations and institutions[76]. The exclusionary practices revolving around caste identity is crucial to understand especially in regards to accessibility to drinking water in India. As one of the most important features of caste is the notion of 'purity' and 'pollution'. And, water has a crucial role to play in this regard as it has always been used as a medium of

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[75]Page, Ben. "Naked power: Women and the social production of water in anglophone Cameroon." *Gender, water and development* (2005): 57-76.
[76] Rao, Y. C., and S. Karakoti. "Exclusion and Discrimination; Concepts, Perspectives and Challenges." (2010).

exclusion[77]. Therefore, drinking water becomes the most critical domain of practice of untouchability as well as other forms of social discrimination.

1.2.6.1 Untochability and drinking water:

"Untouchability means pollution by touch of a certain person by reason of their birth in a particular state of family"[78].

-Dr. B.R. Ambedkar (1948)

Caste based exclusion involved in the caste system needs to be understood properly. The inter-caste relation involved in the institutions of caste and untouchability are both exclusionary and inclusionary in nature[79]. It covers all the spheres of social, cultural, religious, economic and political participation.

There have been several changes made in the laws against untouchability recognizing the inhuman treatment of Dalits. However, the number of incidents against Dalits has been multiplying with the passing decades[80]. This depicts that the focus remains on physical untouchability vis-à-vis physical denial of access to public spaces. But, in ground reality the exclusion of 'untouchables' is far more multifaceted especially in regards to access to drinking water. There are both obvious and subtle ways that are employed to exclude Dalits from having equal access to drinking water. Based on these exclusionary processes, the concept of caste based discrimination can be conceptualized using Amartya Sen's definition of 'unfavorable exclusion' and 'unfavorable inclusion'. Unfavorable exclusion is complete exclusion or denial to members of excluded groups and unfavorable inclusion is the selective inclusion but with differential treatment[81] (Sen 2000)[82].

There are several empirical and case studies on untouchability and drinking water which shows that the notion of purity and pollution is quite resilient in case of drinking water sources. Denial to basic public services is the most common way to

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[77] Kulkarni, Seema. "Women and decentralised water governance: Issues, challenges and the way forward." *Economic and Political Weekly* (2011): 64-72.

[78] Rao, Y. C., and S. Karakoti. "Exclusion and Discrimination; Concepts, Perspectives and Challenges." (2010).

[79] Verma, Vidhu. *Unequal Worlds. Discrimination and Social Inequality in Modern India.* Oxford University Press India, 2015.

[80] Verma, Vidhu. "Unequal Worlds: Discrimination and Social Inequality in Modern India." (2015): 189-213

[81] 'Differential treatment' he meant, in terms and conditions; of contract; this could reflect in discrimination in the prices charged and received by discriminated groups. This can be inclusive of the charges or fees on services such as water and electricity.

[82] Sen, Amartya. *Social exclusion: Concept, application, and scrutiny.* Asian Development Bank, 2000.

exclude Dalits and thus, maintaining the rigid cased-based social structure (Freed 1970[83]; Abraham 1980[84]; Rao 1981[85]; Joshi and Fawcett 2001[86]; Shah et al 2006[87]; Prakash and Sama 2006[88]; Rao and Karakoti 2010[89]; Vanashree 2010[90]; Martin et al 2010[91]; Hannah 2012[92]; Verma 2015[93]). Some of these studies are discussed below.

Amita Abraham (1980) found that the water points that are located twice as often exclusively in 'non-poor' locality of the villages as in the exclusively 'poor' (mostly Harijans, Adivasis or landless labourers) areas[94].

Burman and Karakoti (2010) studied several villages in Uttar Pradesh and showed how Dalits are discriminated in every aspect of their lives. One of the case studies done in Budhakheda village in Roorkee district of Uttar Pradesh (now in Uttarakhand); discussed that a *chamar* family was fined heavily and asked to leave the village forever for using *ghat* (public water tank) which was meant for the upper caste[95].

Rabindra Kumar (2010) discussed several forms of untouchability practices. Two out of eleven forms of practices he discussed are related to drinking water. First, denial of drinking water which includes a) SCs are not allowed to use water sources from where savarnas (upper caste) draw water; b) SCs are not allowed to touch savarnas' water source, only savarnas can pour water into their vessels to avoid 'pollution'; c) SCs draw water only after savarnas are done with their water needs; d) in most of the

[83] Freed, Stanley A. "Caste ranking and the exchange of food and water in a north Indian village." *Anthropological Quarterly*(1970): 1-13.
[84] Abraham, Amita. "Drinking Water for the Poor." *Economic and Political Weekly* (1980): 1468-1469.
[85] Rao, B. G. "Providing Drinking Water to Villages." *Economic and Political Weekly* (1981): 181-182.
[86] Joshi, Deepa, and Ben Fawcett. "Water, Hindu mythology and an unequal social order in India." (2001).
[87] Shah, Ghanshyam, Harsh Mander, Amita Baviskar, Sukhadeo Thorat, and Satish Deshpande. *Untouchability in rural India*. Sage, 2006.
[88] Prakash, Anjal, and R. K. Sama. "Social undercurrents in a water-scarce village." *Economic and Political Weekly* (2006): 577-579
[89] Rao, Y. C., and S. Karakoti. "Exclusion and Discrimination; Concepts, Perspectives and Challenges." (2010).
[90] VANASHREE. "Hori and the Dynamics of Injustice: Mahasweta Devi's" Water"." *Economic and Political Weekly*(2010): 65-73.
[91] Macwan, Martin, Christian Davenport, and Allen Stam. "Understanding untouchability: A comprehensive study of practices and conditions in 1589 villages." *RFK Center for Justice and Human rights* (2010).
[92] Johns, Hannah. "Stigmatization of Dalits in access to water and sanitation in India." *National Campaign on Dalit Human Rights (NCDHR): New Delhi, India* (2012).
[93] Verma, Vidhu. *Unequal Worlds. Discrimination and Social Inequality in Modern India*. Oxford University Press India, 2015.
[94] Abraham, Amita. "Drinking Water for the Poor." *Economic and Political Weekly* (1980): 1468-1469.
[95] Rao, Y. C., and S. Karakoti. "Exclusion and Discrimination; Concepts, Perspectives and Challenges." (2010): 99-119

villages, separate bore-wells persists for savarnas and SCs. Second, SCs have to use their hand in order to drink water directly from the source to avoid touch which is mostly confined to work place[96].

Another study carried out in 11 states to understand untouchability in rural India by Shah et al (2006) discussed the friction over access to drinking water sources in the villages. They have also found similar practices of untouchability in Lon Khurd villages in Maharastra where the sources of drinking water are separated for Dalits and non-Dalits. Dalits have to wait until savarnas finish their water collection. If Dalit touch their vessels, the latter will wash and re-fill the vessel. There have been many incidences of fight among Dalits and non-Dalits whenever Dalits have refused to be subservient to savarnas authority[97].

1.2.6.2 Women, water and practice of untouchability:

The role of intersection of gender and caste in shaping water accessibility has been acknowledged widely in the literature on gender and water (Singh 2006[98], Tiwari et al 2007[99], Joshi 2011[100], Kulkarni 2011[101]) .There are different experiences of caste- and gender-based inequity in water access, however these inequities become much deeper when they converge in complex intersection, making disparities by caste and gender difficult to segregate (Joshi, 2011). And, "these ideas and practices are continued to be sanctioned and reinforced by a host of cultural, political and economic institutions

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[96] Rao, Y. C., and S. Karakoti. "Exclusion and Discrimination; Concepts, Perspectives and Challenges." (2010): 194-210

[97] Shah, Ghanshyam, Harsh Mander, Amita Baviskar, Sukhadeo Thorat, and Satish Deshpande. *Untouchability in rural India*. Sage, 2006: 77.

[98] Singh, Nandita. "Women Women's s Participation in Local Water Governance Understanding Institutional Contradictions." *Gender, Technology and Development* 10.1 (2006): 61-76.

[99] Tiwary, Rakesh, and Sanjiv J. Phansalkar. "Dalits' access to water patterns of deprivation and discrimination." *International Journal of Rural Management*3.1 (2007): 43-67.

[100] Joshi, Deepa. "Caste, gender and the rhetoric of reform in India's drinking water sector." *Economic & Political Weekly* 46.18 (2011): 56-63.

[101] Kulkarni, Seema. "Women and decentralised water governance: Issues, challenges and the way forward." *Economic & Political Weekly* 46.18 (2011): 65.

and also through legal and governance structures"[102]. Hence, it is important to understand the complexities of gender and caste in drinking water accessibility.

i.   **Role of Water in the Regulation of a Hierarchy Based on both Caste and Gender:**

It is generally believed that as a phenomenon caste is unique and a specificity of the Indian society. The origins of the caste systems are, of course, shrouded in mystery, although there is a general agreement that the beginnings were made in the Vedic age[103]. There is four-fold classification of the caste system known as *varnas*; Brahman, Kshatriya, Vaisya and Sudras. Brahmans are considered the purest while Sudras are at the lowest rungs of the social hierarchy. Water has an important role to play in Vedic texts as it is considered to have "intrinsic purity and the capacity to absorb pollution and to carry it away"[104]. "There are essentially two ways to bring about a condition of purity, one is to distance from objects that signify impurity and the other is to purify oneself with things recognized to have the ability to absorb and remove pollution directly"[105]. Many literature gives thrust upon to the understanding of 'temporary' and 'permanent' pollution. Temporary impurity is ascribed to the organic aspects of life, symbolized be the "peripheral extremities of the human body, including the physical margins and matters issuing from them, (including) hairs, nails, spittle, blood, semen, urine faeces and even tears"[106]. Thus, all women, regardless of their social caste, become polluting during menstruation and childbirth. In contrast, Sudras are ascribed to be permanently polluted because of their (imposed) polluted tasks such as "cremating the human dead animals, handling human faeces and cutting hairs and nails as well as washing and cleaning processes associated with bodily excrements and are eternally impure"[107].

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[102] Narain, Vishal. "Shifting the focus from women to gender relations: Assessing the impacts of water supply interventions in the Morni–Shiwalik hills of northwest India." *Mountain Research and Development* 34, no. 3 (2014): 208-213.

[103] Ahmad, Aijazuddin. *Social geography*. Rawat Publications, 1999.

[104] Milner, Murray. *Status and sacredness: A general theory of status relations and an analysis of Indian culture*. Oxford University Press on Demand, 1994.

[105] Joshi, Deepa, and Ben Fawcett. "Water, Hindu mythology and an unequal social order in India." (2001).

[106] Milner, Murray. *Status and sacredness: A general theory of status relations and an analysis of Indian culture*. Oxford University Press on Demand, 1994.

[107] Dube, Leela. "Caste and women." *Caste: Its twentieth century avatar* (1996): 1-27.

ii.   Gender, Caste and Water in Contemporary India:

M.N. Srinivas (1998)[108] argues that in the contemporary rural India, "economic, political and western axes of power determine the dominance of different caste groups"[109]. The dominant caste is the landed caste and has numerical strength and it does not include Brahmans necessarily. However, Dube (1996) argue that "despite reforms, legislations and wider potential for choosing occupations, socially allocated roles prevail in that no one else but a Brahman can perform the function of the priest while the Sudras remains responsible for ritually polluting occupations"[110]. Prakash and Sama (2006)[111] studied how social structure of the Vadali village in Gujarat determines the access to drinking water. Their detailed analysis shows that drinking water scarcity does not affect all the villagers in a similar way. Ahirs the landed community of the village enjoys the dominancy both economically and socially. When there is drought like situation and all the wells are dried up; Ahirs do not have to confront it. However, this has serious implications on other caste communities who do not own any land and farm wells – Dalits and Kolis. In water scarce months, these women have to be dependent on the upper caste households for their drinking water needs. The lower caste women become more prone to harassment due to their dependency on upper caste families. One of the Dalit women puts it, "we cannot afford to disobey upper caste families as we are dependent on them for employment on their farms and other needs including drinking water when our village wells run dry."[112]

Similarly, Joshi (2011)[113] shows that in Chuni village in the mountains of Uttarakhand, the fresh water underground springs (naulas) are not accessible to the Dalits. "In these villages and elsewhere, Dalits have historically lived in hamlets distanced from the main village and the primary water sources, which were also areas where the main village temples were situated"[114]. "Good Dalits" are those who keep

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[108]Srinivas, Mysore Narasimhachar. *The dominant caste and other essays.* Oxford University Press, USA, 1994.
[109]*ibid*
[110]Dube, Leela. "Caste and women." *Caste: Its twentieth century avatar* (1996): 1-27.
[111]Prakash, Anjal, and R. K. Sama. "Social undercurrents in a water-scarce village." *Economic and Political Weekly* (2006): 577-579.
[112]Prakash, Anjal, and R. K. Sama. "Social undercurrents in a water-scarce village." *Economic and Political Weekly* (2006): 577-579.
[113]Joshi, Deepa. "Caste, gender and the rhetoric of reform in India's drinking water sector." *Economic & Political Weekly* 46.18 (2011): 56-63.
[114]*ibid*

away from these "sacred" areas. "These sites are also forbidden to Hindu menstruating women until they are purified on the fifth or the seventh day. When the water level suddenly drops or sources dry up, it is rumoured that the water was polluted by menstruating caste Hindu women and purification ceremonies are performed to absolve the pollution"[115].

In the book, *Untouchability in Rural India* by Shah et al (2006), a case study of Itwakhas village in Madhya Pradesh found that Dalit women always have to wait at the common well in the village. They have to keep distance so that the vessels of upper caste women do not get polluted. Many times, while waiting, Dalit women have to hear casteist abuses from upper caste women.

1.2.7 A critical review on changing relationship of women and water with new evolving institutional mechanisms to manage drinking water in India:

This section is aimed to examine the changing relationship of women and water with new evolving institutional arrangements to manage water resources efficiently. The existing literature on water and its management do acknowledge the relationship between water, political power and social agency; however, very little emphasis has been given to understand the issue of gender in human interaction with water[116].

With the recognition of water as depleting and a non-substitutable resource, several policy initiatives has been undertaken to expand access to 'water users'[117]. The current approach of the water resource management has misunderstood the concept of gender and hence, fails to address exclusion and, at worst, in a reproduction of existing practices of exclusion[118]. This results in the negative impacts on the very poor that current water policies are aimed to assist which includes the poorest women. Hence, it becomes utmost important to understand how 'gender' is defined and how it is incorporated to development discourse and then translated into policies. Gender theory and analysis as used by social scientist as well as economists, is based on the

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[115]*ibid*

[116]Strang, Veronica. "Taking the waters." *Gender, water and development* (2005): 21-38.

[117]In the new water policy reforms to manage water resource more efficiently; the pricing mechanism for operation and maintenance cost of infrastructure is accepted. Hence, those who are the part of this new demand-driven water management which equates efficiency with cost recovery are called as 'water users'.

[118]Joshi, Deepa. "Misunderstanding gender in water: Addressing or reproducing exclusion." *Gender, water and development* 27 (2005): 1135.

conceptual distinction between gender and sex. The separation of meanings was first suggested by Ann Oakley in 1972 as the following:

"Sex is a biological term: 'gender' a psychological and cultural one. Common sense suggests that they are merely two ways of looking at the same division and that someone who belongs to, say, the female sex will automatically belong to the corresponding (feminine) gender. In reality this is not so. To be a man or a woman, a boy or a girl, is as much a function of dress, gesture, occupation, social network and personality, as it is of possessing a particular set of genitals"[119].

Although this universal patriarchal structure maintains the hierarchy where women are subordinated to men; however, caste, class, race, religion, ethnicity deny a universality of gender inequality[120]. Hence, to assume that men and women are the homogenous entity would be a grave mistake. Inequality in access to drinking water is never neutral to these (caste, gender, class, race etc.) identities rather it deepens and is reinforced across all levels of social organizations.

In the development policy, there has been a reversal of thinking, i.e. 'from gender back to sex'[121] where women are 'separated and isolated as the central problem from the context of social relation' and implicitly assuming that gender inequality exists at household level only[122]. Deepa Joshi (2005) argues that the reason for this reversal of thinking is political as well as technical. She further explains:

"Addressing inequality in gender relations involves understanding and challenging local customs and traditions and inequitable global policies and practices. It also requires time, and within the dominant development paradigm designed to achieve economic efficiency, it is possible only to pay lip service to these concerns because project targets have to be met. Involving women in projects, rather than challenging the social construction of gender inequality is easier to achieve and is also quantifiable."[123]

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[119]Ann, Oakley. "Sex, gender and Society". *Temple Smith, London* (1972).
[120]Joshi, Deepa. "Misunderstanding gender in water: Addressing or reproducing exclusion." *Gender, water and development* 27 (2005): 1135.
[121]*ibid*
[122]Baden, Sally, and Anne Marie Goetz. "Who needs [sex] when you can have [gender]." *Feminist visions of development: gender analysis and policy* (1998): 19-38.
[123]Joshi, Deepa. "Misunderstanding gender in water: Addressing or reproducing exclusion." *Gender, water and development* 27 (2005): 1135.

Veronica Strang (2005) has different perspective to look at the current water management systems where technological and infrastructural initiatives with involvement of private sector are considered more efficient. She argues that historically, the gendered meanings encoded with water have been manifested in different forms in every cultural context. It has always been the major influencing determinant in the contest for control and ownership of water resources through which generally many groups and particularly women have been dispossessed. The process of social, political and economic appropriation of water resources over time has been determined through the interaction of cosmological beliefs, gender and material culture. She further elaborates that how technological changes had led to the physical alienation of water. Earlier the physical management of water used to be everyone's business however, with the technological evolution (which is complex and sophisticated); water management is now under very tiny number of people such as engineers, chemists and computers who are mostly men[124].

Deepa Joshi (2005) has emphasized on the unwillingness shown by development flag bearers to challenge the local customs and traditions which upholds the gender inequality and focus largely on 'coverage' targets while Strang (2005) expressed the concern of 'economic appropriation' of water resource infrastructure. There is an alternative viewpoint that is given by Ben Page (2005) which implies the continuing process of de-politicization of women and water in the current water management systems. He argues that in contemporary literature on women and water, much of them is focused on the role of women as 'consumers'. This neglects the historical, cultural and political role of women in the development of water resources. He explains that in his study area (Cameroon), the water has been 'socially produced' with constant proactive role played by women not only as mere water fetchers or managers of domestic water but also as an active agent in the evolving water technology, water institutions and water politics. He writes that if we go on portraying women as passive receivers of water policy and neglecting their historic involvement in the water production may actually translates into their (women) disempowerment[125].

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[124]Strang, Veronica. "Taking the waters." *Gender, water and development* (2005): 21-38.
[125]Page, Ben. "Naked power: Women and the social production of water in Anglophone Cameroon." *Gender, Water and Development* (2005): 57-76.

This section tries to analyze the relationship of water and women in the emerging framework of new water supply systems i.e. piped water system in rural India. In which, the villagers participate as a local community through Panchayati Raj Institutions (PRIs) who manage their own drinking water sources by sharing the operation and maintenance cost of water resource infrastructures. Under this new arrangement, there are two important underlying principles: first, women's participation in decision making to manage water resources and second, the sense of ownership, which is required for efficient and sustainable water resource management. The first part of this section tries to trace how the approach and institutions have changed to manage drinking water in rural areas. The second part tries to understand new institutional arrangement to manage water resources through analytical frameworks.

1.2.7.1 Evolving Institutional Arrangements:

"India's drinking water management, governance and policy context has evolved from community to colonial to centralized state management to more recent "fluid-changing terrains: of "neo-liberal" prescriptions"[126]. In traditional pre-colonial society water was managed at community level. The communities were mostly at village level. Pre-colonial traditionalism describes "harmonious traditional communities, ecological sensitive resource users…of women as primary keepers of a special conservationist ethic"[127]. However, as Moose (2008) argues that these stories were mostly "veins of myth and memory"[128]. In the colonial times, the ownership of water is shifted to more centralized state water institutions and later led to nationalization. The role of state as the supplier or provider of water resources to its 'citizens' is much debated. As Vandana Shiva (2001) argues that the role of state even after independence is questionable. She says that "…institutions constituted to achieve colonial economic and political ambition and now intervening through policies, rules, laws, investment, and technology to facilitate privatization and globalization…"[129].

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[126]Joshi, Deepa. "Caste, Gender and the Rhetoric of Reform in India's Drinking Water Sector." *Economic and Political Weekly* (2011): 56-63.
[127]*ibid*
[128]Mosse, David. "Is good policy unimplementable? Reflections on the ethnography of aid policy and practice." *Development and change* 35, no. 4 (2004): 639-671.
[129]Joshi, Deepa. "Caste, Gender and the Rhetoric of Reform in India's Drinking Water Sector." *Economic and Political Weekly* (2011): 56-63.

However, Rangan (1997) has different view on state's role. He argues that "in the absence of adequate anthropological and ethnographic accounts of the functioning of different state institutions, there are only blanket arguments for and against the state's role"[130]. Questioning the state's role in allocation of water resources based on abstract modelling of market efficiency has provided only vague arguments in favour of market solutions and tried to push 'other' agendas.

In 2003, alarming statistics were presented in the World Water Forum; "over 20% of the world's population was without access to sufficient supplies of potable water necessary for daily basic needs"[131]. In response to the increasing scarcity of water, commercialization of water was taken as the best solution[132]. The reason for this was stated that it is the "state-failure" by governments which are apparently too corrupt, poor and inefficient to govern water resource allocation and distribution efficiently. Hence, many conference participants openly advocated that there is a need to increase private sector involvement in water supply management systems[133].

The global shift from centralized state controlled to market-driven water resource management system has led many countries to implement new water policy. The regional response to these new water policies or projects has responded very differently as it was expected[134]. This ideological shift towards neo-liberalism to 'fix' resource allocation problems per say, is best understood only in conjunction with many other factors (funds aid by World Bank etc.) that led into the acceptance of these reforms[135]. Priya Sangameswaran (2010) has studied the role and meaning of neo-liberalism in the context of the provenance of water reforms in Maharashtra through the water project named as "*Jalswarajya"*.

In the recent times, the major change that has taken place in the rural water management is the shift from what is known as a "supply-driven" approach to a "demand-driven" approach. This involves two critical strands i.e. 'Decentralization' and 'Community based development'. In India, at central level; the government introduced first systematic reforms in rural drinking water in 26 states covering 67

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[130]*ibid*

[131]Bakker, Karen. "The "commons" versus the "commodity": Alter-globalization, anti-privatization and the human right to water in the global south." *Antipode* 39, no. 3 (2007): 430-455.

[132]*ibid*

[133]*ibid*

[134]Wallace, Tina, and Anne Coles, eds. *Gender, water and development*. Berg, 2005.

[135]Sangameswaran, Priya. "Rural drinking water reforms in Maharashtra: the role of neoliberalism." *Economic and Political Weekly* (2010): 62-69.

pilot districts in 1999 via the sector reforms program, and then extending the reforms via the *Swajaldhara* scheme in 2002[136]. These reforms were implemented in different states however, the nature and extent of implementation varies across states.

As there is shift from 'supply-driven' to 'demand-driven' approach, many case studies shows that "the water projects are taken up as and when the concerned local body expresses its need and desire for the same, as against higher- level government bodies decides to do so (as used to be the case earlier)[137]".In this new approach, the pricing mechanism has been given undue importance. The cost recovery mechanism for the operation and maintenance of water infrastructure has been accepted on the logic of increasing water use efficiency and productivity, as it creates so called 'sense of ownership' among the 'water users'. Hence, this shift to new improved water supply systems is criticized mostly around two important points. First, as already explained, is the cost-contribution clause in kind or cash. And, second is the discourse of "…de-politicization that has often accompanied the setting up of new institutions at village levels (for example, village water and sanitation committees (VWSCs) in Maharashtra), the presence of a large number of private players, the lack of attention to local inequalities and power dynamics, the (perceived) withdrawal of the state and the speed (and often in non-transparent manner) of far-reaching legal changes that are being made"[138].

By the end of 1990s, the state governments which approached to the international financial institutes (IFIs) for fund assistance; the multilateral institutions pointed out that state has no long-term plans or objectives in order to deal with the current water crisis and hence any future lending would be on the condition only if they are willing to accept and implement the proposed policy changes. Sangmeswaran argues that the discourse of the World Bank is not all powerful however; it was first hindered and then strengthened by the factors at the state level.

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[136]Sangameswaran, Priya. "Rural drinking water reforms in Maharashtra: the role of neoliberalism." *Economic and Political Weekly* (2010): 62-69.
[137]*ibid*
[138]Sangameswaran, Priya. "Rural drinking water reforms in Maharashtra: the role of neoliberalism." *Economic and Political Weekly* (2010): 62-69.

1.2.7.2 Romanticizing Participation and Community:

Since 1990s, many countries have accepted to decentralize governance especially in developing countries in Asia, Africa and Latin America[139]. The several reports by World Bank has marked that decentralization is the foremost agenda in the 21st century. "In its report on India (WB 2000), it mentions that most of its future bank assistance in various sectors would be done keeping in mind the existence of local governance. In different ways this discourse on decentralization has been shaping this country's governance language. Very broadly, decentralization can be understood as a transfer of administrative and political functions at the local level"[140].

Seema Kulkerni (2011) argues that "decentralization would fail to meet its objectives unless and until the value-systems, cultures and the nature of institution, including family changes"[141]. The policy of decentralization which introduces quotas for women in public bodies is good however, it is not sufficient for the achievement of the policy in a society which is hierarchal, stratified, and ridden with discrimination based on gender, caste, class, race and ethnicity. Decentralized policies which were incorporated in water resource management systems have changed the role of state as provider to the facilitator of water resources through increased community participation. In India, these changes could be seen from 9th five-year plans (1997-2002). There is a change in global meaning of water that is from water as a 'social good' which must be provided by the state for free to the 'scarce resources' which should be managed 'efficiently'. And, its standard would depend on the users who are willing to pay for the maintenance and operation of the water infrastructure that has been translated through decentralized governance structure. The new piped water system which introduces '*Pani Samitis or Water Users Associations (WUAs)*' has nearly 50% women[142]. The representation of women in Pani Samitis is considered important as drinking water sector is largely associated with women and domestic work. This fails to challenge the associated gendered norms and expectation and hence, reinforces the gender inequality. As Wallace and Coles rightly put,

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[139]Kulkarni, Seema. "Women and decentralised water governance: Issues, challenges and the way forward." *Economic and Political Weekly* (2011): 64-72.
[140]*ibid*
[141] *ibid*
[142]Kulkarni, Seema. "Women and decentralised water governance: Issues, challenges and the way forward." *Economic and Political Weekly* (2011): 64-72.

"If you think that a hoe is just hoe or a pump is just pump, read on- both are infused with gendered meanings"[143].

Most of the times, women in Pani Samitis have no idea how are they selected as the committee heads. Seema Kulkerni in her paper explained this as,

"…their names were usually suggested by the village elders. In the WUAs it was the men who were being selected and women were only the proxies. In fact this has been true of Panchayat elections as well where nominations are usually controlled by local power centers but this is particularly true when it comes to selection of women who have the benefit of reservations. In that sense the local vested groups act as gatekeepers to selection of women on committees. However some of the women had a good self-image and exuded confidence by saying that they were selected because the villagers thought they were articulate and capable. This is indeed a changing self-perception among women..."[144]. (pp.66)

The new water resources management system gives immense thrust on community participation in rural areas. Community participation commonly neglects the ingrained social divisions within communities. This often translates into more burdens that are at lower strata of the society. In most of the cases, it is the poorest; lowest in social hierarchy is made to undertake the labour-intensive and socially unappealing task[145]. The equitable allocation of resources through community based water projects remains questionable in the light of provision of water on the basis of ability to pay. In many case, even if poor households pay for water, it is not guaranteed that they will have access to safe water as other social determinants has a role to play. Also, the 'willingness to pay for water' out rightly rejects any understanding of gender, caste, class, ethnicity or other identities. At the household level, these projects talks about women's participation through Pani Samitis which gives 'voice' and 'choice' to women; however, the 'ability to pay' which women lacks and the head of household (mostly men) pays on behalf of household proves the hollowness of these projects and the vague understanding of gender relation at household as well as at community level.

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[143]Wallace, Tina, and Anne Coles, eds. *Gender, water and development*. Berg, 2005.
[144]Kulkarni, Seema. "Women and decentralised water governance: Issues, challenges and the way forward." *Economic and Political Weekly* (2011): 64-72.
[145]Joshi, Deepa. "Misunderstanding gender in water: Addressing or reproducing exclusion." *Gender, water and development* 27 (2005): 1135.

1.2.7. 'New' Water Governance and Exclusion: Understanding the framework:

Cleaver and Hamada (2010) have provided an analytical framework to understand the 'New Water Governance". They argue that narrow and limited focus on gender-sensitive '*mechanisms'* of water delivery (committees, tariffs and technologies) is not sufficient to ensure gender equitable outcomes. They have expanded their analysis in two directions i.e. the mechanism of resource allocation which is primarily shaped by '*societal resources'* and to consider how different people are able to influence the outcomes[146]. The second framework which can be analyzed in parallel is the framework of "Participatory-Exclusion" given by Bina Agarwal (2001).

The general assumption that good water governance leads to good outcomes in terms of ensuring positive impact on gender relations at individual, household and community levels and also negotiate equally in water resource allocation. However, this assumption lacks the understanding as to how governance works out in practice and how the 'good outcomes' are achieved[147]. Cleaver and Hamada argue that 'governance' is or become gender-blind. This is because the different social dimensions and social realities which shape women's access to or control to water resources are often overlooked and assumed to be gender-neutral. In water governance, where gender issues in accessibility to water or inclusivity of different communities is considered as 'technical problems' and even if there is global commitment to ensure gender equality; it is assumed that this can be solved just by involving women into water projects. Despite such actions taken to promote good governance and mainstreaming gender; the outcomes shows no specific concern for gender issues at all[148].

Franks and Cleaver's framework is helpful to understand 'how arrangements for water governance are shaped, and how they impact positively or negatively on different people'[149].

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[146]Cleaver, Frances, and Kristin Hamada. "'Good'water governance and gender equity: a troubled relationship." *Gender & Development* 18, no. 1 (2010): 27-41.
[147]*ibid*
[148]Cleaver, Frances, and Kristin Hamada. "'Good'water governance and gender equity: a troubled relationship." *Gender & Development* 18, no. 1 (2010): 27-41.
[149]*ibid*
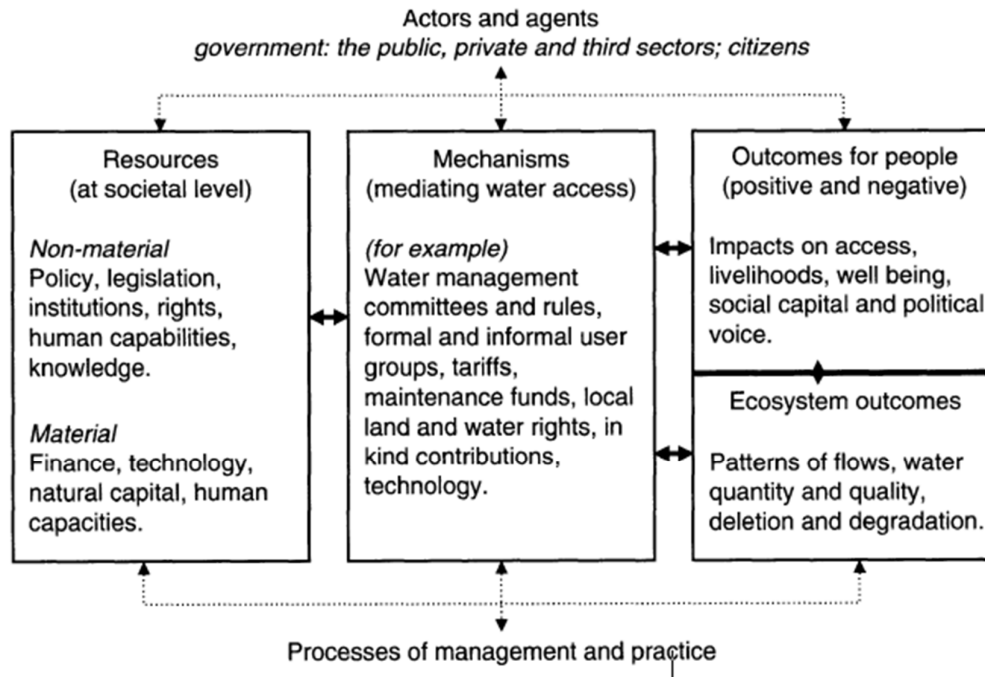
Fig. 1.2 A framework for water governance

Source: Frances Cleaver and Kristine Hamada (2010)

"...the concept of 'resources', as we use it in relation to water governance, encompasses general relationship of power, structures of inequality and 'rules' of social life, and resource allocation..."[150] (pp. 30).

The society or individuals who mobilize and allocate resources are not free from gendered norms and expectations. It is clear that the dominant and accepted economic and political policies set the context for the water governance arrangements[151]. The societal resources such as tariffs and individual titles have influence on the policies which promotes privatization and commercialization of water. Rhodante Ahlers points out that the ideas about economic rationality and efficiency does not take into account that society is hierarchal and it has crucial role to play in shaping accessibility to water. The second important part of the framework is the 'mechanisms'.

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[150]Cleaver, Frances, and Kristin Hamada. "'Good' water governance and gender equity: a troubled relationship." *Gender & Development* 18, no. 1 (2010): 27-41.

[151]Ahlers, Rhodante, and MargreetZwarteveen. "The water question in feminism: water control and gender inequities in a neo-liberal era." *Gender, Place and Culture* 16, no. 4 (2009): 409-426.

Cleaver and Hammada explains Mechanisms as,

"*'Mechanisms' as a term covers a variety of different arrangements which affect people's access, ranging from formal institutions (such as water user associations) through social norms about 'proper' water use and social relations between different individuals and groups, to particular technologies (hand pumps, pipes etc). Specific mechanisms of access are rarely gender-neutral - that is, they have different implications for use by men and women. These mechanisms do not exist in a social vacuum, but are shaped by, and often in turn actually shape, the socially accepted way of doing thing"*[152] (pp. 31).

The third important part of the framework is outcomes. Outcome can be varied for people placed differently in the social matrix. The outcomes for water governance can be seen in terms of social relations and processes and its impact on access, livelihoods, well-being, social capital and political voice. This segment can be more clearly understood if we use 'participatory exclusion' framework by Bina Agarwal (2001). She has given seven typologies of participation which can be used effectively to measure and analyze the outcomes for water governance. These typologies as shown in Table 1.1 range from nominal and passive participation to active and interactive participation.

In the current water governance, the term 'participation' is used extensively without giving attention to the possibilities of its use to control the water outcomes to maintain the unequal distribution of water. And, these implications of participatory exclusion on distributional equity and institutional efficiency can be used as a strong indicator to analyze water project's outcomes[153].

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[152]Cleaver, Frances, and Kristin Hamada. "'Good' water governance and gender equity: a troubled relationship." *Gender & Development* 18, no. 1 (2010): 27-41.
[153]Agarwal, Bina. "Participatory exclusions, community forestry, and gender: An analysis for South Asia and a conceptual framework." *World development* 29, no. 10 (2001): 1623-1648.

Table 1. *Typology of participation*

Form/Level of participation	Characteristic features
Nominal participation	Membership in the group
Passive participation	Being informed of decisions *ex post facto*; or attending meetings and listening in on decision-making, without speaking up
Consultative participation	Being asked an opinion in specific matters without guarantee of influencing decisions
Activity-specific participation	Being asked to (or volunteering to) undertake specific tasks
Active participation	Expressing opinions, whether or not solicited, or taking initiatives of other sorts
Interactive (empowering) participation	Having voice and influence in the group's decisions

Table 1.1 Typology of participation by Bina Agarwal, Source: Bina Agarwal (2001)

1.3 Research Question:

The rigid social structures (caste and gender) and political structures in a given ecological setting interact with water in such a way that it produces a specific kind of water –society relations. These water-society relations are dynamic, cyclic and specific to time and location which shapes water accessibility. With this understanding, this dissertation is aimed at exploring how social, political and ecological conditions interact in critical ways to shape and re-shape accessibility to drinking water?

1.4 Objectives:

1. To study the levels of access to drinking water in two villages (analyzing indicators for availability and accessibility).
2. To explore how the distribution of drinking water sources varies among different social hierarchies with specific locational context.
3. To explore what are social, political and ecological conditions which are infused with water to create different levels of water accessibility for different social hierarchies.
4. Lastly, to understand the current and temporal socio-political ecology of water access.

1.5 Study Area:

The basis of selection of study area is the following:

1. Based on secondary data analysis, Purvanchal region of Uttar Pradesh is selected as a study area.

2. Composite scores are calculated for availability and accessibility to improved water sources[154] which includes treated tap water, hand pump, tube well/bore well and covered well for Purvanchal region of Uttar Pradesh.

3. Based on the above analysis, Sonbhadra district is selected for the proposed research.

4. To have an idea about the ecology of study area, Normalized Difference Vegetation Index (NDVI) and Normalized Difference Water Index (NDWI) has been calculated.

5. Satellite imageries are obtained from Google Earth to analyze the size, location of villages.

6. From Census of India, population composition (percentage of SC population, number of households) is analyzed for selecting villages.

7. Based on above stated analysis, two villages; Kushmha and Orgai in Robertsganj block is selected.

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[154] WHO defines "improved drinking water sources' as sources that, by nature of their construction or through active intervention, are protected from outside contamination, particularly faecal matter. It includes household connection, public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs and rainwater collection." Accessed from
http://www.who.int/water_sanitation_health/monitoring/water.pdf

Table 1.2 Composite Scores of Availability and Accessibility to Improved Sources of Drinking Water in Purvanchal Region

Purvanchal Districts	Availability	Purvanchal Districts	Accessibility
Ghazipur	1.32	Ballia	0.92
Mau	1.12	Kushinagar	0.4
Sonbhadra	1.1	Mau	0.11
Mizapur	1.05	Deoria	0.1
Varanasi	0.66	Maharajganj	0.06
Azamgarh	0.64	Sant Kabir Nagar	0.05
Chandauli	0.63	Gorakhpur	0.01
Ballia	0.53	Basti	0
Sant Ravidas Nagar	0.29	Siddarthnagar	-0.07
Jaunpur	-0.16	Varanasi	-0.28
Deoria	-0.48	Ghazipur	-0.31
Basti	-0.94	Azamgarh	-0.32
Kushinagar	-1.23	Jaunpur	-0.38
Gorakhpur	-1.38	Chandauli	-0.46
Sant Kabir Nagar	-1.47	Sant Kabir Nagar	-0.56
Siddarthnagar	-1.89	Mizapur	-0.76
Maharajganj	-2.47	Sonbhadra	-0.92

Source: Census of India, 2011

Table 1.3 Ranking Districts of Purvanchal Region based on Calculated Composite Scores:

Drinking Water (Improved Sources)	Purvanchal Districts
Better availability and worst accessibility	Sonbhadra, Mizapur, Varanasi, Azamgarh and Chandauli
Worst availability and better accessibility	Kushinagar, Ballia, Maharajganj, Gorakhpur, Sant Kabir Nagar and Deoria
Both availability and accessibility in better off condition	Mau
Both availability and accessibility in worst condition	Jaunpur, Sant Ravidas Nagar, Basti and Siddarthnagar

Source: Census of India, 2011

Map 1.1 Location Map of Study Area
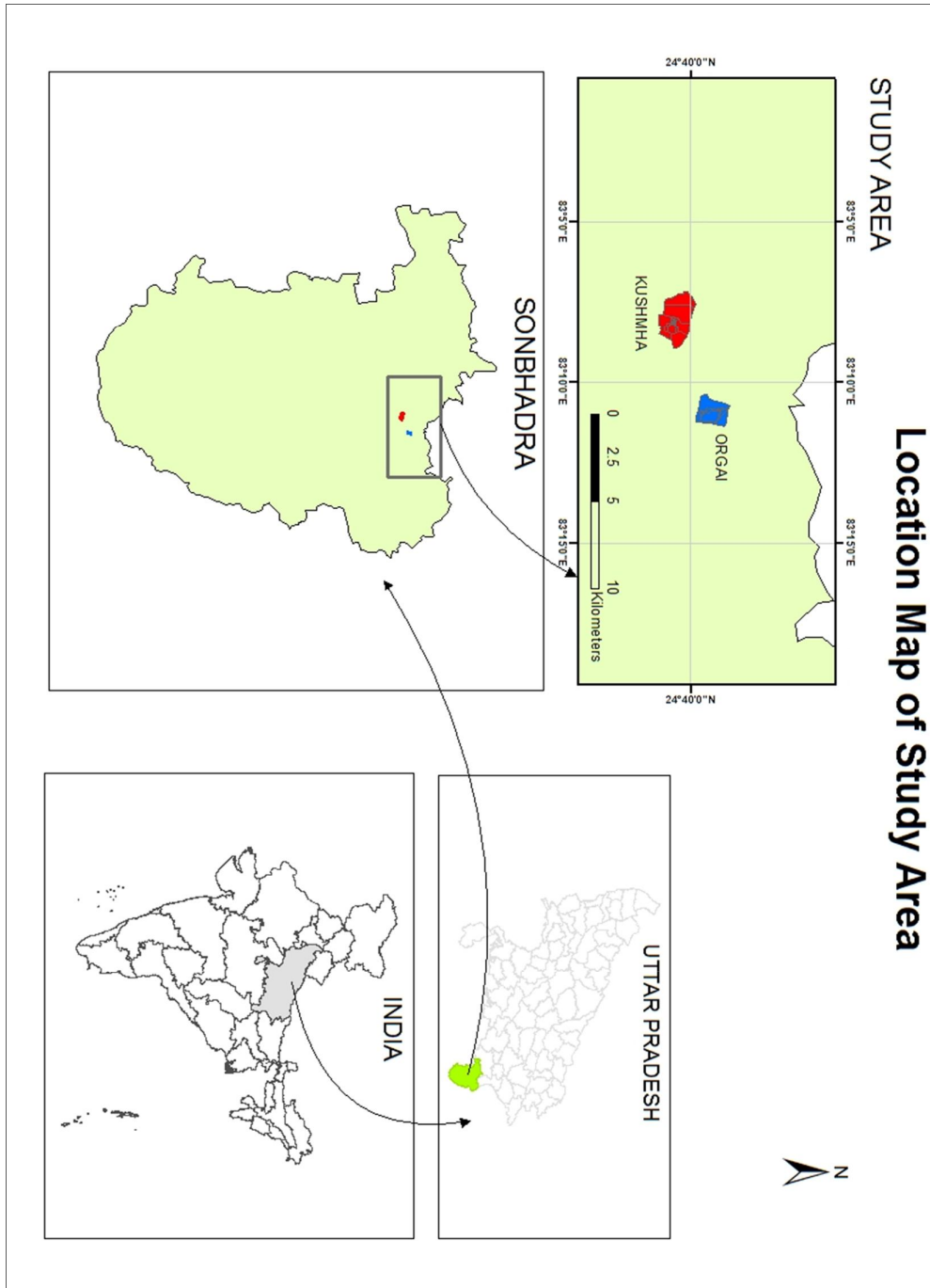
(A)

(B)

Plate 1: (A) Satellite image of Kushmha village.

(B) Satellite image of Orgai village.

Map 1.2 Normalized Deferential Vegetation Index (NDVI), District Sonbhadra, Uttar
Pradesh (2017)

**Normalized Differential Vegetation Index
Sonbhadra District, Uttar Pradesh (2017)**

N

NDVI Values

- -0.189227969
- -0.189227969 - 0.000919096
- 0.000919096 - 0.149623851
- 0.149623851 - 0.300766389
- 0.300766389 - 0.432406664

Kilometers
0 5 10   20   30   40
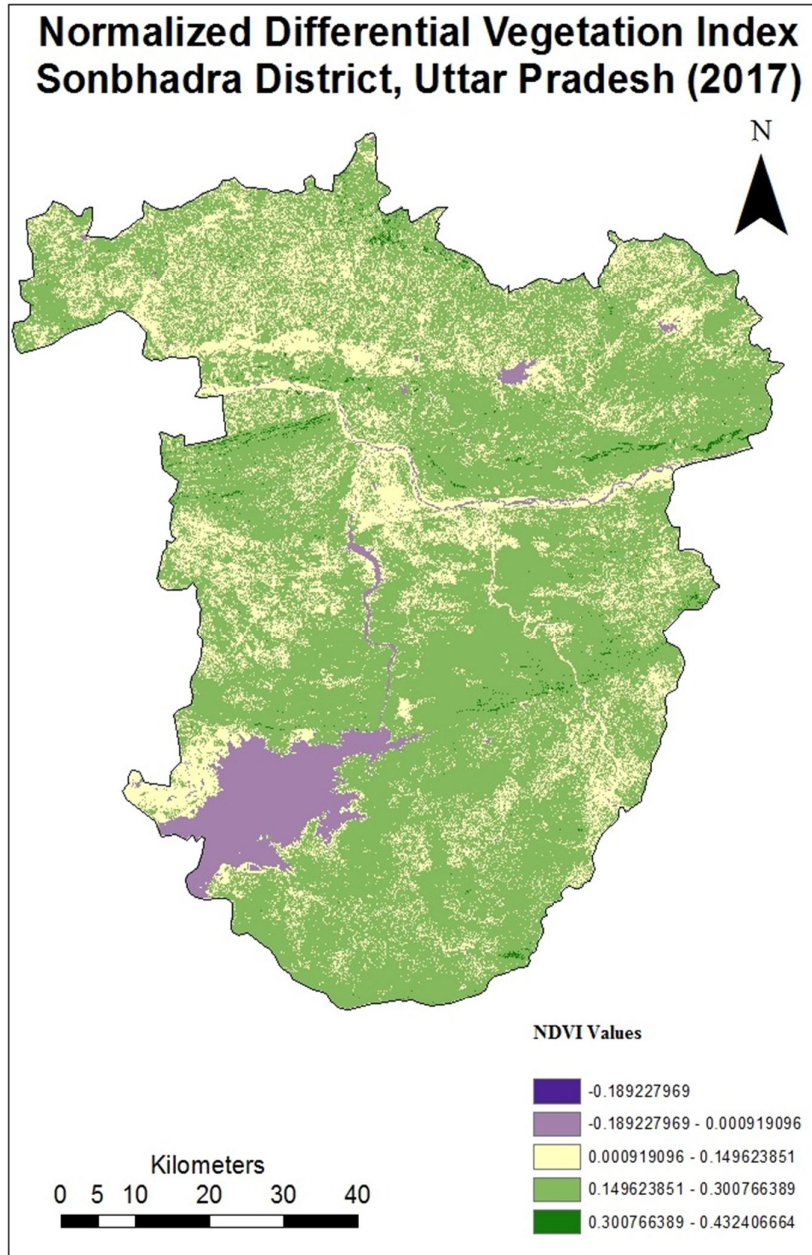
Source: LANDSAT 8

Map 1.3 Normalized Deferential Water Index (NDWI), District Sonbhadra, Uttar Pradesh (2017)
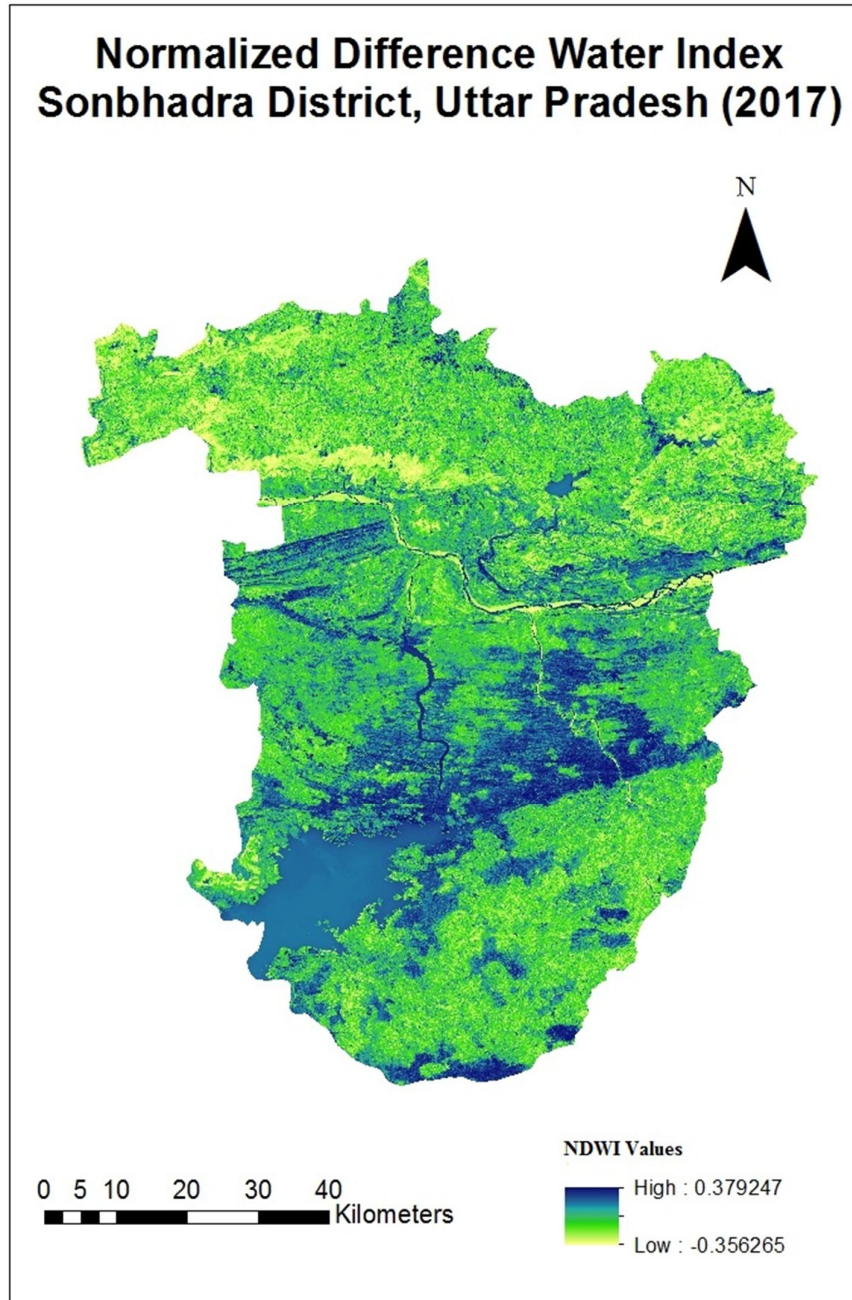
Source: LANDSAT 8

Interpreting NDVI and NDWI values:

NDVI = (NIR – Red)/ (NIR+Red)

RED and NIR are spectral reflectance measurements in red and near-infrared regions respectively.

The NDVI values ranges from -1 to +1 which represents vegetation loss and vegetation gain respectively. NDVI values of dense vegetation canopy is well represented by positive values mostly ranging between 0.3-0.8 while lakes, rivers tend to show negative values as it has very low reflectance in both RED and NIR spectral bands. Moderate vegetation is represented in the range between 0.2-0.3 while temperate and tropical rainforest are represented within the range of 0.6-0.8. And lastly, the value below 0.1 shows barren rocks snow and sand.

The NDVI values for Sonbhadra district shows clearly that the vegetation is mostly moderate in the region falling under 0.14-0.30. Very scattered patches of dense forest can be seen in the upper part of the Son river. The yellow part shown by value below 0.14 represents barren rocks covers mostly the upper part of the district. And lastly, the reservoir is shown by purple region having negative value.

NDWI = (Xnir-Xswir)/(Xnir+Xswir) where, nir is near infrared and swir is short wave infrared wavelengths

The values of NDWI ranges from -1 to +1 which represents non-water features (terrestrial vegetation, bare soil dominated cover types) and open water areas or high vegetation water content.

1.6 Data Collection

The data sources for this study are derived from two sources i.e. primary data and secondary data. Secondary data is taken from Census Household data for basic amenities 2011 and India Human Development Survey-II (IHDS-II), 2011-12.

The primary data is collected by:

i. Surveying 120 (Kushmaha 80 and Orgai 40) households using questionnaires. For this, multi-level stratified random sampling method is used.

ii. For hand pump mapping, GPS locations were taken. 69 hand pumps in Kushmha and 15 hand pumps in Orgai are mapped along with related details

such as number of households it serves, when it was installed and by whom etc.

iii. Focussed group discussion: Muslim, OBC and Dalit women and men. Mixed groups of men and women.

iv. Personal interviews: BDC and Pradhan of both villages, school teachers, Right-based organization working in Robertsganj block covering these villages, Dalit activist, women appointed for evaluating MNREGA in Kushmha village.

1.7 Methodology:

1. Ecological mapping using ArcGIS with latest LANDSAT-8 data (2017) for calculating Natural Difference Vegetation Index (NDVI) and Natural Difference Water Index (NDWI).

2. Appropriate statistical analysis of data for both primary and secondary data is analysed using SPSS, Stata and Microsoft Excel and Microsoft Access software.

3. Specialization Index (Sij), adopted from Amitabh Kundu, 1991 is used for analysing dependency on different sources of drinking water. The index Sij for the ith fractile and jth source of drinking water may be written as follows:

   a. **Sij = {(Person in ith fractile using jth source) / (All person using jth source)} / {(Person in the ith fractile) / (All persons)}**

4. ArcGIS is used for district level mapping of accessibility and availability of drinking water sources.

5. ArcGIS and Google Earth is used for mapping hand pumps and delineated caste localities in both the villages.

1.8 Chapter Scheme of this Dissertation:

In the first chapter, various case studies drawing from existing literature are explored to understand the different processes constituting several entities which creates and (re)creates hybrid space. And how water distribution, access, use and control is mediated and/or shaped

in such unique hybrid spaces. It also covers the present scenario of drinking water in India and how it is managed and governed. Lastly, it discusses research question, objectives, data collection, methodology and study area for this research work.

The second chapter focuses on providing a theoretical framework for the research undertaken in order to provide background material for analysis and discussion. Third chapter is based on secondary data analysis to provide a general idea about the situation of water availability and accessibility in the study area. Primary data analyses of the villages are covered in fourth chapter. Fifth chapter is based on the narratives of the field study to understand the socio-political ecology of water accessibility in the study area. And lastly, sixth chapter summarizes the major findings of the undertaken research and proposes noteworthy recommendations to the current drinking water policies.

Situating 'Waterscape' Approach in Social Geography: A Theoretical Framework

<div style="float:right; border:1px solid; padding:4px;">**2**</div>

2.1 Introduction:

There has been an innumerable attempt to conceptualize nature-society relations in geography and particularly to understand, what actually constitutes 'nature' (or non-human element) in their interactions (Castree 1995[1]; Castree and Braun 1998[2]; Cornut and Swyngedouw 2000[3]; Huber 2010[4]). Nature-society perspective in geography has evolved from 'nature' and 'society' being separate entities interacting with each other to 'hybrid' socio-natures (Cornut and Swyngedouw 2000[5]; Huber 2010[6]). What is more important to highlight in such debates is that- it sets epistemological boundaries in the analysis of the objects[7]. My interest here is not to explore how these epistemological boundaries has evolved in geography but to develop a theoretical framework keeping these debates in mind to understand how nature (or water) and society interacts with other processes (political, technological and ecological) and creates hybrid spaces. In doing so, I would like to emphasize on how and why geography matters in the analysis of water-society relations in addition to what it deals with its socio-political imperatives.

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[1]Castree, Noel. "The nature of produced nature: materiality and knowledge construction in Marxism." *Antipode* 27, no. 1 (1995): 12-48.

[2]Castree, Noel, and Bruce Braun. "The construction of nature and the nature of construction." *Remaking reality: Nature at the millenium* (1998): 3-42.

[3]Cornut, Pierre, and Erik Swyngedouw. "Approaching the society-nature dialectic: a plea for a geographical study of the environment." *Belgeo. Revue belge de géographie* 1-2-3-4 (2000): 37-46.

[4]Huber, Matthew T. "Hyphenated geographies: The deindustrialization of nature-society geography." *Geographical Review* 100, no. 1 (2010): 74-89.

[5]Cornut, Pierre, and Erik Swyngedouw. "Approaching the society-nature dialectic: a plea for a geographical study of the environment." *Belgeo. Revue belge de géographie* 1-2-3-4 (2000): 37-46.

[6] Huber, Matthew T. "Hyphenated geographies: The deindustrialization of nature-society geography." *Geographical Review* 100, no. 1 (2010): 74-89.

[7]Matthew T. Huber (2010) has provided three different ways the hyphen between nature-society has been used in the geographical research- Barrow's human ecology, Sauer's cultural landscapes, and critical theories of social nature. He has beautifully revealed how the hyphenated geographies had put epistemological limits to their object of study. He further argues that geography's empirical and conceptual fixation on what comprises of 'nature' has largely led to the relative neglect of the ecological underpinnings of industrial capitalism which is not considered as 'natur(e)al' as pheripheralized ecology.

2.2 Overcoming nature/society divide in Geography: What's next?

With the rising environmental concerns in global political agenda like climate change, uneven development and its socio-economic and ecological implications, access to resources such as forest, land and water, air pollution fused with poverty, race and class etc. has been on the top list of issues concerning researchers across the disciplines (Cornut and Swyngedouw 2000[8]; Huber 2010[9]). It is not at all surprising that these concerns are somehow inherently geographical in nature. Yet, we have witnessed that "very little attention has been paid to these disturbing geographies regardless of being out rightly geographical in nature"[10]. This aversion is not new in this discipline but has its origin way back to quantitative revolution in 1950s which revolutionised the discipline by cutting off the traditional mode of enquiry which insisted on relating human to physical world (Cornut and Swyngedouw 2000[11]; Huber 2010[12]). On the contrary, geographers involved themselves in the hegemonic view that natural sciences are distinct from humanities and social sciences. And, this has led to systematic institutionalization of separation of human and physical geography (i.e. human/environment interaction) which is the very base on which geography legitimizes itself and takes pride having own place in academia (Warnes 1984[13]; Douglas 1986[14]; Swyngedouw 1999[15]; Cornut and Swyngedouw 2000[16]; Simmons 2004[17]).

With the rise of more positivistic approach after 1950s led to the expansion of discipline in mostly (not so related to ecological implications of human structures) urban, commercial and economic geography. However, this trend in geography has

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[8]Cornut, Pierre, and Erik Swyngedouw. "Approaching the society-nature dialectic: a plea for a geographical study of the environment." *Belgeo. Revue belge de géographie* 1-2-3-4 (2000): 37-46.
[9]Huber, Matthew T. "Hyphenated geographies: The deindustrialization of nature-society geography." *Geographical Review* 100, no. 1 (2010): 74-89.
[10]Cornut, Pierre, and Erik Swyngedouw. "Approaching the society-nature dialectic: a plea for a geographical study of the environment." *Belgeo. Revue belge de géographie* 1-2-3-4 (2000): 37-46.
[11]*ibid*46
[12]Huber, Matthew T. "Hyphenated geographies: The deindustrialization of nature-society geography." *Geographical Review* 100, no. 1 (2010): 74-89.
[13]Warnes, A. M. "Places and people: Reflections on their study in social geography." *GeoJournal* 9, no. 3 (1984): 261-271.
[14]Douglas, Ian. "The unity of geography is obvious..." *Transactions of the Institute of British Geographers* (1986): 459-463.
[15]Swyngedouw, Erik A. "Marxism and historical-geographical materialism: A spectre is haunting geography." *Scottish Geographical Journal* 115, no. 2 (1999): 91-102.
[16]Cornut, Pierre, and Erik Swyngedouw. "Approaching the society-nature dialectic: a plea for a geographical study of the environment." *Belgeo. Revue belge de géographie* 1-2-3-4 (2000): 37-46.
[17]SIMMONS, IAN G. "Value Geography: Value Environment." *Geography* (2004): 26-31.

seen new turns where geographers across the world started recognizing the fact that to address the burning environmental issues we need unity in our own discipline[18]. To address such 'big questions' of geography, it needs explanation of some unpleasant facts of the world. Ian Douglas (1986)[19] lists three basic characteristics of geography as suggested by Haggett (1981)[20] which would provide such explanations. These are as follows:

   a. Spatial variation of the physical and human phenomena of earth's surface
   b. The ecological emphasis on people-land relationships and
   c. The fusing of the spatial and ecological approaches in regional analyses.

Such unifying understanding of delicate interplay of social, cultural, political, ecological fragility, technological and economical processes (esp. when studying water and society relation) presented in its geography and history is important and is 'obvious'[21] in the study of people-environment interaction. I would elaborate spatial approach in the latter part and discuss in detail how space and place 'matters' in the unfolding of social relations, political processes and ecological manipulation to attain human desires to control, access and use of resources.

Coming back to nature/society debate which got space mostly in Marxist geography (Harvey 1974[22]; Smith 1984[23]; Castree 1995[24]; Castree and Braun1998[25], Swyngedouw 1999[26]; McCarthy and Prudham 2004[27]; Heynan, Kaika, and

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[18]Douglas, Ian. "The unity of geography is obvious..." *Transactions of the Institute of British Geographers* (1986): 459-463.

[19] Douglas, Ian. "The unity of geography is obvious..." *Transactions of the Institute of British Geographers* (1986): 459-463.

[20]Gregory, Derek, Ron Johnston, Geraldine Pratt, Michael Watts, and Sarah Whatmore, eds. *The dictionary of human geography*. John Wiley & Sons, 2011.

[21]Ian Douglas (1986) in his paper 'The unity of geography is obvious…' has called for the need to unify all the unique range of skills provided by geography to make striking contributions to more fundamental issues at global, regional and local levels.

[22]Harvey, David. "Population, resources, and the ideology of science." In *Philosophy in geography*, pp. 155-185. Springer, Dordrecht, 1979.

[23]Smith, N. "Uneven Development: Nature, Capital and the Production of Space." (1984).

[24]Castree, Noel. "The nature of produced nature: materiality and knowledge construction in Marxism." *Antipode* 27, no. 1 (1995): 12-48.

[25]Castree, Noel, and Bruce Braun. "The construction of nature and the nature of construction." *Remaking reality: Nature at the millenium* (1998): 3-42.

[26]Swyngedouw, Erik A. "Marxism and historical-geographical materialism: A spectre is haunting geography." *Scottish Geographical Journal* 115, no. 2 (1999): 91-102.

[27]McCarthy, James, and Scott Prudham. "Neoliberal nature and the nature of neoliberalism." *Geoforum* 35, no. 3 (2004): 275-283.

Swyngedouw 2006[28]) has shown such understanding of intertwined relationship of human and environment. This shift in approach to study nature-society relation which, I have already touched upon in the previous chapter, took place, not surprisingly at a time, when in academia, people started questioning traditional binary vision of the world for example, human-environment, men-women, nature-culture etc[29]. Marxist Geographers have actively participated in this revival of nature-society relationship as a response to modern/ bourgeoisie[30] conception of nature which is inadequate in the understanding of contemporary environmental problems.

2.2.1 Critical Theories of Socionature: Creating Hybrid Worlds

The conceptualization of nature and society as separate entity has served the desperate need of mastering nature, which was basically intended to free human kind from the clutches of nature by transforming their relationship in a particular way. However, in doing so, it has produced new forms of nature. These new forms of nature are socio-natural 'things' which Swyngedouw (2004)[31] calls quasi-objects/ hybrids. Cornut and Swyngedouw (2000) explains these hybrid worlds as:

"Indeed, on closer inspection, the city, Ozone, BSE, 'Dolly' or human bodies are networks of interwoven processes that are simultaneously human and natural, real and fictional, mechanical and organic. There is nothing 'purely' social or natural about them, even less a-social or a-natural; these 'things' are both natural and social, real and fictional. Society and nature, representation and being are inseparable, integral to each other, infinitely bound up. Simultaneously, these hybrid socio-natural 'things' are full of contradictions, tensions and conflicts." [32](p. 4)

Such understanding of nature-society relation that every body and thing is part social and part nature has led to the omission of any discrete boundaries between the two. And, in this process, it internalizes the conflicting relations and re-defines every body

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[28]Heynen, Nik, Maria Kaika, and Erik Swyngedouw. "In the nature of cities." *Urban political ecology and the politics of urban metabolism. London and New York: Routledge Taylor and Francis Group* (2006).

[29]Cornut, Pierre, and Erik Swyngedouw. "Approaching the society-nature dialectic: a plea for a geographical study of the environment." *Belgeo. Revue belge de géographie* 1-2-3-4 (2000): 37-46.

[30] Smith (1984) has talked about the 'ideology of nature' where nature is seen as *external* to society as well as *universal* at the same time. Such contradictory conception of nature has political implications. Benton (1991) has called it as 'epistemic conservatisms'.

[31]Swyngedouw, Erik, and E. Swyngedouw. *Social power and the urbanization of water: flows of power*. Oxford: Oxford University Press, 2004.

[32]Cornut, Pierre, and Erik Swyngedouw. "Approaching the society-nature dialectic: a plea for a geographical study of the environment." *Belgeo. Revue belge de géographie* 1-2-3-4 (2000): 37-46.

and thing (Cornut and Swyngedouw 2000)[33]. This dialectical relation between nature and society has been accepted as a perspective to approach nature-society relation by many (Latour 2012[34]; Smith 1984[35]; Castree 1995[36]; Cornut and Swyngedouw 2000[37]). But, even after getting rid of any boundaries between nature and society has, somehow, put some boundaries in socionature analysis.

2.2.2 Obsessing over 'nature': A Call for Expansion of Imposed Boundary

The conceptualization of socionature as mutually constitutive entities where some nature is social and some social is natural, there still seems to be some hanging on to 'nature' as to know what exactly nature in socionature is? This fixation on nature as discussed by Huber (2010)[38] has actually created the dualism between 'natur(e)al' and 'unnatur(e)al'. Whatever nature is outside socionature is not considered nature. Castree and Braun (1998)[39] explained this by giving an example that how by only focussing on what actually counts as nature, we often miss out to study the ecological relationship of urban industrialization. Such dualism, from an epistemological viewpoint, put limitations on the conduct of research to only specific 'naturalized landscapes' in which nature is visible[40].

This limitation in nature-society research, as Huber (2010) argues, needs to be addressed by *letting go* of nature "as both an empirical referent and a problematic ontological category"[41]. This insight provided by Huber (2010)[42] shows geography a way towards better understanding of present ecological problems and offers socioecological perspective along with political ecology (as popularized by the proponents of waterscape perspective) to analyse those relations valuing its openness

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[33]*ibid*

[34]Latour, Bruno. *We have never been modern*. Harvard university press, 2012.

[35]Smith, N. "Uneven Development: Nature, Capital and the Production of Space." (1984).

[36]Castree, Noel. "The nature of produced nature: materiality and knowledge construction in Marxism." *Antipode* 27, no. 1 (1995): 12-48.

[37]Cornut, Pierre, and Erik Swyngedouw. "Approaching the society-nature dialectic: a plea for a geographical study of the environment." *Belgeo. Revue belge de géographie* 1-2-3-4 (2000): 37-46.

[38]Huber, Matthew T. "Hyphenated geographies: The deindustrialization of nature-society geography." *Geographical Review* 100, no. 1 (2010): 74-89.

[39]Castree, Noel, and Bruce Braun. "The construction of nature and the nature of construction." *Remaking reality: Nature at the millenium* (1998): 3-42.

[40]Huber, Matthew T. "Hyphenated geographies: The deindustrialization of nature-society geography." *Geographical Review* 100, no. 1 (2010): 74-89.

[41]*ibid*

[42] *ibid*

for detailed empirical as well as rich ethnographies. (See Strang 2005[43]; Wallace and Coles 2005[44]; Sultana 2007[45]; 2009[46]; 2011[47]; Thompson 2016[48])

Such perspective to study especially water-society relation gives (deserved) importance to its different geographies (even '*denaturalized*'[49]) and breaks the conventional boundaries of water research mostly focussed on broader political structure of capitalist development and production of unequal socionatures. I would elaborate on socio-political ecology of waterscapes as a perspective (which I propose as a mode of analysis to study accessibility to drinking water in Sonbhadra) in the last section of this chapter. Before that, we need to explore what social geography has to contribute to enrich water-society research.

2.3 The Making of Water Geographies:

In this section, I would like to discuss, first, what the core concern in social geography is and how it has evolved the concept of space. Second, I would elucidate Edward Soja's trialectics of spatiality. And, lastly, how can these conceptual understanding can better serve the purpose of studying water-society relation.

2.3.1   Concept of Space in Social Geography:

Social geography's primary concern has always been people in groups with reference to their milieux[50]. In the history of this subject, the understanding on how (hu)man's behaviour could be related to their habitat has been developed from deterministic to possiblistic school of thought. Earlier in nineteenth and twentieth century, two great British proponents of deterministic thought were Huntingdon and Semple. They proposed the idea that humans' behaviour is determined by their environmental

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[43]Strang, Veronica. "Taking the waters." *Gender, water and development* (2005): 21-38.

[44]Wallace, Tina, and Anne Coles, eds. *Gender, water and development*. Berg, 2005.

[45]Sultana, Farhana. "Water, water everywhere, but not a drop to drink: Pani politics (water politics) in rural Bangladesh." *International Feminist Journal of Politics* 9, no. 4 (2007): 494-502.

[46]Sultana, Farhana. "Fluid lives: subjectivities, gender and water in rural Bangladesh." *Gender, Place and Culture* 16, no. 4 (2009): 427-444.

[47]Sultana, Farhana. "Suffering for water, suffering from water: emotional geographies of resource access, control and conflict." *Geoforum* 42, no. 2 (2011): 163-172.

[48]Thompson, Jennifer A. "Intersectionality and water: How social relations intersect with ecological difference." *Gender, Place & Culture* 23, no. 9 (2016): 1286-1301.

[49] Huber (2010) calls for inclusion of 'denaturalized' geographies such as transportation, electricity generation, and industrial production rather than only considering human interactions with farms, forests, and water systems in the study of nature-society relation. This breaks the epistemological limits imposed by tendency to define what nature is and what is not?

[50]Jones, Emrys, and John Eyles. *An introduction to social geography*. Oxford University Press, 1977.

conditions. Thus, there exists a causal relationship between the two. However, this extreme environmentalism was faced with reactions from French geographers, mainly, Vidal De La Blache who proposed that the relationship is rather two-ways, i.e., 'to a larger extent, (hu)man decided how they wanted to live, albeit within limits set by nature'[51]. He explained this relationship as the number of possibilities offered by the environment and (hu)man can always choose within that limit set by the environment. The crucial understanding provided by this school of thought is that (hu)man always have choices as compared to being at the dictate of environment as thought by environmentalist, and, these 'choices' are largely the outcome of (hu)man's culture. This more flexible approach led to the development of many crucial concepts in social geography.

One of these monumental concepts is 'terrestial unity' developed by Vidal De La Blache, explained as particular 'geographical setting' which provided 'stable ways of perceiving and conducting daily life'[52]. And, this adaptation to their environment has concrete expression in particular patterns of living (*genres de vie*) which is developed by repeated experience within particular geography which, in turn, makes it an *ecological system*. This holistic understanding of viewing space as a total phenomenon (See work of British geographer Roxby) where events take place cannot be ignored.

Human ecology extended this understanding of *ecological space* as 'natural areas' where there is a competition for "limited space of the habitat and for access to the most desirable locations for residence and business. Because 'individuals' with similar social attributes are similarly placed in their ability to cope with these forces of competition there results a pattern of segregation"[53] (pp. 29). This segregation, therefore, is the basic unit of ecological space. This view has been criticized for seeing 'spatial space' with little or no social meaning which neglects the ability of individuals and groups to make choices.

The response to such understanding of spatial space is then, given by the pioneering work of W. Firey (1947) as explained by Jones and Eyles (1977)[54]

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[51] *ibid*

[52]Jones, Emrys, and John Eyles. *An introduction to social geography.* Oxford University Press, 1977.

[53]*ibid*

[54]*ibid*

"In Firey's view, the human ecologists saw individuals as being passive adapters to place. He thought that physical space, considered apart from its culturally defined meaning, might be quite irrelevant to social interaction." (pp. 32)

This viewpoint has emphasized the sentimental and symbolic meanings attached to the living space, and, therefore, affect the locational patterns in consistent with spatially attached values. Thus, social values become both cause and consequence of specific uses and activities[55].

2.3.2 Edward Soja's Concept of Lived Space:

Edward Soja's thinking of 'third space' has provided an epistemology to understand social spatiality. He theorized spatiality as an equally important (neither dominant nor subordinate) dimension along with historicality and sociality in order to understand the world. He has criticized the 'modernist myth' of linear understanding of world. He argues that it is not only the making of history and the constitution of society but also the making of human geography. He seeks to deconstruct and reconstitute the entire dialectic logic by incorporating spatial thinking into it. Edward Soja puts it as *"it shifts the 'rhythm' of dialectic thinking from a temporal to a more spatial mode, from linear or diachronic sequencing to the configurative simultaneities and synchronies"*[56]. (pp. 269)

Drawing largely from Lefebvre's major work *The Production of Space,* he has also questioned the relentless presence of dualism between mental and material or real and imagined or first and second spaces. To address this, he introduces the third (what he calls as a *critical thirding-as-Othering*) space or 'lived space'. He conceptualizes Thirdspace as Livedspace which transcends all composite of spaces comprising all real and imagined spaces simultaneously and beyond.

Space as a concept is mainly understood as a 'social and discursive practice' which is a product of interrelations rather than just being bounded or self contained entity[57]. This understanding directs us to spatial praxis which provides a methodology to understand how subjectivities are necessarily ingrained in place. Soja (1996) asserts that "spaces can tell stories which can unfold histories. It can be interrupted,

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[55]*ibid*

[56]Soja, Edward W. *Thirdspace: Expanding the geographical imagination.* Blackwell, 1996.

[57]Arias, Santa. "Rethinking space: an outsider's view of the spatial turn." *GeoJournal* 75, no. 1 (2010): 29-41.

appropriated and transformed through artistic and literary practices"[58]. And, these acts of appropriation or manipulation using space are political acts as they are the disguised representation of asymmetrical power-relations'.

2.3.3 Space, Spatiality and Water:

In water-society research, emphasis on historical-geographical process (time/place specific or spatio-temporal or geohistoric dialectic) has advanced the understanding of socio-natural mechanisms as it provides a *structuring medium* through which water-society relations unfolds. Several scholarships have discussed the role of geography in exploring such relationships as important as history (Swyngedouw 1999[59]; Cornut and Swyngedouw 2000[60]; Mehta 2003[61]; Page 2005[62]; Strang 2005[63]; Smith Jr. 2008[64]; Sultana 2009[65]; Loftus 2011[66]; Pannu 2012[67]; Jepson 2012[68]; Boelens 2014[69]; Linton and Budds 2014[70]; Thompson 2016[71]; Boelens, Hoogesteger, Sywngedouw, Vos and Wester 2016[72]). Moreover, geography has been given credit to provide a spatial representation of imbued social, political and cultural relations and meanings which

[58]Soja, Edward W. *Thirdspace: Expanding the geographical imagination.* Blackwell, 1996.

[59]Swyngedouw, Erik A. "Marxism and historical-geographical materialism: A spectre is haunting geography." *Scottish Geographical Journal* 115, no. 2 (1999): 91-102.

[60]Cornut, Pierre, and Erik Swyngedouw. "Approaching the society-nature dialectic: a plea for a geographical study of the environment." *Belgeo. Revue belge de géographie* 1-2-3-4 (2000): 37-46.

[61]Mehta, Lyla. "Contexts and constructions of water scarcity." *Economic and political weekly* (2003): 5066-5072.

[62]Page, Ben. "Naked power: Women and the social production of water in anglophone Cameroon." *Gender, water and development* (2005): 57-76

[63]Strang, Veronica. "Taking the waters." *Gender, water and development* (2005): 21-38.

[64]Smith, William James. "The place of rural, remote and least-wealthy small islands in international water development: the nexus of geography–technology sustainability in Chuuk State, Federated States of Micronesia." *Geographical Journal* 174, no. 3 (2008): 251-268.

[65]Sultana, Farhana. "Community and participation in water resources management: gendering and naturing development debates from Bangladesh." *Transactions of the Institute of British Geographers* 34, no. 3 (2009): 346-363.

[66]Loftus, Alex. "Thinking relationally about water: review based on Linton's What is water?." *The Geographical Journal* 177, no. 2 (2011): 186-188.

[67]Pannu, Camille. "Drinking water and exclusion: A case study from California's Central Valley." *California Law Review*(2012): 223-268.

[68]Jepson, Wendy. "Claiming space, claiming water: Contested legal geographies of water in South Texas." *Annals of the Association of American Geographers* 102, no. 3 (2012): 614-631.

[69]Boelens, Rutgerd. "Cultural politics and the hydrosocial cycle: Water, power and identity in the Andean highlands." *Geoforum*57 (2014): 234-247.

[70]Linton, Jamie, and Jessica Budds. "The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water." *Geoforum* 57 (2014): 170-180.

[71]Thompson, Jennifer A. "Intersectionality and water: How social relations intersect with ecological difference." *Gender, Place & Culture* 23, no. 9 (2016): 1286-1301.

[72]Boelens, Rutgerd, Jaime Hoogesteger, Erik Swyngedouw, Jeroen Vos, and Philippus Wester. "Hydrosocial territories: a political ecology perspective." (2016): 1-14.

changes with time in such analyses. Space and Spatiality[73] has also been discussed extensively in the discourse of historical-geographical materialism[74] which is an important focus in water-society research. The much celebrated contribution of geographers as providing the concept of space and place has opened doors for other disciplines to render both concrete/tangible/real and abstract/intangible/fictional meanings to incorporate in their analysis of objects as well as creates opportunities for them to contribute in return (See Malpas 1999[75]; Casey 2001[76]; Arias 2010[77]). Such academic engagement, undoubtedly, is crucial in the development of discipline's theory of knowledge.

However, this acceptance of geographers' much cherished contribution especially in water-society relations is not insensible to contradictions/tensions emerged often when it is put into practice. In this case, there seems to be created tension between the physicality of space and its metaphoric meanings. As Raju (2011)[78] showed the same kind of concern, argues,

"…*What we see in these expositions is the tacit acknowledgement of geographical factors in the construct of spaces. However, these authors privilege abstract metaphoric signifiers over the spatial inputs in the making of spaces, the latter at best gets secondary role to play. Some strongly negate geography in arguing that apart from providing a locale where interactions must take place, 'geographical space is not the origin of cultural space [and therefore] geographical rootedness is neither necessary nor sufficient [also that] . . . the mute fact of geography is of little relevance'*…"

She continues explicating her ideas as,

"…*I counter these positions and maintain that geography can never be mute nor can it be just incidental to metaphoric construct of spaces. However, in doing so, I deny as Soja does, an absolute causative/generative role being assigned to physically*

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[73]Soja (1989) used the term social spatiality for social production of spaces which can be seen synonymous to the concept of place in social geography.
[74] Much debated in Marxist geography to incorporate in the analysis of social production of space. See Soja (1980); Sywngedouw (1999) and Cornut and Sywngedouw (2000).
[75]Malpas, Jeff. *Place and experience: A philosophical topography.* Routledge, 2018.
[76]Casey, Edward S. "On habitus and place: responding to my critics." (2001): 716-723.
[77]Arias, Santa. "Rethinking space: an outsider's view of the spatial turn." *GeoJournal* 75, no. 1 (2010): 29-41.
[78]Raju, Saraswati. "Reclaiming spaces and places: The making of gendered geography of India." *Gendered Geographies: Space and Place in South Asia* (2011): 31-59.

conceptualized space, but assert, perhaps more strongly than him, that even if (physical) spaces were not to be given the determining role, social relations, their evolution and articulation cannot be completely independent of them either. Moreover, I propose that rather than seeing these physical spaces as a mere stage against which human lives unfold, they be given the credit they deserve. To reiterate, this is because physical spaces not only sets the tone for the creation of ideologically and metaphorically formed spaces, but also contributes proactively by virtue of their geographic specificities to what may be termed as multi-vocal 'regnant set of meanings' (Gupta 2000: 31) through differentially institutionalized practices (also see, Bauder 2001). Conceptualized thus, physical spaces (places) take precedence over ideological and metaphoric spaces in my schema of things."

This conceptual clarity is needed in order to understand how physicality of spaces as well as associated symbolic meanings are intertwined in a way that one cannot be explained without the other. Thus, why certain spaces are appropriated, manipulated or transformed in a particular way must be understood in relation to the available spatial inputs which can be perceived in a certain way in order to execute it. This understanding would be used in the analysis of control, use and access to water in the study area.

2.4 Conceptual Framework:

The primary focus of this work is to understand that how the available water in the study area is being distributed and made accessible to people. Through this work, I want to understand that even if there is one drop of water available, then, who is getting what share and who is not getting water at all? Why and how 'some' groups of people is able to manage to have access to water and 'some' are not? For this, I will use the framework (Fig. 1) given below. In this, framework, to understand the mechanism of the control of drinking water resources in the selected villages is understood by analysing socio-political ecological processes. The two villages which are just 5 km away from each others, still showed stark differences in the process and mechanisms to control water. These socio-political ecological processes rest on the awareness of the interdependence of biophysical, socio-cultural and role of local politics as well as political environment at global, regional levels to some extent.
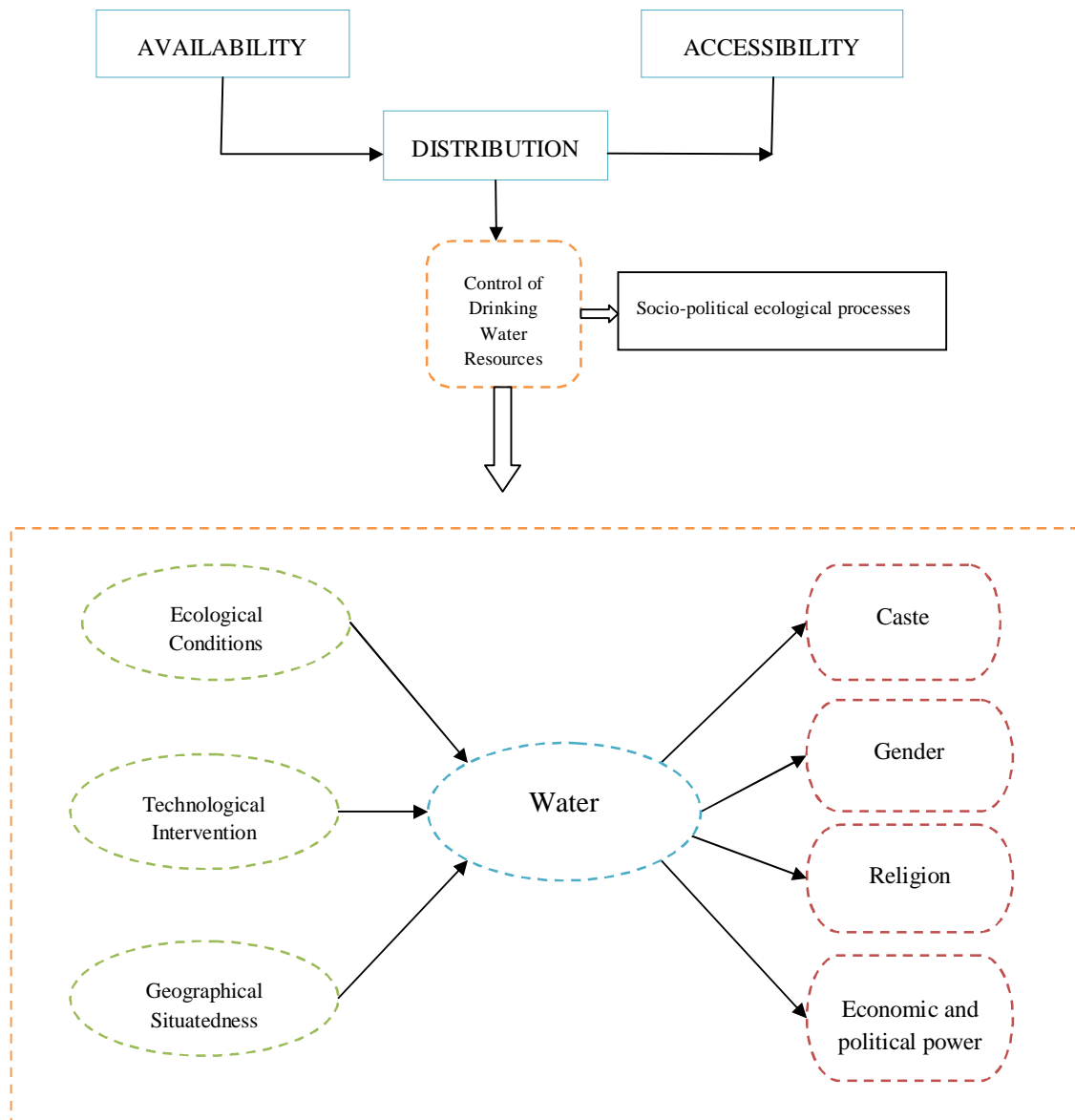
Fig. 2.1 Conceptual Framework

When technological interventions, local politics, prevailing ecological fragility and geographical specificity interact with water and existing socio-spatial structure, it further complicates the accessibility to water. The unequal access to drinking water, thus, produces and produced by the social hierarchies based on caste, gender, and religion. And, this dynamic process of producing and (re)producing control over water resources leads to varied pattern of accessibility over time and space.

Water-society relations based on social hierarchies; caste and related ramifications and fragile water ecology becomes more complex when it further interacts with local and regional caste dominancy acquired by economic and political power. The political power which influences the decision making on water allocation, control and use further accentuates the struggle to access drinking water in villages. Moreover, it is not necessary that all these phenomena are completely isolated or localized, but has spatial and regional dimensions. In waterscapes, all these complexities are related internally which has multiple constituent factors. All these factors create a unique configuration which makes unique water struggles. Thus, waterscapes perspective a powerful approach to understand dynamic water-society relations of social hierarchy, political and economic power, uneven ecology, history and its geographical situatedness with water. Such understanding would be used to contextualize 'lived experience' and 'everyday contestations and negotiations' in access to drinking water in selected villages.

2.5 Conclusion:

The conceptual understanding developed in this chapter with the waterscapes approach discussed in the first chapter will provide a background material and a framework to situate my analysis and arguments in the latter chapters of this dissertation.

A Macro View on Drinking Water Availability and Accessibility in Uttar Pradesh

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3.1 Introduction:

The objective of this chapter is to get the overall idea of pattern of availability and accessibility to drinking water in Uttar Pradesh as well as comparing it with regional and district level. This study only focuses on rural areas. Uttar Pradesh is divided into 8 regions; Upper Doab, Middle Doab, Lower Doab, Rohilkhand, Awadh, Purvanchal, Bundelkhand and Baghelkhand. Sonbhadra falls in Purvanchal region with other 16 districts (Azamgarh, Ballia, Basti, Chandauli, Deoria, Ghazipur, Gorakhpur, Jaunpur, Kushinagar, Maharajganj, Mau, Mirzapur, Sant Kabir Nagar, Bhadohi, Siddharth Nagar and Varanasi)). The secondary data analysis will provide the ground for relational analysis as to situate Sonbhadra in relation to its regional and state level analysis.

3.2 Secondary Data Analysis:

The data for analysing water accessibility and availability is taken from Household level data for basic amenities, Census of India 2011 and India Human Development Survey-II (IHDS-II), 2011-12. The secondary analysis has been done on three levels in order to get the overall picture of accessibility and availability of drinking water.

3.2.1   Availability and Accessibility to Drinking Water in Rural Uttar Pradesh:

The objective of this analysis is to get the regional pattern of accessibility and availability of rural drinking water. The accessibility to drinking water is measured by percentage of SC and non-SC population having access to drinking water within, near and away premises. Since, Census of India only provides data for total population and SC population, SC population has been subtracted from total population in order to have better comparison between SC and non-SC population. This study is focussed on rural drinking water; hence, analysis is only based on rural population of the state.

3.2.1.1 Availability of Drinking Water in Rural Uttar Pradesh:

(i)   Main Source of Drinking Water:

The ten main sources of drinking water listed by Census of India 2011 are treated tap water, untreated tap water, hand pump, tube well/ bore well, covered well and uncovered well, spring, river/canal, tank and other sources.

Table 3.1 Main Source of Drinking Water for Total, SC and Non-SC Households in Rural Uttar Pradesh, 2011

Main Source of Drinking Water	Total (%)	SC (%)	Non-SC (%)
Tap water from treated source	13.06	11.43	13.62
Tap water from un-treated source	7.11	6.53	7.31
Covered Well	0.64	0.63	0.64
Un-covered Well SC	4.24	4.40	4.19
Hand pump	73.18	75.69	72.31
Tube well/ Bore well	0.98	0.44	1.16
Spring	0.04	0.04	0.04
River/ Canal	0.09	0.09	0.10
Tank/Pond/Lake	0.08	0.08	0.08
Other Sources	0.58	0.67	0.57

Source: Census of India, 2011

Table 3.1 shows that the majority uses hand pump as their main source of drinking water in rural Uttar Pradesh i.e. 73.18%. The second main source of drinking water is treated piped water (13.06%). For SC households, the percentage of households using hand pump is higher than the state average while the percentage of households using treated piped water is lesser than the state average. This pattern is opposite for non-SC households which indicates that SCs are more likely to depend on hand pump as their main source of drinking water while, non-SCs have more better water available through treated piped water.

Hand pump as the main source of drinking water for both SC and non-SC households shows that the majority is still depended on ground water source. The studies as well as water policies on drinking water which focuses mainly on piped water supply, excludes large number of villages who are still dependent on common and ground water sources of water. The percentage share of SC and non-SC using hand pump as

their main source of drinking water fails to capture the inequality in access to these hand pumps. Secondary data for drinking water source availability also fails to show the quality of sources, water availability in these hand pumps etc. which often misleads the results. Many studies (see Tiwari 2007[1]; Shah et al 2006[2]; Rao and Karakoti 2010[3]) shows that the available water sources for SCs in villages are mostly separated from upper caste localities, poor water quality, distance, caste based conflicts and violence at water source are common features of drinking water sources available for SCs.

(ii)   Improved and Unimproved Sources of Drinking Water:

WHO defines 'improved drinking water sources' as sources that, 'by nature of their construction or through active intervention, are protected from outside contamination, particularly faecal matter'[4]. It includes household connection, public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs and rainwater collection. For having a clear picture on the availability of improved water sources in rural areas of Uttar Pradesh, treated tap water, hand pump, tube well/bore well and covered well are included in improved water sources while others as unimproved water sources. Table 3.2 shows the percentage of SC and non-SC households using improved and unimproved water sources. It shows that the percentage of SC households using unimproved water sources (87.49%) is higher that non-SC households (84.58%).

Table 3.2 Improved and Unimproved Sources of Drinking Water Available to SC and Non-SC households, Rural Uttar Pradesh, 2011

Sources of Drinking Water	SC (%)	Non-SC (%)
Improved	12.51	15.42
Unimproved	87.49	84.58

Source: Census of India, 2011

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[1]Tiwary, Rakesh, and Sanjiv J. Phansalkar. "Dalits' access to water patterns of deprivation and discrimination." *International Journal of Rural Management*3.1 (2007): 43-67.
[2]Shah, Ghanshyam, Harsh Mander, Amita Baviskar, Sukhadeo Thorat, and Satish Deshpande. *Untouchability in rural India*. Sage, 2006.
[3]Rao, Y. C., and S. Karakoti. "Exclusion and Discrimination; Concepts, Perspectives and Challenges." (2010).
[4] Accessed from http://www.who.int/water_sanitation_health/monitoring/water.pdf

Defining improved water source in the village with uneven ecology fails to point out the complexities involved in access to safe drinking water. Sultana (2006)[5] studied chronic arsenic poisoning in rural Bangladesh. She found that the uneven spatial and ecological distribution of contaminated water as well as water sources resulted into complex gendered relations influenced by resource use, access and control over arsenic free water sources. Such complexities are not reflected in the understanding of improved water sources and gives only partial information. Access to improved water sources to SCs is much more difficult as shown by data. Rao and Karakoti (2010)[6] showed that, in villages where water is related to its conception of purity and pollution, SCs' water sources are often contaminated by upper caste to maintain social hierarchy. They found several incidences in the village where the upper caste have thrown dead animal in SCs' well whenever any of them tried to challenge the age-old tradition of caste hierarchy.

3.2.1.2 Accessibility to Drinking Water in Rural Uttar Pradesh:
(i)   Location of Drinking Water Source

The state of Uttar Pradesh has 25.66% SC rural households and 74.34% of non-SC rural households. Census of India defines within, near and away premises as within households/compound, less than 100 meters and more than 100 meters respectively. Out of 25.66% SC households, 51.43 % households have the location of main source of drinking water near premises which highest among other locations. While the majority of Non-SC households (48.75%) have their location of main source of drinking within premises as compared to near and away premises.

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[5]Sultana, Farhana. "Gendered waters, poisoned wells: Political ecology of the arsenic crisis in Bangladesh." *Fluid bonds: Views on gender and water* (2006): 362-86.

[6]Rao, Y. C., and S. Karakoti. "Exclusion and Discrimination; Concepts, Perspectives and Challenges." (2010).
[6] Accessed from http://www.who.int/water_sanitation_health/monitoring/water.pdf

Table 3.3 Location of Drinking Water Source for SC and Non-SC Households in Rural Uttar Pradesh 2011

Location of Drinking Water Source	SC (%)	Non-SC (%)
Within Premises	30.48	48.75
Near Premises	51.43	38.58
Away Premises	18.09	12.67

Source: Census of India, 2011

Fig 3.1 Location of Drinking Water Source for SC and Non-SC Households in Rural Uttar Pradesh 2011
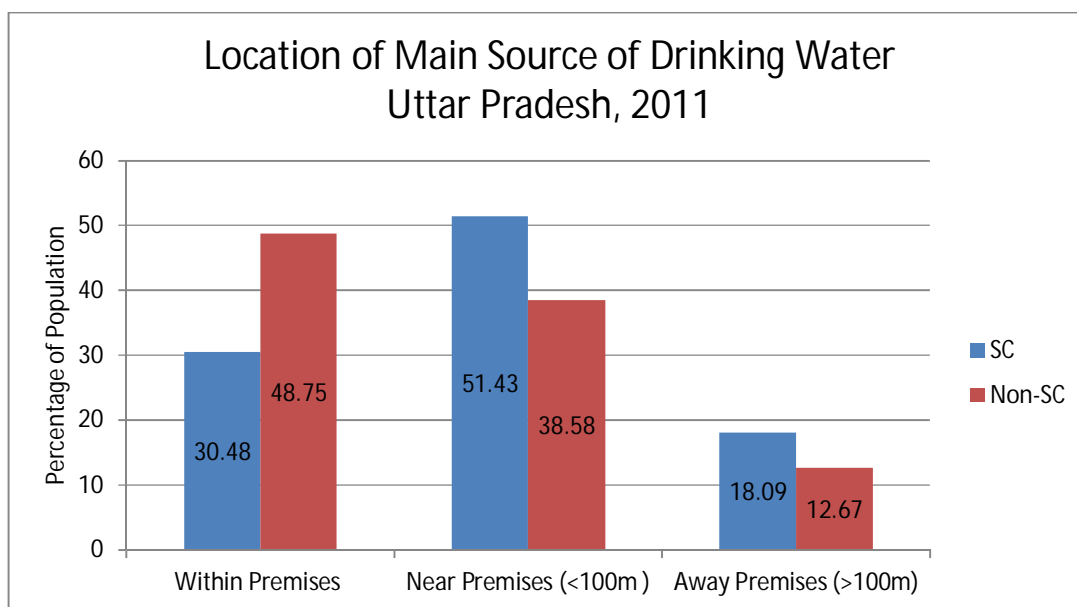
Source: Census of India, 2011

Table 3.4 Location of Different Sources of Drinking Water for SC and Non-SC Households in Rural Uttar Pradesh 2011

Sources of Drinking Water	SC (%)			Non-SC (%)		
	Within	Near	Away	Within	Near	Away
Tap water from treated source	5.6	4.55	1.28	8.91	3.78	0.92
Tap water from un-treated source	2.6	3.18	0.75	4.05	2.7	0.57
Covered Well	0.13	0.35	0.15	0.21	0.3	0.12
Un-covered Well SC	0.44	2.65	1.31	0.61	2.44	1.13
Hand pump	21.49	40.16	14.04	34.18	28.71	9.42
Tube well/ Bore well	0.22	0.14	0.09	0.78	0.25	0.13
Spring	0	0.02	0.02	0	0.03	0.01
River/ Canal	0	0.05	0.03	0	0.06	0.04
Tank/Pond/Lake	0	0.06	0.02	0	0.06	0.01
Other Sources	0	0.27	0.4	0	0.25	0.32
Total	30.48	51.43	18.09	48.74	38.58	12.67

Source: Census of India, 2011

Form Table 3.4, it is clear that the two major sources of drinking water i.e. hand pump and treated piped water source located within premises of non-SC households (34.18% and 8.91% respectively) is higher than SC households (21.49% and 5.60% respectively). Also access to tube well/ bore well located within, near and away premises is higher for non-SC as compared to SC households.

(ii)   Spatial Distribution of Location of Main Source of Drinking Water:

The Map (3.1 and 3.2) shows the difference in levels of accessibility to drinking water within premises.

Map 3.1 Spatial Distribution of SC households having Access to Drinking Water Within Premises

Map 3.2 Spatial Distribution of Non-SC households having Access to Drinking Water Within Premises

Map 3.1   Map 3.2

SC Households Having Access to Drinking Water Within Premises, Uttar Pradesh 2011

Non-SC Households Having Access to Drinking Water Within Premises, Uttar Pradesh 2011
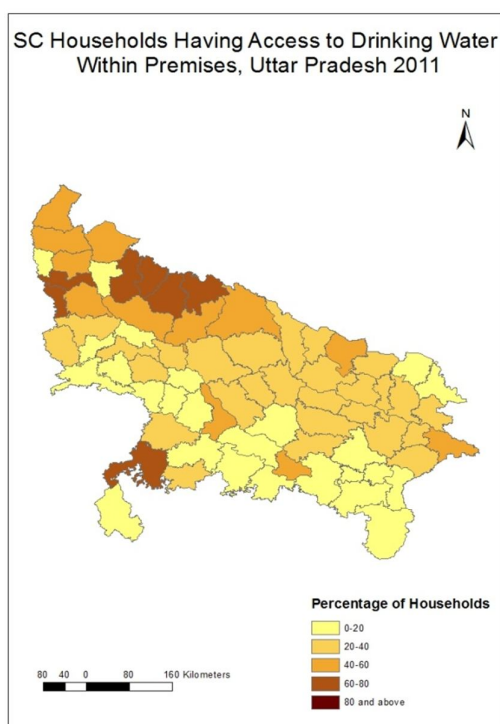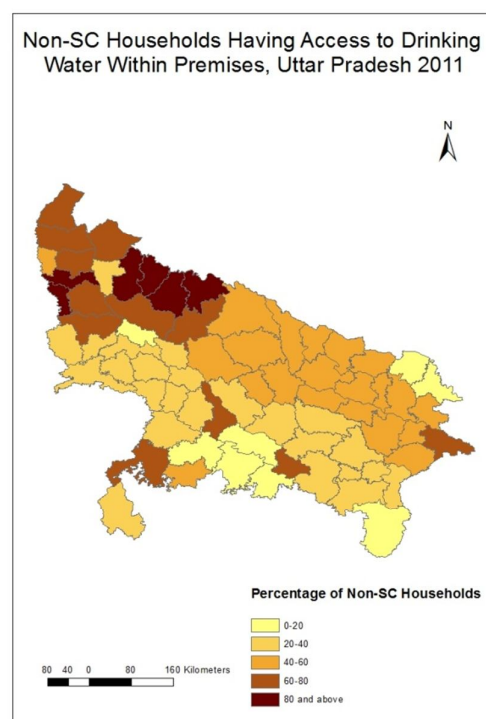
Source: Census of India, 2011

The districts which have less than 10% of total SC households having access to drinking water source within premises are (lowest to highest) Mahoba, Chitrakoot, Kaushambi, Lalitpur, Banda, Hamirpur, Fatehpur and Sonbhadra while for non-SC households, it is only Mahoba which has less than 10% of households within premises. Districts which have more than 70% of total SC households having access to drinking water source within premises are only Bareilly, Pilibhit and Rampur while for non-SC households, there 12 districts which have above 70% of households having access to drinking water source within premises.

Map 3.3 Spatial Distribution of SC households having Access to Drinking Water Near Premises

Map 3.4 Spatial Distribution of Non-SC households having Access to Drinking Water Near Premises

Map 3.3   Map 3.4
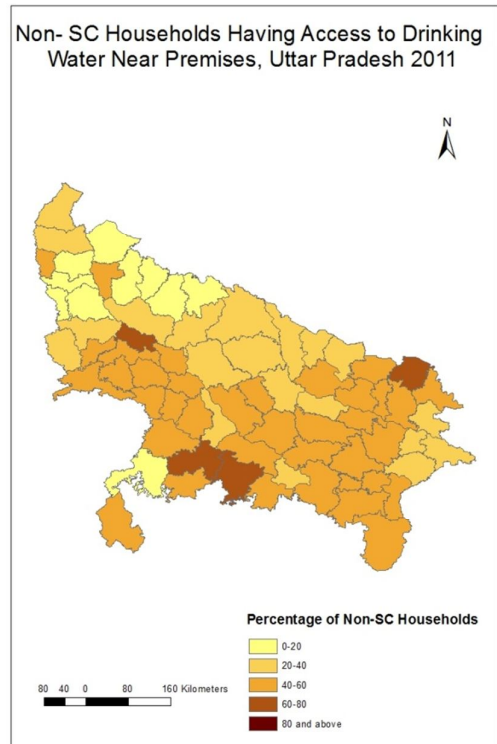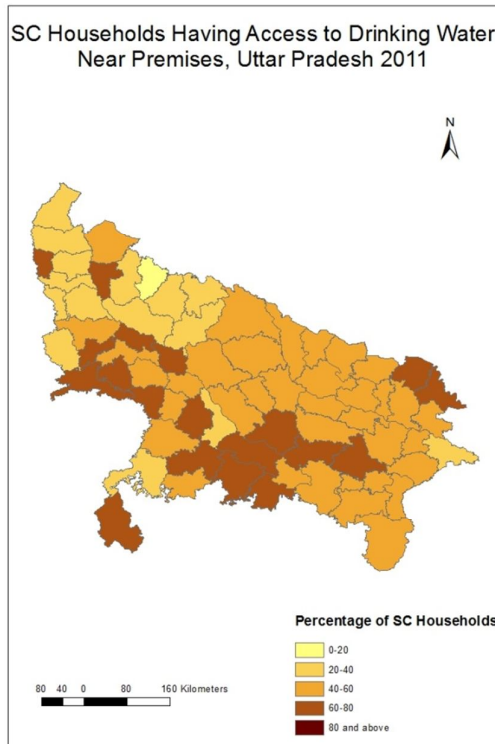
Source: Census of India, 2011

Map 3.5 Spatial Distribution of SC households having Access to Drinking Water Away Premises

Map 3.6 Spatial Distribution of Non-SC households having Access to Drinking Water Away Premises

Map 3.5   Map 3.6
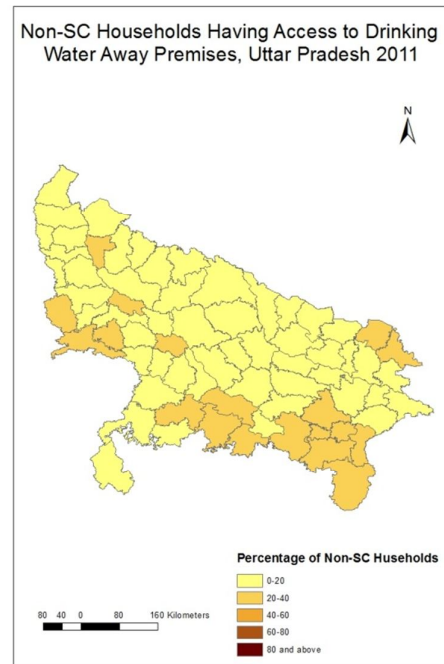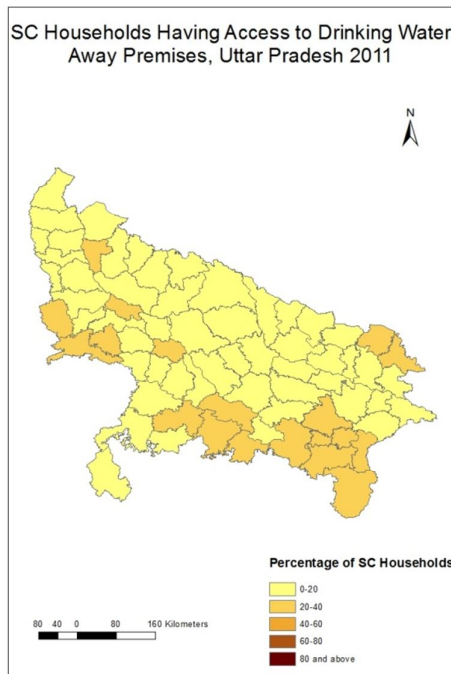
Source: Census of India, 2011

The spatial pattern for SC and non-SC households having access to drinking water near premises shows that mostly SC households have access to source of drinking water near premises as compared to non-SC households who mostly have their source within premises. While, Map 3.5 and 3.6 shows similar spatial pattern of SC and non-SC households having access to source of drinking water away their premises.

The location of main source of drinking water which is within premises mostly for upper caste in rural areas shows the presence of stark inequality in distribution water sources among different groups of people. The upper caste and the landed

communities are able to get water source inside their households while others who are mostly poor have to walk longer distances to get water[7].

3.2.2 Availability and Accessibility of Drinking Water in Purvanchal Region:

In this section, the availability and accessibility of water in Purvanchal region of Uttar Pradesh has been analysed by using India Human Development Survey-II (IHDS-II), 2011-12. Since, IHDS provides rich dataset for different caste groups, analysis in this section is based on General, Other Backward Castes (OBCs), Scheduled Castes (SCs) and Scheduled Tribes (STs) and others.

(i)   Availability of Drinking Water Sources in Purvanchal Region:

Table 3.5 shows the proportion of population in different regions of Uttar Pradesh who uses different sources of drinking water. In Purvanchal region, 90.69% of total population uses hand pump as their main source of drinking water and 7.06% (second largest) of total population are dependent on open well as their main source of drinking water.

Table: 3.5 Main Source of Drinking Water in Purvanchal Region

Regional Divisions	Main Source of Drinking Water in Normal Season								
	Piped (Public)	Tube well	Hand pump	Open well	Covered well	River, Canal and Stream	Pond	Tanker	Others
Upper Doab	8.7	0.19	89.65	0.34	0	0	0	1.12	0
Middle Doab	3.09	51.68	41.58	3.65	0	0	0	0	0
Lower Doab	2.93	1.13	90.69	3.5	0.33	0.66	0	0	0.76
Rohilkhand	0	0	99.65	0	0	0	0.35	0	0
Awadh	0.95	0.11	94.9	4.04	0	0	0	0	0
Purvanchal	1.74	0.51	90.69	7.06	0	0	0	0	0
Bundelkhand	0	0	78.4	21.6	0	0	0	0	0
Baghelkhand	0	0	100	0	0	0	0	0	0

Source: IHDS II, 2011-12

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[7]Tiwary, Rakesh, and Sanjiv J. Phansalkar. "Dalits' access to water patterns of deprivation and discrimination." *International Journal of Rural Management*3.1 (2007): 43-67.

(ii)   Availability of Drinking Water for Different Social Groups in Purvanchal Region:

Table 3.6 shows the population share of different social groups based on sample data (IHDS II, 2011-12). OBCs have the highest population share 51.65%; General caste population is the second highest in region with 25.93%. SC, ST and others are 20.77%, 1.57% and 0.07% respectively in Purvanchal region.

Table 3.6 Percentage of Population of Different Social Groups in Purvanchal Region

Social Groups	Population (%)
General	25.93
OBC	51.65
SC	20.77
ST	1.57
Others	0.07

Source: IHDS II, 2011-12

Table 3.6 below shows the percentage of different social groups using different sources of drinking water. The SCs are mostly depended on hand pump as their main source of water which is highest (92.79%) among all other social groups. The second most available drinking water source for them is open well (5.15%). STs are worse among all others. As only 78.6% ST households have hand pump available while others depend on open well (11.69%) and other sources (pond, river etc.)

General caste have the highest percentage of households (3.61%) using piped water as the main source of drinking water as compared to others. From the table, it is clear that General and OBCs have many sources of drinking water available as compared to SCs, STs and others. Among OBCs, 87.61% of households use hand pumps. While 5.51% of households use open well for drinking water. However, they have the highest proportion of households having tube well as a main source of drinking water. Such pattern of OBC households using different sources of drinking water shows that within OBCs, there is huge inequality as not all OBCs are landed and rich. Thus, the landed OBCs who are mostly dominant caste in UP (esp. in Purvanchal) can affords to have piped and tube well as their main source of drinking water while other OBCs who are poor mostly depend on hand pump and open well as their main source of drinking water.

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Table: 3.7 Main Source of Drinking Water for Different Social Groups in Purvanchal Region

Social Groups	Main Source of Drinking Water				
	Piped	Tube well	Hand Pump	Open well	Others
General	3.61	3.2	90.8	1.97	0.42
OBC	1.49	5.21	87.61	5.15	0.54
SC	1.84	0	92.79	5.37	0
ST	0	0	78.6	11.69	9.71
Others	0	0	100	0	0
Total	1.98	3.49	89.37	4.66	0.5

Source: IHDS II, 2011-12

(iii)   Location of Main Source of Drinking Water in Purvanchal Region:

Table 3.8 Main Source of Drinking Water Located Inside and Outside Compound in Purvanchal region

Social Groups	Location of Main Source of Drinking Water	
	Inside	Outside
General	52.3	47.7
OBC	43	57
SC	25.72	74.28
ST	39.57	60.43
Others	100	0
Total	3.49	59.36

Source: IHDS II, 2011-12

The gap between percentage of SC and ST households having main source of drinking water inside and outside compound is huge i.e. 48.56 and 20.86 percentage points respectively. It shows that the distance to main source of drinking water for SCs and STs is much greater as compared to General and OBCs. Only among General households, 52.3% have their main source of drinking water inside compound which is highest as compared to others. While majority of the other social group have their main water source located outside compound.

3.2.3 Availability and Accessibility of Drinking Water in Sonbhadra District:

In this section of data analysis, the accessibility and availability of drinking water is analysed for Sonbhadra District and comparing it with Uttar Pradesh.

(i) Availability of Drinking Water Sources in Sonbhadra District:

As we have already seen that the major proportion of households across different social groups are dependent on Hand pump as the main source of drinking water as compared to other sources of water. In the graph given below, 79.25% of SC households uses hand pump which is slightly higher than the state average. The opposite pattern is seen for the other sources of water where in Sonbhadra district, the proportion of SC households using sources of water other than hand pump is slightly lower than the state average.

Fig. 3.2 Main Source of Drinking Water for SC Households, Sonbhadra and Uttar Pradesh, 2011
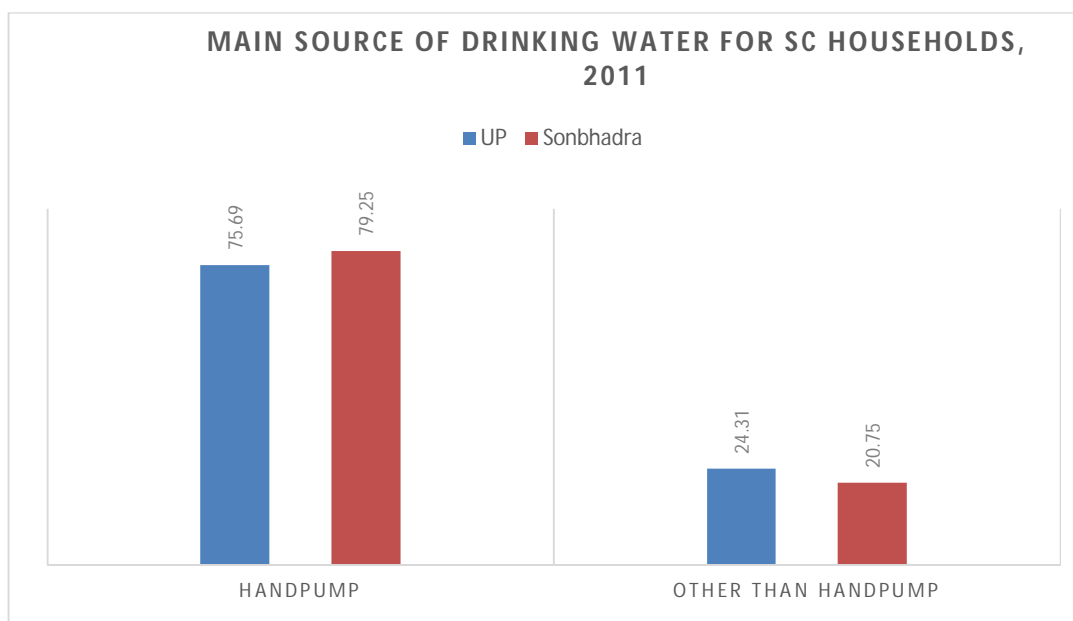
Source: Census of India, 2011

(ii) **Measuring Dependency on Different Sources of Drinking Water in Sonbhadra and Uttar Pradesh:**

To measure the dependency on different sources of drinking water, specialization index is calculated. Specialization Index (Sij), adopted from Amitabh Kundu, (1991)[8] is used for analysing dependency on different sources of drinking water. The index Sij for the ith fractile and jth source of drinking water may be written as follows:

Sij = {(Person in ith fractile using jth source) / (All person using jth source)} / {(Person in the ith fractile) / (All persons)}

From Table 3.9, it is shown that generally SCs are more dependent on hand pump than other sources as compared to non SC households in both Sonbhadra and Uttar Pradesh. The higher the value of index, higher is the dependency. There is huge difference in case of tube well for both SC and non-SC households which indicate that non-SC have better accessibility to tube well than SC households. Thus, SC households obtain drinking water from the sources which is not as reliable, hygienic as treated tap water and tube well.

Table: 3.9 Specialization Index (Sij) for SC and Non-SC Households

State/District	Specialization Index							
	Treated Tap Water		Hand Pump		Tube well		Others	
	SC	Non-SC	SC	Non-SC	SC	Non-SC	SC	Non-SC
Sonbhadra	0.8	1.07	1.13	0.96	0.4	1.21	0.09	1.31
Uttar Pradesh	0.88	1.04	1.03	0.99	0.45	1.19	0.56	1.15

Source: Census of India, 2011

(iii) **Accessibility to Drinking Water Sources in Sonbhadra District:**

The accessibility of drinking water sources within, near and away premises in Sonbhadra district and Uttar Pradesh is shown in the graph below. The proportion of SC households having access to drinking water within premises is slightly better than the state average. However, the proportion of total SC households having access to drinking water near and away premises is lower than the state average.

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[8] Kundu, Amitabh. "Micro Environment in Urban Planning: Access of Poor to Water Supply and Sanitation." *Economic and Political Weekly* 26, no. 37 (1991): 2167-171.

However, the picture becomes clearer when we look at accessibility of drinking water sources within SCs and Non-SCs households. In Sonbhadra, only 11.72% of total SC households have access to drinking water within their premises as compared to 25.16% of Non-SC households.

The condition becomes clearer when we compare Sonbhadra with state average. In Uttar Pradesh, 35.12% of SC households have access to water within their premises while 57.01% of Non-SC households which is much higher than Sonbhadra district.

Fig. 3.3 Location of Main Source of Drinking Water, Sonbhadra and Uttar Pradesh,

LOCATION OF MAIN SOURCE OF DRINKING WATER, SONBHADRA AND UTTAR PRADESH, 2011
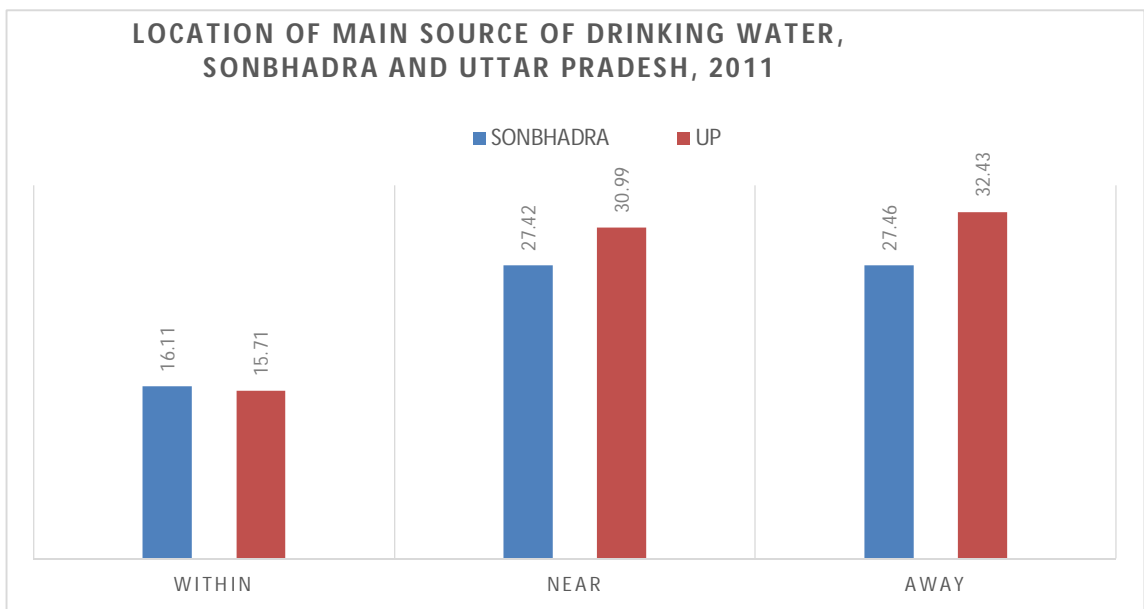
2011

Source: Census of India, 2011

Fig. 3.4 Location of Main Source of Drinking Water for Different Social Groups, Sonbhadra and Uttar Pradesh, 2011

LOCATION OF MAIN SOURCE OF DRINKING WATER FOR DIFFERENT SOCIAL GROUPS, SONBHADRA AND UTTAR PRADESH, 2011
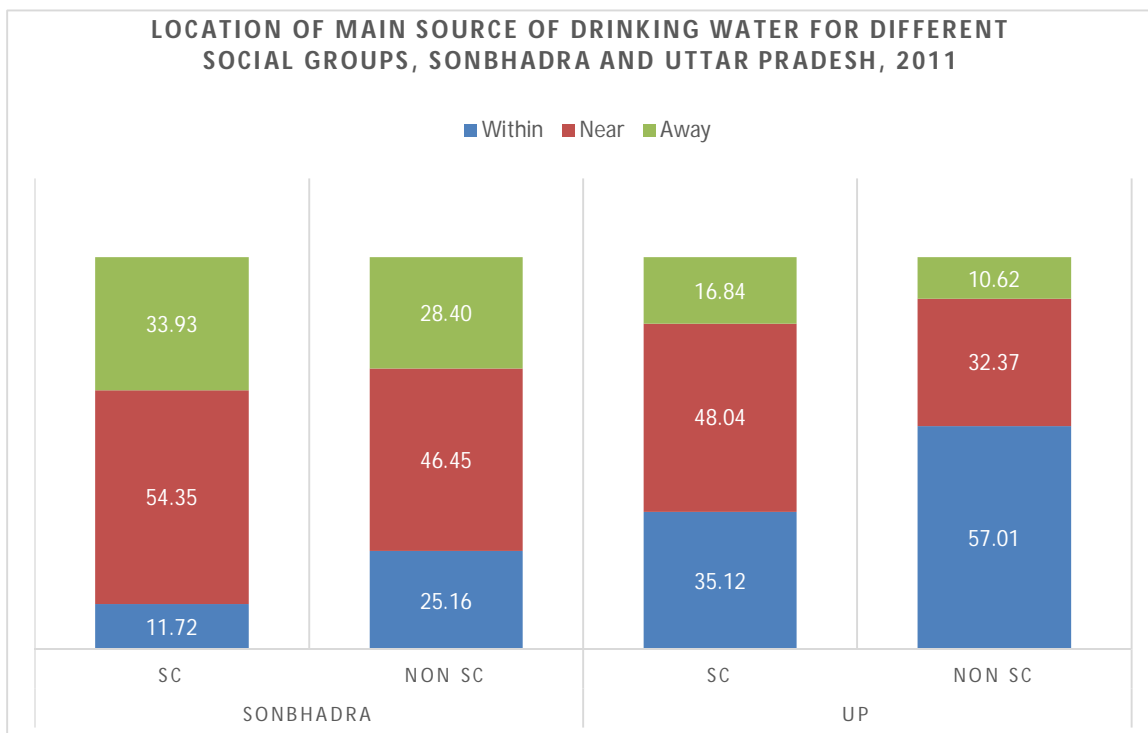
Source: Census of India, 2011

Conclusion:

After analysing the available secondary data on drinking water, it is found that first, majority (73.18%) in Uttar Pradesh uses hand pump as their main source of drinking water. While, treated piped water is the second main source of water i.e. 13.06% of total households. Second, as defined by WHO, improved sources of water is available to only 12.51% SC and 15.42% non-SC. This shows that the majority is still dependent on unimproved sources of water in Uttar Pradesh. Third, the location of main source of drinking water shows huge inequality among SCs and non-SCs households. 48.75% of non-SC households have their main source of water within premises while only 51.43% of SC households have their source of drinking water near premises. Fourth, in Purvanchal region, 90.69% of total population uses hand pump as their main source of drinking water and 7.06% (second largest) of total population are dependent on open well as their main source of drinking water. Fifth, SC and ST households are more likely to have their main source of drinking water

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outside compound in Purvanchal region which is opposite for General and OBC caste groups. Sixth, in district Sonbhadra, the dependency measured by calculating specialization index shows that SC households are more dependent on hand pump than other sources of drinking water while, non-SC households are more dependent on tube-well.

Thus, it is clearly showing that there persists huge inequality in availability and accessibility to drinking water among different social groups. SCs and STs among others mostly depend on hand pump and open well as their main source of drinking water while General and OBCs have more options available such as piped water and tube wells. There also persists huge inequality in location of main source of drinking water. SCs have their source of drinking water mostly located in near and away premises. However, the main source of drinking water for non-SC households is mostly located within premises.

However, these findings are limited in order to present the depth of the problem. The distance to main source of drinking water as shown by numbers often fails to explain caste, gender and class based water relations which affect accessibility to water sources. As discussed in first chapter, the gendered relations at household level might change with nearer water points. This does not mean that the reduced distance is not good, but it is certainly requires to address these complex relations to get the clear picture of water scenario in villages. Also, the nearest water source available to SC households does not mean it is accessible to them. These issues especially in studying drinking water accessibility become prominent in influencing the accessibility to available sources of drinking water.

An Analysis of Drinking Water Availability and Accessibility in Sonbhadra District

<div style="float:right; border:1px solid black; padding:8px;">**4**</div>

4.1 Introduction:

This chapter is based on the field study of two villages in Sonbhadra District in Uttar Pradesh. Primarily the selection of these villages is made after analysing the available secondary data; Sonbhadra rank's first for having better availability but worst accessibility (See chapter 1). This result is intriguing as it indicates that making water sources available does not necessarily make it accessible to everybody. This poses many questions such as how drinking water is being allocated, how to make it more accessible to people rather than just focussing on number of water sources. It also creates space for researchers to integrate both qualitative and quantitative methods of analysis to have better understanding of any existing water problem.

The primary focus of this chapter is to analyse the availability and accessibility to drinking water in two villages of Sonbhadra, based on primary data collected in the month of March 2018. This chosen time period, which is approaching summer, provided a window to see water problem very closely as well as increasing emotional burden, panic and anxiety of what is coming?

4.2 A Brief Background of Villages:

The two villages studied for this research are Kushmha and Orgai which is 10 kms and 12 kms away from Roberstganj block respectively. And, the distance between these villages is about 5 kms. Robertsganj is the district headquarters of Sonbhadra which is situated in the upper central part of the district. This region faces drinking water shortage mainly in summer season. Since, the region is hilly and rocky; the ground water level has declined significantly. However, studies (refer to cgwb.gov.in) suggests that Robertsganj block compared to other blocks in the district has much better availability of ground water. And, again it is interesting to find out as to why there is huge inequality in access to drinking water in these villages even after having much better availability in relation to other part of the region. We will explore in this study that how this recent and 'new' problem of water scarcity faced by people in Robertsganj has created conditions for control, use and access to drinking water while

other region (e.g. Dudhi block) have been dealing with acute water shortages for quite some time.

4.2.1 Kushmha Village:

Kushmha village, according to Census of India, has total population 2746 and 496 households. Out of which, general population is 1999 (72.80%), Scheduled Castes (SCs) 742 (27.02%) and Scheduled Tribes (STs) 5(0.18%). In this village, there are around 25-30 households of Muslims. This is the largest villages in this block in terms of population and area. The major source of surface water is canal coming from Dhandhraul dam (23 km away from Robertsganj) which is mainly used for irrigation purposes. Hence, ground water becomes the major source of drinking water accessed mostly through hand pumps, and then wells and even submersible pump owned by 3-4 households.

In Kushmha village, total 80 households were surveyed. Out of which 6 general castes (Pandey, Tripathi , Sharma and Chobey), 44 OBCs (Anasari, Chaurasia, Chandrabanshi/Prajapati, Maurya/Kushwaha, Yadav, Sonar, Gupta,) and 30 SCs households (Koli, Paswan, Dusad and Chamar)

The table below shows the percentage of population (surveyed) of different caste groups based on multi-level stratified sampling. The percentage of population of General OBC and SC are 25.93%, 51.65% and 20.77% respectively based on IHDS sampling. The difference in population share of General and SC is huge. In these villages, there are very few upper caste (both Brahmins and forward caste) as most of the members of these families migrate to other states for education, job etc. (as reported by a member of Tripathi family). Thus, the number of households of upper caste remains more or less same as it was decades before. While, number of SC and OBC households has increased over time.

Table 4.1 Number of Households Surveyed in Kushmha Village:

Caste Groups	Number of household surveyed	Percent
General	6	7.5
OBC	44	55
SC	30	37.5
Total	80	100

Field work carried out in March 2018

There are total 75 hand pumps (introduced first in 1995) in the village (out of which 69 are mapped) and more than 100 wells mostly found inside their homes. Interestingly, only one community well is in the 'harijan basti'[1] and 2-3 wells in the outskirts which mostly Yadav and few Paswan households use for drinking purposes. There are 4 ponds in the village out of which only one has water and the other two are already dried up at the time I visited there. Villagers also have 5-7 *Baulis*[2] in which they store rain water.

Table 4.2 Name of Caste of Surveyed Households in Kushmha Village:

Name of Caste	Number of households surveyed	Name of Caste	Number of households surveyed
Ansari	10	Paswan	10
Chandrabanshi	6	Sharma	1
Chaurasia	9	Sonar	3
Gupta	4	Chobey	2
Chamar	14	Tripathi	1
Kushwaha	4	Yadav	2
Maurya	6	Koli	4
Dusad	2	Total	80
Pandey	2		

Field work carried out in March 2018

The village is divided into 13 wards represented by different caste group's[3] households. Each ward has their elected representatives.

Ward 1: Koli, Chaurasia, and Paswan

Ward 2: Sharma, Chandrabanshi, Pandey, and Kushwaha

Ward 3: Maurya (Kushwaha), Brahmin (Pandey and Tripathi)

Ward 4: Sonar, Kushwaha, and Chaurasia

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[1] Name used by villagers to denote the locality where the Dalits (SCs) lives.
[2] Villagers dig small ponds of around 5-6 meters diameter to store rain water during monsoons and use it mainly for irrigation and livestock purposes.
[3] General caste includes Brahmins (Pandey, Chobey, Tripathi) and Thakurs; Other Backward Castes (OBCs) includes Chaurasia, Sharma, Chandrabanshi, Kushwaha/Mauryas, Sonar and Yadavas , Scheduled Castes (SCs) includes Dalits (*harijans),* Paswans and Dusads

Ward 5: Paswan and Dusad

Ward 6: Muslims (Ansari), Chobey, and Chaurasia

Ward 7: Pandey, Yadav, and Sharma

Ward 8: Kushwaha

Ward 9: Kushwaha

Ward 10: Kushwaha

Ward 11: Kushwaha, few Paswan, Pandey, and Chaurasia

Ward 12: Chamar

Ward 13: Chauhan, Yadav and Chamar.

Table 4.3 shows the main source of income of surveyed households in Kushmha village. The main sources of income are agricultural labor, farmer and non-agricultural labor (construction work) in Kushmha village. The occupation such as teacher, auto rickshaw drivers have been included in others category.

Table 4.3 Main Source of Income in Kushmha Village

Main Source of Income	Number of household surveyed	Percentage of households
Agricultural Labor	22	27.5
Artisan/ Independent Work	3	3.8
Farmer	15	18.8
No Income	1	1.3
Non-agricultural Labor	33	41.3
Others	1	1.3
Pension	1	1.3
Petty shop/ Small Business	2	2.5
Retired	1	1.3
Unemployed	1	1.3
Total	80	100

Source: Field work carried out in March 2018

4.2.1.1 Spatial Distribution of Caste Groups:

The village is well segregated on the basis of caste (as shown in Map 4.1). The morphology of village can be said to be the clear manifestation of integration of social order into spatial order. The directional aspect of the morphology is also strictly following the Hindu cosmological scheme where everybody has their 'assigned' place.

The central part of the village near old temple (*Maa Kushmeshwari Devi)* is occupied by four Brahmin (Pandey and Tripathi) households. Kushwaha, Sharma, few Paswan are in the same locality. Gupta, Chaurasia and Sonar are in the back side of temple. The western part of the village is occupied by big landowning castes (mostly Kushwaha and one Thakur family) which is nearest to canal. Muslims and OBCs (Sharma, Gupta, Chaurasia and Sonar) have taken the eastern part of the village. The northern part of the village is dwelled by Chaurasia and Koli where households are in sporadic manner. And, lastly, the southern part is allotted to Chamar.

Map 4.1 Kushmha village boundary showing different wards and location of hand pumps
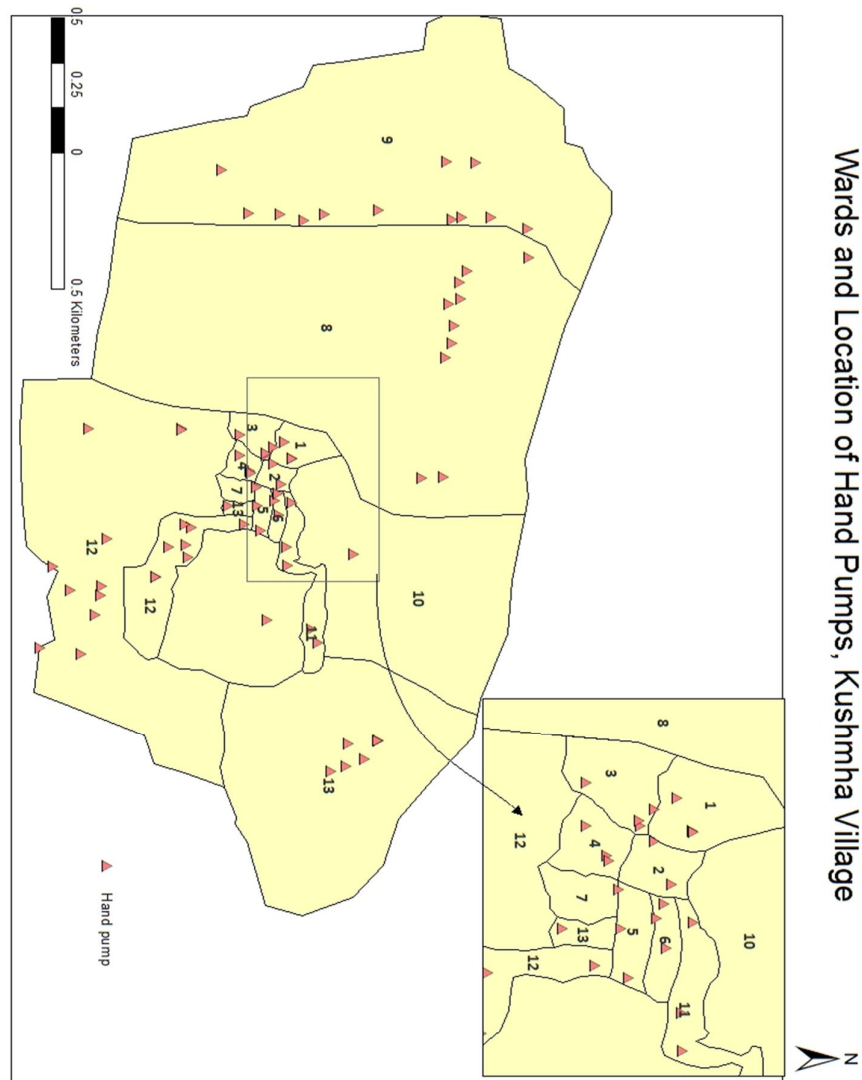
Source: Field work carried out in March 2018

4.2.2 Orgai Village:

Orgai village has a total population (according to Census of India) of 1178, out of which General, SCs and STs are 946, 227 and 5 respectively. There are 212 households.

Table 4.4 Number of Households Surveyed in Orgai Village:

Caste Groups	Number of household surveyed	Percent
General	5	12.5
OBC	25	62.5
SC	10	25
Total	40	100

Source: Field work carried out in March 2018

Table 4.5 Name of Caste of Surveyed Households in Orgai Village:

Name of Caste	Number of households surveyed	Name of Caste	Number of households surveyed
Chauhan	5	Maurya	10
Dusad	2	Paswan	2
Gupta	3	Patel	5
Chamar	6	Thakur	2
Jaiswal	1	Tripathi	3
Kushwaha	1	Total	40

Source: Field work carried out in March 2018

The village has only 15 hand pumps, around 100 *nals*[4] installed personally long before mostly inside households. There are 30-40 wells mostly on the farm lands owned by landowners (Chauhans, Maurya/ Kushwaha and few Patel households). There are 4 ponds already dried up during the visit. Only one pond was filled with water using submersible pump by one of the Chauhan family who has taken pond on *theka*[5]. In this village, unlike kushmha, many households have access to submersible

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[4] Small hand pumps 50-70 m deep usually installed by villagers themselves in their houses to access ground water. The installation charge is around Rs. 10,000.
[5] On lease

pumps with thick black pipes, wells with mono-block motor mostly owned by landowning caste[6] in the village.

The village is divided into 7 wards:

Ward 1: Chauhan

Ward 2: Chauhan

Ward 3: Maurya, Gupta, Jaiswal

Ward 4: Paswan, Patel, Kushwaha

Ward 5: Dusad

Ward 6: Chamar

Ward 7: Maurya

Table 4.6 shows the main source of income of surveyed households in Orgai village. The main sources of income are agricultural labor, farmer and non-agricultural labor (construction work) in Orgai village.

Table 4.6 Main Source of Income in Orgai Village

Main Source of Income	Number of household surveyed	Percentage of households
Agricultural Labor	13	32.5
Farmer	17	42.5
Non-agricultural Labor	9	22.5
Salaried Employment	1	2.5
Total	40	100

Source: Field work carried out in March 2018

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[6] Chauhans and Kushwahas/Mauryas (OBCs)

Map 4.2 Orgai village boundary showing different wards and location of hand pumps
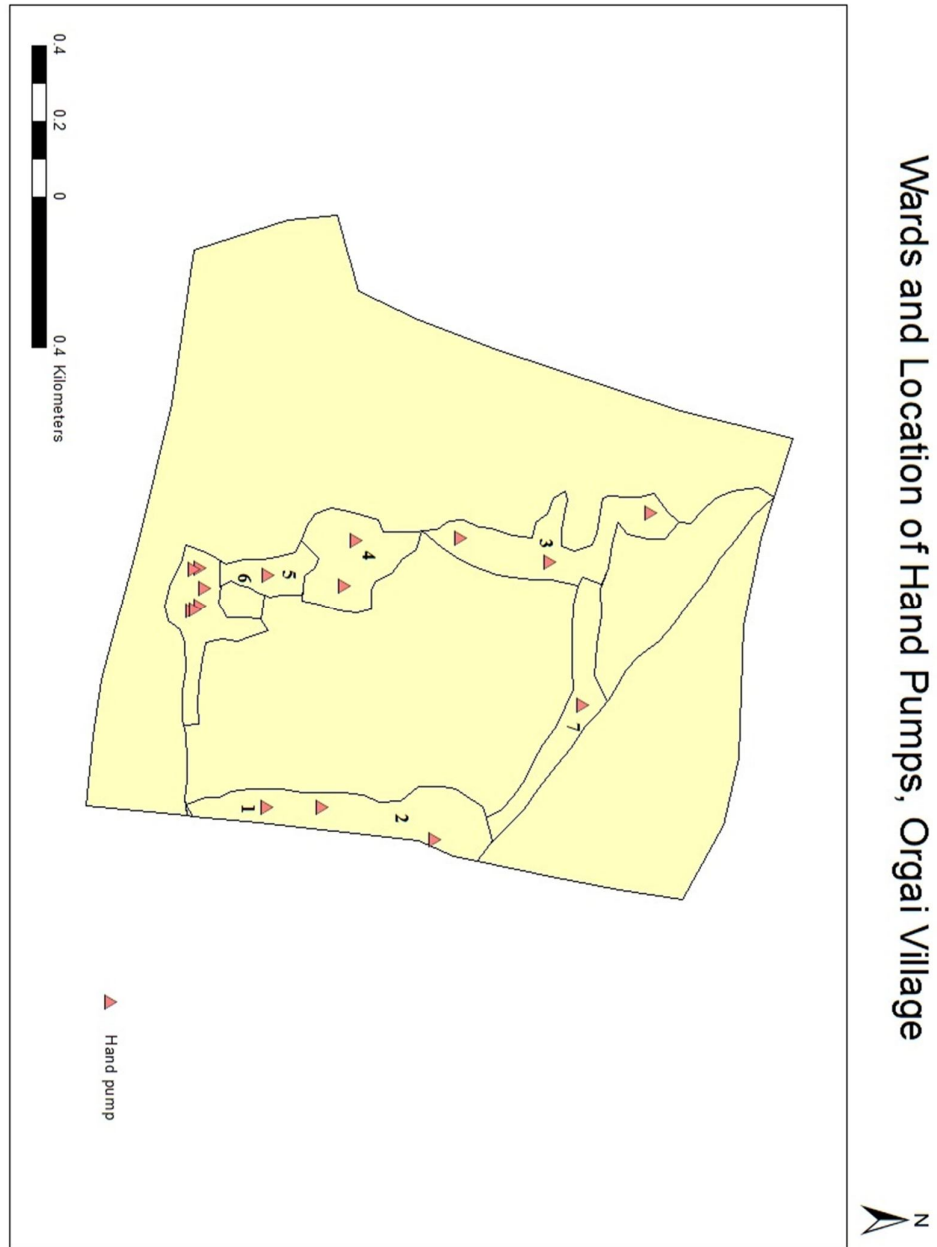
Source: Field work carried out in March 2018

4.3 Analysis:

In this section, first, a comparative analysis is done based on primary data collected of 80 households covered in Kushmha village and 40 households covered in Orgai village. Second, analysis based on hand pump location and related information collected about hand pumps such as functionality, density of hand pumps, water availability in hand pumps in different seasons etc. In some cases both are used for explaining the pattern of availability and accessibility to water.

4.3.1 Availability of Drinking Water Source:

   a) Main Source of Drinking Water:

The main source of drinking water for the majority of population in both the villages remains hand pump (Kushmha almost 80% and Orgai 60% of the total surveyed households). In Kushmha village, there are around 70-75 hand pumps available which are installed in every 75-100 meter distance, hence, majority of the surveyed population have access to these hand pumps. While, in Orgai, there are only 15 hand pumps installed. So, the population dependent per hand pump in Orgai is much higher than in Kushmha village (i.e. In Orgai 79 persons per hand pump and in Kushmha, 37 persons per hand pump). This shows more skewed distribution as not every hand pump shares the same burden. Few hand pumps mostly located in the area where SCs and OBCs live, there is much more crowd as compared to Brahmins, and land owning caste's area.

In Kushmha village, near the canal area where Kushwahas/ Mauryas[7] live, have much better access to hand pump as it has water almost all year due to better ground water recharge. Most of these households have their own personal hand pumps installed. The Brahmins of the village (only 5-6 households)[8] also have hand pump installed just in front of their houses with limited access to other households. The number of

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[7] These land owning castes have migrated from Bihar for better job opportunities in 1965. Robertsganj block which was industrializing at fast pace attracted mostly OBCs to immigrate and settle down in these villages. There are almost 1500 villages in this block. Since, the villages in Purvanchal region are mostly compact in nature; migrants are not allowed to disturb the central/main part of the village. Hence, they settled down in the outskirts of the village area and brought land from upper caste (mostly Brahmins) and started doing agriculture.

[8] The villages in Purvanchal region of Uttar Pradesh are mostly undisturbed by external factors such as migration. Hence, the families who are staying there in village have been staying since past 100 years. The increase in their population is mostly because of increase in family members and their households. Since, Brahmins have better access to education and jobs outside; their children have migrated to other cities, states for better life. Hence, the population of Brahmins remained almost same.

hand pumps available to other communities such as Chaurasia, Chamar and Muslims is very less as compared to other communities in the village.

Very few percentage of population has access to more than one source of drinking water available to them. In Kushmha village, community well and personal well is the second and third most available main source of drinking water. Water is well is usually dried up as the summer approaches. At the time of my visit, almost all wells were dried up and filled with garbage which is not at all permissible to drink. However, few households (Chaurasia and Sonar), the lane just behind the Brahmins, there is no hand pump; hence, they use these community wells. These women wake up early in the morning to take out water from the well and then wait for next 7-8 hours for water to come up little bit and then these women again continue their work.

Table 4.7 Main Source of Drinking Water, Kushmha Village

Main Source of Drinking Water	Number of Households	Percent
Hand Pump	65	81.3
Hand Pump, Pond	1	1.3
Hand Pump, Small Handpump	3	3.8
Hand Pump, Small Handpump, Well (Owned)	1	1.3
Small Handpump	1	1.3
Well (Community)	7	8.8
Well (Owned)	2	2.5
Total	80	100.0

Source: Field work carried out in March 2018

What makes accessibility to drinking water more complicated as these water points are used for bathing, washing utensils and clothes and other household purposes along with drinking water. Hence, the water collection is done in several trips and every time they take water to their homes is used for all these activities. Therefore, it is difficult to analyze trips exclusively for drinking water. Moreover, they collect water in buckets, so, at the crowded water points, they could only take 3-4 buckets at a time. This becomes more restricted as the water level goes down in summer season. Hence, drinking water collection is not limited to only 2-3 trips.

Fig. 4.1 Main Source of Drinking Water, Kushmha Village

Main Source of Drinking Water in Kushmha Village, Sonbhadra
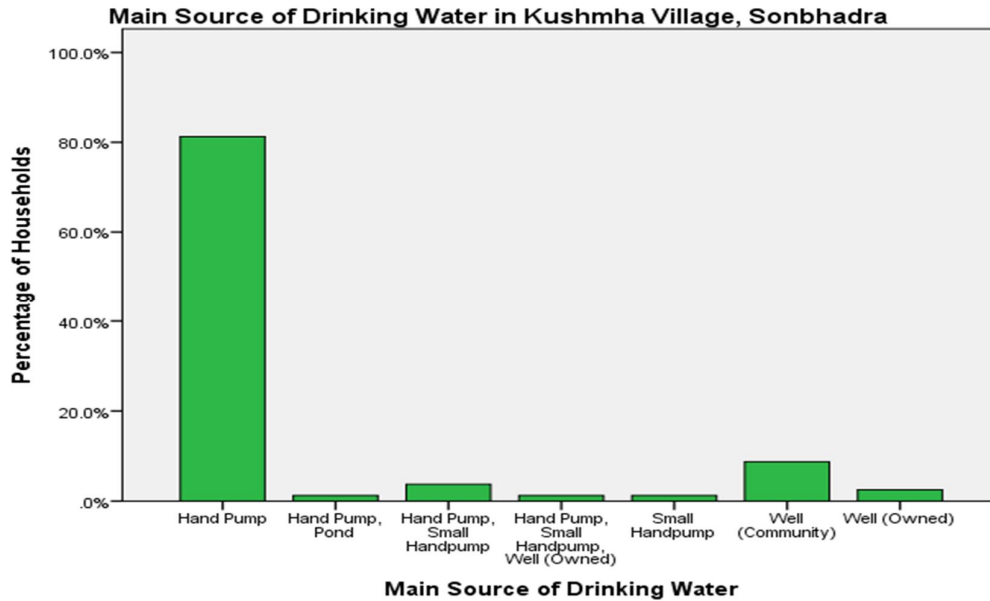
Source: Field work carried out in March 2018

There is only one pond filled with water which is near Temple and Masjid used by mostly these Chaurasia families, Chamar and Muslims living near the pond. They use this water for other purposes but when there is huge crowd or conflict at their water point, they have to use pond water for drinking purpose as well. However, this is also being made restricted to these people, which will be discussed in the next chapter.

In Orgai village, however the water scenario is different as compared to Kushmha village. In this village, out of 15 hand pumps only 2 hand pumps serves the majority of population which comprises of Chamar, Paswan, Dusad, Patels, Gupta and Jaiswals. The other hand pumps (which are functional) are mostly owned personally or installed using personal relations with Sarpanch (current Sarpanch of Orgai is Chauhan), or *vidhayak quota* or *Jal nidhi* government policy (discussed in detail in the latter part of this chapter).

Map 4.3 Map Showing Number of Household Served at each Hand Pump, Kushmha Village
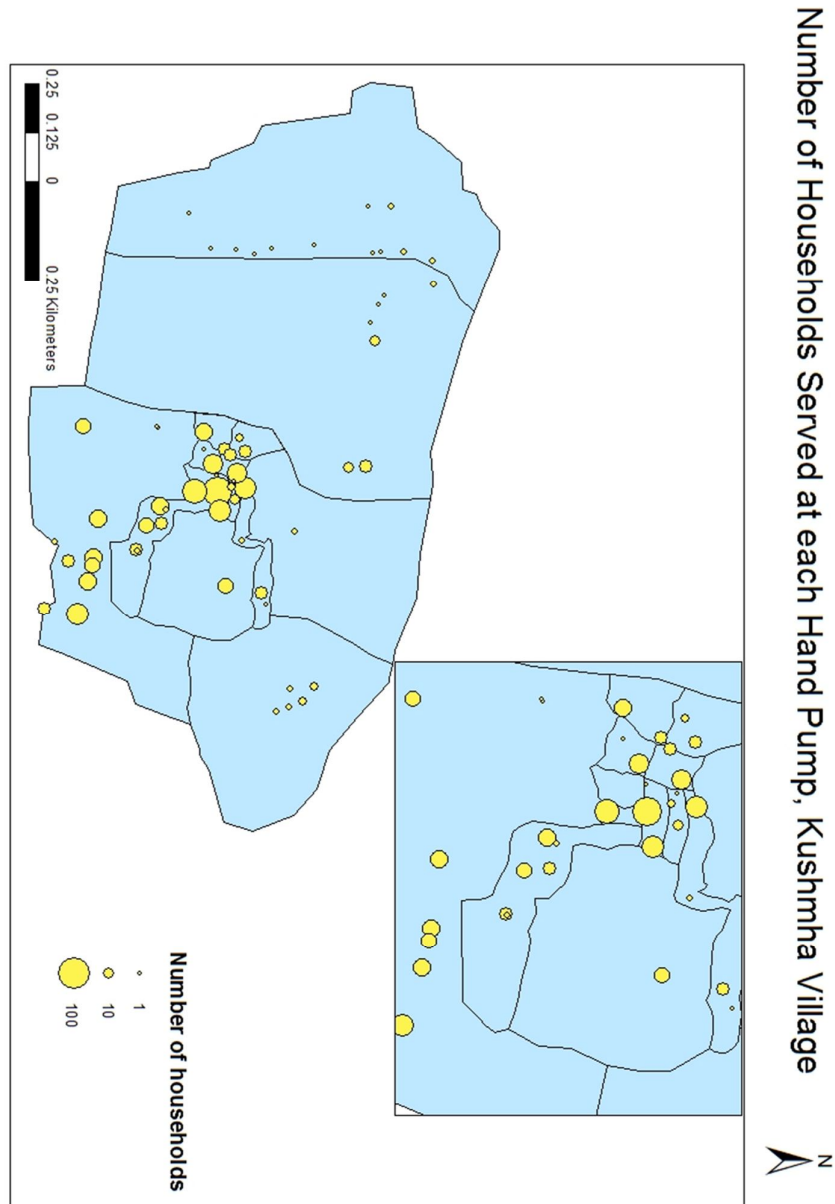
Source: Field work carried out in March 2018

The second major source of drinking water in this village is submersible pump and well with mono-block pump. The village was enveloped with thick black pipes and well with motors mainly on farm lands strictly protected by constructing wall and locking it up.

Interestingly, the Dhandhraul dam which is 23 Kms away from Robertsganj is nearer to Orgai village than Kushmha. The village which is more nearer to the dam has better ground water level as compared to the villages at distance from the dam. Hence, in Orgai, the water level present below ground is better than Kushmha. But, what makes it more complicated and sometimes mysterious is that the water level is unevenly distributed hence, not everyone in Orgai has better water level in the ground as compared to Kushmha. There were few cases, where the household could afford to install hand pump (either personally or sharing the cost among families or even community), but due to unavailability of water even at 250 ft, they could not access ground water as easily as those who found water just below 75-100 ft.

Table 4.8 Main Source of Drinking Water, Orgai Village

Main Source of Drinking Water	Number of Households	Percent
Hand Pump	24	60.0
Handpump with Submersible	2	5.0
Handpump with Submersible, Pond, Well (Owned), Well with Mono-Block	1	2.5
Small Handpump	2	5.0
Small Handpump, Well with Mono-Block	1	2.5
Submersible Pump	6	15.0
Submersible Pump, Well with Mono-Block	1	2.5
Well with Mono-Block	3	7.5
Total	40	100.0

Source: Field work carried out in March 2018

Fig. 4.2 Main Source of Drinking Water, Orgai Village

Main Source of Drinking Water in Orgai Village, Sonbhadra
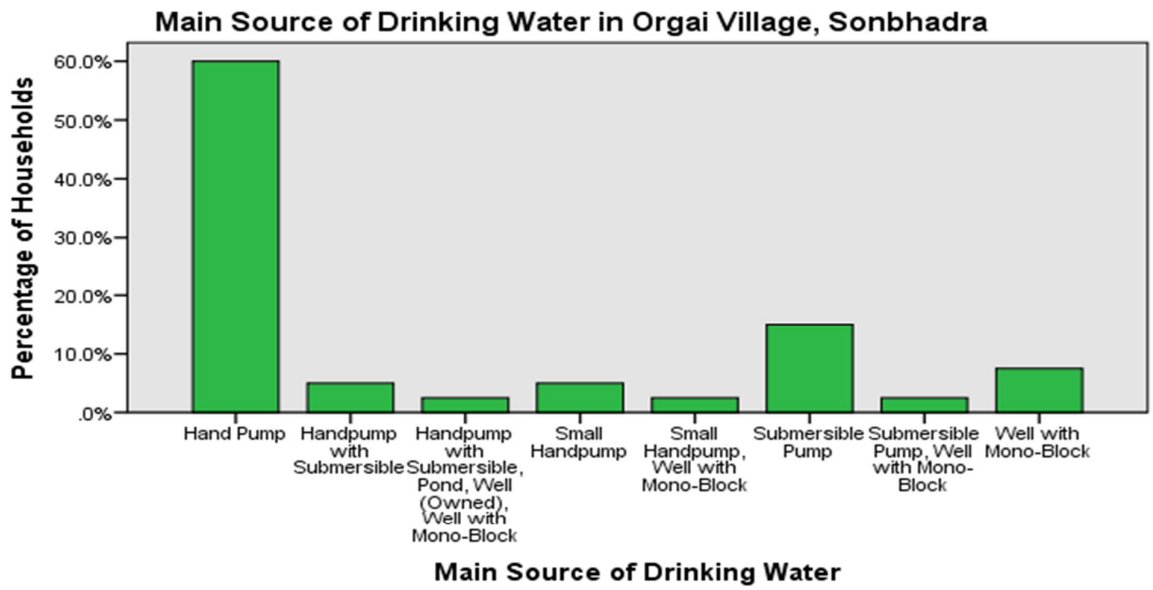
Source: Field work carried out in March 2018

Map 4.4 Map Showing Number of Household Served at each Hand Pump, Kushmha
Village
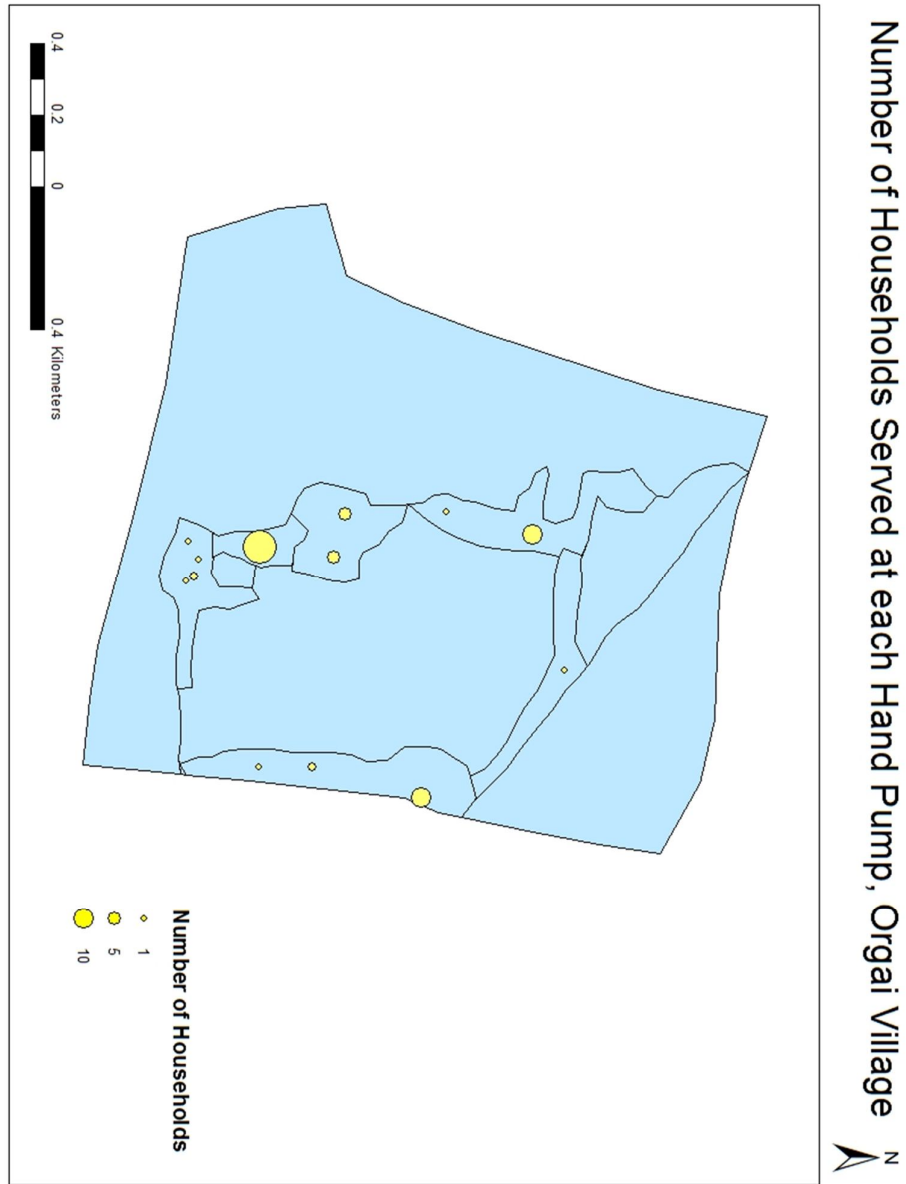
Source: Field work carried out in March 2018

Map 4.5 Map Showing Busy and Free Hand pumps, Kushmha Village

Source: Field work carried out in March 2018

Map 4.6 Map Showing Busy and Free Hand pumps, Orgai Village

Source: Field work carried out in March 2018

b) Alternative Sources of Drinking Water:

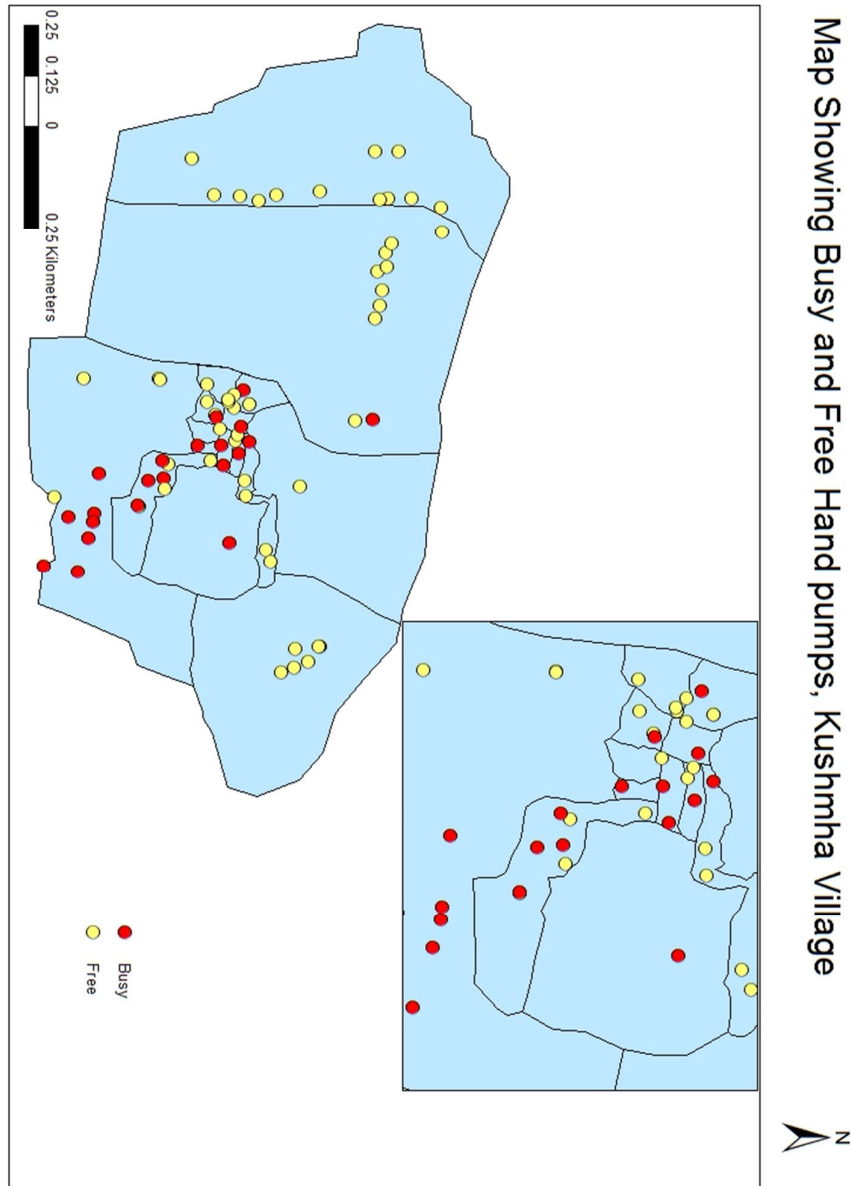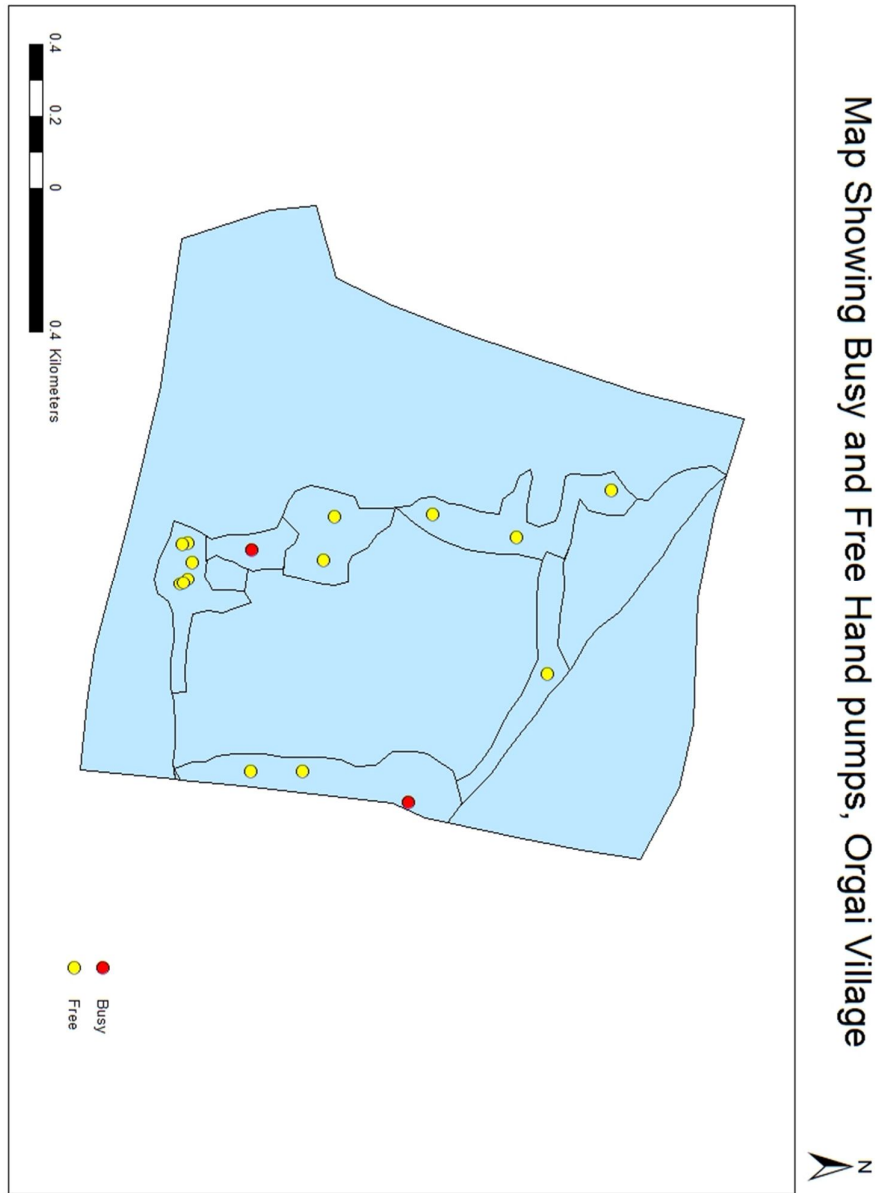In both the villages, the scarcity of drinking water is usually experienced in summer season. Water in hand pumps leaves as the summer approaches, therefore, most of the hand pump becomes completely dry or people have to wait for few hours (in some cases days) for water level to rise. In such cases, people have to look for alternative sources of drinking water available.

In Kushmha village, hand pumps near canal area do not leave water even in summer season due to better recharge of ground water. Also, hand pumps which are installed near Brahmins' households and few OBCs are dug deep up to 150-200 ft. As when I asked, a Brahmin family that if this hand pump also dries up in summer season, a 15 year old boy replied, "if this hand pump dries up then no hand pump in this village will have water. It is dug so deep that it has water all year no matter what".

On enquiring about the depth of hand pumps in other localities such as in Chamars and Muslims and even few OBCs, these hand pumps are dug only 75-80 feet. Interestingly all these hand pumps are installed by Panchayat. Those residing near the canal rarely need any alternative source of water. And, the upper caste and well-off households (Chandrabanshi, few Sharma families) own 2-3 wells both inside their houses and on farm lands (very few). Before coming of the hand pumps (1995) in the village, they used well as their main source of drinking water. The other sources of drinking water in Kushmha are electric/mechanized pumps which is used to access canal water. Hence, Dalits, Muslims, and OBCs (except landowning castes[9]) have to depend on the next nearest hand pump available as an alternative source of drinking water.

In Orgai village, during summer season, the condition gets much worse than Kushmha village. Dalits have only one hand pump in their locality and they cannot use any other hand pump. It was reported that this particular hand pump needs to be repaired after every 1-2 months even in normal season. The other two hand pump in the same stretch that is 75m away in the locality of Jaiswals, Patels and few Kushwahas/ Mauryas (poor); also faces similar problem. These households can go at Dalit's hand pump when their hand pump is not working, however, when Dalits goes to their hand pump (unless and until there is acute shortage), they have to face conflict. Hence, in

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[9] In Kushmha, Mauryas/ Kushwahas are big land owners.

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this way, they are left with just one source of water. There is a pond near to the Dalit locality. One year ago, this pond was used by Dalits for drinking as well as for other purposes. But, this year, pond has been taken on lease by a Chauhan family based on his personal relation

Fig 4.3 Alternative Source of Drinking Water for Different Caste Groups in Kushmha Village
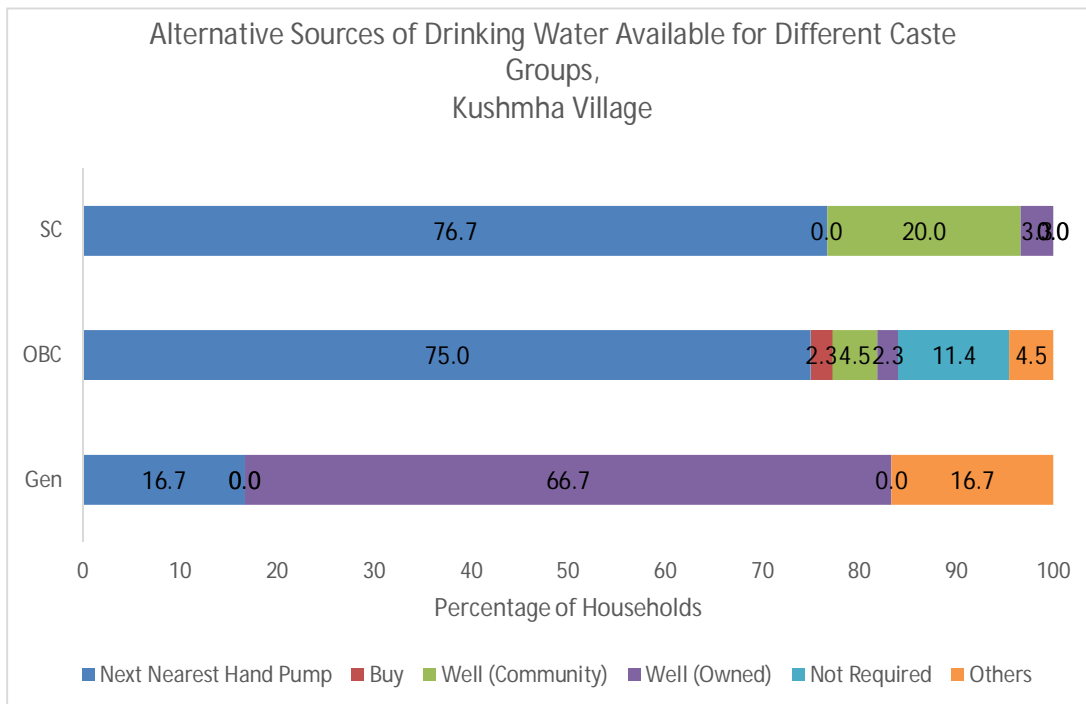
Source: Field work carried out in March 2018

with Pradhan, is now restricted to them. If their livestock drinks water from the pond by any chance, they are faced with verbal abuse. Due to huge spatial variation in the availability of ground water in Orgai which is also a case in Kushmha but made relatively better by installing hand pumps; there is more thrust over controlling water. Therefore, where ever it is possible to access ground water using submersible pumps, huge amount of water is drawn for irrigation as well as domestic purposes. Many people dig up small ponds (*Baulis)* on their land and fill it up with water using pumps and sell it at Rs 1000 per bigha. And, the price rises up as the summer approaches because (as they say) the cost of drawing water also increases. Most of the households

who have personal relationship with these submersible pump owning families (as tenants, laborers and kin) have to depend on them for their water requirements which includes drinking water as well. Many families (mostly OBCs) buy water to irrigate their small patches of land so that the livelihood security is somehow maintained.

Fig 4.4 Alternative Source of Drinking Water for Different Caste Groups in Orgai Village
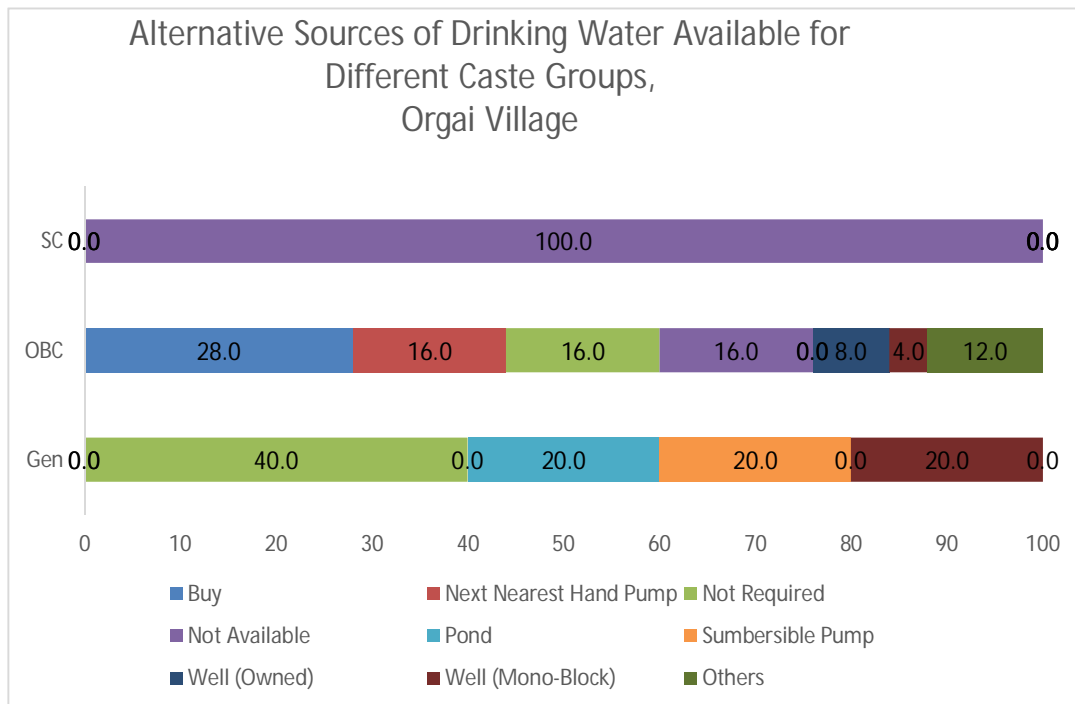
Source: Field work carried out in March 2018

During summers, as there is acute shortage of water (made worse by excessive control) due to dried up hand pumps and small wells, people buy water for irrigation and use some for drinking purposes. This way, the submersible pump owners cover their installation charges and electricity cost by selling water and in the long run, their water becomes almost free and others have to pay for it.

c) Quantity of Water Collected by Different Caste Groups:

Quantity of water available to different caste depends on factors such as crowd at water point, water availability in hand pump, more than one source of water etc. And, it differs for different social groups in both the villages.

The box plot for quantity of water used by different social groups for both the villages shows a stark difference. In Kushmha village, as reported by the surveyed households, the range for OBCs is much higher than SCs and General caste group.

Fig 4.5 Quantity of Drinking Water Fetched by Different Caste Groups, Kushmha Village
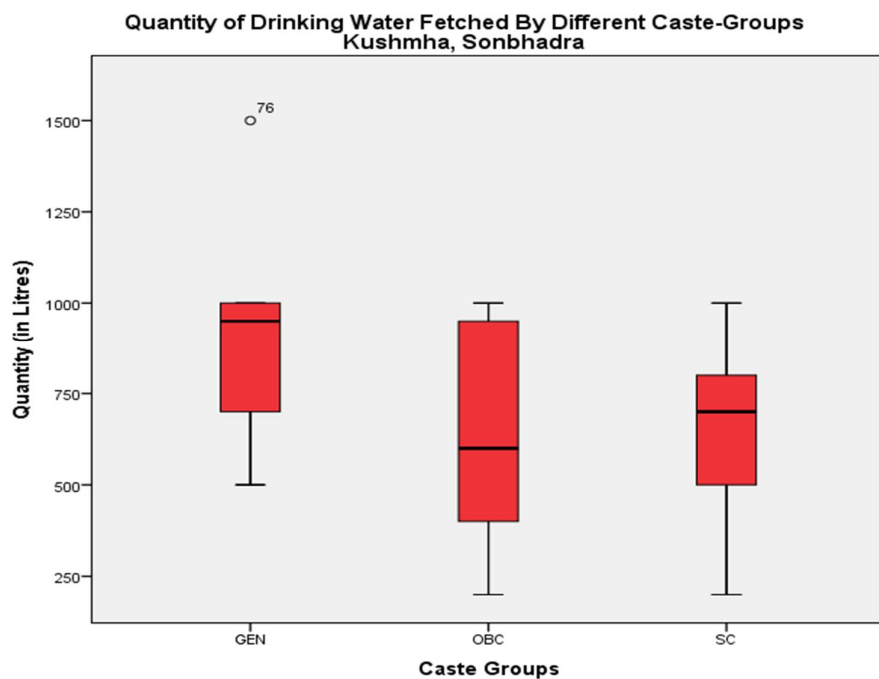
Source: Field work carried out in March 2018

Fig 4.6 Quantity of Drinking Water Fetched by Different Caste Groups, Orgai Village
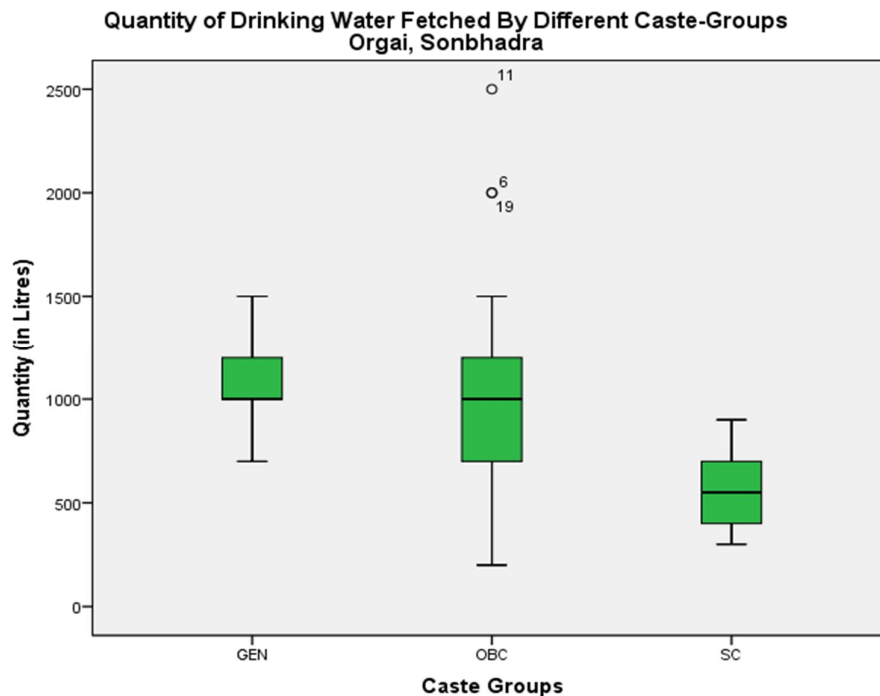
Source: Field work carried out in March 2018

This is because of the Kushwahas/Mauryas who live near canal area have access to larger quantity of water while others (mostly Chaurasia, Yadav etc.) have to be dependent on crowded hand pumps or only community wells. This similar pattern is also shown in Orgai village for OBCs (Chauhans and Kushwahas have better access and others don't). But, as it is shown in the plot (few OBC households reported they use approximately 2000-2500 liters of water), that inequality among OBCs is much higher in Orgai than Kushmha.

The available quantity of water for SCs in both the villages show smaller box as compared to others which means that majority of the SC population have access to water within smaller range of quantity which is lesser than other social groups. The condition of SCs in Orgai is more deteriorated than Kushmha due to very less number of hand pumps (only 1 in Orgai) and unavailability of any alternative source.

For General caste, the majority of population has access to 500-1500 liters of water in Orgai while 500-1000 liters in Kushmha as almost every household have more than one source of drinking water.

d) Frequency of Drinking Water Available for Different Caste Groups:

The graph shown in the next page shows the percentage of households reported availability of drinking water. In Kushmha village, 6.7% of SC households have access to water 24 hours. These are the households (family) of former Dalit Pradhan, Savitri Devi, who installed hand pump just in front of her house. This is the only hand pump got installed during her term. The other few households who have 24 hours access to drinking water is Dalit activist and his wife who works in *Aaganwadi.* They got this hand pump installed as a gift from NGO. However, other Dalit households reported that when there is no water at all then they might allow us to use their hand pumps otherwise they don't allow. Those households who said that water is available at only certain hours, they have to make several trips to get water which depends on many other factors. Some time they have to cater their water needs from two or three hand pumps or wait for the hand pump to be free or even have to wait for water level to come up.

Fig 4.6 Frequency of Drinking Water Availability for Different Caste Groups, Kushmha Village
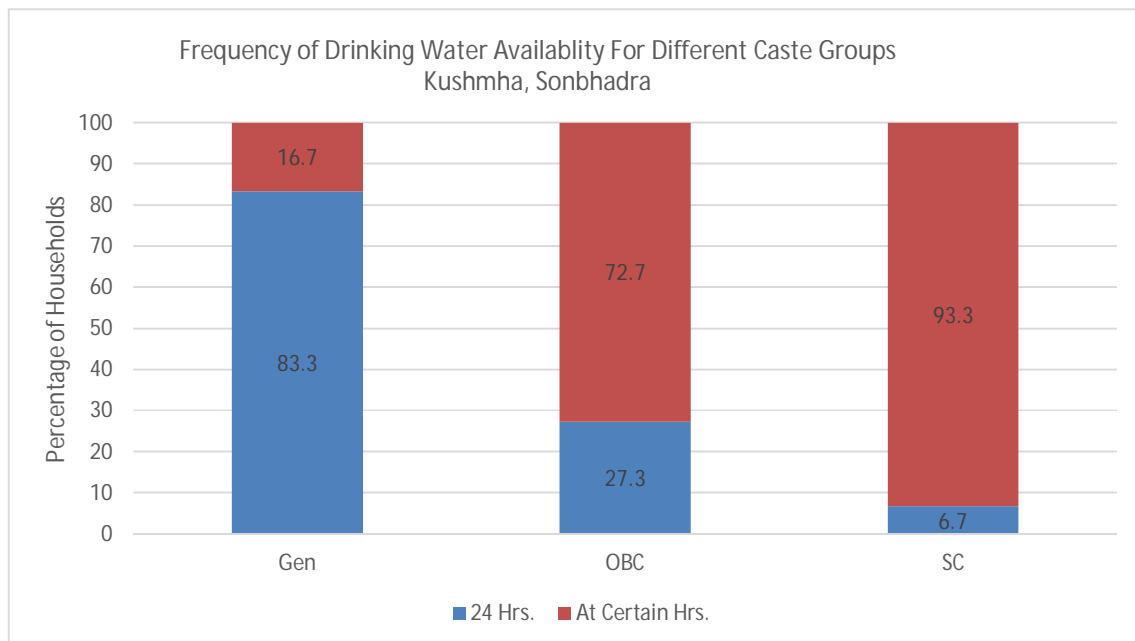
Source: Field work carried out in March 2018

Fig 4.7 Frequency of Drinking Water Availability for Different Caste Groups, Orgai Village
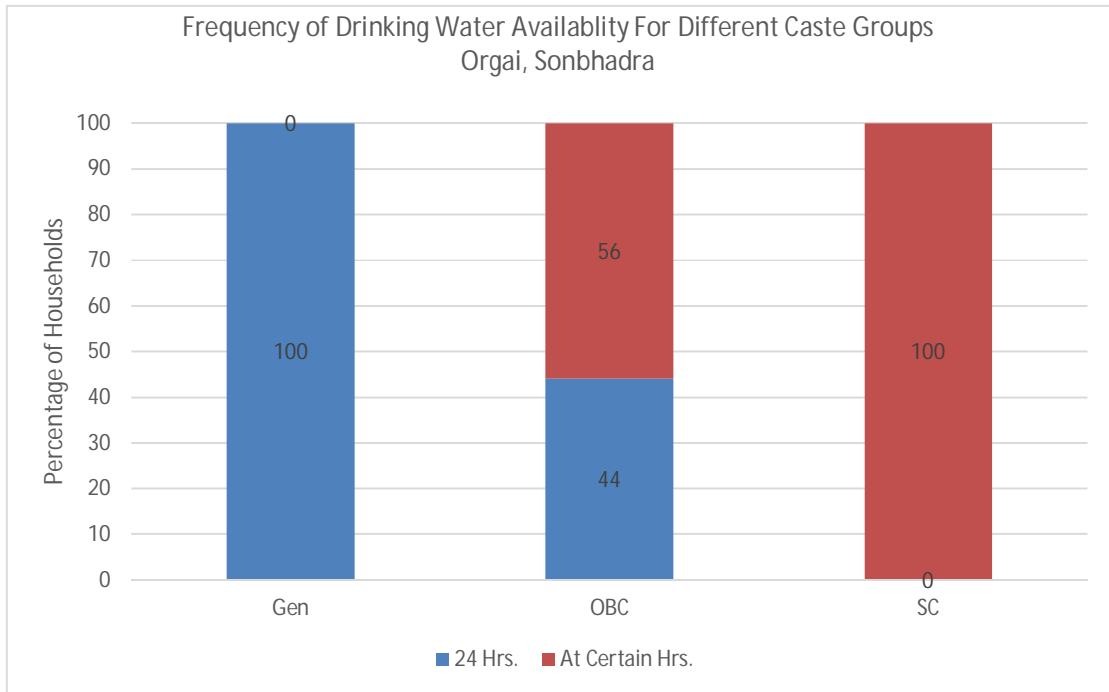
Source: Field work carried out in March 2018

Map 4.7 Water Availability in Hand Pumps, Kushmha Village
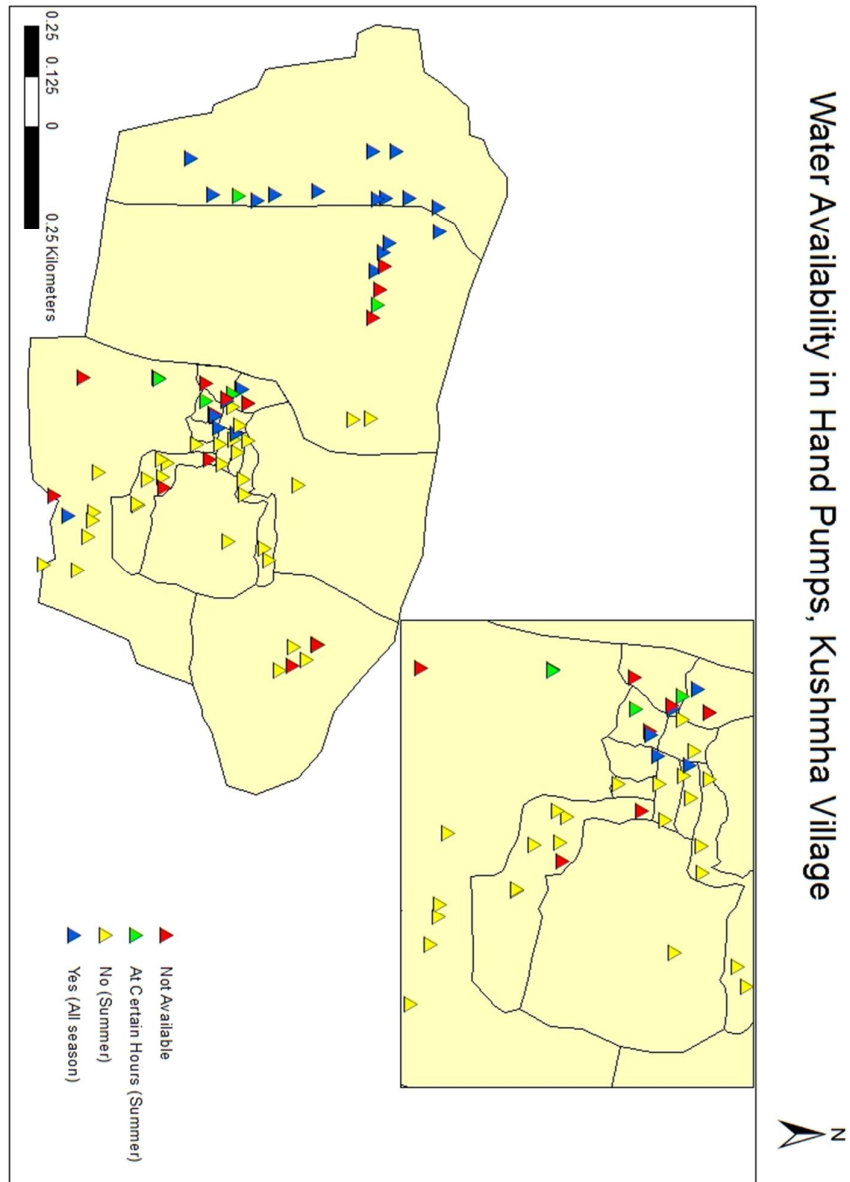
Source: Field work carried out in March 2018

Map 4.8 Water Availability in Hand Pumps, Orgai Village
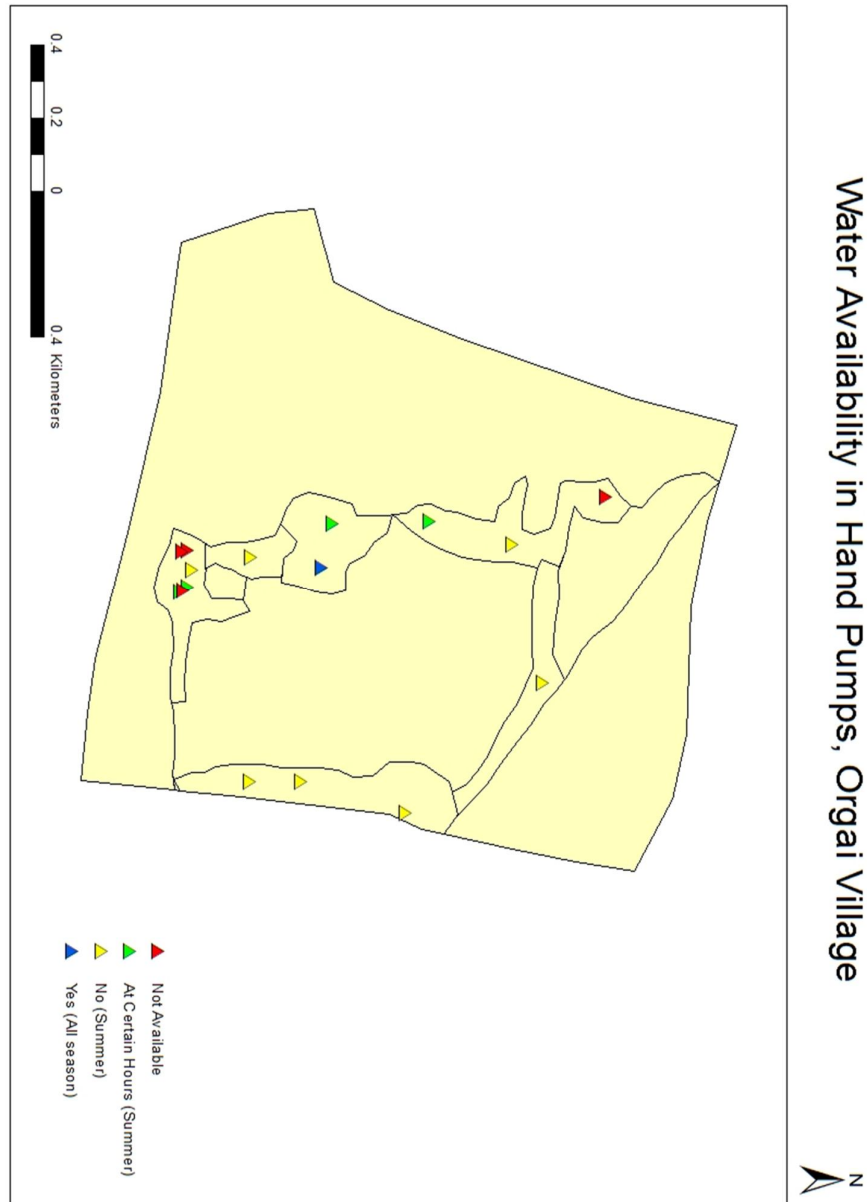
Source: Field work carried out in March 2018

In both the villages, households who have access to water 24hours are those who have personal hand pump or submersible pump, or hand pump in their own compound which facilitate them to restrict other people. From the graph showing caste-wise availability of water, it is clearly visible SC households in both villages don't have access to water 24 hours as compared to other social groups. Moreover, on comparing Kushmha and Orgai villages, Orgai has overall more skewed pattern.

The maps showing the water availability in hand pumps for different caste groups is clearly showing that in Kushmha, hand pumps installed near to the canal and Brahmin locality have water all the season while hand pumps in Dalit, Muslims and OBCs (other than Kushwahas/ Maurya) dries up in summer season.

In Orgai village, where hand pumps are mostly associated with poor and lower caste people as others have switched to submersible and mono-block motor pumps have no water during summer season. Only one hand pump which has water throughout year is attached with submersible pump. This particular hand pump was installed by Avinash Kushwaha (former MLA) as he had installed several hand pumps for Kushwaha community during his term in almost all the villages in Robertsganj block. He took this initiative under a government's policy *Jal Nidhi,* where one has to pay only 33% of the total installation cost.

e) **Interruption/ Breakdown During Last 6 Months:**

This section analyzes the percentage of households that have faced interruption or breakdowns in drinking water supply (hand pump) during last 6 months. And, the pattern shows similarity with the frequency of water availability. SCs in both villages have to face more interruption /breakdowns as compared to other caste groups.

Fig 4.8 Interruption/ Breakdown in Drinking Water Supply During Last 6 Months, Kushmha Village.
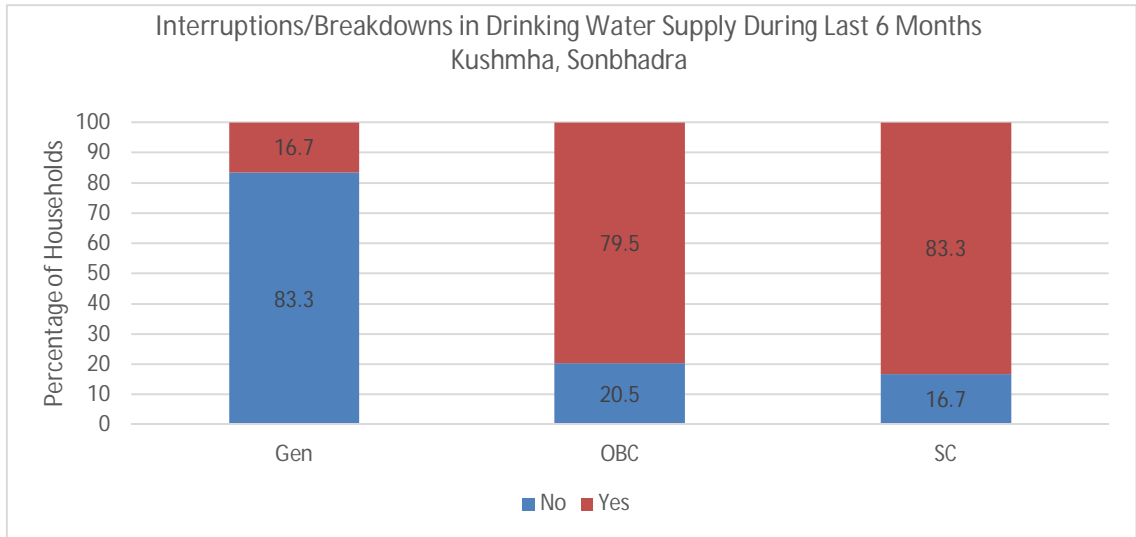
Source: Field work carried out in March 2018

Fig 4.9 Interruption/ Breakdown in Drinking Water Supply During Last 6 Months, Orgai Village.
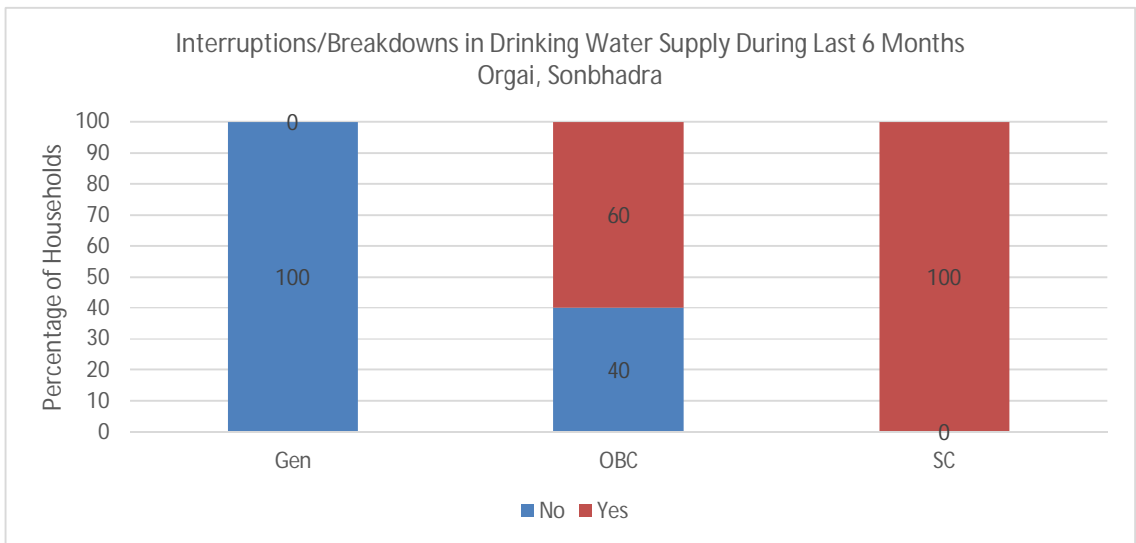
Source: Field work carried out in March 2018

4.3.2 Accessibility to Drinking Water:

a) Distance to and Number of Households dependent on Main Source of Drinking Water:

The graph below is showing the distribution of hand pump and including other water points[10] (wells and submersible pump) and number of households served based on surveyed households. Maximum hand pumps are within the distance of 200m in both the villages. In Kushmha village, the concentration of hand pumps which are inside household's compound are not shared with others. Even if these hand pumps are available near those households who don't have their 'own' hand pumps, they have to go to the next nearest hand pump. These water points' distribution and number of households dependent shows that farther the source is, more number of households get dependent. However, in Orgai village, water points are available much nearer as compared to Kushmha with greater number of households dependent.

Fig 4.10 Distance to and Number of Households dependent on Main Source of Drinking Water, Kushmha Village

Kushmha Village, Sonbhadra

Source: Field work carried out in March 2018

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[10] Term is used in this dissertation to refer all the sources of drinking water such as hand pump, submersible pump, well with mono-block motor, community well, personal well etc.
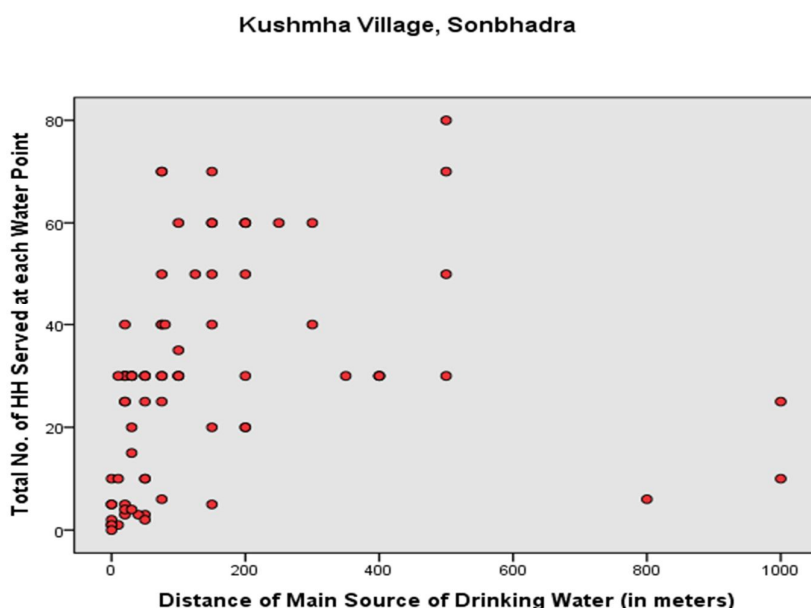
Fig 4.11 Distance to and Number of Households dependent on Main Source of Drinking Water, Orgai Village
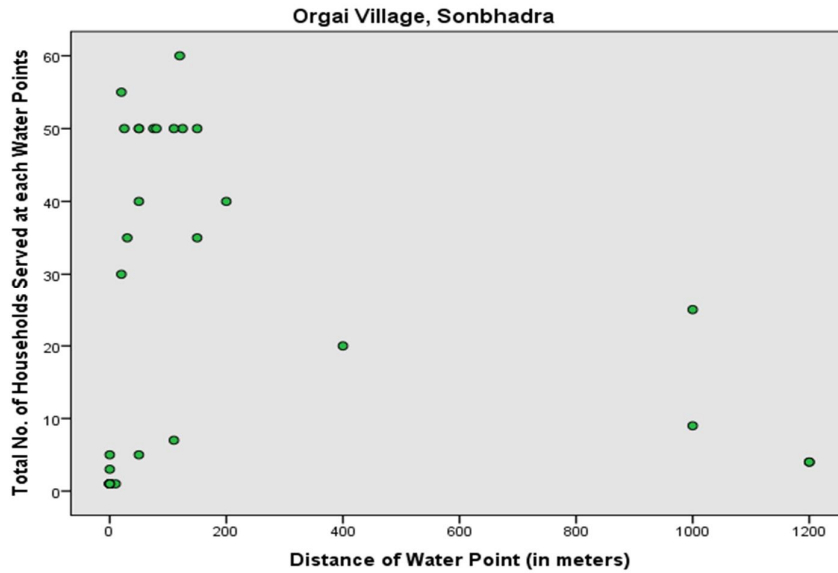
Source: Field work carried out in March 2018

b) Location of Main Source of Drinking Water:

The location of water points (classification is same as Census of India, 2011) for both the villages shows that in Orgai, most of the water points are either within premises or away premises. While in Kushmha village, maximum water points are either near premises or away premises. This shows clearly that the distribution of water points is more unequal in Orgai village as compared to Kushmha village.

Fig 4.12 Location of Main Source of Drinking Water in Kushmha and Orgai Village
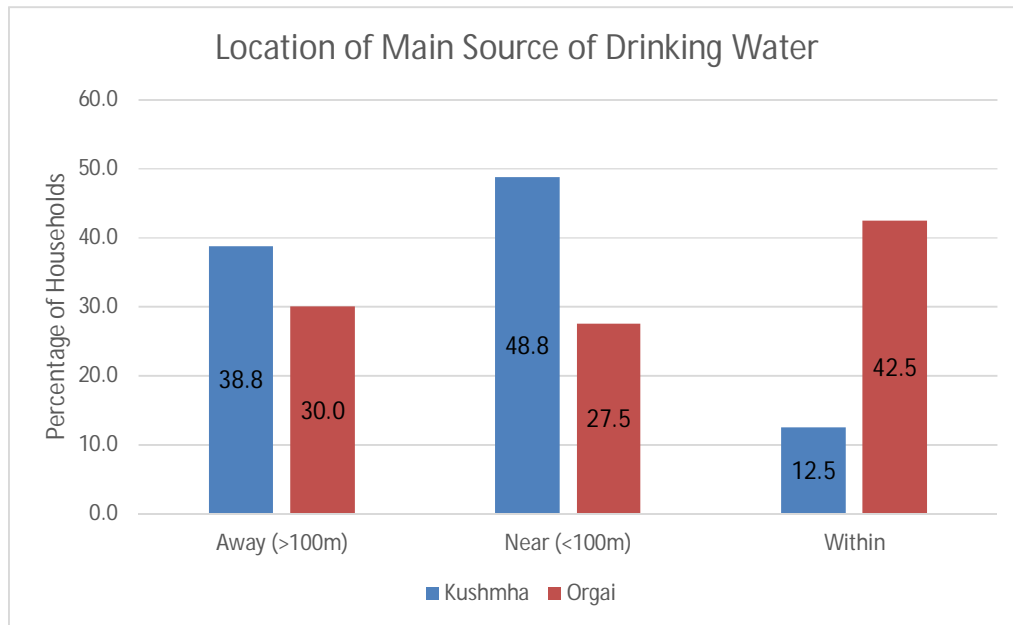
Source: Field work carried out in March 2018

c) Caste-wise Location of Main Source of Drinking Water:

In Kushmha village, almost 60% of SCs have to walk more than 100 m to collect water and that too in several trips. Due to less number of hand pumps (some are even non functional) the crowd at their water point is huge. So, that the burden of water collection becomes multi-folded. Only 3.3% have hand pump within their premises (only 1 household, former Dalit Pradhan). Among OBCs, almost 60% of the population has access to hand pumps near premises. This includes mostly Prajapatis/ Chandrabanshis, Sharma, Chaurasia and few Patels. However, even if the hand pumps is in less than 100 m, their access to these hand pumps are made restricted. For example, in the ward 6, there are Muslims, one Brahmin household and few Chaurasia households and there are two hand pumps (one minority quota and one that of Brahmin's). Chaurasia can't go to hand pump which is in the front of Brahmin household and have to face verbal abuse at the other hand pump due to increased pressure and bad drainage system (will be discussed in detail in next chapter). While 27% of OBCs and 50% Brahmins of this their main source of drinking water within their premises.

In Orgai, there is not a single SC household that has access to main source of drinking water within their premises while 80% of Brahmin population has. And, 40% of SC population have to collected water from more than 100 m while no Brahmin has to walk this long and wait in the queue, that too added with sudden breakdowns in water supply etc. These figures are clearly showing this huge inequality that persists in accessibility to the most basic but precious drinking water resource. However, this is not the end of the story. The discriminatory practices to strictly control and appropriate the water sources are much beyond this, which will be discussed in the next chapter.

On comparing both the villages, as it has shown the similar patterns in the availability of drinking water; there is greater degree of inequality in Orgai as compared to Kushmha.

Fig 4.13 Location of Main Source of Drinking Water for Different Caste Groups, Kushmha Village

Source: Field work carried out in March 2018

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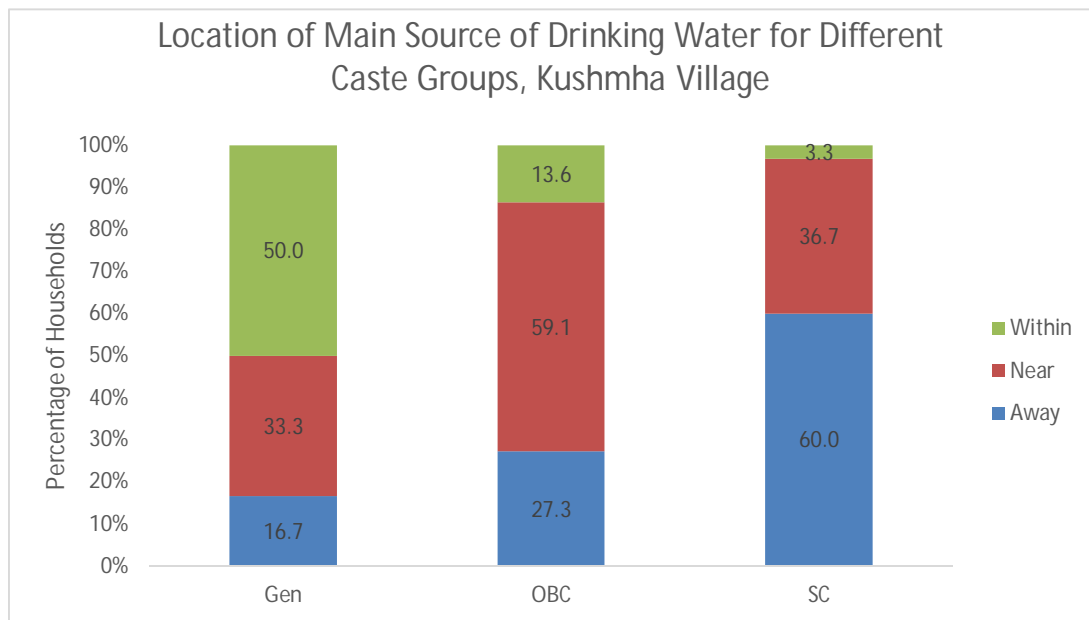
Fig 4.14 Location of Main Source of Drinking Water for Different Caste Groups, Orgai Village
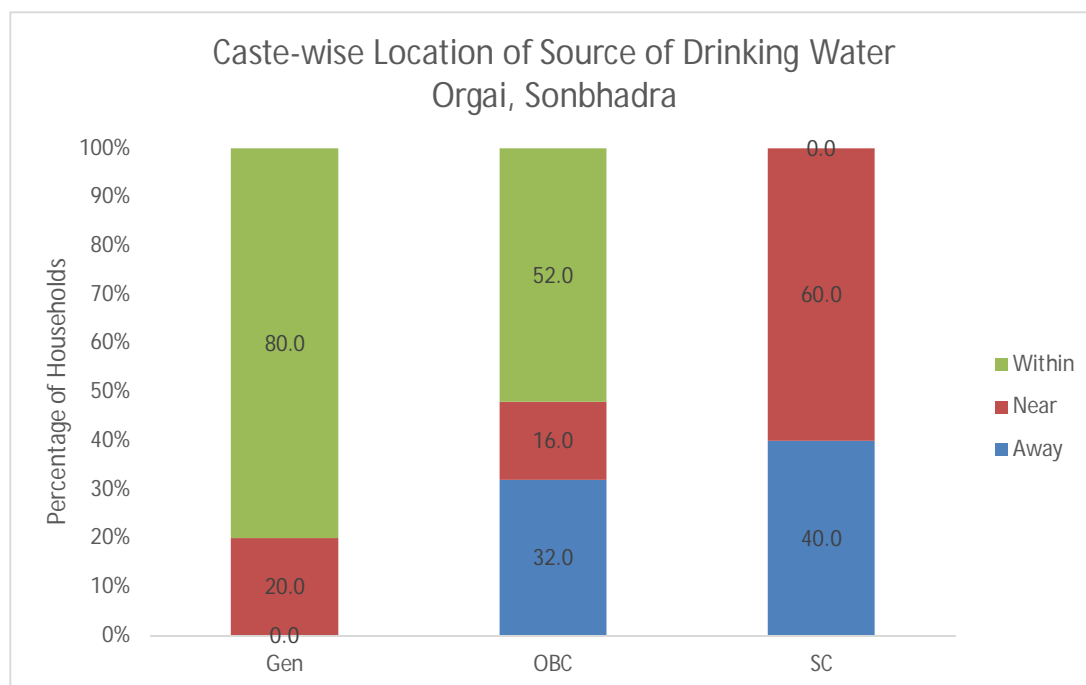
Source: Field work carried out in March 2018

d) Average Distance to Main and Alternative Sources of Drinking Water:

The box plot showing the distance to main and alternative source of drinking water for different caste groups in Kushmha village shows how water accessibility becomes bleak once the available main source is not available anymore. For general caste who owns more than one source of drinking water hardly needs any alternative source even in summer season when most of the population as well as livestock have to struggle to get water. On the contrary, SCs have to see difficult days during summer when their hand pump and community well along with restricted access to pond water is dried up. For them, they have to walk longer distance with little or sometimes no chance of water availability in the next nearest hand pump. Within OBCs, in equality is huge as 50% of the OBC population have access to alternative source of drinking water within 250 m (usually neighborhood relations near canal area) while other's have to face problem.

Fig. 4.15 Average Distance to Main Source of Drinking Water for Different Social Groups, Kushmha Village

Average Distance to Main Source of Drinking Water for Different Social Groups
Kushmha, Sonbhadra
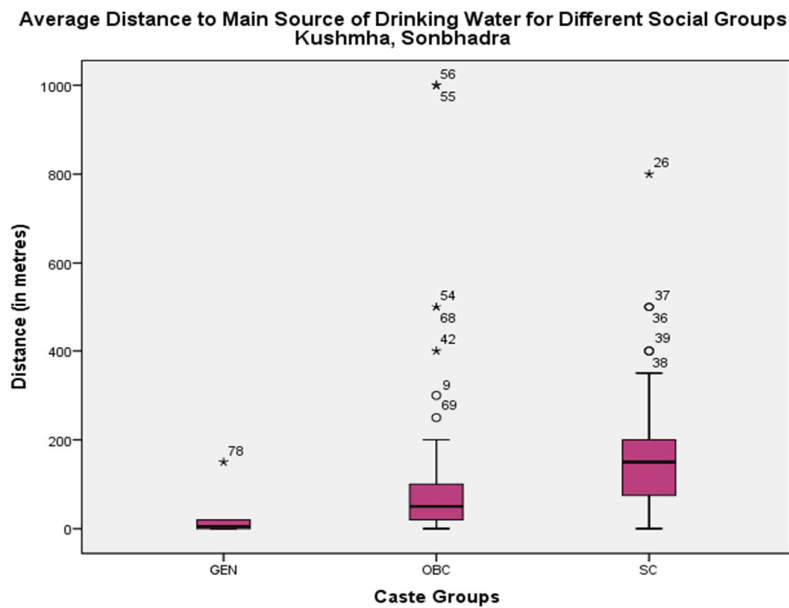
Source: Field work carried out in March 2018

Fig. 4.16 Average Distance to Alternative Source of Drinking Water for Different Social Groups, Kushmha Village

Average Distance to Alt. Source of Drinking Water for Different Social Groups
Kushmha, Sonbhadra
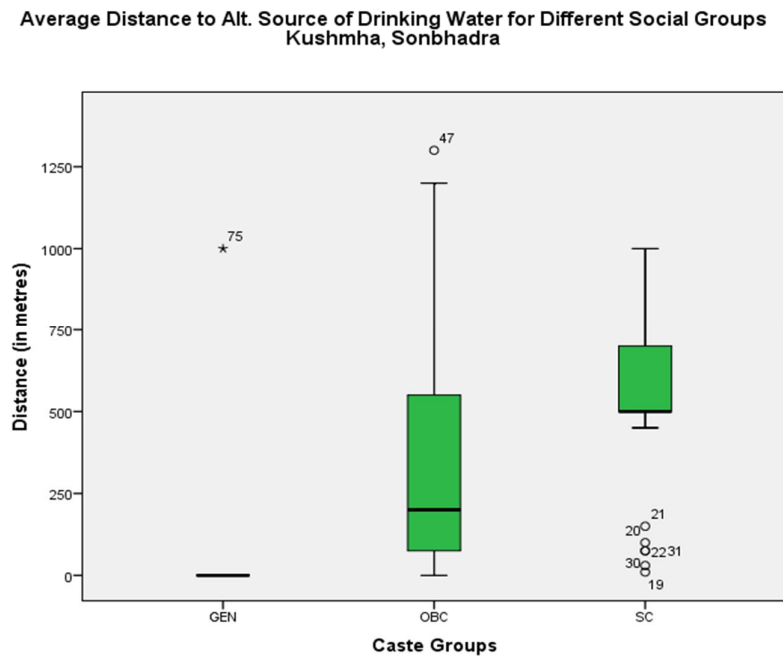
Source: Field work carried out in March 2018

Fig. 4.17 Average Distance to Main Source of Drinking Water for Different Social Groups, Orgai Village
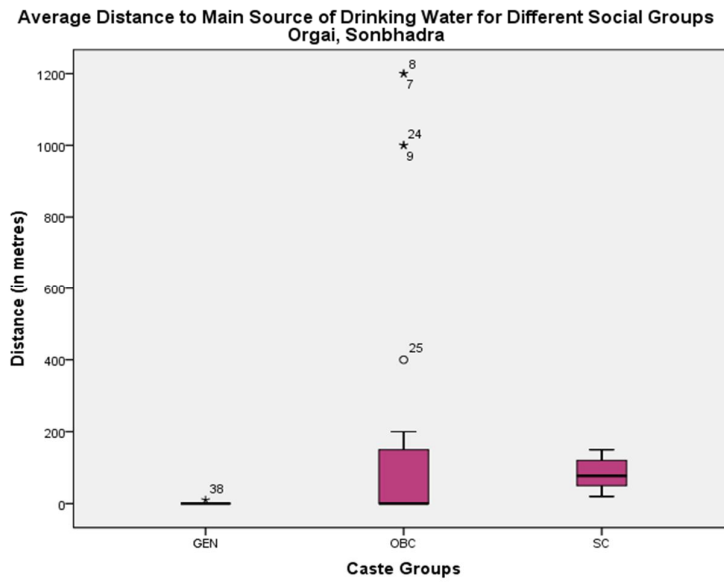
Source: Field work carried out in March 2018

Fig. 4.18 Average Distance to Alternative Source of Drinking Water for Different Social Groups, Orgai Village
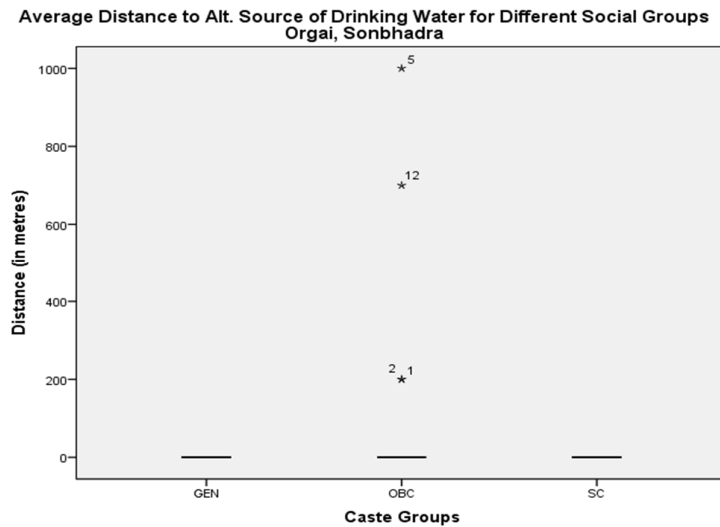
Source: Field work carried out in March 2018

In Orgai village, where for General caste, there is no requirement of any alternative source while for SCs there is no alternative source of water available. Such 'blunt' inequality in Orgai village is not just simply given rather it is a systematic control of water sources in the face of ecological water conditions.

e) Time Spent in Water Collection:

By looking at the box plots of time spent in water collection for different social groups for both the villages, again, Orgai has more unequal distribution as compared to Kushmha. In Orgai village, almost all SC households have to spent minimum 30 minutes and maximum 50 minutes to fetch water in 1 trip while, General households spent maximum 30 minutes and minimum it takes only 10 minutes for them. Time spent in water collection does not have much difference between OBCs and SCs in Kushmha, however, in Orgai the difference increases.

Fig. 4.19 Time Spent in Drinking Water Collection for Different Social Groups, Kushmha Village
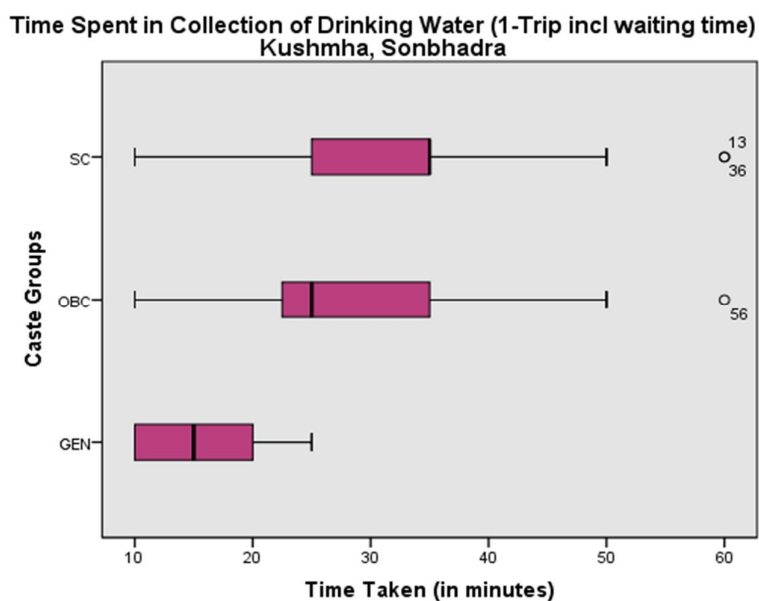
Source: Field work carried out in March 2018

Fig. 4.20 Time Spent in Drinking Water Collection for Different Social Groups, Orgai Village
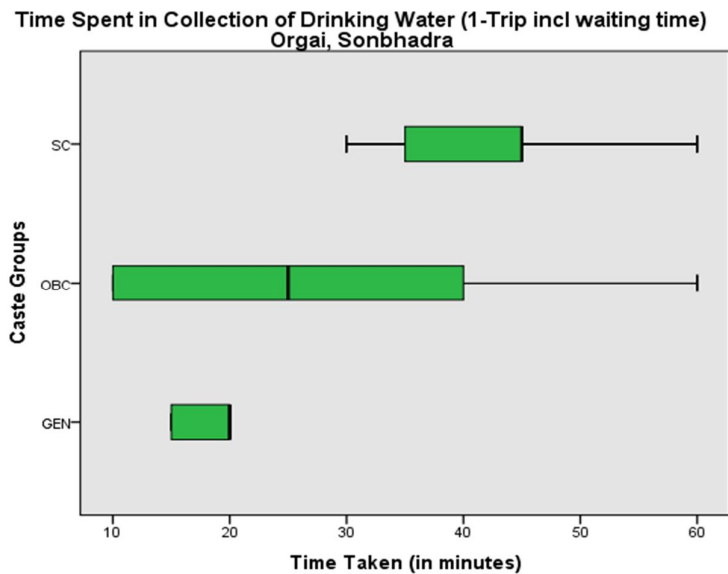
Source: Field work carried out in March 2018

4.3.3 Perception Based Questions:

a) **Caste-wise Time Spent in Water Collection for Normal and Summer Season:**

By looking at the figure below for both the villages, in normal season, the time spent in collecting water is much higher in Orgai village than Kushmha village. In both villages, the time taken by SCs is much higher than compared to other caste groups.

In Kushmha village, time spent in summer season is much higher than normal season for SC households while for others it remains more or less same. It clearly indicates that as the hand pumps, ponds and other sources of water start to dry in summer season, the most affected one's are those who are at the lowest rungs of the society.

Fig 4.21 Perception of Time Spent in Collecting Drinking Water (Normal Season), Kushmha Village
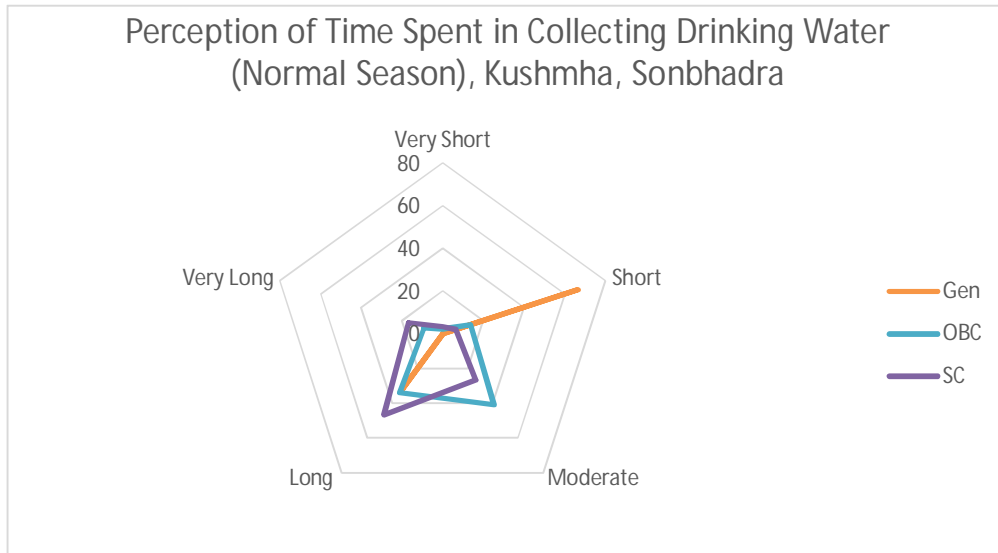
Source: Field work carried out in March 2018

Fig 4.22 Perception of Time Spent in Collecting Drinking Water (Summer Season), Kushmha Village
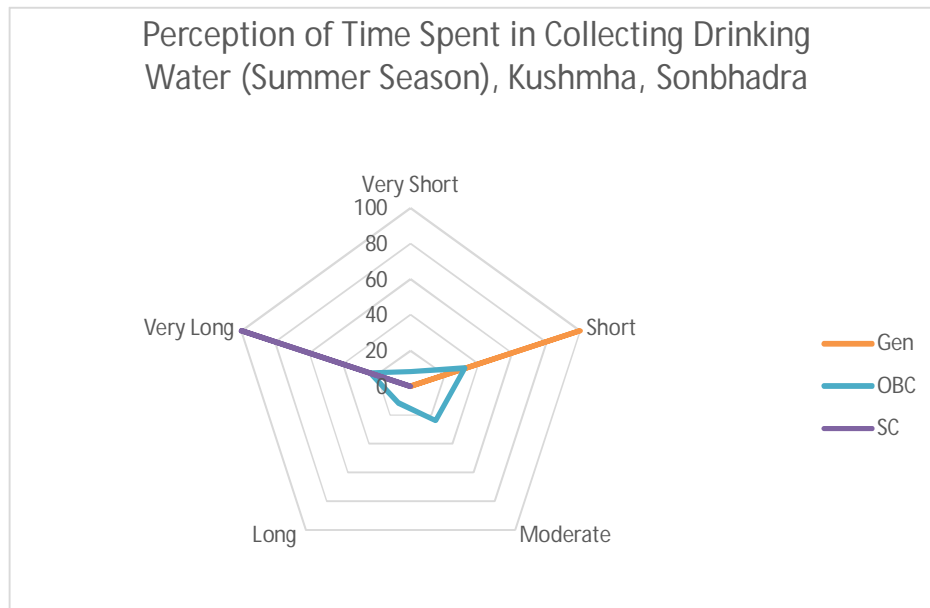
Source: Field work carried out in March 2018

However, in Orgai village, the situation for SCs becomes worse in summer season while others do not face any change with the change in season.

Fig 4.23 Perception of Time Spent in Collecting Drinking Water (Normal Season), Orgai Village
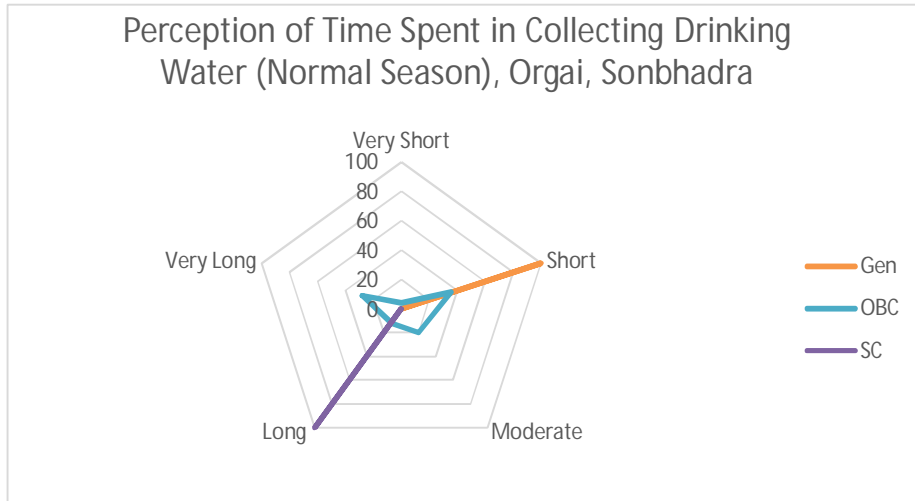
Source: Field work carried out in March 2018

Fig 4.24 Perception of Time Spent in Collecting Drinking Water (Summer Season), Orgai Village
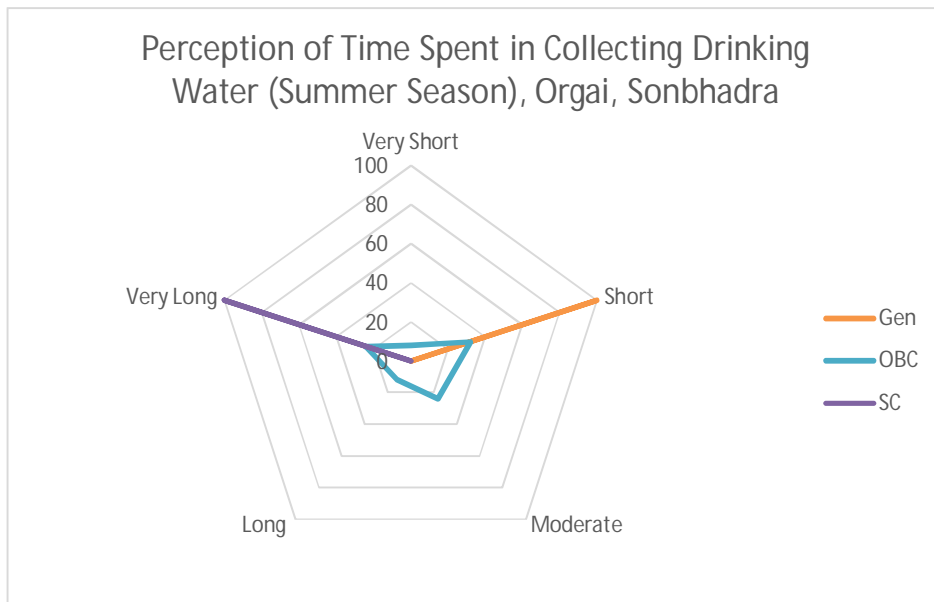
Source: Field work carried out in March 2018

b) Caste-wise Perception of Water Quality:

In Kushmha villages, the water quality is found to be spatially uneven as well socially unequal distribution. The hand pumps whose water level goes down during summer, it throws out red water with white worms. The hand pumps located at Dalit, and OBC locality except the canal area where water level is good and Brahmins as their hand pumps are dug deep; face water quality problem.

Fig 4.25 Perception of Water Quality for Different Caste Groups Kushmha

Perception of Water Quality for Different Caste Groups
Kushmha, Sonbhadra
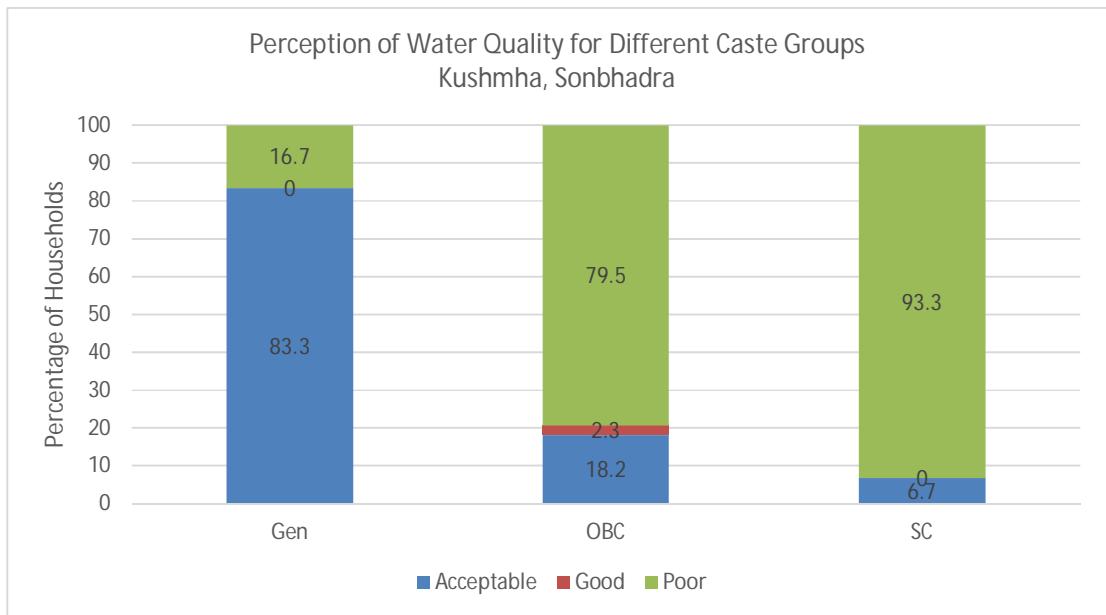
Village

Source: Field work carried out in March 2018

But in Orgai, upper caste faces no water quality at all as they access water using submersible pump. However, majority of population whose water needs are fulfilled by just 3 handpumps, face water problems which includes mostly Dalits and poor OBC households which cannot afford submersible pump.

Map 4.9 Quality of Water in Hand Pumps, Kushmha village
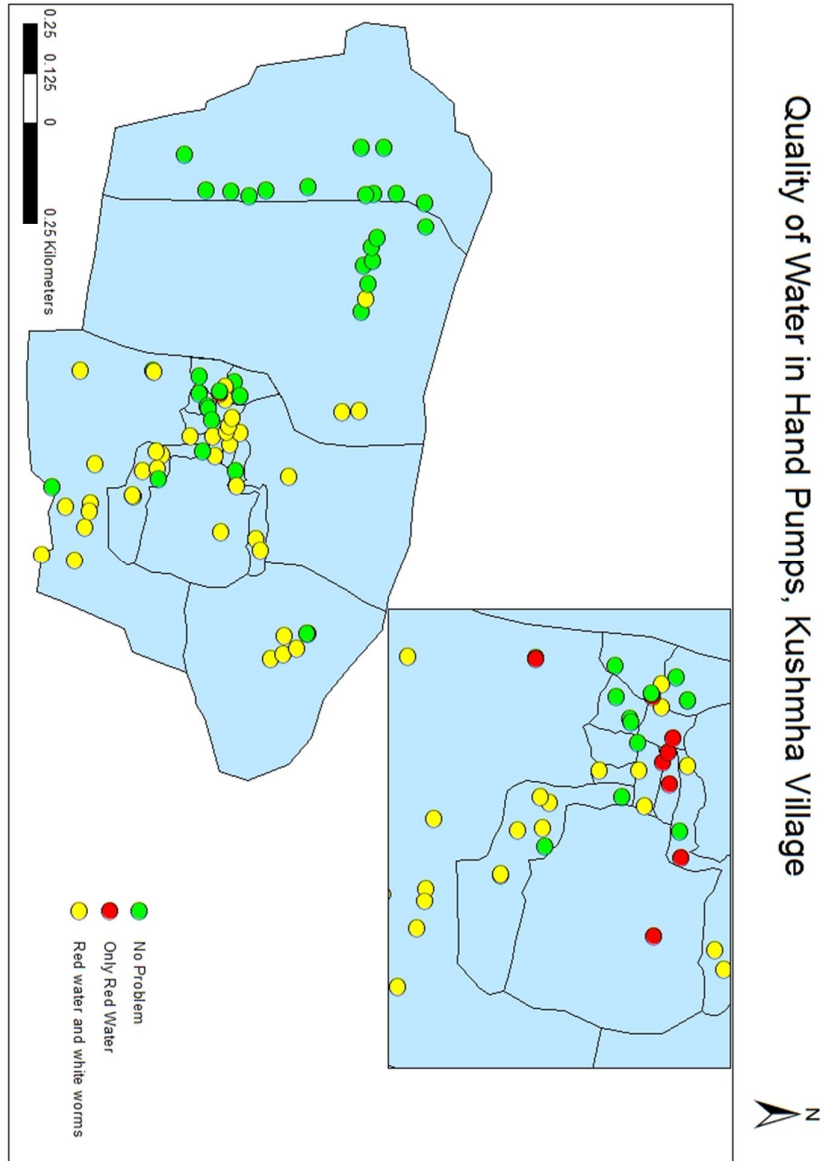
Source: Field work carried out in March 2018

Map 4.10 Quality of Water in Hand Pumps, Orgai village
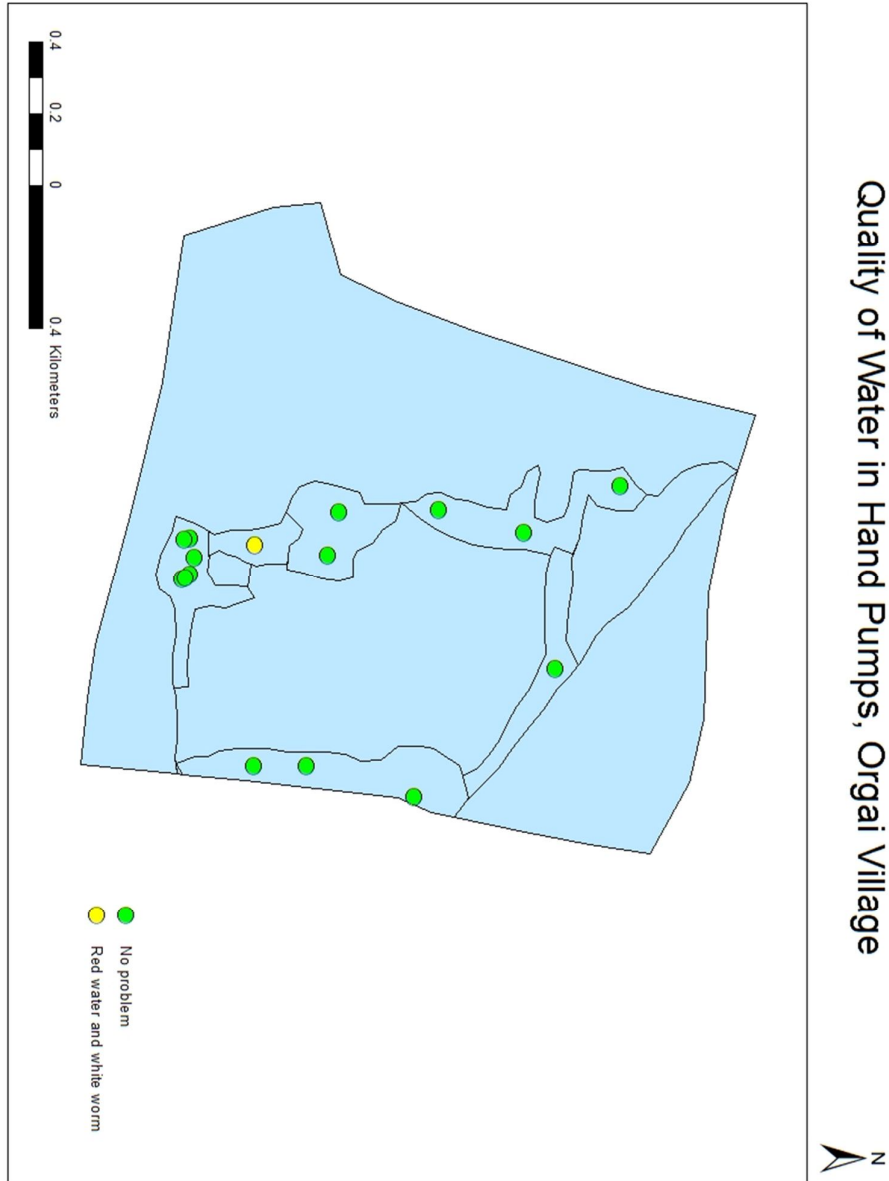
Source: Field work carried out in March 2018

1Fig 4.26 Perception of Water Quality for Different Caste Groups, Orgai Village

Perception of Water Quality for Different Caste Groups
Orgai, Sonbhadra
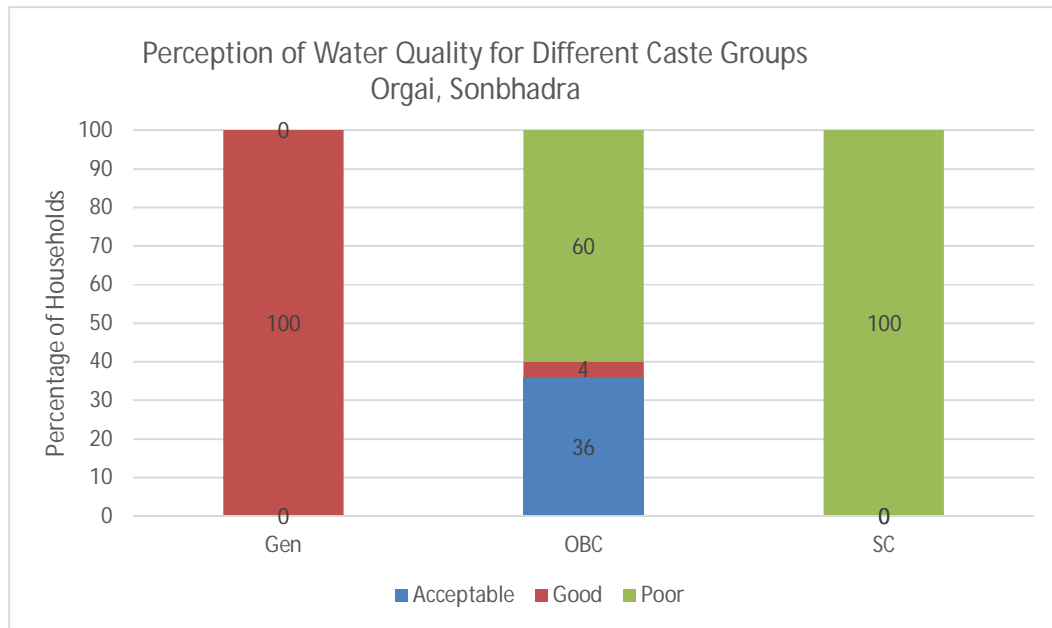
Source: Field work carried out in March 2018

c) **Caste-wise Report of Verbal Abuse:**

In both the villages, all those who reported that they face verbal abuse and conflict while fetching water, most of them are Scheduled caste. While, there is no general caste from both the villages who ever faced any verbal abuse. Since almost all Dalits are dependent on hand pumps which are commonly used by many, thus crowded most of the time are more prone to face verbal abuse as compared to others.

Fig 4.27 Report of Verbal Abuse While Fetching Drinking Water, Kushmha Village
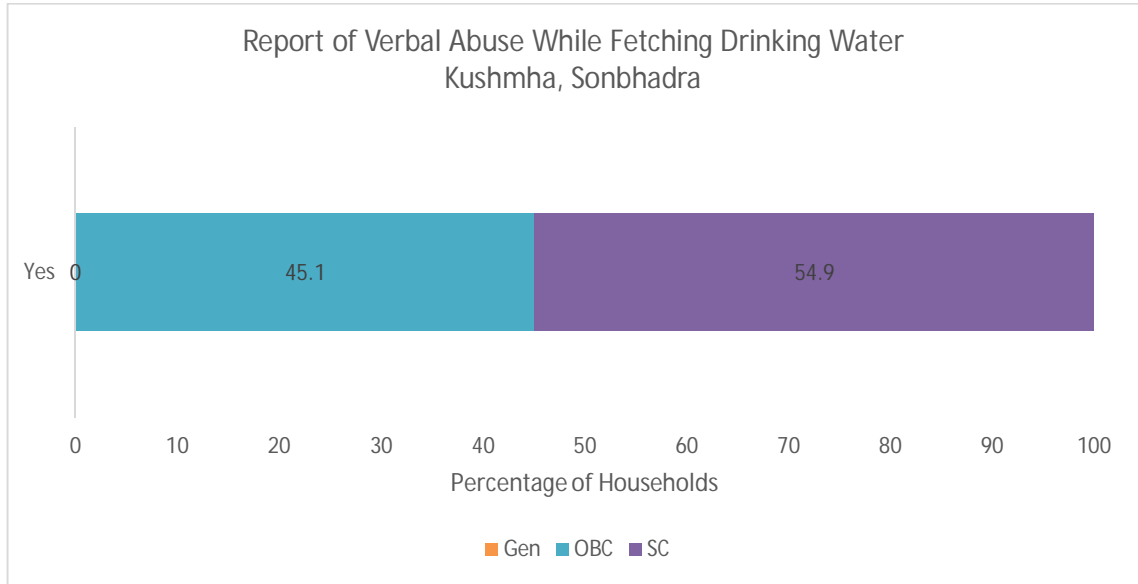
Source: Field work carried out in March 2018

Fig 4.28 Report of Verbal Abuse While Fetching Drinking Water, Orgai Village
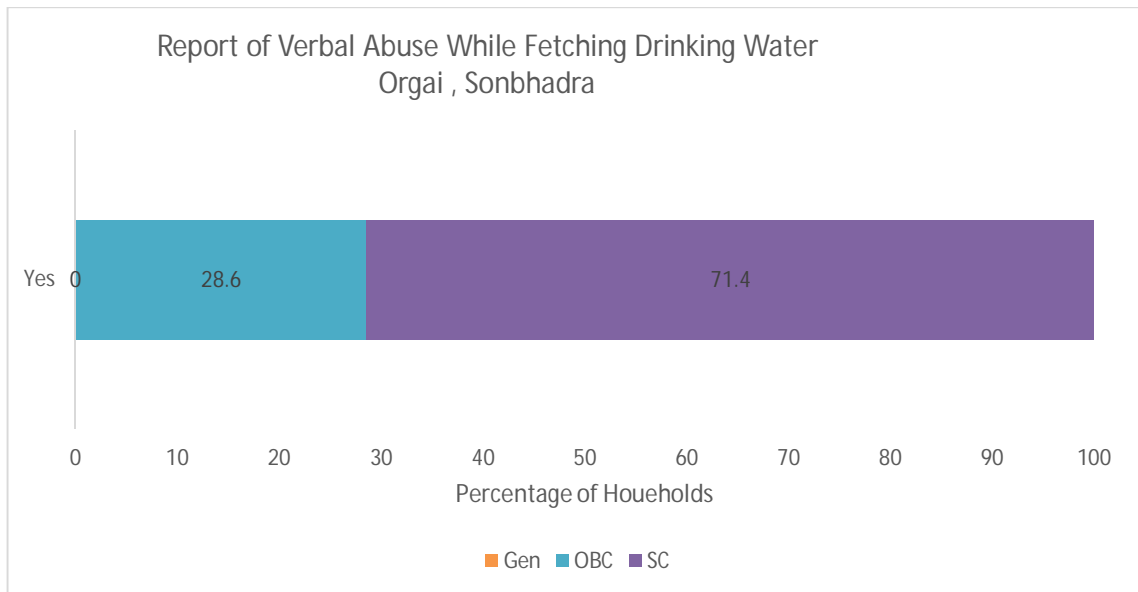
Source: Field work carried out in March 2018

4.4 Conclusions:

The major findings of this analysis are first, the main source of drinking water for the majority is hand pump in Kushmha village while in Orgai, it is mixed as Dalits and OBCs (excluding dominant castes) are mostly dependent on hand pump while others have submersible pump and wells with mono-block motors. The upper and dominant castes in both the villages have mostly more than one source of drinking water. Most of them have personal well inside their houses and personal ponds, small hand pumps in other cases.

Second, the alternative source of drinking water is not at all available to Dalits and OBCs in Orgai village while the upper and dominant castes do not require alternative source of drinking water even in water scarce months. In Kushmha village, the situation is relatively better as Dalits and OBCs can walk to the next nearest hand pump. However, it is not as simple as said, because mostly the next nearest hand pump is in different locality which is too far or/and they have to conform to other rules and regulations (forms of untouchability).

Third, the pressure on hand pumps located in Dalit, Muslim and poor OBCs are huge as compared to other hand pumps. The hand pumps in front of Brahmin or Thakur household is restricted for others to fetch water without their permission. These hand pumps are made exclusive on grounds of socially sanctioned norms and traditions. The dominant communities of both the villages can afford to install personal hand pumps as well as submersible pumps which require huge investment. Since, they invest money, no one can ask for water from these hand pumps.

Fourth quantity of water collection at water points depends on several factors such as crowd, water availability in hand pump (in summer season water level goes down), sources of water available (more than one) etc. The analysis showed that quantity of water available for Dalits, Muslims and OBCs is much lesser than upper and dominant castes.

Fifth, the frequency of water availability shows the same pattern. The upper caste and dominant castes reported that they have water available 24 hours even in summer. While, Dalits, Muslims and OBCs have water available only for certain hours (depends on ground water level, interruption or breakdown in water supply, crowd at water point etc.)

Sixth, it is also found that the hand pumps installed mostly by Panchayat needs repair at least 2-3 in the six month duration. The water level once goes down; people have to wait for 1-2 hrs to 1-2 days depending on the season. Most of these hand pumps are located in Dalit, Muslim and OBCs' locality.

Seventh, location of drinking water source is mostly within premises for upper and dominant caste while for Dalits, OBCs and Muslims it mostly far away their premises.

Eighth, average distance to alternative source of drinking water especially in summer season is much longer for Dalits, Muslims and OBCs as compared to Upper and dominant caste in Kushmha village. In Orgai village, there is no alternative source of water for Dalits and OBCs. Since, they have to cope up with the water scarcity in summer season and hence, they depend on kin based social relation to access water from their (upper caste) water source which exposes them for further exploitation.

Ninth, the time spent in water collection for Dalits, OBCs is much higher as compared to upper and dominant castes. It increases in summer season as they have walk longer in search water source if there is no water in the current water point.

Tenth, the water quality is found to be spatially uneven as well socially unequal distribution. The hand pumps located in Dalits, Muslims and OBCs' locality have poor water quality as they reported red water (excess ferrous) and white worms. It worsens as the water level goes down in summer season. While water extracted using submersible pump, well with mono-block motor, hand pumps near canal and hand pumps that are dug deeper is of much better quality.

Lastly, The two villages which are just 5 km apart shows that in Orgai, there is comparatively more inequality among different caste groups in terms of location and distance of main source of water, unavailability of reliable alternative source of water in summer season, quantity of water available, facing more breakdowns and interruption in water supply etc. These results indicate that there is a complex interrelation of water, social hierarchy, uneven ecology, political associations and land ownership which shapes water accessibility for different social groups. These socio-political ecological relations thus, becomes imperative to understand why there is such difference in levels of water accessibility among these two villages in spite of bare minimum distance between them. These discussions are carried forward in the next chapter.

Socio-political Ecology and Accessibility to Water: A Micro Level Perspective

<div style="float:right; border:1px solid; padding:4px">5</div>

5.1 Introduction:

In this chapter, the study on drinking water access, use and control, shaped and mediated by different factors, is based on the findings and narratives collected from field research. For this, I would be using the conceptual framework provided in the first and second chapter of this dissertation in order to achieve overall understanding of socio-political ecological processes of waterscapes with respect to accessibility to drinking water in these waterscapes and its control.

This chapter is structured into different sections. Each section discusses events, stories and narratives from the field, and then, an attempt is made to understand and deconstruct these processes. In this way, it provides us an open space where we can discuss it from different perspectives in order to get a holistic understanding of these processes and is not limited by any particular doctrine. I would like to mention again that this piece of work does not end with this dissertation but opens up future research avenues for all those who are concerned with equitable distribution of drinking water to all regardless of caste, class, gender, religion or any other socially constructed 'boxes'.

5.2 'Creating' Water Reality: Whose story is heard?

In both the villages, it was found that there are 'few' group of people who need tanker water during summer season when hand pumps are dried up while 'few' other groups said, 'we don't need tanker in our village'. This stark difference in opinion about tanker requirement when enquired further from both the groups in both the villages, came out to be an issue of maintaining status quo of the village as '*khushal gaon*' (self sufficient in terms of water). But, if we deconstruct this narrative; we would understand how history, geography, technology, social structure and ecology of water is playing a vital role in the creation of this 'water story' which is far from the reality.

On interviewing BDC of the Kushmha village, he said, *"those who demand tanker in the village, they just want to create tension in the village. In this village, people just*

want some subject to discuss and as the summer approaches, tanker just becomes one."

While during a discussion with Chaurasia and Yadav men, they said, *"all these Mauryas who think they can do whatever they want, just because they have power in Panchayat and money; actually have all the water. And then, they say we don't need tanker. Our village is the largest village in this region. Everybody outside thinks we are happy and we share brotherhood. But, nobody knows, these people use 'goonda(ism) against us to threaten us.".*

Then, on interviewing Pradhan of the village, who is Dalit woman, said, *"See, we have 75 hand pumps installed in the village since 1995. You will see hand pumps in every 75 meters. Whenever it is required, I repair them without any delay, do you really think, we need tanker?"*

And, lastly, group of Chaurasia and Sonar (OBCs) women said, *"You can see we don't have hand pump in our locality. We use this dirty water of the community well that is so deep and pulling up water is difficult. In summer, the water in this well just disappears. Then, we have to walk long distances and face humiliation, insult and what not. Because, those hand pump which have water are so crowded and water is limited in those months."*

On asking, if they have ever asked for tankers from the Pradhan, they said, *"we don't go in those meetings, and if you think women in this village have unity, then you are wrong. If we even talk about tankers at hand pump sites while fetching water, men around say, we only create nuisance, women just like to talk and create divides among villagers. And, this is not enough, even if our husbands demand tanker in Panchayat meetings, next day if we go at those hand pump sites, (nearest one is in front of Chobey (Brahmin) household), they say, why have you come to take water from our hand pump? Your husband was complaining about me in Panchayat. Go and use some other hand pump."*

These different views on tanker from different groups of people is not a result of just having conflict among different groups but a systematic effort to have control over drinking water. For this, we need to understand how these 'few' groups of people are able to create the myth of water availability in the village.

First, as discussed in the earlier chapter, that Robertsganj block has far better ground water availability as compared to other bocks in the district. If we open newspapers, most of the news about water scarcity covers the region of Dudhi, Bhabhani block where there is huge scarcity as well as severely fluoride-contaminated water as compared to Robertsganj where iron in water is a problem, but that too is unevenly distributed. Drinking water problem, which has come in focus since last five summers in these villages, due to its uneven nature, has erstwhile not attracted much attention due to conscious efforts of groups with vested interest. This relational spatiality of water scarcity, hence, is used for validating the status quo of the village as '*Khushal Gaon*'.

Second, the uneven ecology of water where the landowning castes have better access to drinking as well as irrigation water from canal, Brahmins and other few OBCs who can afford to dig deep down the earth to access water are able to create the myth of water availability in the village. The landowning castes (who live near to canal) have migrated in 1965 and occupied the outskirts of the villages at the time, when the main source of drinking water was well, ponds and *baulis*. There was no such water scarcity then. Canal was also not new at that time as it was in existence since British times. These agriculturists found it to be suitable to settle down near canal area. It was difficult to imagine today's reality of water scarcity then.

In 1995, when first the Pradhan installed hand pumps in the main village[1], the upper caste and few OBCs (mostly Prajapatis) were the first to get them in front of their houses. However, it was not as required or needed, until the village witnessed drought in 2002 and reduction in rainfall. Later on, other localities also got hand pumps, and it was reported, that under this Pradhan, the village got maximum number of hand pumps installed. The households near canal area got their hand pumps installed only after 2005 as their population also increased. These installations were done using caste based relations. Avinash Kushwaha (MLA) installed hundreds of hand pumps in several villages for Kushwaha community between 2005 and 2010 (refer Map). This new access to technology (hand pump, motor for irrigation), favoured ecology of

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[1] In 1995, the Pradhan of village was from Chaurasia community. He was the Pradhan of village until he died 10 years ago. He is very popular and respected by most of the villagers for his good relations with everybody. However, Chaurasia community of the village complains that he did work for everybody but not for his own community. And, most of the Chaurasia community don't have access to hand pump. They are either dependent on community well or hand pumps which are very far from their locality.

ground water, caste position (caste i.e. 'not too low' to have political and economic power[2]) and acquired political and economic power with time, has provided a collective set of tools to have access to and control over water.

Third, in the current scenario, the Panchayat meetings, which are supposed to be conducted among the 13 ward representatives of different caste groups, often takes place in a mysterious way when it comes to water and, most of the representatives do not even get to know about the meetings. If the village wants to ask for tankers, it has to be passed by these ward representatives. Moreover, if this is passed, Panchayat has to spend around 1 lakh rupees from Panchayat fund. It is no surprise, why this myth of '*khushal gaon*' is maintained.

5.3 Hand Pump Installation in the Village:

There is much politics behind installing hand pump in Kushmha village. It has recently become a big issue after change in waterscape from well and pond to hand pumps and the increasing shortage of drinking water. On field, it was observed that mainly three factors have played a crucial role in deciding where hand pump will be installed. One, access to *Jal Nidhi* programme of government where one needs to pay only 33% of the total installation cost. This information and access to such programme was provided and facilitated by Avinash Kushwaha. Two, personal and kin-based relation with Pradhan as in Panchayat meetings, the location of hand pump installation needs to be passed by the consent of all ward representatives And, third, who so ever give application to the Panchayat for installing hand pump in their locality must have 'enough space'. In both the villages, these factors were same for having a hand pump installed.

In Orgai village, there are around 200 households and 15 hand pumps. Out of which only three hand pumps serves 90-100 households (includes Chaurasia, Teli, Viswakarma, Paswans, Patels, Dusads and Chamars). The rest of the 12 hand pumps serve other 35 households. 13 households owns submersible pump in the village as told by Pradhan (Chauhan) of Orgai village. Many of them do not need hand pumps yet they get hand pumps installed personally (mostly Kushwahas/Mauryas, using *jal nidhi*). Such unequal spatial distribution of hand pumps has excluded other communities to access to hand pumps (see map). Few Patel and Maurya households in the village who are poor and cannot afford to have a submersible pump (Minimum of

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[2] See Dominant caste by M.N. Srinivas.

1 lakh rupees required) have only small hand pump, which they get installed by collecting 10,000 rupees. This small hand pump is only 70 ft deep. So, when summer approaches around the beginning of the month of March, these hand pumps become too tight as water level goes down. The only drinking water source left for them is to go beg for use of personal hand pumps of Kushwaha households. They have asked the Panchayat several times to install hand pumps in their locality. Nevertheless, every time their request is rejected on the grounds, that there is not enough space to install them. This politics of space is used to establish control over where hand pumps will be installed. In this case, the space in front of these communities is actually taken over by the other Maurya families who are rich and have personal hand pump as well as submersible pump. They have land attached to the road that lies in front of Patel community households. As reported by one of the members of Patel household (who got severely hurt while pulling up water from small hand pump, see plate) that, *this land is not even owned by them. They have small landholdings but since they have water and can irrigate, they sow vegetables in their land and now extend it until this road. This is merely a display of power. However, when we ask for hand pumps, Panchayat says, we do not have space. Panchayat also knows that this is illegal but no one has strength to say it.*

In Kushmha village also, space is one of the main issues when it comes to installing hand pumps. Most of the applications of hand pump installation are rejected; by saying, there is not enough space. Muslim, Chaurasia and Dalit communities have reported such incidents. These communities live in compact segregated localities. The area of their locality is much smaller and has greater number of households. This is opposite for the localities of Brahmins and few OBCs in the main village. Even if they are somehow able to find 'enough space' for hand pumps, applications are rejected, as the Panchayat often does not find them 'suitable'.

The upper caste households have managed to get hand pumps installed in front of their house as they hold power over Panchayat by virtue of their position in the social hierarchy and nobody opposes their a century old supremacy in spite of being a minority in terms of their population. Also, landowning caste have acquired political power over Panchayat on the basis of land, agricultural income and control over water.

In both the villages, water has an agential role to play in re-enforcing power structure and relations based on caste and in return, have implications on accessibility to drinking water mediated via these very power relations.

Map 5.1 Year of Instalment of Hand pump, Kushmha Village
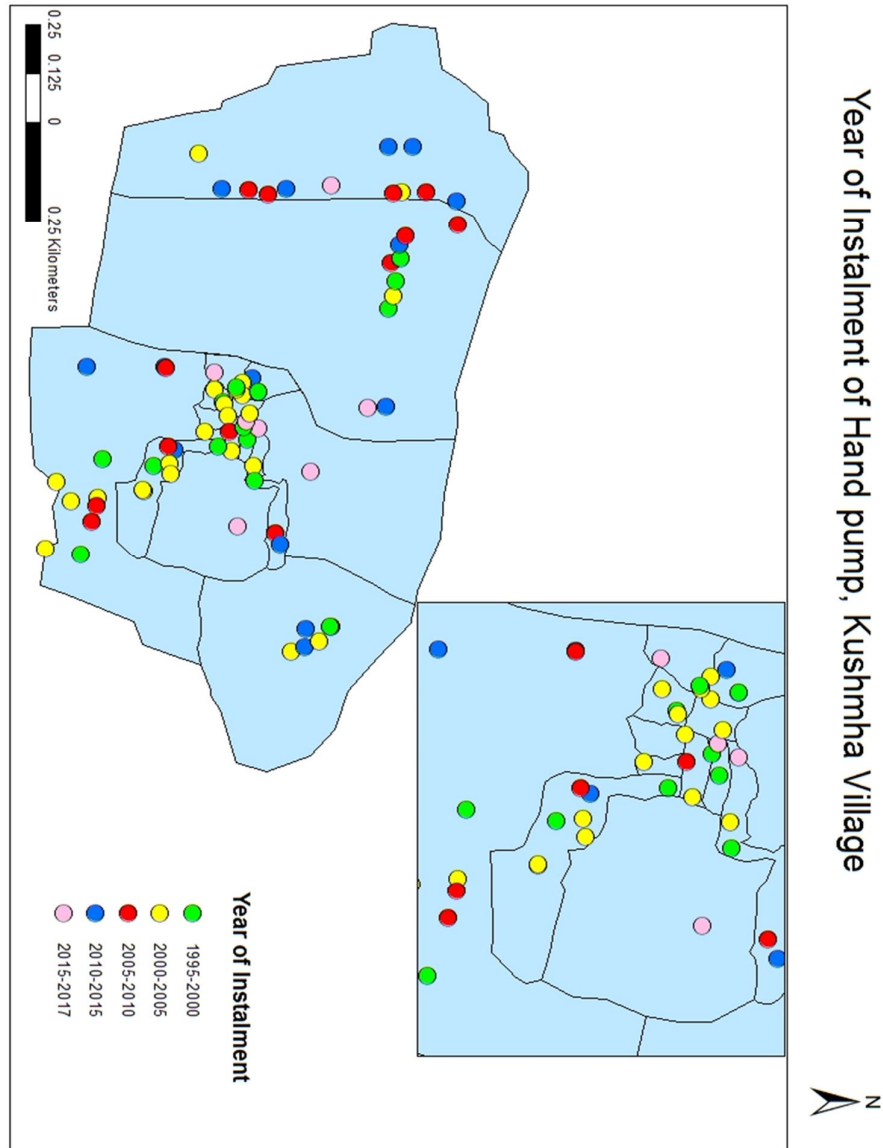
Source: Fieldwork carried out in March 2018

Map 5.2 Year of Instalment of Hand pump, Orgai Village
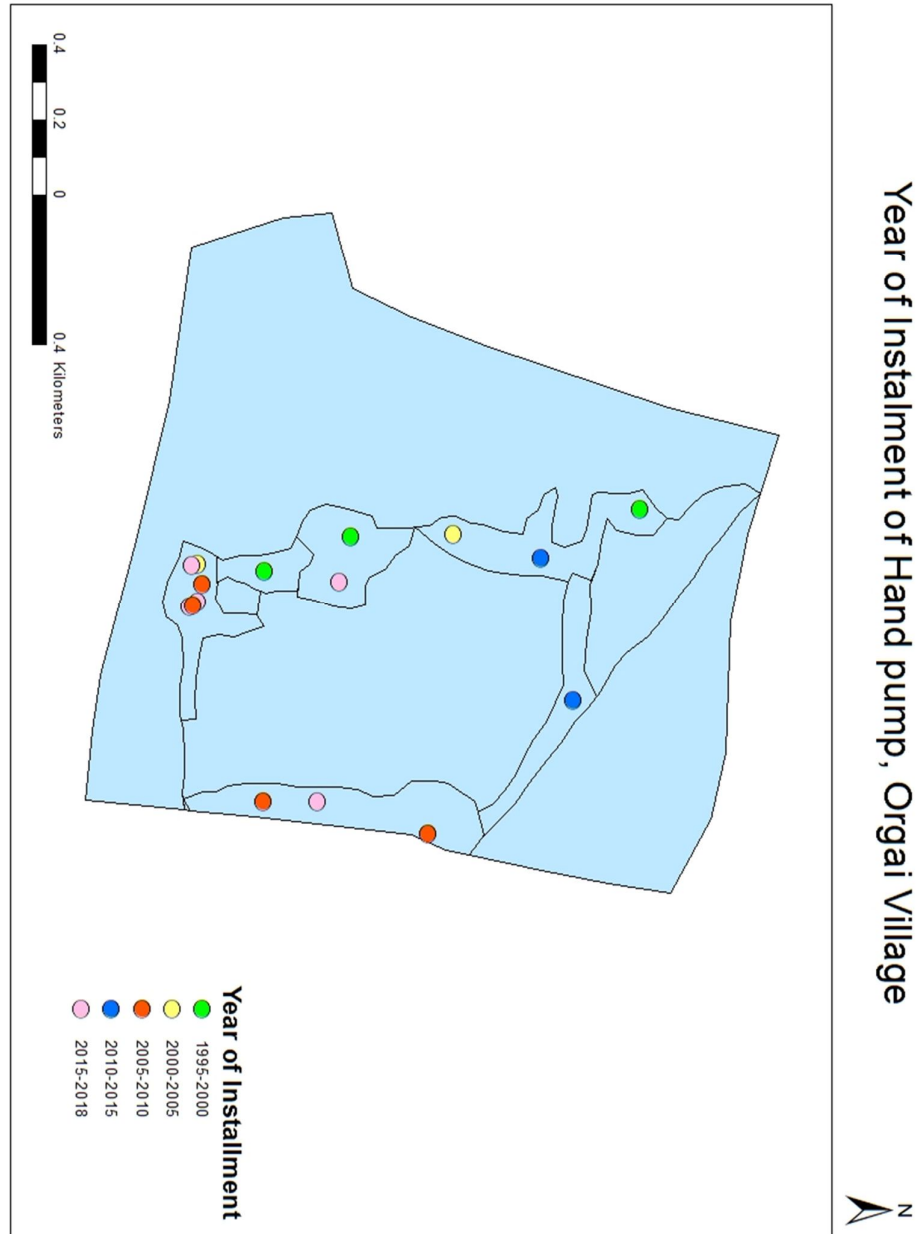
Source: Fieldwork carried out in March 2018

Map 5.3 Mode of Payment for Installing Hand pump, Kushmha Village
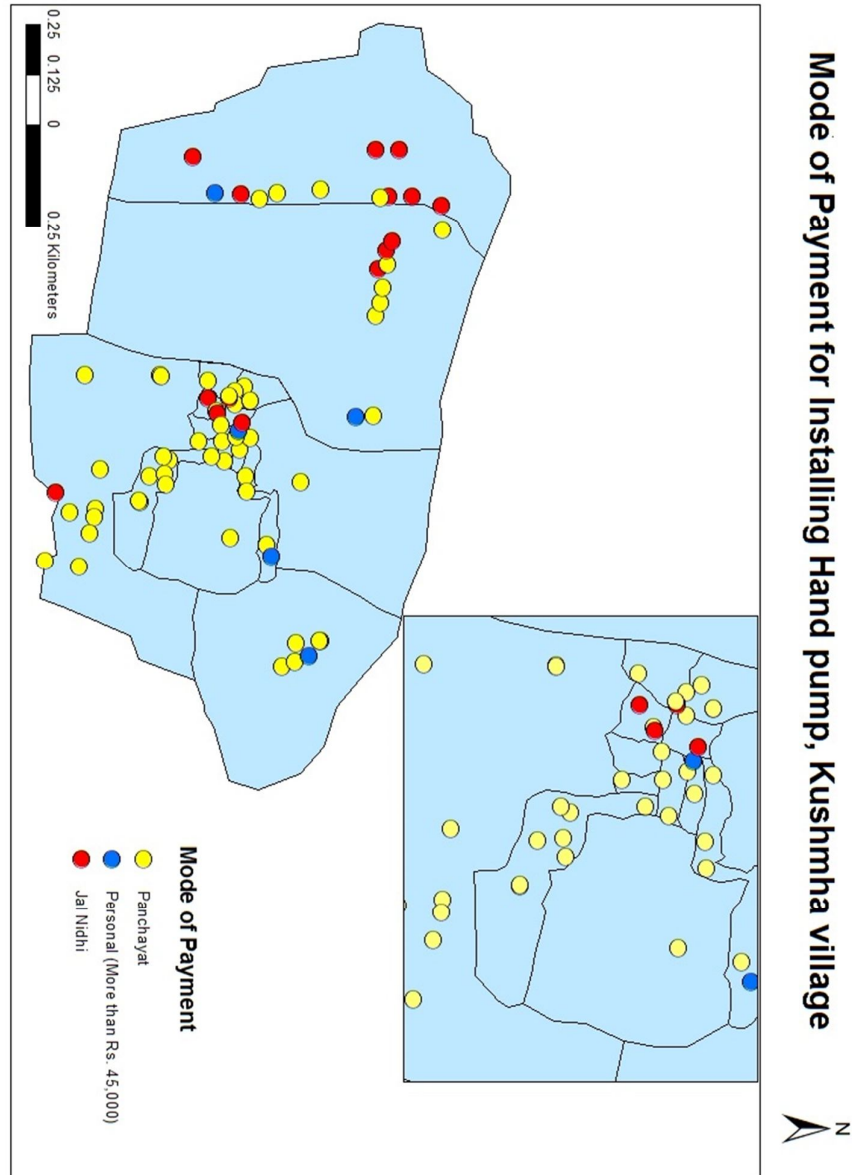
Source: Fieldwork carried out in March 2018

Map 5.4 Mode of Payment for Installing Hand pump, Orgai Village
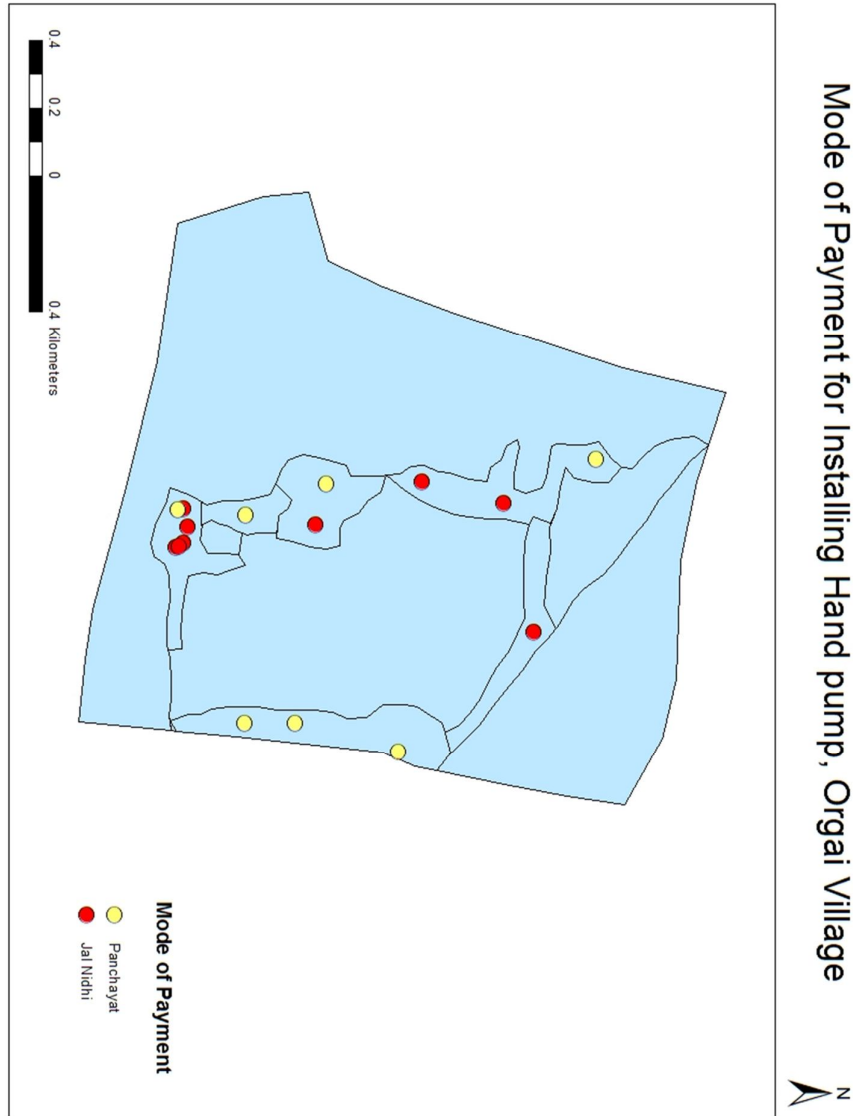
Source: Fieldwork carried out in March 2018

5.4 Manipulation of Water Ecology:

In both the villages, there is uneven spatial distribution of ground water. In Kushmha village, the ground water availability is better in the western direction due to canal. It is also better in the northern direction within the depth of 150-175 ft where mostly Prajapati and Chaurasia community live. However, due to unavailability of hand pumps for Chaurasia community, they have to face water shortage and to walk longer distances. While, Prajapati mostly have personal hand pumps installed using personal relations with upper caste households. In the southern direction of the village that is inhabited by Dalits, it is mostly dry, and water is not available even at the depth of 200 ft. In the eastern part of the village where hand pumps installed by the Panchayat, mostly at shallow depth (100-110 ft) as compared to the western and central part of the village (mostly 250ft); water is found at 200-250 ft[3]. Where water is available even at shallow aquifers, hand pump are dug deep while where water is not available even at 200ft, hand pumps are dug only up to 100 ft. Such setting of hand pumps over already given unequal ecology of water further complicates water accessibility. Thus, water ecology is manipulated using technological interventions in such a way that water is made available for some at the cost of other.

The ground water is mysterious for the villagers, as nobody knows who is drawing how much water. It is difficult to keep track on ground water usage. This mysterious character of ground water creates more space for controlling and manipulating it. For example, in Orgai village, the access to submersible pumps with subsidized electricity has led to unprecedented drawing of ground water. It has also led to the emergence of water sellers in the village. Household who owns submersible pumps are filling up 'personal ponds'[4] and irrigating their big lands in summer where others have to struggle even for drinking water. Interestingly, these households on asking why they do so, said, "*Since, we own these pumps, we draw water from this small patch of ground and then fill big ponds, in this way we allow ground water recharge more effectively for larger area.*" However, this pond water is used for irrigating personal land and selling water to those who need water for irrigation and drinking purposes. In addition, it is observed that hand pumps in these areas, where there is unprecedented drawing of water using pumps is done, are mostly dried up in the beginning of month of April.

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[3] All these rough estimation is given by villagers.
[4] Ponds dug personally at their land for collecting water using submersible pumps.

5.5 Gendered Waterscapes:

Without discussing gender, any analysis of drinking water would be incomplete. There is sharp gendering of water responsibilities when it comes to drinking water. It gets more and more complicated when it intersects with all other kind of inequalities. There have been numerous studies on caste, gender and water focussing on their nuanced relationships (to mention few, see Joshi 2002[5], 2006[6], 2011[7]; O'Reilly 2006[8], Halvorson, Sultana and Laurie 2009[9]; Sultana 2006[10]; Kulkerni 2011[11]; Cleaver and Hamada 2010[12]; Dube 1996[13]; Narain 2014[14]; Page 2005[15]; Prakash and Sama 2006[16]; Singh 2006[17]; Strang 2005[18]).

In this study of drinking water accessibility in Sonbhadra, it was found; first, that even if women are at a different place in the matrix of caste and other deprivations (economic, political, and ecological) and face discrimination in different forms, no

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[5]Joshi, Deepa. "The rhetoric and reality of gender issues in the domestic water sector: a case study from India." PhD diss., University of Southampton, 2002.

[6]Joshi, Deepa, and Ben Fawcett. "Water, Hindu mythology and an unequal social order in India." *A History of Water* 3 (2006): 119-36.

[7]Joshi, Deepa. "Caste, gender and the rhetoric of reform in India's drinking water sector." *Economic and Political Weekly*(2011): 56-63.

[8]O'Reilly, Kathleen. ""Traditional" women, "modern" water: Linking gender and commodification in Rajasthan, India." *Geoforum* 37, no. 6 (2006): 958-972.

[9]O'Reilly, Kathleen, Sarah Halvorson, Farhana Sultana, and Nina Laurie. "Introduction: global perspectives on gender–water geographies." *Gender, Place and Culture* 16, no. 4 (2009): 381-385.

[10]Sultana, Farhana. "Gendered waters, poisoned wells: Political ecology of the arsenic crisis in Bangladesh." *Fluid bonds: Views on gender and water* (2006): 362-86.

[11]Kulkarni, Seema. "Women and decentralised water governance: Issues, challenges and the way forward." *Economic and Political Weekly* (2011): 64-72.

[12]Cleaver, Frances, and Kristin Hamada. "'Good'water governance and gender equity: a troubled relationship." *Gender & Development* 18, no. 1 (2010): 27-41.

[13]Dube, Leela. "Caste and women." *Caste: Its twentieth century avatar. New Delhi: Penguin* (1996).

[14]Narain, Vishal. "Shifting the focus from women to gender relations: Assessing the impacts of water supply interventions in the Morni–Shiwalik hills of northwest India." *Mountain Research and Development* 34, no. 3 (2014): 208-213.

[15]Page, Ben. "Naked power: Women and the social production of water in Anglophone Cameroon." *Gender, water and development* (2005): 57-76.

[16]Prakash, Anjal, and R. K. Sama. "Social undercurrents in a water-scarce village." *Economic and Political Weekly* (2006): 577-579.

[17]Singh, Nandita. "Women Women's s Participation in Local Water Governance Understanding Institutional Contradictions." *Gender, Technology and Development* 10.1 (2006): 61-76.

[18]Strang, Veronica. "Taking the waters." *Gender, water and development* (2005): 21-38.

matter where they exist. Second, gendered accessibility to water is multi-layered accessibility, which means that, women have to cross several levels of barrier in order to fetch water for the household. Third, the study of women's relation to water is incomplete without studying it with relation to men. This suggests that role of men in regards to drinking as well as other kinds of water at both household and community level has crucial impact on women and water relation. Fourth, how space and spatiality is used as a tool to limit water accessibility to women and hence, making it worse for them.

5.5.1 Emotional and Physical Burden:

It is not surprising that domestic water collection and management is always considered a women's task. In Kushmha villages, where drinking water is mainly collected at hand pump sites; this task is not limited to one or two trips but several trips are made in a single day. Water collection starts early morning around 5am and ends at 10 pm in the night. The entire day revolves around water. Water is intertwined with their lives that it influences almost all other activities in it. It was found that there are two 'peak' times, in the morning and evening, when almost women from all households go at hand pump sites to collect water. It is usually around 5am to10 am in the morning and 6 pm to 8pm in the evening. During these peak hours, the crowd and water collected at hand pump sites is highest. Other trips taken in a day are not time restricted but a continuous process of water collection to fulfil household water needs. As analysed in the previous chapter, distance covered and time taken to collect water depends on several other factors. Caste, access to personal/public hand pumps, location of hand hump, site of hand pump, whether congested or not, whose house is nearest to the hand pump, whether men are present at site or elderly women, who is allowed to take how much water in one trip etc., determines who faces what kind of problem during water collection. Hence, it is clear that water collection is not just walk up to the site, wait for your turn, fetch, and come back. It is rather a collection of stages of water collection, where a woman goes through multi-layered arrangements that often changes on daily basis, seasonal basis or any change inflicted in the given waterscapes.

a) Water Collection as Physical Burden:

The amount of physical burden on women depends much on distance of main source of drinking water. As, we have seen that in Kushmha village, most of the hand pumps are located within 70-75 meters, then, how it is even a problem when in other areas water points are located not even within 1 km of range? However, visiting these water points and closely observing the challenges attached to it tell us a different story. The visible availability of hand pumps located at much smaller distance somehow, make these challenges invisible to many of us who are 'outsiders' to this job but interested in making accessibility to water more equitable.

There are common incidences of women not going to the nearest hand pump available but decide to walk to the next hand pump to collect water. In addition, selection of hand pump is not same for the entire day, which means they may go to a particular hand pump at certain time but different for other occasions. The reasons for such decisions may depend on many factors. Such as, presence of men at water site, if men are taking bath or stop by to use water from hand pumps, other women have to stop and wait for them to finish. If men or elderly women are present then it is not allowed for newlywed or younger women to go at water sites. It is simply not sanctioned by the societal norms and values attached to it. Thus, these women either wait for them to go or just decide to walk longer distances. Hand pumps which serve more than 50-70 households (comprises of mostly Dalits, Muslims, OBCs) are crowded most of the time. Each time before making the trip, women have to estimate crowd beforehand on a daily basis. All these factors are compounded in summer season due to increased interruption and breakdowns in water supply, which is common for mostly heavily burdened hand pumps.

However, not everyone is lucky to have hand pumps within 70-75 meters. As we have seen in the previous chapter that the distance to main source of drinking water varies for different caste groups and for few, there is no hand pump available. This increases physical burden on women especially as they are the water collectors of the household. Few households also use bicycles to carry water, which is mostly done by young girls of the household.

b) Water Collection as Emotional Burden:

Water collection becomes an emotional burden on a daily basis. Each time when women have to go at hand pumps to collect water, they have to be mentally prepared and ready for what is going to happen. At peak hours, there are common incidences of conflict and verbal abuse. If there is crowd, often there will be arguments among women and sometimes with men. For example, a woman said, *"at morning there are so many buckets lined up, each one should wait for their turn to come. However, when water in hand pumps goes down, everybody starts fighting for their chance, as water will come only after 5-6 hours. Many times, they push my bucket out of the queue because my house is farther than most of them. Households nearest to the hand pump think it belongs only to them. Therefore, they should take water first. You see, my house is at a distance and I come early, even then, I don't get water and have to wait for the next trip."* All these negotiations are very common each time they a make a trip. On average, one household makes 8-9 trips in a day. Each time, no matter what, they have to deal with one or collection of such issues.

In a village, where people live a communitarian life, personal relation with neighbourhood as well as with others is very important. The social structure of the village is so rigid that it is made sure the all the caste and gender based 'norms' and 'values' are strictly maintained. There were many households in the villages, which had not so pleasant relations with families who have hand pumps installed in their households. On asking the women how they managed to collect water at those hand pumps, they said, *"we have to go at their hand pumps as there are no other hand pumps we can go at. It is already pre-decided which household will collect water from which hand pump. In addition, it is more strictly followed during summers or at peak hours. We have to go at hand pumps even if our relations are not good. They abuse us and our children, but, we have to bear that insult every time because nobody can live without water."*

"Water is all we have in our minds," said a women who was returning after washing clothes from the pond. She said, *"We send our young boys and girls every now then to keep an eye on hand pumps. As soon as there are only few people, then we go at hand pump to collect water. This process goes on the entire day. In summers, it gets worse because hand pump dries out very soon."*

Water collection is an emotional burden for women as they are solely responsible to collect water for the household that is a 'domestic' activity. This gendered nature of water has different implications for different groups of people. In addition, one way it is mediated through is emotions, which is not only individual subjectivity but is embodied in social, spatial, as well as ecological relations with water.

5.5.2 Household Responsibilities in Fetching Drinking Water:

Drinking water collection is considered women's job until and unless it is not productive. Much literature on women and water has shown how the nature or kind of water is also gendered and have gendered implications on its access, use and control (see Zwarteveen, 2011). Who is taking responsibility to collect drinking water in the household is not a choice but is sanctioned socially. For example, in Kushmha and Orgai village, SC and OBC women also have to work at fields as construction labour or agricultural labourer along with going to hand pumps and collect drinking water. These women can go to fields and do economically productive jobs to support their family, while upper caste women and also OBC women who are economically well-off are not allowed to do so. It is seen as disrespectful in these households, if their daughters or daughters-in law work outside or share economic burden with men. However, for SC and OBC women who can work on the field or as labour (MNREGA) do not gain any respect rather it adds up to their burden. In summer season, when there is scarcity of drinking water, they have to stand in the queue and walk longer distances with more humiliation and conflict to collect drinking water. Due to this, these women have to manage both with other household (domestic) responsibilities. In many cases, men work neither outside ('productive') nor inside ('domestic') home. Women who are not able to manage both mostly during summers, they have to give up on economically productive work as against domestic work because nobody takes up the responsibility. In this way, there is cut down in their income which is already too low. On asking one woman, why don't you ask your husband to collect water and you can work on field if he doesn't like to work outside? She laughed looking at my face and replied, "Have you seen such thing in your life ever?" I could not answer.

5.5.3 Dalit Women and Water:

In both the villages, there is lesser number of hand pumps for Dalits (only 1 in Orgai) which makes their accessibility to drinking water more challenging. An old Dalit woman said, *"Before this hand pump we had only one well which was the dirtiest in the villages, now we have hand pumps, which are out of order most of the time. These hand pumps have red water with white worms. The busiest hand pump of the village is in our locality."* Most of these women work as both construction labourer as well as caretaker at the household. In Kushmha, there are almost 15 hand pumps in Dalits' locality. The Dalit locality, which the villagers call 'harijan basti', has large extension towards outer side of the villages. The houses are scattered over large distances and separated by huge fields (see photo). The number of hand pumps in proportion to its area is very low when compared to the main/central villages where the majority population lives. The land is very dry, absence of any source of ground water recharge[19], highest number of non-functional hand pumps (out of 15, 3 are non-functional), frequent need of repairing hand pump etc, make it harder to access drinking water. In summer season, all these woes multiply. The conflict, humiliation and verbal abuse is so common at these water points. One Dalit woman said, *"There are very few hand pumps in our locality[20] which we can use. One hand pump is just in the front of Savitri Devi's house, former Pradhan, who only installed this single hand pump during her entire term. Another hand pump has been installed by one who calls himself a Dalit activist, that too just in front of his house. Likewise, few other households, even in this locality, use one or two hand pumps individually. They think they are different from us. We are left with one hand pump, which serves 80-100 Dalit households. There is always crowd at our hand pump. Since early morning, women keep their buckets and wait for their turn. If somebody needs more water (more than 2-3 buckets) in the morning, people start fighting. In this way, all women are engaged in collecting water all day. We have to manage by making several trips. We keep a*

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[19] There is only one pond in the village which is already dried up (March 2018). This pond has been selected by the Panchayat to clean it up under MNREGA, and Dalits are exclusively given this job. However, the problem is instead of cleaning the pond so that water is collected during monsoon, the soil which is taken out, is kept near to the pond. So, when there is rain this soil is still there and the process of desilting remains incomplete and useless. People do this deliberately so that they can have the job for longer time. There are many incidences that even this job is given on the basis of relations with Panchayat (current Pradhan of Kushmha is a Dalit Woman) which excludes many women who wants to work for survival (one widow woman reported).

[20] Dalit locality is also divided into 2 broad areas. One is nearest to the main/central village but isolated and second is extensive outermost area of the village. Number of hand pumps in the locality near to village is higher than the second.

watch at the hand pump whether it is free or not. If water level is good enough, women get to wash their clothes and bathe children at hand pump site, which reduces the burden of carrying buckets of water. However, in summer season, this burden increases. So, we cut down our usage of water as there is no other choice left for us."

Being at the lowest rungs of the society, these people have to face the adverse outcome of 'natural' and 'manufactured' water scarcity. This social exclusion to access water does not take place without any reference to ecological, spatial, and political relations that is embodied through these relations. For instance, if the hand pump in this locality is dried up, broken or needs any kind of repair, they have to go to next nearest hand pump until it is repaired. However, since hand pumps are located at larger distances, they have to walk longer and wait longer as households near to the hand pump will take water first. Therefore, in summer season as they said, most of the time it is no guarantee if even they walk off longer distances, that they would get water. Second, the only alternative sources they have are well and pond. Well is owned by former Dalit Pradhan, is not allowed for others to use during summer as they keep it exclusively for themselves. The only pond, which has water in summer, though little, is used for cattle and other livestock, washing clothes etc. Due to unavailability of drinking water, many Dalit household use that pond water for drinking purposes. However, now there is an effort to restrict pond water for only temple purposes (explained in the latter section of this chapter). This means, there is no alternative source other than other hand pumps for Dalit people. Interestingly, Dalits have always lived in isolation from the main village and, in this case, water is effectively used to re-enforce this isolation. The hand pumps in other localities, which are not so far from the main villages are restricted for Dalits. A Dalit woman said, *"We cannot use the hand pumps of other locality which have water even in summer season. They say, go and repair your own hand pump, dig deeper, collect money from your community. But, our land has no water. There is no method of recharging ground water. Our only pond has been taken over by these people and our hopeless men are digging up the pond for money that does not have water when we need it. We tried using other communities' hand pump. They take away their buckets kept at the site in fear of us touching them. They wash their hand pumps after we have touched them. I do not understand my child; untouchability is among us, humans. If they have*

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problem in touching us, that is fine. But, how touching hand pump or flowing water would harm them. Water is under ground. We can never touch that water."

On asking other communities (mainly OBCs, as upper caste live far away from Dalit locality) if they will allow Dalits to use their hand pumps during summer season, said, *"Panchayat has installed hand pumps in their locality, so that they do not come here."*

In Orgai village, the Dalits have only one hand pump in their locality, which is not isolated as in Kushmha village. There are many entry points to the village (mainly two). From one of the entry points, the first community hand pump other than school and farmlands is for Dalits. There is one big pond just by the road. This pond, Dalits have been using for years for domestic and livestock purposes. However, this pond has been restricted to Dalits from using as a Chauhan family (with the help of current Chauhan Pradhan) has taken it on lease. He is using this pond for aquaculture by filling water in it using submersible pump. For years, nobody took initiative to clean and desilt the pond, which is very important for its management, but this year, when I was crossing that pond, I saw bulldozers cleaning the pond, so I took one photograph. After 5 minutes or so, I reached at Pradhan's house for an interview. The first question he asked me, have you clicked a photo of pond, as he had been informed of it. Suddenly three men came and took the camera which was kept on the table and started checking. I somehow managed to take back my camera and started my interview. This incident indicated the rigid power structure and relations that are maintained using *water*.

The common characteristics of hand pumps in Dalit locality are bad water quality, need of repairing hand pumps at least 3-4 times in 6 months duration, water level goes too low as summer approaches, number of households dependent is comparatively too high etc. Other features are present, such as, no availability of alternative sources, incidences of humiliation, shame, conflict are high, and lack of political and economic power etc. makes accessibility to drinking water difficult for Dalits and especially for Dalit women.

In Kushmha village, the current Pradhan is a Dalit woman who has been trying to win for the last few years. She has been actively involved in politics and considered very vocal in the village. However, after talking to different groups of people in the village,

everybody had a different view about her. A Dalit woman said, *"She won this election on general seat. She does not consider herself as one of us. She is not at all concerned for our issue. We voted for her because she belongs to Dalit community. She goes to her parent's house every now and then. She does not even have time for the village. She never speaks up for our concerns in any of the meeting."* On talking to other Dalit people, they also shared same sort of opinion about her. I tried to take her interview but she refused. She simply gave two-three answers about hand pumps in the village. She has not installed any hand pump in Dalit locality during her term; however, she is fast in repairing the hand pumps of who so ever complains. A Dalit man, who was a representative of his ward few years ago said, *"There are total 13 wards in the village and we represent three wards as our population is highest. In Panchayat meetings, each ward representative's presence is necessary. Yet, most of the time meetings happen without us getting any information about it. Nobody has listened to us for years. Two times, we have had a Pradhan from our own community but it has not made any difference to our situation. We have presented our request for hand pump installation many times in these meetings. All the 13 members have to agree to get it passed. It is almost 3 years, nobody heard our request."*

The power structure is maintained through social (caste and gendered) structure, Panchayat politics, manipulating ecology of water and use of space (in this case maintaining social distance by systematic hand pump installation) in a way to effectively control, use and access to drinking water.

The woman Pradhan who is affiliated to Bahujan Samaj Party (BSP) that represents Dalit concerns is not appreciated by OBCs and Upper caste that supports Samajwadi Party (SP) and Bahrtiya Janta Party (BJP) respectively. However, interestingly, the maintenance of rigid power structure is based on centuries old caste based social structure of the village. In spite of political win for Dalits in Panchayat election, it has failed Dalits to move up even a little in the power structure of the village. For example, in focussed group discussions with Dalit men and women, they said, *"the Pradhan's husband is a drunkard and often is beaten up by Thakurs and Kushwahas. And, the Pradhan has no power to stop it. She does not react in any way. As she is surrounded by her mantris (the ward representative of Kushwahs/Mauryas and upper caste) and she is the queen. She enjoys her status this way. She cannot listen to us because; she does not have power to do so. During her term, only Kushwahas,*

Pandits and few Prajapatis have installed hand pumps in their houses using jal nidhi programme."

In this case, it is evident that drinking water, which is mostly fetched by women, is controlled and managed mostly by men. The presence of a woman in the political structure of the village is nullified based on gender and caste. Such proxy representation of both gender and caste is not new especially in case of drinking water (see Singh 2006;Kulkerni 2011). Women are being dispossessed of drinking water resources and excluded from decision making for its management in which they invest all their energy (emotional as well as physical) all day long.

5.5.4 Muslim and OBC Women:

In Muslim lane, mostly Muslims, one Brahmin (Chobey), and few Chaurasia households are there[21]. For all these people there are total of three hand pumps available. One (let us say A) is outside Masjid, which is not in this lane but little outside. Second (B), one is in front of a Muslim family and the third (C) is in front of the Brahmin family (see photos). There are around 40-50 Muslim households in the village. For them, there are two hand pumps installed under minority quota (Masjid and one in front of Muslim family). Generally, 10-15 Muslim households fetch water from Masjid (A) hand pump. Other Muslim households collect water from B. In addition, all other Chaurasia households (around 10-15) also collect water from B hand pump. At C, hardly anyone goes to fetch water because of bad behaviour (mostly abusive but considered the most respected family in this lane). Therefore, C is restricted only to Brahmin family. Even Chaurasias are not allowed to use Brahmin hand pump, forget about Muslims. The hand pump B is installed in a very small space and has drainage problem. Whenever people take bath or wash clothes or even while fetching water, the spilled water flows all over the road, which is a constant issue of fighting. The Muslim man who has B hand pump in front of his household, was complaining, *"This hand pump is installed under minority quota. You see, how they have installed it. Used water mixed with soap flows all over in front of my house. These people come, take water and go. We have to clean it every now and then. When water level goes down, water becomes red.*

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[21] Muslim households can also be found in other parts of the village mostly with Dalits, Sharma and Chaurasia. These households are mostly scattered in the outskirts (northern) of the villages.

Photo 1, 2 and 3

(A)

(B)

(C)

Plate 2: Hand pumps A, B and C

Map 5.5 Location of Hand pumps in Kushmha Village

Source: Field work carried out in March 2018

and houses white worms. We have to drink that water. This hand pump is for Muslims but even these Hindus come, and take water. We just keep cleaning it all day."

However, other Muslim women who fetch water from hand pump B, said, *"We only take 4-5 buckets at a time. We do not take bath at hand pump, instead, he and his family take bath, wash clothes etc. Yes, sometimes we do wash our clothes at hand pump and that is because carrying water is difficult for us every time. However, they are the ones who waste water and then scream as if we have done it. He abuses women and our children. But, we need water, or else, where would we go? We are so habitual to his behaviour. We call him a mad man."*

By looking at the picture of hand pump, we can see the space around hand pump B and C. C is quite spacious, comparatively clean and is dug 200feets. It does not dry in summer, only when water level goes down, they have to wait for 4-5 hours and then, water comes again. While, B is in a congested space, drainage problem, water quality is bad as water level often goes down and also dries as soon as summer approaches. It is only 150feets dug deeper. However, C is only used by Brahmin households while, others have to go to hand pump B. Due to overcrowding at B, there is high incidence of fights, abuse, humiliation, shame (mostly Chaurasias) etc. on daily basis. Women and children (mostly girls) have to face this emotional torture on a daily basis and they have their own tactics to deal with this. These daily negotiations to access water have become a part of their life.

In a group discussion with Muslim women, they said, *"In next few days, Muslim men have decided to re-bore hand pump (A) inside Masjid. They say that, this hand pump was initially installed for Masjid purpose. All men need to wash their hands before Namaj. This is the only hand pump we have nearer to our house. Hand pump B is already very crowded. We can't go to hand pump C either because we are not allowed to touch Brahmin's hand pump. We are not allowed to enter Masjid by religion. The other hand pump D is near the temple. The next hand pump is non-functional. The last hand pump we are left with is in the Harijan Basti that is approximately 1km far away. Will our men go inside Masjid to fetch water?"* (see Map)

The hand pump A used by Muslim women is being restricted by constructing a wall. They are planning to break the previous wall of Masjid gate to extend it up to the

hand pump, so that, it becomes convenient for Muslim men. Such bordering of hand pumps will out rightly exclude Muslim women from having access to water. This is an example of how space and borders are being used to control water. These spaces are not neutral but have embodied social, religious meanings. In Map 1, we can see how access to hand pump for these Muslim women has been controlled. Interestingly, when I asked the villagers about the name of the pond which is *Sri Ram Jalashay* on google earth, they did not know that this pond even has a name. However, BDC of the village is well aware of the name. During my visit, in March, 2018; the construction of *Ramleela Stage* was going on. They celebrated *Ram Navmi* on that stage in the last week of March. The villagers now have decided that, this pond water will only be used for religious purpose. Therefore, Muslims, Dalits and OBCs who used pond water for other household purposes and livestock is now restricted.

Such bordering of hand pumps and restricted access to hand pump is not only limited to Muslim women in Kushmha but, also for Chaurasia women in the northern part of the village. These families are very poor and do not have any hand pump near their house. They depend on well water which is dirty and dries up in the summer. They have to walk a distance of 1 km to fetch water. The only hand pump which was near to their house is 50 m away. However, the power house construction that is going on for a year has now decided to take the hand pump inside power house. The villagers are willing to do that as, for electricity and people working in power house must have hand pump (see photo 2).

In Orgai village, a household (Maurya) which has almost all sources of water available like well with mono-block motor, submersible pump, well on farmland, small hand pump (80 feet) and a government hand pump installed under *Jal Nidhi* programme. The man in the house, said, *"I installed this hand pump paying 33% of the total cost. Rest was compensated by the government. This hand pump is broken; hence, we built this wall. We do not need this hand pump as we have well and submersible pump."*(see photo 2)

A certain kind of spatial setting of hand pumps is used to control access using several tactics like constructing a wall around it. By doing so, new meanings, rules and norms are attached to the space. According to newly created spatial meanings, the pattern of accessibility to hand pumps changes. The hand pumps are physically present there but not accessible. From next day, the hand pumps are turned from 'living' to 'dead',

'visible' to 'invisible', accessible to non- accessible or limited accessibility to hand pumps for a few against the majority.

From the examples above from the village, it is observed that how spatial setting of hand pumps, cultural practices, economic and political power, given ecological setting, lack of information (e.g. name of pond; how information is withhold within the community or group of people to carry out certain intention) is interrelated and entangled in complex ways. These complexities are crucial in understanding the control, use and access to drinking water. The spatial setting provides the tool/tactics to control water to maintain the status quo by re-enforcing caste, gendered, religious code of conduct. Undoubtedly, water plays a critical role to maintain the power relations in both the village.

Photo 4 and 5:

Photo 4:
Hand pump
in Orgai

Photo 5:

Hand pump
near Power
House,
Kushmha

Plate 3: Bordering hand pumps in Orgai and Kushmha village

5.5.5 Men, Women, and Water:

To understand women's water troubles, one must pay attention to men's role in regards to drinking water and other kinds of water sources (irrigation, canal, pond etc.). This can only be understood in relation to men. If, it is not necessary to add women and water with other aspects related to men, it is not sufficient either. This is explained through observing men's role in water, which has direct implications on women and water in Kushmha village.

In Kushmha village, after the coming of hand pumps, and electricity that enabled easy access to canal water; the meanings associated to water have changed. Moreover, with this new technological intervention, the socioecological relations around this new kind of water are also changed. And, this has implications on how water interacts with society, ecology, space, and history. It becomes important to understand how men respond to the newly created waterscapes because; they have the control over resources. Therefore, their response has also implications on relations of women and water. In addition, not all men have the equal capacity to affect the complicated relations of water and society. For example, men from different caste, class, religion face different kinds of water problems. During Panchayat meetings, application by Dalit man for hand pump instalment in their locality is not heard for years while, a Brahmin man can easily install hand pump inside their house.

As drinking water collection is primarily given to women, therefore, most of the humiliation, verbal abuses etc. are faced at water collection sites. There is no case of direct confrontation of upper caste woman and lower caste man while, the opposite normally happens on daily basis. Direct confrontation of lower caste women to upper caste men increases their proneness to get harassed and humiliated at water collection sites.

At household level, the relation between man and woman also has impact on women's water burden. Women's emotional burden is affected by how their men behave. In some Dalit households, men suppress their wives and disrespect their water collection task saying, *"What do you do all day? You just carry water and scream."* The husband keeps fighting only making work more difficult. One woman said, *"My husband does not work. He only smokes weed and drinks. I have to carry water walking 1km daily. I make 9-10 trips in a day. I also work as a construction labourer*

and take responsibility of my four children. And he says, I do nothing. Only thing he does is fight and beat up children for no reason."

In some cases, men were involved with their women in water collection, not helping her in physical work of water collection but at least emotionally. They recognized their difficulty of work, tried to voice their water problem in meetings and some times also helped in water collection during scarcity months. One woman said, *"at least, my husband understands my water collection work. Some time, when I am sick, my husband goes and collects water."*

This shows that having good emotional environment at home makes a difference in women's water work. Not so significant, but cannot be ignored either.

5.6 Changing Waterscapes:

The change in waterscape of the village with time gives us more clarity on the changing socio-political ecology of water. This is explained by studying the change in waterscapes in Kushmha village. For convenience, let us call the present waterscapes as W2 and the past which is the collection of earlier all waterscapes as W1.

The change in waterscapes of Kushmha village, if we look at macro level, happened with the first introduction of hand pump in 1995. The waterscape of wells, ponds, small hand pump changed to hand pump, electricity that made it easier to take out water form canal. In W2, more emphasis is shifted towards having access to hand pumps. However, in W1, more focus was on wells, pond management (indigenous method of desilting), and maintenance of Baulis. These public sources of water have lost attention with the introduction of new technology in both drinking and irrigation water. Second trigger point can be said to be the drought in 2000. This drought was seen as the wakeup call for the villagers. As, it was 'visible' crisis of water this time, people needed to cope up. The reaction of villagers to this visible crisis of water led to more control over and access to technology to fix the problem.

The highly stratified society based on caste, class, religion, and gender along with uneven fragility of ecology, affects the capacity of different social groups to cope up the given water scarcity. Thus, the response to and effects of the crisis differs for different groups of people. The responses can be understood as temporary or

immediate effects/response and long term effects of the changed waterscapes. (See Fig. 1)

The water scarcity has become a real issue in Robertsganj block since last 5 years. Before that, as villagers said, at least hand pumps never dried up in summer. However, in recent years, hand pumps dry out as the summer starts. Villagers have to face water problem all through summer. They are only relieved when monsoon arrives. When I was in the village, the panic among villagers as the summer was getting closer day by day could be seen very clearly.

The immediate response is restricting access to water for some so that others can have required amount of water. For example, last summer the pond water was accessible to neighbouring villagers for their livestock to drink water while, this summer they are not allowed to do. The second reaction is bordering hand pumps as we have discussed in this chapter. To be safe, many households who can afford, in some cases group of families; have installed personal hand pumps up to 250 feet by paying around 70-80 thousand rupees inside their houses. While some still have to drink contaminated well water as they do not have access to hand pumps.

The long-term effects of the present waterscapes are first, boring hand pumps more than 200feets while hand pumps bored by Panchayat are only 100-120feets. In addition, personal boring is more near canal area where it is not much required. Thus, with uneven ground water distribution, such pattern of hand pump instalment leads to inequality that will deepen more with increased visible crisis of drinking water.

Fig. 5.1 Changing Waterscape of Kushmha Village

Changing Waterscape of Kushmha Village

W1
(Waterscape in Past)

W2
(Waterscape in Present)

- Wells
- Small Hand pump
- Ecological setting
- Social setting
- Spatial setting

Trigger Points

1. Hand Pump, 1995
2. Drought 2000

- Tracing Immediate and Long term effects

Long term:

- Depth of personal hand pumps boring up to 250 ft.
- Associating new culture to pond (constructing Ramleela stage near pond)
- Reduced indigenous methods of cleaning pond
- Reduced construction of *Baulis.*
- Introducing Submersible pump.

Temporary/ Immediate:

- Pond for livestock of neighboring villages has been restricted.
- Increase in personal Hand pumps.
- Muslim women's access to Masjid Hand Pump
- Using collected rain water in ponds for irrigation etc.

_____ Past

_____ Present

_____ Point of Change

5.7 Plurality of Waterscapes:

Plurality of waterscapes can be understood as the different forms of waterscapes where the factors intertwined internally are somewhat different. The waterscapes of Kushmha and Orgai which are only 5 km away from each other shows a stark difference in access to drinking water for different social groups (as we have seen in the last chapter). It becomes crucial to understand why despite close proximity and similarity in other factors such that broader social structure, political, economic, and cultural aspects along with fragile ecological conditions, there exists highly unequal access (in Orgai as compared to Kushmha) to drinking water. The socio-political ecological processes that explain the varied pattern of accessibility to water gives us an idea of how control over water resources produces and reproduces over time and space.

In this section, the different main sources of drinking water in both the villages are studied as to understand how it affects the dynamics of control over water resources. As discussed in previous and this chapter, Kushmha waterscapes is primarily 'Handpumpscapes' which controls the major waterscapes while, in Orgai it is more of a 'mixedscapes' of Submersible pump, well with motor, hand pump and others. It is interesting to point out the Handpumpscapes where accessibility to hand pump is much better in Kushmha as compared to Orgai shows difference in accessibility to drinking water for all social groups.

5.7.1 'Handpumpscapes' in Kushmha

In Kushmha village, the wells, ponds and Baulis which were the part of the waterscapes are now disappearing at fast pace. The hand pumps after 1995 have become the main factor in the waterscapes of the village. The spatial distribution of hand pumps and its accessibility through different channels determines the accessibility to drinking water for different social groups. While, in Orgai, where there are hand pumps on which the majority of population is dependent, however, access to submersible pump and well with mono-block motor has implications that are more serious on control over drinking water.

5.7.2 'Pondscapes' in Kushmha

In Kushmha, to understand ponds (its history and present), we need to look at the three main sources of irrigation, i.e. canal, ponds and baulis and rainfall. Kushwahas

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are the community who works 12 months in agricultural field, thus, need water for irrigation almost all months except monsoon. They extract water using motor pumps directly from canal while, others depends on collected rainwater in ponds and Baulis. Also, there are channels carved out from canal for irrigating small patches of land given by government to Dalits and OBCs. However, the water level in canal is already very low during summers that it hardly reaches these channels. Whatever the water level is in the canal, Kushwaha communities take it. Recently, they have restricted any livestock to drink water from the canal that was not the case in last summer. All these have implications on ground water recharge, and, more importantly, due to lack of irrigation water for others, they solely depend on collected rainwater in ponds. Before hand pumps, women in the village used to go to ponds and used the mud around pond for their houses. This indigenous practice of cleaning the pond has died out since hand pumps have come in the village. Moreover, as soon as the water is collected in pond, it is immediately taken by the landlords for irrigating their land which does not give time for ground water recharge. Due to this, hand pumps remain dry for longer period. The ponds are disappearing primarily in four ways in the village; lack of pond management, irrigation water, rainfall deficiency, and reduced/restricted use of ponds. In addition, recently, Land mafias are selling the dried out pond's public land that is mainly used for irrigation purposes.

5.7.3 'Pondscapes' in Orgai

There are 4-5 ponds in the village. All the ponds have dried up except one which is taken as *theka* by one Chauhan household which is near the pond. He has paid 70,000 rupees to the Pradhan. He is owner of this pond since last year. He fills water in the pond using submersible pump and uses it for fisheries and sells it. Other ponds are dry in this summer season. He said that we are filling this water and because of this water is being recharged for others. The nearby school hand pump does not dry out in the summer due to this very reason. Other ponds lands are filled in monsoon season but it is again used for irrigation purposes by few families. However, ponds are outdated as the management of ponds is poor and hence, the recharging capacity of underground water by ponds has been reduced drastically. One of the main reasons why ponds are being neglected is because the land of pond when it is dry is used for growing vegetables and also given (*patta)* to a single household who holds some kin relation to

the powerful families in the village (Chauhans and few Mauryas in this case). The land area of ponds is also reducing with time.

There is also an increase in number of households who are digging up pond in their large lands to collect water using submersible pumps and wells. However, other people are not taking interest after seeing the failure of ponds that are being dug on personal lands. A Thakur family, who has a pond in his backyard, fills water for irrigating vegetables grown in a small patch of land. There were also one Chauhan and two Maurya families who fill water in their personal ponds using submersible pump and well for personal usage.

5.7.4 Wellscapes in Orgai

As the Pradhan reported, there are no public wells in the village. However, people own wells inside their houses, in their premises or in the farmlands. There are 11 bigger wells with diameter 10-12 feet in the village which are owned by Chauhan (4), Thakur (2), Patel (1), and Maurya (1) caste groups. While, there only 5 smaller width wells owned by Chauhans (2), Maurya (2) and Patel (1). Almost all the wells are personally owned and hence, other people are restricted to use it. Most of these wells have mono-block motors attached to it to pull up the water and used for irrigating farmlands as well as small patches of land where they grow vegetables etc. These wells are locked inside a small room so that nobody can come disturb the setup. There is a well owned by a Brahmin family which is just in front of poor Maurya communities' hand pump. People said, *"In summers, when our hand pumps dry out, we have to walk longer distance. That too does not guarantee if we will get water. This locked well is just in front of us. In summer we could see the well with water. But, we cannot touch it."*

5.7.5 Submersible Pumps in Orgai: 'Pumpscapes'

The Pradhan reported that there are 13 households who owns submersible pumps which includes caste groups Chauhans (2), Mauryas (6), Kushwaha (2) and Patels (3). The other households of the same caste group mostly have well with mono-block motor and others are poor who are either dependent on the hand pumps in their neighborhood (share water from same kins' personal hand pump based on personal relation) or have to walk longer distances to get water. Most of these houses who own submersible pumps are *pakka* houses and have more assets as compared to rest of the

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villagers. However, on observing the village one can see the long thick black pipes enveloping the village. There are more black thick pipes as compared to hand pumps. One has to invest around 1 lakh rupees in order to set up a submersible pump. Not everybody in the village can afford them, but few. And, most of the underground water is being wasted because it is very easy to access. While, others have to walk long distances in order to get merely 2 buckets of water.

5.7.6 Emerging Water Sellers in Orgai village:

In Orgai village, since ground water availability is spatially varied there is more thrust towards controlling water. At few places ground water can be accessed at just 80-100 feet while there is no water even if they dig 250-300 feet at other places. Due to which, where ever it is possible to access ground water using submersible pump, huge amount of water is drawn from irrigation purposes to domestic purposes. Many people dig up small ponds on their lands and fill water using pumps and sell it irrigation at 1000 rupees per *bigha*. And the price rises as the summer approaches as the cost of water drawing increases (as they say). Most of the households who have a personal relationship with these submersible owning families (as tenants, laborers and kin) have to depend on them for their water requirements. Many families buy water to irrigate their small patches of land so that the survival is possible. In summer season, as there is acute drinking water shortage due to dried out hand pumps and small wells, people buy water for irrigation and use some for drinking purposes. Therefore, these submersible pump owning families tries to cover their installing cost by selling it and in long run, their water becomes almost free for them while others have to pay for it even for drinking.

Photo 6 and 7:

(A) Hand pumps in Brahmin households in Kushmha village.

Photo 8 and 9:

(B) Hand pumps in OBC's household (Photo 8: installed under Jal Nidhi govt. programme) and personally installed hand pump inside bathroom by paying Rs. 60,000 (Photo 9) in Kushmha village.

Photo 10 and 11:

(C) Hand pump for Dusad (Photo 10) and Chamar (Photo 11)

Plate 4: Hand pumps for different caste groups in Kushmha village.

Photo 12 and 13:

(A) Hand pump for Chaurasia (Photo 12) and Muslim (Photo 13) in Kushmha village.

Photo 14 and 15:

(B) Well (only drinking water source available) for Chaurasia and Sonar households in Kushmha village.

Photo 16 and 17:

(C) Canal from Dhandhraul dam (Photo 16) and accessing water from canal by Kushwaha household (Photo 17) in Kushmha village.

Plate 5: Hand pump and other water sources for different caste groups in Kushmha village.

Photo 18 and 19:

(A) Well with mono-block motor (Photo 18) and Brahmin woman using well water for household purposes (Photo 19) in Orgai village.

Photo 20 and 21:

(B) Personal wells (owned by Thakur (Photo 20) and Kushwaha (Photo 21) on farm lands in Orgai village.

Photo 22 and 23:

(C) Hand pump for poor OBCs (Photo 22) and for Kushwaha, landed OBC (Photo 23) in Orgai village.

Plate 6: Wells and hand pumps different caste groups in Orgai village.

Photo 24 and 25:

(A) Submersible pump (Photo 24) and small hand pump (Photo 25) in Orgai village.

Photo 26 and 27:

(B) A man got hurt while using small hand pump because handle becomes too tight when water level goes down in summers (Photo 26) and hand pump for Dalits (Photo 27) in Orgai village.

Photo 28:

(C) Pond taken on lease by a Chauhan household which wasearlier used by Dalits and livestock

Plate 7: Different sources of water in Orgai village

Photo 29 and 30:

(A) Poor water quality collected from hand pump in Dalit locality (Photo 29) and girl carrying water on bicycle from hand pump 2 km far away (Photo 30) in Kushmha village

Plate 8: Water quality and gendered responsibility to carry water

5.8 Conclusions:

In both the villages, the 'lived' experience of different groups of people in access to drinking water is different. As the locality changes the nature and kind of water they use, access and control also changes. These different experiences are based on daily negotiations and contestation to access the available water with given host of factors such as caste, gender, ecological/spatial differences and associated political and economic power. These factors are intertwined in such a way that it makes a unique case of drinking water in these villages which is historically, culturally and geographically determined and thus, making it a dynamic process. Since, all the constituent factors of these waterscapes works differently for different groups of people, they have their own 'water story'. All these water stories in a small village such as Kushmha and Orgai shows that how complex are these processes which shapes water accessibility to drinking water. However, these complexities are not completely beyond comprehension. A host of factors which we discussed in the chapter shows how water is being made available (more than required) for some while others face water scarcity in the 'same' set up.

Caste hierarchies which has been there since a century, is one of the dominant factor which influences access, use and control of water resources. These power relations and divide based on caste is used to access most of the available water by upper caste

on the one hand. While on other hand, water is used to maintain these hierarchies by excluding lower caste people. Thus, it becomes a two way process of use, control and access to drinking water which makes it a spiralling, cyclic and dynamic process. The practice of untouchability which is so evident even today in access to drinking water in these villages is the clear representation of maintaining those rigid structures.

The landed communities, who acquired political and economic power in village with time, have gained bargaining power to affect these existing water-society relations. Kushwahas/Mauryas in Kushmha and Chauhans in Orgai are both dominant landed caste in the region. The political and economic power of Kushwaha/Mauryas in nearly all the villages in Robertsganj block increased manifold when Avinash Kushwaha became MLA. He provided access to hand pumps and submersible pumps to his own caste community in the villages changes the waterscape in a major way. However, Chauhans who have acquired power in Panchayat in Orgai village have not been able to affect these dynamic processes of water control, use and access as Kushwahas have been able to do. This shows how caste ramifications have its influence not only localized at village level but proliferate at regional level.

When all these complexities intersect with gender, women regardless of their place in caste and other hierarchies (economic and political), face discrimination in access to drinking water. The problems that women have to deal within all these structure of dominance, is different for different women. Since, drinking water is the primary task of women in every household; they are the first to face the consequence of any inflicted change in the waterscapes.

All these hierarchies which are strictly maintained in access to drinking water do not happen all alone but requires host of tools, tactics in order to control waterscapes. In the analysis, it is found that how a) uneven ecology of water, b) systematic spatial arrangement of hand pumps, c) new powerful technologies, d) encoding new cultural and religious meanings of existing water sources, e) restricting free access to community water, f) making previously used water sources unavailable for people who were dependent on them etc. are used in a way to control the distribution and allocation of available drinking water. All these processes become more complex as well as deepened in summer season when the ground water level goes down.

Conclusions and Recommendations 6

This chapter gives summary of the major findings of the analysis and discussion of the research problem posed in the first chapter. It is also aimed at posing critical questions on the understanding of drinking water problem and how it is managed and governed in current water practice. Based on this, it proposes few recommendations that may be noteworthy to the current drinking water policies.

The main focus of this work is to understand how social, political and ecological conditions interact in critical ways to shape and re-shape accessibility to drinking water. To approach this question, a conceptual framework has been drawn based on literature review. With this developed understanding, 'waterscapes' as a perspective is used to analyze the social, political and ecological interaction with water over time and space.

For this, two villages (Kushmha and Orgai) were studied based on field survey and narrative based analysis to understand its dynamic relations of social hierarchy, political and economic power, uneven ecology, history and its geographical situatedness with water. Such understanding is developed by contextualizing 'lived experience' and 'everyday contestations and negotiations' in accessing drinking water.

6.1 Waterscapes: a perspective to study drinking water accessibility:

Waterscapes provide a powerful perspective to study the water and society interaction. In this study, waterscapes as a fluid, dynamic and open perspective as against holistic theoretical framework; made it possible to study nuanced water-society interaction in both the villages.

The impetus given to specific ecological setting and particular landscapes in this perspective gave an opportunity to do both empirical and detailed case studies. The fluidity and dynamicity of this approach made it possible to capture a) the fluid nature of water and society relation with change in any constituent factor for example technology (hand pump and electricity) and drought (2000) in this particular study (changing waterscapes). And, b) changing social, cultural, and symbolic nature and meaning water as it flows through different geographies (plurality of waterscapes).

The waterscapes approach foregrounds the dialectical relation of the production of unequal social ecology and new technological interventions in water domain which creates space for stringent control over access and use of water. For example, In Orgai village, the emerging water sellers has created market for drinking water in the traditional setup which never existed before. Moreover, as the water scarcity intensifies, the prices increases making it more difficult for the poor to access drinking water.

The waterscape approach focuses on the complex unequal power relations that are both obvious and subtle. The struggle to water is simultaneously the struggle to power. Such complex interrelations of power asymmetries with given geography and history is often represented in the distribution of drinking water.

6.2 Socio-political ecology of Kushmha and Orgai:

In the villages, it was found that unequal social hierarchy (caste, gender, class and religion), political and economical power, cultural practices and uneven water ecology interacts in complex ways with water which shapes and (re) shapes accessibility to drinking water. Interestingly, these processes take place on particular space and place at particular time. The following are the findings of the study which answers how such complex interactions of water and society explains accessibility to drinking water.

6.2.1   Uneven ecology:

The uneven (ecology) distribution of ground water in both the villages has serious implications on accessibility to drinking water. The 'given' uneven ecology of water is further complicated by its manipulation through different means (power relation based on caste, class and political association, technology, and space). In Kushmha village, it was found that hand pumps are dug deeper in the areas where water can be found at shallow depths while hand pumps in relatively drier areas (extremely low water level) were dug at shallow depths. Upper castes (Brahmins and Thakurs), dominant castes (Kushwaha and Mauryas) who are mostly rich than others in the village, could afford to install hand pumps deeper using their close association with the Panchayat, access to government policy (*jal nidhi)*, access to technology (hand pumps, canal, electricity and submersible pump) and historical advantage of

favourable space and location (location near canal, huge space in front of upper caste households).

In the given uneven water ecology, the areas where water level are much lower as compared to other areas are mostly inhabited by Chamars, Paswans, Kolis, Chaurasia, Jaiswal, Yadavas, Teli and Dusads. The social, ecological and spatial structure of the village is such that people who are socially downtrodden and poor are the one who face the consequences of uneven ecology the most. And, this is continuously maintained in order to keep the structure intact if not, the different forms of new configurations of society and ecology are put into place to keep the asymmetrical power relations in control and access to drinking water.

6.2.2 Unequal social order:

The analysis of primary data collected from field survey showed that in both the villages; Dalits and OBCs (other than Kushwahas and Chauhans, who are landed dominant castes) are the one who face extremities in drinking water collection. The availability and accessibility to drinking water for them is much more restricted than the upper and dominant castes. This becomes worse in summer season. The water scarcity month rarely affects the upper and dominant castes while for Dalits, Muslims and OBCs faces the most of it.

The following are the major findings:

i) The main source of drinking water for the majority is hand pump in Kushmha village while in Orgai, it is mixed as Dalits and OBCs (excluding dominant castes) are mostly dependent on hand pump while others have submersible pump and wells with mono-block motors. The upper and dominant castes in both the villages have mostly more than one source of drinking water. Most of them have personal well inside their houses and personal ponds, small hand pumps in other cases.

ii) The alternative source of drinking water is not at all available to Dalits and OBCs in Orgai village while the upper and dominant castes do not require alternative source of drinking water even in water scarce months. In Kushmha village, the situation is relatively better as Dalits and OBCs can walk to the next nearest hand pump. However, it is not as simple as said, because mostly

the next nearest hand pump is in different locality which is too far or/and they have to conform to other rules and regulations (forms of untouchability).

iii) The pressure on hand pumps located in Dalit, Muslim and poor OBCs are huge as compared to other hand pumps. The hand pumps in front of Brahmin or Thakur household is restricted for others to fetch water without their permission. These hand pumps are made exclusive on grounds of socially sanctioned norms and traditions. The dominant communities of both the villages can afford to install personal hand pumps as well as submersible pumps which require huge investment. Since, they invest money, no one can ask for water from these hand pumps.

iv) Quantity of water collection at water points depends on several factors such as crowd, water availability in hand pump (in summer season water level goes down), sources of water available (more than one) etc. The analysis showed that quantity of water available for Dalits, Muslims and OBCs is much lesser than upper and dominant castes.

v) The frequency of water availability shows the same pattern. The upper caste and dominant castes reported that they have water available 24 hours even in summer. While, Dalits, Muslims and OBCs have water available only for certain hours (depends on ground water level, interruption or breakdown in water supply, crowd at water point etc.)

vi) It is also found that the hand pumps installed mostly by Panchayat needs repair at least 2-3 in the six month duration. The water level once goes down, people have to wait for 1-2 hrs to 1-2 days depending on the season. Most of these hand pumps are located in Dalit, Muslim and OBCs' locality.

vii) Location of drinking water source is mostly within premises for upper and dominant caste while for Dalits, OBCs and Muslims it mostly far away their premises.

viii) Average distance to alternative source of drinking water especially in summer season is much longer for Dalits, Muslims and OBCs as compared to Upper and dominant caste in Kushmha village. In Orgai village, there is no alternative source of water for Dalits and OBCs. Since, they have to cope up with the water scarcity in summer season and hence, they depend on kin based social relation to access water from their (upper caste) water source which exposes them for further exploitation.

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ix) The time spent in water collection for Dalits, OBCs is much higher as compared to upper and dominant castes. It increases in summer season as they have walk longer in search water source if there is no water in the current water point.

x) The water quality is found to be spatially uneven as well socially unequal distribution. The hand pumps located in Dalits, Muslims and OBCs' locality have poor water quality as they reported red water (excess ferrous) and white worms. It worsens as the water level goes down in summer season. While water extracted using submersible pump, well with mono-block motor, hand pumps near canal and hand pumps that are dug deeper is of much better quality.

xi) **Caste, Gender and Water:** Caste and gender relations have crucial implications on drinking water accessibility. The major arguments developed in this analysis are the following.

First, even if women are at different place in the matrix of caste and other lives of differences (economic, political, and ecological) face discrimination in different forms, no matter where they exist.

Second, gendered accessibility to water is multi-layered accessibility, which means that, women have to cross several levels of barrier in order to fetch water for the household.

Third, the study of women's relation to water is incomplete without studying it with relation to men. This suggests that role of men in regards to drinking as well as other kinds of water at both household and community level has crucial impact on women and water relation.

Fourth, space and spatiality is used as a tool to limit water accessibility to women and hence, making it worse for them. (Bordering hand pumps, systematic instalment of hand pumps that restrain their access to water sources, changing meaning encoded in water with changing waterscapes e.g. restricted use of pond)

6.2.3 Economic and political power:

Economic and political power is historically acquired based on social relations of production. There is an intimate relation between caste and land ownership. These power relations are produced and (re)produced in the changing waterscapes. The landed castes (Kushwahas, Mauryas and Chauhans) and upper castes (Brahmins and Thakurs) have maintained their status quo by attracting more economic and political power based on their socially sanctioned higher position in the hierarchy. Such spiralling effect of caste as an institution makes it a living reality even in the 21st century. The axes of economic and political power have a strong influence on the distribution of drinking water in the village. It is clearly visible in Panchayat meeting, access to government policies, installing personal hand pump, private ownership of community ponds, access to submersible pump etc. The power to create exclusive rights and control over water resources and its distribution is reserved with only 'few' who are historically and socially privileged to do so.

6.2.4 Water as a material force in waterscapes:

The water has a material force and agency which defines and (re)defines the social relations around it. In Kushmha village, besides constructing *Ramleela* stage; the nearby community pond's name has been changed to '*Shree Ram Jalashay'*. This shows that not any action is taken in isolation or random but, a systemic, political and social act to control water. The new codified meaning of pond water restricts Dalits, Muslims and OBCs to use water for their household purposes. This increases pressure on hand pumps resulting lesser quantity of water availability and increase in tensions and conflicts among them.

Similarly in Orgai village, the community pond, when changed to privately owned pond (taken over by a Chauhan household), imposed new rules and regulation on water accessibility which is known and accepted by everybody else in the village.

6.2.5 Technological intervention:

Any kind of technological intervention in the waterscapes changes its water-society relations around it. The water-society relations around community wells, ponds, Baulis is entirely different around hand pumps and submersible pumps. After the introduction of hand pumps in the village, the traditional method of maintaining the

community water sources (wells and ponds) has died out. As a consequence of this, if water in hand pumps is not available, they have no other sources to depend on.

6.2.6   Space in waterscapes:

Both the physical spatial setting and symbolic meaning attached to it is crucial in waterscapes. To understand, how physicality of spaces as well as associated symbolic meanings is intertwined in a way can only be explained in relation to each other. In the study area it is found that, a certain kind of spatial setting of hand pumps is used to have control over water by using several tactics like constructing a wall around it. By doing so, new meanings, rules and norms are attached to the space. According to these newly created spatial meanings, the pattern of accessibility to hand pumps has also changed. Therefore, it can be concluded that the spatial setting provides the tool/tactics to control water to maintain the status quo by re-enforcing caste, gendered, religious code of conduct. Thus, why certain spaces are appropriated, manipulated or transformed in a particular way must be understood in relation to the available spatial inputs which can be perceived in a 'desired' way in order to execute it.

6.3 Recommendations:

1. The present study raises few questions in the current drinking water management in India which largely focuses on piped water supply. As discussed in the third chapter that majority of the population (more than 70 percent) uses hand pump as their main source of drinking water in Uttar Pradesh in general and Purvanchal region in particular. The villages studied have never seen piped water supply in their lifetime and not going to see any soon. On one hand, this shows the failure of policy to reach them and exclusion of majority of people from water policy on the other hand.

2. The Ministry of Water Resources, GOI, released a draft National Water Policy (2012) emphasizes on pricing mechanism, community participation and 'good governance' through informed decision making as an effective way to efficient water management. All these principles on which drinking water policy is based are insufficient to address the water problem.

3. Pricing drinking water directly affects the poor (mostly Dalits, Muslims, OBCs and women). Access to safe drinking water which has no substitute is essential to

survival. Thus, pricing drinking water which would make it more difficult for poor must be rejected.

4. As this study shows that how community is stratified in several kinds of differences (caste, gender and class). Hence, to assume community as a homogenous entity would only lead us to failed water policy.

5. The principle of 'good governance' needs to be aware of the rigid social structure and power relations in rural India. This study has shown that how unequal power relations in Panchayat work in favour of the upper and dominant caste to have control over water resources.

6. In the current policy, there is no mention of the need to control ground water exploitation. The policy also ignored the need to rebalance the ground water extraction and recharge. The ground water which is commonly considered as private (ground water and land ownership) is exploited with ease by using submersible pumps. There is no check on these kinds of extraction of ground water which affects the larger areas.

7. The micro waterscapes have its specific geography, history and ecology which need to be understood and given space in the water policy. The uneven ecology of water when interacts with other (social, cultural, economic and political) factors, the implications on already unequal water distribution is compounded.

8. The quantitative analysis fails to capture the complex water-society relations. For example, the hand pumps installed within 75-100 meters does not mean it is accessible equally to all. Thus, such analysis often gives misleading results.

9. Lastly, viewing water problem as a technical problem which can be solved by introducing efficient technology and making institutional arrangements fails to question the age-old hierarchy based on caste, class and gender and hence, end up producing and (re)producing exclusion based on these structures.

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