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GROUNDWATER AND THE CITY: MAPPING THE UNEASY RELATIONSHIP BETWEEN PEOPLE AND WATER IN DELHI

Introduction

That groundwater in India is overexploited has been an undisputed fact for long. However, the root cause of the problem seems to be not only public apathy to the issue but also the way water is managed and governed in the country. Using the case of Delhi, the paper discusses how different mainstream debates, concepts and actors have managed to polarize and in some ways limit the deliberations around water and failed to recognize the complexity and multi-dimensional aspects of the precious resource (see Asthana, 2011). Understanding political decisions and confronting them could be of use in bridging research –implementation gap and also filling the sustainability gap along with building consensus between policy, culture and science. The paper thus strives to unpack the complexities around water management in general by focusing on the invisibility of groundwater in public discourse and inadequate water policy and management. In the process, the paper argues beyond the narrow definition of resources in India. Looking at the situation in Delhi, particularly in South Central Aravalis (field), the research argues for a more robust, inclusive and flexible framework of policy that takes into consideration the socio-political aspects of groundwater in conjunction with environmental and physical aspects of the resource.

Aravali, the oldest mountain range in the world are undergoing a rapid transformation into the newest, swankiest pieces of real estate in and around Delhi, the national capital. The range is the only remaining patch of wilderness in Delhi and adjoining district of Faridabad. These withering hills are said to be the last barrier stopping the ingress of the Thar desert into the Indo-gangetic plains, proven to be the largest re-charge zone of groundwater for Delhi and its vicinity and last stronghold of the natural vegetation and fauna of the region. Rich in minerals, the area has been a mining hub for decades till the Supreme Court put a stop to it all in its landmark order in 2009. Today's Aravali can safely be termed an urban ecosystem, whose transformation carries with it deep ramifications for the local environment as well as the social fabric.

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Delhi and the townships of Gurgaon and Faridabad provide for the largest stretch of Aravali in the NCR with over 18 million people jostling for this space. The economic boom and the explosion of population (Gurgaon alone saw a 73% decadal growth since 2001) have put tremendous pressure on the resources and the area suffers from increasing shortages of roads, electricity, basic sanitation, and most of all water. While many of the changes in the Aravali's ecology are apparent, changes in the groundwater regime do not find as much importance in various fora.

Delhi sources about 80% of its water from the river Yamuna and from far flung rivers Ganga and Beas. Inspite of this, groundwater comprises 11% of piped supply in the city. In addition to this, some estimates put a third of Delhi's water burden on its groundwater sources through illegal and unauthorized private pumping for both household and commercial (construction, hotels, small industry, etc.) uses. Centralized supply does not reach everyone so illegal extraction of groundwater is rampant in the region.

Even though the study focuses on one part of the Aravalis in Delhi, the reason why the NCR is important here is to do with the fact that the entire region acts as one and its difficult to separate blocks of Aravalis as stressors from all over affect the hills.

Setting the Context

Primarily the study tries to contextualize the importance of Aravalis in Delhi and NCR by studying the political economy of its most important ecosystem service, water. The aim is to inform the policy debate on how best to manage water resources so as to achieve the twin goals of water security and environmental sustainability.

It goes a step further to analyse the issue of groundwater from a political ecological point of view. This would cover an analysis of motivations for water and land policy formulation, and implications of these policies on the ground as well as interactions between environmental governance (structures and process) and the general population.

An inherent part of the study is also to analyse critically the role of rights and obligations in attaining improved access to water.The notion of rights, while often referred to in the general water management debate, seems to allude to various rights simultaneously. A multitude of dimensions exist, where the human right to water is to be distinguished from 'water rights' and property rights in water resources.

The research starts with an examination of the reason(s) for the water crisis in the Masoodpur and Vasant Kunj area. The central groundwater board states that except in south Delhi and Aravali belts, the groundwater in NCT is brackish and unsuitable for consumption. Despite the area being ecologically

important and already under pressure, the Delhi Development Authority chose to construct the Vasant Kunj colony by acquiring land from Masoodpur and surrounding villages in the 1960s and Seventies. This area has had a history of water shortages and there is always a tussle between the affluent colonies and the village and slum clusters in the area for access to water. I will examine this issue and see how the scarcity pans out politically, socially, economically and ecologically.

Background

The current literature on the state of water resources in and around Delhi centers on either the physical approaches, or socio-economic, political ones. Not many approach or delve into the political nexus that plays a pivotal role in framing policies, use and distribution of resources in the region. My research will simply tell the story in the context for which it has not been told- the political, technical and social constructions of water.

Water is the 'lifeblood of ecosystems' and 'essential for many eco-hydrological functions' (Mehta *et al.* 2007: 1). Academic debates about water contrast the spectre of water scarcity – for which technological solutions are often proposed with models which seek more equitable distribution and access – sometimes emphasising rainwater harvesting, recycling and other alternative sources of water (Mehta *et al.* 2007: 3).

The water crisis in urban areas has often less to do with actual water availability but more to do with struggles over access to and control over a resource (Mehta *et al.* 2007). A major insight of political ecology concerns the ways in which the issue of scarcity is framed to serve the interests of the elites who profit from the social processes that produce this scarcity (Kaika, 2005). Control of knowledge and of the forms of representing reality (scientific or discursive) is an important source of power.

My field of research also draws from urban political ecology looking at water in terms of its scarcity and distribution. The study area faces acute water shortages and is a playground for conflict over water and land. So far, most studies on the area cover issues of distribution and conflict using an economic or ecological lenses(Soni 2003, 2007; Mohan 2005; Chaudhary 2008; CGWB 2002, 2004, 2008, etc.). My study looks at urban water issues in a contentious setting, examining the uneven process of construction of water scarcity beyond the apparent into the sub-layers of politics, power relations and distribution. It tells of the political, technical and social constructions of water.

Political ecology framework

Political ecology is an interdisciplinary science between natural science and social science. It explains the relations between nature, society and

humanity. Economic, cultural, and political aspects are fundamental broad terms to be applied in political ecology. In 1970, academics from three different fields of study – journalist Alexander Cockburn, anthropologist Eric Wolf and environmental scientist Grahame Beakhust – "coined the term as a way to conceptualize the relations between political economy and Nature in the context of a burgeoning environmentalmovement" (Paulson, Gezon, and Watts 2003, 206). Piers Blaikie and Harold Brookfield (1987, 17 quoted in Paulson, Gezon, and Watts 2003, 205; Gezon and Paulson 2005, 2) define the field: "the phrase 'political ecology' combines the concerns of ecology and broadly defined political economy".

The field of political ecology has three main approaches centered on its core concepts. The first concept is pressure of production on resources. "Resource use is organized and transmitted though social relations that may result in the imposition of excessive pressure of production on the environment" (Watt 1983 quoted in Gezon and Paulson 2005, 2). The second is "a plurality of positions, perceptions, interests, and rationalities in relation to the environment for example, one person's profit may be another's toxic dump" (Gezon and Paulson 2005, 2). The third is marginalization, in "which political, economic, and ecological expressions may be mutually reinforcing: land degradation is both a result and a cause of social marginalization" (Blaikie and Brookfield 1987, 23 quoted in Gezon and Paulson 2005, 2).

However, political ecology work has been criticized on the extent political ecologists integrate ecology and politics in political ecology. Some political ecologists do not involve biophysical ecology questions or environmental change in their work. Pete Vayda and Brad Walter (Vayda and Walter 1999, 168 quoted in Walker 2005, 75) note that: Some political ecologists do not even deal with literally the influence of politics in effecting environmental change but rather deal only with politics, albeit politics somehow related to the environment. It looks like an 'over-reaction' to the 'ecology without politics' studies that preceded the discipline. Now though, the discipline itself looks like it is studying 'politics without ecology'.

On the other hand, the first generation of political ecology work is also criticized for its lack of a serious and consistent treatment of politics and for its abstract or vague conceptualization of political economy (Paulson, Gezon, and Watts 2003, 208). However, Peter Walker (2005, 80) argues "political ecology is today's most prominent inheritor of traditions in geography with deep historical roots in the study of both biophysical ecology and social science". Moreover, Zimmerer and Bassett (2004 quoted in Walker 2005) encourage political ecologists to be a bridgebetween social science and bio-geophysical sciences. In conclusion, political ecology is applied in various disciplines including anthropology, sociology, geography, biology, and political science. These disciplines employ political ecology as an approach that addresses the concerns of both political economy and cultural ecology (Gezon and Paulson 2005, 1).

To employ political ecology, a conceptual framework is used to explain the human-environment relationships in economic and ecological dimensions. All three approaches from political ecology are equally relevant to this study. Excessive groundwater extraction leads to environmental degradations, and plurality of water perceptions and interests generate economic and ecological conflicts. Arturo Escobar (2006) points out that ecological, economic, and cultural differences lead to conflicts. "Conflicts often times appear when poor communities mobilize for the defense of the environment as a source of livelihood" (Martinez Alier 2002 quoted in Escobar 2006, 9).

Different economic, political, and cultural conceptualizations lead to unequal access of water. Studies on different meanings of water ownership emphasize that states, markets, and communities have different claim of natural resources ownership. States claim that it is the only legitimate custodian of natural resources; therefore, water should be managed by states. Markets claim that water is an economic good; any items are traded, evaluated and priced. Meanwhile the communities use natural resources and, as they are defined by their location in particular geographical regions, their knowledge systems are competent to make the best use of those natural resources and their survival depends on them.

Methodology

The complex water-related problems and issues in the world today need a broader understanding and must be considered from different angles simultaneously. This, in turn, necessitates simultaneous integration of knowledge, values and methods from several academic disciplines. It also calls for researchers, policy and decision makers, communicators and others to embrace an unconventional mind-set.

Going by the belief that complex water-related problems cannot be solved without an interdisciplinary approach, I chose to add to my disciplinary background in sociology and anthropology. Methods, concepts, theoretical points of departure, etc., from several different disciplines are integrated in the research process in an endeavour to further understanding using a more holistic approach to the inquiry. Hence, all stages from formulating research questions to choosing methods, analytical tools and theoretical framework; and carrying out the study, are influenced by "systems thinking".

Interdisciplinarity has its benefits and hurdles. Among the former comes the freedom one can take in everything from practical elements to finding support for hypotheses among scholars from a variety of areas. I believe that the interdisciplinary approach can be followed in/with anthropological studies by an individual researcher like me, specially given my work experience in the field of economics, journalism, management and geography and science to some extent. (Gronwall, 2008).

An indisputable benefit of conducting an interdisciplinary study is that it allows for the collection of data from other sources, and with the help of a larger variety of methods, than an intra-disciplinary one might. It can be termed an eclectic or pluralistic approach: selecting the elements that seem best from various sources, styles, doctrines, ideas, methods, etc.

Accordingly, my research was performed partly from my desk via electronically accessible libraries and databases, and partly through discussions at conferences in Delhi, elsewhere in India. More importantly though, through discussions with government officials in the Delhi Jal Board, Central Groundwater Management Authority, the revenue officers at the land records division, the local people, civil society members, scientists – hydrologists, geologists, engineers, and the business community that has interests in the area. The combination of locations and spheres from which I have acquired my knowledge has naturally enhanced the possibilities for deeper and more grounded comprehension.

I use a case study approach to provide critical input in the design and valuation of conservation and development policy. Data collection revolved around analysis of secondary data from government and local/village records on social and economic indicators, land use change, institutional change, resource availability and consumption patterns, ecological issues, population and governance. Research explored the functioning and effectiveness of national and local policy institutions by looking at how these institutions affect availability and use decisions of water and land resources with respect to the community. Judicial records and role of non-government organisations and private developers was also studied critically.

Collection of primary data was undertaken using questionnaires, structured interviews, key informant interviews, observation as well as case studies. To catch resource perception and use, role of institutions in influencing coping mechanisms, relationship between rules and norms and natural resource use, etc. I looked at both formal (governmental rules pertaining to water and landuse) and informal rules and norms (community's own set of rules to govern their natural resources- if they have any, if they do then of what kind, were there any rules that were followed in the past, the existing rules and their effect on use presently etc.). The case studies helped examine the operationalization of larger social forces in a micro context. This knowledge has in turn informed the study by explaining why different actors behave the way they do.

Universe of study

The study is set in the Aravali range falling in central-south Delhi. The fieldwork has been conducted in Masoodpur village area comprising the village, an adjoining slum cluster, the Jawaharlal Nehru University, the

surrounding blocks of Vasant Kunj and the Vasant Kunj Shopping Malls. All this land belonged to the villages of Masoodpur,Munirka, Mehrauli and Mahipalpur. My field is restricted to the Masoodpur village lands overlapping a bit with Munirka's.

Masoodpur is today a urban village with a population of over 2000 comprising mainly Jats, from 'Malik' *gotra*. It falls under the South-west District of Delhi and is said to have been settled in the 15th century when Chaudhary Ladam Singh from Sonipat bought land from Masood Khan at Rs. 500 and settled agriculturists in the area. The main occupation of the people used to be agriculture till the late 70s when Delhi Development Authority began acquiring land for the construction of Vasant Kunj. The demarcation of land and coming up of the Jawaharlal Nehru University precedes Vasant Kunj. The village is flanked by a slum cluster on one side and Vasant Kunj D block on the other. The village offers cheap accommodation options for students from nearby JNU and young professionals.There is a *Harijan basti* settled across the village on land once donated by the village *sarpanch* in the 1970s. This *basti* is much more diverse in its population groups and the residents do not really have a sense of history of the area as there is a constant movement of residents in and out of the *basti*. The Shopping Malls that have come up next to JNU comprise Masoodpur land that was to be left fallow.

Water and its many forms

Depending upon which side of the fence you are on, one definition of water rules above another. For the government and the market water is a resource and a commodity – to be distributed, regulated and traded. For the people, it's an essential physical as well as social resource, a priceless 'thing' that ought to be free to begin with. In this talk about assigning categories to water and chaining it to 'either' 'or' lies the core of my argument. Whatever water is, its not free, both literally and figuratively. In all our definitions, we have put water out of context and instead of seeing it as a 'system' or part of a 'whole' we tend to deal with different 'bits of it.

This piecemeal approach to water has its repurcussions. It allows the government or those in power to exercise their authority through the notions of management, distribution and scarcity. In the course of my pilot study in Dwarka subcity, many respondents highlighted the political clout of a congress leader when he categorically cut off water supply to the entire sector post the win of a BJP candidate in the last parliamentary elections. In Masoodpur village too, Roshni and Brahmo, my 60+ respondents reminicise about the election time when water tankers were just a call away unlike other days.

What these examples highlight is 'extraction' and 'mobilisation' of water as well as the role that politics plays in 'access' to water, but there is no regulation of the amount extracted and distributed specially by private players.

The politics thus clearly masking notions of fair distribution, equity, accountability and quality- who gets how much, at what price and what kind of water?

Similarly, this politics of power relations, plays on notions of scarcity. The government would have us believe that there being physical scarcity of water in Delhi, people do not have a 24 x 7 supply. This contrasts with the fact that the per capita water availability in the capital city is among the highest in the world at 170 liters per capita per day (Singh, 2005; Ali, 2017). Then there is varaition within Delhi in water distribution. "A recent report reveals that people in Mehrauli and Narela receive only 29 and 31 liters per person per day respectively, those in the Cantonment Board get 509 liters and Lutyen's Delhi 462 liters, The Karol Bagh zone receives 337 liters per person per day" (CSE (a), undated). Untill recently, when the Delhi Governemnt abolished the 'tanker' system, and enforced DJB control over supply, the private players had a tight control over indeed the whole of Delhi and charged fancy money to supply water to all 'under' and 'un-serviced' areas.

The bias in water distribution across the city, is also reflected in the field, with upper-middle class Vasant Kunj receiving a much more regular supply of piped water than the 'urban village' of Masoodpur. And within Masoodpur, the slum cluster and the dairy areas depend on political largess and tankers for steady supply of water compared to the settlement.

The Legal angle

So how did this come to be? It looks like Delhi took its colonial past to heart even in water distribution. The British centralised water supply in Delhi in late 1800s but kept it exclusive to the rich and the 'fair' to divide the city into the priviledged and the commoners. Post independence, the Indian state extended the piped supply but withheld it from so called ' illegal' colonies. These illegeal colonies instead got water through 'other' means (nefarious politicians- tubewells, tanker supply, neighbours, nearby residential areas, etc.) (Kacker, 2012) and many 'legal parts' were and still remain under or un-serviced due to lack of inter- agency coordination (there are several agencies- DJB, DDA, Cantt. Board, CGWB, MoWRand GR, etc) politics of planning (Dwarka), or tardiness on part of the government. This led to the development of private infrastructure to pump out groundwater among the increasingly affluent middle class. For those in apartments or non-regularised colonies, the tanker supply network grew and prospered. Most of the tanker supply also draws from groundwater.

Here the lack of a clear legal mandate on groundwater further complicates matters. Groundwater is still governed by the old British land law - people who own land have access to the groundwater below their land, even if they do not own the water as such (Kulkarni *et al.* 2015). This leads to over exploitation of what is otherwise a commonpool resource and creates

social divides. In all this the idea of water being a part of a 'whole' is lost. But have we ever thought of the urban water cycle?

People's Imagination of water

A typical talk on scarcity goes thus in Masoodpur - "What scarcity of water do you talk of? Who has seen the future? Water is there under the ground, doesn't matter 30ft. or 500 ft. and its not going to end any time soon. It was there 1000 years ago, its here today and it will be in the future". Said Ram Singh, a 50 year old resident. This notion of water in 'endless' supply is not unique and also, strangely more prevalent in the masculine gender.

Women like Roshni and Brahmo, tell of countless ways water is internalised in culture and ritual and consequently these very cultural manifestations of water tell of a declining and increasingly polluted resource. 65 years old Roshini spends about an hour and a half each day filling up water for household use from the piped supply. She came to the village as a young bride of 14 years and remembers the small seasonal stream that ran where JNU's back wall stands today. "We used to wash clothes in the stream and occasionally took our animals there for a drink. The village Johad (now a DDA park at the enterance of the village) was nearby and the entire community came together to de-silt and clean the Johad before the monsoons. A small portion of the mud from the Johad was used to prepare the courtyard of my house. The water table was so high that the village well used to service all our needs the year round. I have not seen any water in the well for more than 20 years now. The 'kuan pujan' rituals after the birth of a son are still performed by the well, but now we use tap water."

Her reacall of the past highlights how an important part of water is missing from the common public's psyche. Apart from the fact that a third of delhi's water supply is from groundwater, most of the city seems oblivious to its importance. But for Brahmo and Roshini and their ilk, the cultural aspect of water too is lost. The two friends tell of the times when water from the well was drinkable and its steadfast deterioration into brakkish water in the 1980s to its complete disappearance.

The Ridge and the City

The ridge in Delhi has been blasted and turned into residential complexes, commercial complexes and even mined heavily. Today just four isolated forest patches remain – the Asola Wildlife Sanctuary (6200 ha, southern ridge), Sanjay Van (633 ha, south central ridge), the central ridge (864 ha, behind Rashtrapati Bhavan) and the northern ridge (87 ha, Delhi University). These were once a contiguous stretch that are under pressure to be used differently. Other parts of the ridge have been converted under the city master plan and are today unrecognizable.

The Water Connect

The Aravali area is characterized by shallow aquifers that are dependent on seasonal rains for recharge and have traditionally formed a barrier between the surface and the deep aquifers. The area under the ridge provides the only palatable groundwater in the city. In terms of sub surface geology in the Masoodpur area the first Layer of clay and *kankar* extends to depth of 12m below ground level(bgl). This is followed by a layer of *kankar* and silt from 12 to 25m bgl. This is again underlain by layer of clay and *kankar* which extends even beyond 40m bgl (CSE (b), undated).

In terms of water level a comparative study of water level map of 1960 and 2002 shows in Masoodpur/Vasant Kunj the water level which was at 5 to 10m below ground level has gone down to 20 to 30 mts below ground water level.In Vasant Kunj fresh water occurs at all depths.

The groundwater availability has gone down sharply in the area, as the Vasant Kunj area was more or less dependent on groundwater supply till 2006 when the Sonia Vihar treatment plant supply was made available to the colonies here. The malls and the five star hotel still depend on tanker water supply, which draw water from the ground.

Water Sources and Decline in CPR

The main source of water supply is Delhi Jal Board pipelines and tankers. People pump groundwater to augment supply. The groundwater in Masoodpur is saline and availability has shrunk with unbridled use and high concentration of population. The groundwater table is varied falling between the depths of 30-80 feet in some areas and in other parts going down to 120 feet or more.

Before land use change in the 1970s, one well and handpumps near the village Johad used to be the main source of drinking water. The Johad was filled and converted into a community park in the late 1980s. The common property management institutions no longer exist. Earlier people used to de-silt the Johad as a part of religious rituals, before the rainy season. This used to bring the community together and also help maintain the water body. Another way of contributing to the water management was a small tax/fee taken from every newly married couple that would go into the maintenance of the temple, cowshed and the Johad.

With the acquisition of land, the tubewells and wells operational on those lands were no longer available to the community, leading to a loss of social capital. The built up area increased causing less and less recharge of groundwater, thus adding to the problem.

Rainfed agriculture and cultivation of vegetables was the mainstay of the village economy. Today most of the families have small businesses – hotels,

shops, or agriculture businesses and the new generation is engaged in the tertiary sector.

Informal settlements depend on community level sources for water supply. In Masoodpur JJ cluster and resettlement colony, handpumps and tankers are the main water supply sources. The average duration of water supply in informal settlements is one to five hours a day. Households dependent on tankers for water supply have no fixed timing or duration for supply. Although the households dependent on handpumps have supply for 24 hours they have to cope with the poor quality of water due to contamination of groundwater in these areas. Households that are dependent on community level water supply sources have to spend one hour or more to fetch water, while households having access to individual connections do not have to waste time for collecting water, but they have to waste sleep since the supply time is not assured. In all the different types of informal settlements covered under this study the residents reported a poor quality of water supply. Very few households make payment for water supply; there is however, a high level of readiness to pay if provided improved services.

Informal settlements have different types of drainage systems - open *kutcha* and open *pucca*. The frequency of cleaning of the drains varies from daily to monthly with majority of the households reporting that the frequency of cleaning drains was weekly. There are different actors involved in the maintenance of the drainage system including municipality, private sweepers and community. Despite the presence of these multiple agencies there is a high level of dissatisfaction among communities with respect to the type of drainage system and its maintenance.

Competition for Local water

The village is not the only claimant on groundwater. The Vasant Kunj area upto 2006 lived largely on groundwater, either pumped directly or supplied through DJB tankers. The Sonia Vihar water pipeline became functional in 2006 and since then the drawing of groundwater has reduced but not completely stopped.

Along with the residential colony, the Grand –a five star hotel, four shopping malls and 2 more under construction as well as the Jawaharlal Nehru University campus, all lay claim to the groundwater. These structures help exacerbate as well as mask the water scarcity in the area. A symptom equally applicable to the rest of the city. The hotel and the malls operate completely on tanker water supply, some through DJB and most through private water tankers. Locals report that at night the tankers line up to fill water for the malls. On an average tanker water costs Rs.5 - Rs 10 per Litre in the area. Many houses report paying a flat charge for a tanker for instance paying Rs. 350 to fill they 500 litre household water tank and in summer this amount could go upto Rs 1000.

Water collection is still primarily the task of women. Even though the area is serviced by piped supply, owing to the erratic nature of the supply and the heavy dependence on groundwater pumping, women still end up spending anywhere between 1-4 hours every day is pumping and storing water for household use.

Problems and then some more...

Some of the main constraints among others in water managementin this area (reflective of water problems in many parts of India) happen to be lack of precise estimation of demand and supply of water for various uses. This creates gaps in demand and supply. Coupled with the demand-supply gap is the issue of water use inefficiency. There are large scale losses at various steps - leaks are seen in pipelines and rampant use of hosing to clean the village dairy, roads, even houses and cars. The supply of water is uncertain and dis-proportionate in certain pockets like the JJ cluster and the dairy part of Masoodpur.

An added problem to the supply disparity is improper disposal of generated wastewater (sewage). There are open sewers and some of these are not lined (Kutcha). Again, there is lack of precise estimation of waste water generation. The water departments do not think of sewage generation and the municipal corporation hasn't mapped the proper amounts generated. This has repercussions for provision of facilities – length and breadth of drains, the general drainage in the area is poor with scattered plans to extend it further or link the small drains to the larger ones creating a disruptive environment and temporary flooding during the rains in parts of the village.

Apart from the ineffective and insufficient monitoring of proper supply and waste generation, the poor pricing policy and water revenue collection in Delhi also rears its ugly head. This is generic to Delhi and leads to a lot of waste of water. All the unplanned growth and illegal colonization seen in Masoodpur runs unchecked despite the presence of physical barriers and limits to expansive growth both in law and on the ground.

There is poor awareness about availability of water with the different supply agencies leading to a dependence on tankers as well, specially during the summer. This is exacerbated by the confusion about the role of different government institutions – the MCD, DJB, village councils, DDA all working simultaneously and yet apart (Daga, 2010; Mehta, 2012). Many residents blame the government or their neighbours for wastage and misuse but do not consider their own responsibility towards regulating the use of water (both inflow and outflow) from their households. Many houses modify the pipes and acquire new, more powerful pumps to draw groundwater but limit their role on sewage management to just dumping the waste water on the road or small drain right outside their door.

Conclusion

The urban water scenario is governed by both natural and anthropogenic forces that need to be understood before we can initiate long term urban management and planning from a sustainability perspective. Urban population growth and modern amenities is increasing water demand as well as inter-sectoral competition for water. Managing urban water resources sustainably and through pricing mechanism has remained a big challenge till date. This is largely because using price policies requires significant government intervention so that equity and public goods issues are adequately covered (Rogers *et al.*, 2002).

Economic liberalisation and the kind of changes that have come about due to creation of a land market across the developing world have led to rapid social and environmental changes in cities. The cityscape, as such removed from the 'natural' has moved further towards being called a 'manufactured' environment. Many environmental debates in the country seem to have bypassed the 'urban' until recently when the issues of air pollution and conflicts over depleting water caught the public's imagination.

We tend to work with ideas of 'cultural identity' that fall back on sedentric metaphysics – linking people to place. This has led to easy assumptions like poor are ecologically virtuous when that may not be the case, or that environmental problems are issues of management over and above anything else. One tends to keep the culture, people's use, transformation of resources like land and perceptions around issues out of debates on water. We often ignore how these meanings and assumptions come to transform landscapes and livelihoods. It also has implications on notions of what environment is all about and different kinds of meaning that come together on the environment. If more importance is given to the economic sphere and resources are commercialized then questions of sustainability and equity take the back seat.

A planned and readable city is a fiction. "Urban-village" is more of an oxymoron that neatly sums up its hybrid presence. The areas that is now Jawaharlal Nehru University, was Masoodpur village's common land. The presence of cows, continuance of certain social rituals around (defunct) water structures, memories of a stream, all signify the continuity between the villages' past and present. The village is just one among the 250 odd villages in Delhi that supply milk and cheap accommodation options to the neighbouring colonies, university students and the economically weaker sections.

In all this the place of nature in a city has become a matter to be ordered and regulated. The paper thus sees city streets as an embodied public sphere wherein identity, citizenship and public space are formed, negotiated and transformed. Water, once subjected to formalized management, is frequently represented as a stand-alone resource system. Deprived of its social,

ecological and even spatial relations, water becomes a tradable commodity albeit one that is shared – spatially, sectorally and socially.Actors modify and project the issues of water availability and scarcity thereby circumventing, modifying and even influencing the rules of governance of water – the power and politics of urban development.

At a city level, the heavy use of groundwater provides an environmental externality that tacitly facilitates minimal state provision. For higher income households, this means that availability is partly a function of household income; more money means deeper wells, more powerful pumps, and less water for other proximate users. For poorer households, various forms of micro-politics and intermediation, as well as material factors, structure water supply and access.

Groundwater is more socially and environmentally embedded than the piped supply, making it much harder to reach with policy initiatives. Both water tankers and bore wells are said to be closely related to the economy of party politics. Local politicians and leaders have a sizeable amount of discretion over the provisioning of bore well and tanker water. Water may be "organised" by local leaders, usually aligned with political parties, in return for local support.

When you think of water, you think in terms of – availability (sources), distribution, purity, pricing (commodity). The idea of water as a physical resource (and its environmental aspect), as a part of a life cycle, a hydrological cycle, a hydro-social cycle (Linton, 2011), is laking in the active imagination of people. But social and cultural aspects – rituals around water (kuan poojan, cleaning of johad before monsoons, women's work around water) and social memories (women remember stream, johad, lack of clean water) still imagine water as a 'whole' around which we organise our lives and our uiverse.

Further, good science in development of policy is only now staking up with emphasis on aquafer management and regulated withdrawl of water from sources. But his too is mediated by politics. Thus, understanding political decisions, social meanings and confronting them could be of use in bridging research –implementation gap and also filling the sustainability gap along with building consensus between policy, culture and science.

The need of the hour therefore is to keep the social imagination of water alive with support from policy that weaves together the physical, environmental, social, economic and legal aspects of water. What this means is to treat water as a local resource and apart from the supply side also look critically at regulating consumption.

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