

AN INVENTORY OF SIGNIFICANT MODES OF RECHARGING OF GROUNDWATER

7.1 Introduction

To address the lack of safe drinking water in the research region, an attempt was made to compile a list of ponds and water bodies, which would serve as a reliable source of groundwater recharging. Several ponds and tanks were existing in ancient time in the city. They performed a crucial function in collecting rainwater, replenishing groundwater, and serving as holy grounds for Hindu religious rites. The city was famous for 'Eight Wells' and 'Nine Vapis' (i.e., a large diameter well). Out of Nine Vapis, only two are existing at present. Out of ever existing 118 ponds and tanks in the city, a record of 39 is lacking in the revenue register of the 'Nagar Nigam', the department responsible for the city's development. However, 18 ponds and water bodies have now completely dried up.

Furthermore, if immediate action to protect the ponds is not taken, a total of 54 ponds may perish. It may be stated that the city is short of water. Every fifth citizen does not have access to safe drinking water. As a result, quick action should be done to restore these ponds and water bodies, which served as a source of groundwater recharge.

7.2 Ponds and Water Bodies in the City

The ancient people of the city have well realized the importance of ponds, tanks and water bodies in the recharging of groundwater. These ponds and pools of water

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were thought to be purifiers for the Ganga. Hindus revere the ponds as a sacred site for performing auspicious rites. The ceremonial activities on the banks and landing steps of ponds are a sight to see and experience, as they reflect the city's way of life. The ancient people were undoubtedly influenced by the views described in ancient religious texts. The most ancient Hindu religious text-Rigveda (6500-3100 B.C) verses 1.12.18,1.23.18, 5.32.2 refer to the use of water from rains, rivers, wells, ponds, etc. for agriculture, domestic, and or other purposes with wisdom and efficiency. Atharvaveda (2000-1500 B.C.) describes in its verses (2.23.1, 6.100.2, 7.11.1) the objectives of drought management through efficient use of available water resources and conservation. It prescribes the learned man to provide water in the desert areas by wells, ponds, canals, etc., and take precautionary and preventive measures against droughts, floods, and natural calamities in advance (Rustago, 1996). With the rapid growth in population and an expansion of the city, most of these sacred ponds have diminished from the map of the city. As mentioned already that the city was famous for 'Eight Wells' and 'Nine Vapis' (i.e., a large diameter well); Eight Wells have extraordinary medicinal properties. Out of Nine Vapis, only two exist. Others have been reclaimed for land by the local people. Some of these are well exploited by the inhabitants for their day-to-day requirements. One of the wells, namely "Bridhkal," having water of medicinal properties, is sacredly used by the local people even today (Chowdhary, 2005). These wells were given the name of the town. Even though large wells, ponds, and water bodies are becoming less prevalent, the areas where they do exist are still recognizable by their names. Several places (called locally as "Mohallas") are still known by the names of once-existing water bodies due to this practice around the city. These include "Bulanala," "Godowalia," "Baulia Bagh," "Machodary," and other

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neighborhoods that make up the city's core. "Ganesh Garhi," "Mishir Pokhra," "Harteerath," "Agasta Kunda," and "Pitar Kunda," among others, are worth mentioning. This is the name by which the location is still known today. The ponds are an essential feature of the city's cultural landscape. The historic ponds and water bodies are ecological organisms and valuable resources for the environment. Due to rampant urbanization and encroachment of the surrounding territory, the ponds and their ecosystem have been under threat in recent years. The ancient people and aristocracy, who understood the city's environment, created water bodies in the city to preserve rainwater and replenish ground water, such as Queens Ahilya Bai Holkar and Rani Bhavani's constructed Durgakund pond and Kurukshetra pond, respectively. Big pool of water existed in these water bodies. Unfortunately, land sharks have erected immense masonry structures on once existing water bodies owing to the apathy of the State Government and slumberous attitude of the 'Varanasi Nagar Nigam. The said department, 'Varanasi Nagar Nigam,' has expressed regret for not providing an exact number of ponds and water bodies that exist today. Its records on the status of water bodies in the city are also shabby and do not reveal much about the total number of water bodies that existed in the past. A survey of old literature gives a detailed account of the settlement pattern in the city and the existence of the water bodies in different parts of the city. The 'Nagar Nigam' revenue resistor is missing 38 ponds and tanks out of the city's total of 118 ponds and tanks. Table 7.1 shows the list of 38 ponds and tanks that have not been mentioned in the 'Nagar Nigam' records. So, a total of 79 ponds and tanks have been mentioned in the record of the 'Nagar Nigam.' However, 18 ponds and water bodies have been wiped out from the map of the city. The land mafia had a Nexus with government officials and bureaucrats at the time of its existence. They

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developed large residential and commercial complexes there, usurping the country's Supreme Court (i.e., Supreme court). At the behest of avid citizens and environmentalists, the city authority has prepared a list of 54 ponds and tanks needing urgently for its conservation a few years back. These 54 ponds may soon die out if immediate steps are not taken to protect them.

Even during a drought, water could be found in these ponds.. Even though these ponds' construction is not available, heritage conservation experts and local people believe that these ponds are very old. These ponds are at the mercy of those who live in the area. If such vandalism goes unpunished, the historic structure will lose its allure and significance. These 54 water bodies are about to vanish due to the threat being imposed by the local people by dumping garbage and wastes. Out of these 54 water bodies, only about half a dozen have the water throughout the year. Mention may be made of 'Ram Kund', Pishachmochan Kund, Shankuldhara Kund, Durgakund and Pushkar Talab. The rest have more or less diminished its existence. The well-known 'Moti Jheel,' which has been used for bathing by the people, has now lost its beauty. This pond is now a place for dumping garbage and refuse. Besides, other ponds that were once the local community's water resources and cattle are in a state of neglect. Sorry to say that in spite of the Supreme Court's ruling, the plotting of some parts of the Moti Jheel is being done without any hesitation for the prominent masonry structure and multi-flat buildings. Similarly, Ram Katora Kund has become a suitable place for local people to throw down solid waste. The condition of the Lahartara Talab, an area associated with the manifestation of the great Saint, 'Kabir Das', is highly deplorable. The surrounding of the pond has been occupied by the people residing around it; they dump the wastes in the historical and holy pond. In the Kapildhara Kund, a heap of

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scraps up to a height of 20 feet happens to occur. Similar is the case with a pond at Lamhi, a place of birth of well-acclaimed Hindu novelist 'Munshi Premchand'. The pond has also become a victim of heavy encroachment and dilapidated conditions. Thirty-eight ponds and tanks, which have **NOT** been mentioned in 'Nagar Nigam' records, Varanasi is cited in table 7.1.

Table 7.1: A list of 38 ponds and tanks that aren't listed in the 'Nagar Nigam' records in Varanasi.

Sr.no	Ponds/Talab/Tanks	Location	Present status
1	Puskar Talab	Bhadaini	Decapitated
2	Small Pond	Bhadaini	Neglected
3	Lolark	Bhadaini	Poor
4	Krim Kund	Bhadaini	Good
5	Sonbhadra Talab	Bhadaini	Half filled with garbage
6	Small Pond	Tulshipur	Completely filled with garbage
7	Small Pond	Tulshipur	Decapitated
8	Bakaria Kund	Alaipur	The filling with refuse continued
9	Chhohara Talab	Jaitpura	Now turned into a locality
10	Eshwargangi Talab	Jaitpura	Poor
11	Baulia Begh Talab	Jaitpura	Completely filled with garbage
12	Ramkatora Talab	Jaitpura	Not in usable order
13	Dhoopchandi Talab	Jaitpura	Frayed
14	Jagatgang Talab	Jaitpura	Now turned into a locality
15	Karnganta Talab	Kashipura	Encroached
16	Sonia Talab	Lallapura	Shabby
17	Shastri Nagar Pokhra	Lallapura	Filled with herb
18	Maldahia Pokhra	Habibpura	Poor

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19	Suraj Kund	Ramapura	Poor
20	Sagar Talab	Shivpurava	Now turned into a locality
21	Shivpurava Talab	Shivpurava	Filled with mud
22	Pond At Lahartara	Lahartara	Filled with wastes
23	Lahartara Talab	Lahartara	Poor
24	Small Pond	Makdumpura	Poor
25	Shankuldhara Pond	Jolha	Filled with rubbish
26	Aditya Nagar Pokhra	Karaundi	Filled with rubbish
27	Small Pond	Shivpur	Half Filled with debris
28	Pond At Pilikot	Shivpur	completely filled
29	Panchopandava Pokhra	Shivpur	Decapitated
30	Small Pond	Shivpur	Now turned into a locality
31	Kanphorva Pond	Khajuri	Decapitated
32	Mavaian Pond	Mavaian	Decapitated
33	Sarang Talab	Paharia	Now turned into a locality
34	Small Pond	Mirapur Basanhi	Poor
35	Small Pond	Mirapur Basanhi	Filling Continued
36	Small Pond	Sikraul	Poor
37	Sona Talab	Danialpur	Ragged
38	Small Pond	Sudhipur	Ragged

Goa Bai Talab of an area of 2.2 acres has been filled with garbage and soil, 'Pushkar Talab' and 'Kurukshetra Talab' were also impinged by the local people by the heaps of bricks and sands 'Ishwargangi Talab' and 'Karnghanta Talab' have now become a place for the shelter of cattle and storehouse for cow dungs. 'Hartirah talab' situated in the midst of the city, was declared by the Varanasi development authority (VDA), a state government department has a freehold land in 1997 to construct

residential flats. The ponds of religious significance, 'Pishachmochan kund' and 'Laxmi Kund', have been the property of the state government due to being freehold land, and the VDA has constructed one solely on the tanks located near the well-known Omkaleshwar temple, a shrine of Lord Shiva. During the rainy season, most of the ponds interconnected with water stages, aside from the star water, lead to the Ganga. Another pond, Bakshi Talab, is located near the municipal corporation of Ajmal and is posing a similar hazard..The water has become highly polluted and black. The pond was constructed some 150 years ago in an area of 1.5 acres. The Chakra Talab situated in the heart of the city near Shastri Nagar has been filled with the waste and building material by the builders.

In Khajuri, only two ponds out of 8 exist at present: In the Chitaipur area, a big building has been constructed at the place of a pond. Ponds ever existing at Sarai Surjan and Sarai Nandan areas have now completely been filled with wastes. Pond at Shivdaspur area has been elapsed, and a school building came into existence therein. Similar situation is with ponds ever found at Ramrepur , Pahapur ,Lalpur ,Kiroul and Anoula areas. Locations of ponds and water bodies is represented in figure 7.1 (Srivastava 2007) . However the survey conducted join at Ramrepur, Paharpur ,Lalpur, Kiroul and Anoula areas and the survey conducted jointly by the Varanasi Municipal Corporation and the Varanasi Development Authority regulated that Varanasi Cantonment Board has also encroached a pond in 33 acres and constructed a multi-purpose ground. Similarly, in the Ekta Nagar colony, the electricity department has constructed its office in the city's heart. After filling the water bodies with garbage, a police auto post at Lalapura has been made. Thus these important and historical ponds and water bodies are on the verge of its diminution owing to exploitation by the local

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people and neglect from the administrative end. It is disheartening to note that the district authority could not succeed to implements its own plan till date.

Table: 7.2 Ponds and water bodies, which have now turned into human settlement

Sr.No	Name of Talab/Kund	Condition
1	Sonia Talab	Wastes are being dumped from its southern side
2	Bhikharipur Kalan	Filling with wastes continued
3	Kakarmatta Talab	Filled with wastes
4	Naya Baba Talab	Filled approximately 80% with waste
5	Ranipur Talab(North)	Filled approximately 80% with waste
6	Ranipur Talab (South)	Filling with wastes continued
7	Chakrakala Talab	Filling with wastes continued
8	Manduadih Talab	Now, construction of a building is in progress
9	Mahmurganj Talab	Pillars have been fixed for building construction
10	Panchperva Talab	Now, construction work is in progress
11	Bag Baulia Talab	Now, construction work is in progress
12	Shivpur (Ashtbhuj temple)	Encroached by the local people
13	Mavaiyan Talab	Encroached by the local people
14	Ghanta Karn	Now a Karn Ghanta area
15	Reva Sarovar	Revani Talab locality (It was existing till 1930)
16	Ganesh Tal	Now a school building at Bara Ganesh locality (In the record of the municipal then corporation ,It was cited as Ganesh Garhi till 1911)
17	Sapta Sagar Tirth	Now,a Sapta Sagar locality
18	Agastya Kund	Now,a Agastya Kund area
19	Pushakarini tirth	Now ,a Mishir Pokhara locality

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20	Moti Jheel	A suitable place for dumping garbage of the nearby area
21	Ramkatora Kund	A place for throwing down the solid wastes
22	Lahartara Talab	Deplorable state (This lake was related to manifestation of great Saint Kabir in1400 B.C.)
23	Kapildhara Kund	A heap of waste occurs herein
24	Lamhi Talab	Encroached by the local people (This place was related with Hindi novelist Munsii Premchand)
25	Goa Bai Talab	Filled with the city waste and soil
26	Puskar Talab	Encroached by the people of the area
27	Kurukshestrab Talab	Encroached by the people of the area
28	Eshawargangi Talab	Encroached by the people of the area
29	Haritirth Talab	A place for the shelter of cattle's
30	Tank near Onkaleshwar temple	Now a big building of department of telecommunication (D.O.T.) came into existence
31	Chakra Talab	The state Government has constructed a colony
32	Bakaria Kund	Filled with waste of the Shastri Nagar colony
33	Kamal Garha Talab	Diminished
34	Mansarovar Pond	Diminished
35	Sarang Nath Talab	Now, a locality of its original name
36	Hashimpura Talab	Filled with garbage continued
37	Dhoopchandi Talab	Filled with garbage continued
38	Suraj Kund	Filled with garbage continued
39	Dhoop Sarovar	Filled with garbage continued
40	Sankatmochan Talab	Filled with garbage continued

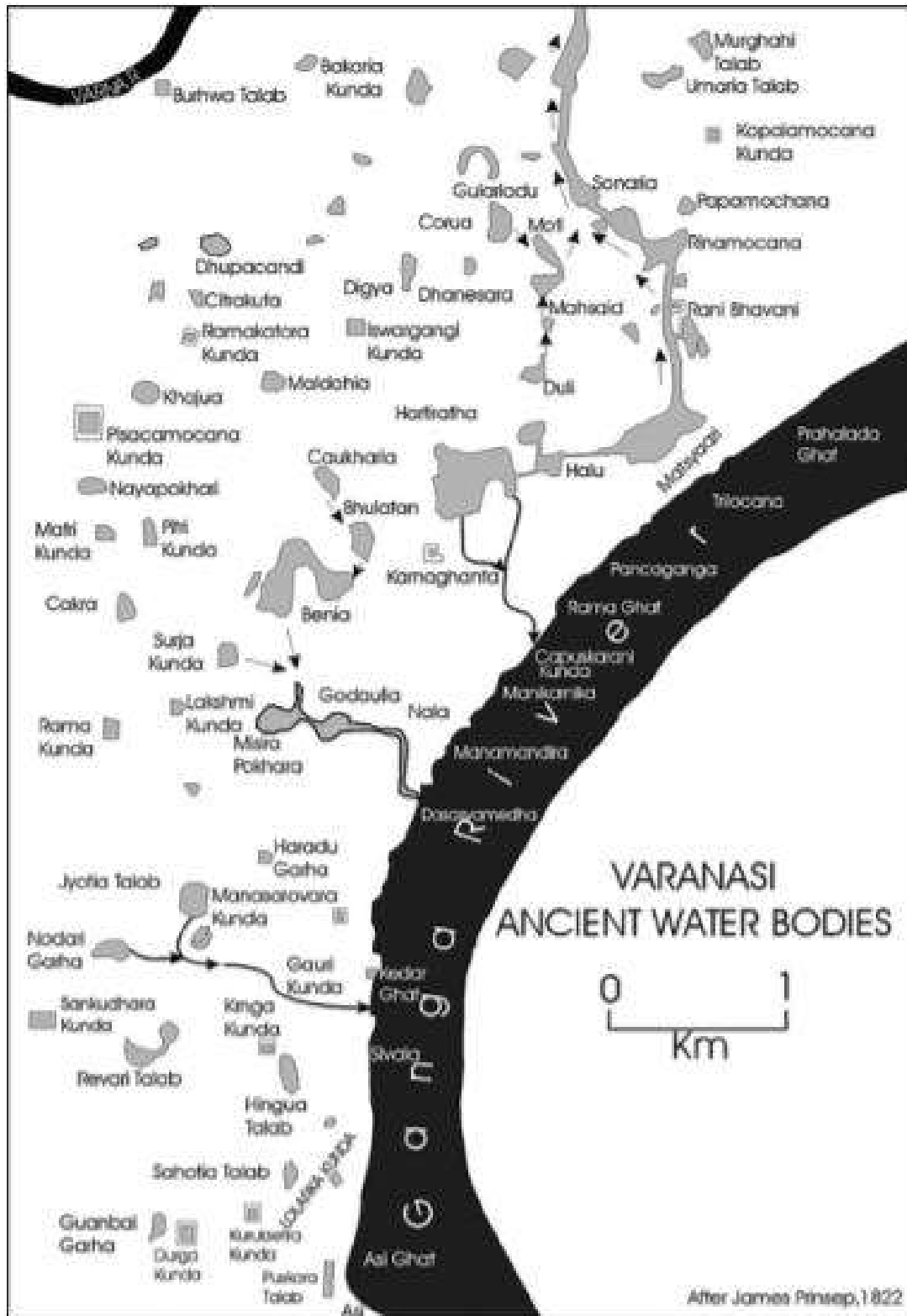


Figure 7.1 Varanasi ancient water bodies (after James Prinsep, 1822)

The State government in 2002 had made rainwater harvesting and groundwater recharging compulsory for the government offices, hospitals, shopping complexes and buildings having an area more than 300 sq. meters. But the scheme has not taken off. Taking corrective steps forward the Central Government has released a sum of Rs.1.69 crore for the maintenance and beautification of these water bodies. But their revival can only be done with the assistance of the local people. The vanishing wells might be revived by the cumulative efforts of an avid citizens and environmentalists.

7.3 Existing water supply in the city

State Government department, 'Varanasi Jal Sansthan' is engaged in the supply of drinking water to the people residing in the city of Varanasi. The water supply system through piped line was started way back in 1892 when James Princep as the chief architect planned and build the city. The raw water used by the Jal Sansthan are from two sources: (a) the Ganga and (b) underground water. The Bhadaini intake works pumps a total of 125 million liters per day of raw river water through six pumps, four of which have a capacity of 40 Kilo liters per minute each. And two of them, each with a flow rate of 30 kilolitres per minute. The pumped raw water is chlorinated and purified at the Bhelupur waterworks, which is roughly 1.5 km away from the pumping station. The purified water is delivered to the city's residents via a pipeline network with a total length of around 575 kilometers. The said intake works were unable to pump a total of 125 MLD due to scarcity of electricity. Sometimes it only sucks 60 M.L.D. raw water from the river. It would not be out of fit to mention that due to leakage in the age-old water pipeline, the sewer of the city generally mixes at several places with the water meant for public supply causing a great health hazard. Besides, a total of 145 MLD of the groundwater is extracted from 118 deep bore tube wells installed in the different

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localities of the city. To meet the increased demand for potable water, the above-mentioned department erected a total of 2347 India marks 11 hand pumps in various parts of the city for the administration and distribution of water supply. Jal Sansthan has split the city area into 16 zones, 11 zones on the cis-Varuna and 5 zones on the trans-Varuna (on the opposite bank of the river Varuna). Besides, Jal Sansthan has Provided 1402 public stand posts and about 12000 hands for common people . The area known as trans Varuna is dependent completely on groundwater. Thus Jal Sansthan provided a total of 270 million litre water per day(through ganga river 125 million later per day and tube wells and hand pumps 145 million liters per day). Through these arrangements, each person avails 169 litres per day. The present water supply system is not enough to cater to around 20 lakh people residing in the city. It has been noted that one-fifth of citizen is devoid of potable water in the city.

The area lying upstream of the river Ganga flow suffers much due to the water crisis. They are solely dependent on Ganga River for their day-to-day requirement obviously; there is a sufficient gap of the recommended norm and present water supply capacity. The River Ganga is an important source of drinking water in the city, but the continuous flow of the river has suffered much due to the Tehri (33°22'N and 78°31'E) for 2400 MW hydroelectricity generation by Tehri Hydro Electricity Development Corporation. In addition to these, a huge amount of water, i.e., 6500 MLD, is being sent to Delhi to cater to the growing water demand through the Upper Ganga Canal. So, the original flow (minimal discharge) is captured only two cumecs of water in the Tehri Dam. The width of the river in the city of Varanasi has shrunk due to capturing of the river by the dam and other factors, viz. siltation in the channel (Srivastava,1996). Therefore, the water carrying of the river has decreased. Hence, Jal Sansthan finds it

very hard to imbibe 125MLD water in the spring, winter, and rainy seasons. Even after sucking 50-60 MLD. Raw water, the polluted water starts to come in the tanks of Jal Sansthan.

7.4 Environmental significance

Excessive removal of groundwater to cater to the need of the ever-growing population in the city has resulted in land subsidence in the past, causing a decline of water head. In 1986, reports of subsidence from Varanasi snatched press line, and suddenly very alarming situation cropped up. The truck weighing 12 tons suddenly went underground, making hollows in busy thoroughfares of the city. The frequency of occurrence of land subsidence during the year made the city a city of subsidence. The aquifer sands in the city are overlain by a layer of clay often mixed with fine sands and Kankars in a good, which makes it leaky. It is conceived that vertical seepage of stormwater received by heavy rainfall in the area (9100 cm/year) through the overlying leaky beds cause the erosion of the underlying bed (Pathak,1977). A pumping well produces disturbances that propagate its effects, namely the decline in the pressure head, in space and time, through the hydrogeological system. The underlying loose sands are quite susceptible to subsidence. It may be narrated that the restoration of the ponds and water bodies for the groundwater recharging does not pose any environmental problem on our ecosystem. Instead, it performs an important function in augmenting the declining water level. Curiously enough, the lowering of groundwater has been 7feet (213cm approximately) in the preceding years. The fresh groundwater was met at a depth of 58 feet in 2005, whereas it was occurring at 125 feet in 2018. Indeed, the very method elaborated herein is economically viable and environmentally friendly.

7.5 Conclusion

A reconnaissance survey followed by a detailed investigation of the ponds and water bodies in the city is necessary to delineate the exact number of water bodies. After thorough investigations, sincere efforts are required to revive the ponds and water bodies in the city for the purpose of groundwater recharging. This artificial Recharge is essential as we can see the groundwater recharge depletion. The ponds, wells, and water bodies have become suitable places for dumping local people's waste and garbage. The vanishing water bodies might be revived by the cumulative efforts of avid citizens and environmentalists. It may be narrated that an apex court of the country, i.e., Supreme Court, has passed a clear-cut order to conserve the ponds and water bodies throughout the country. Indeed, the revival of these water bodies is an arduous task. It requires redevelopment and conservation of the water bodies that the city already has, capturing rainfall run-off and directing it to these water bodies, and recharging the groundwater in the process. This could be achieved only by the integrated efforts of the mass, environmentalist, and heritage conservation experts. A wide-scale awareness program through seminars and mass media is also needed. It may be stated that the ritualistic activities, still performed on the banks and landing steps of these ponds, are the sights to behold and experience, as these are the reflections of the city's way of life. The vanishing ponds and water bodies might be saved by clubbing the scientific facts with religious convictions. This could help bridge the gap between demand and supply of drinking water in the city.