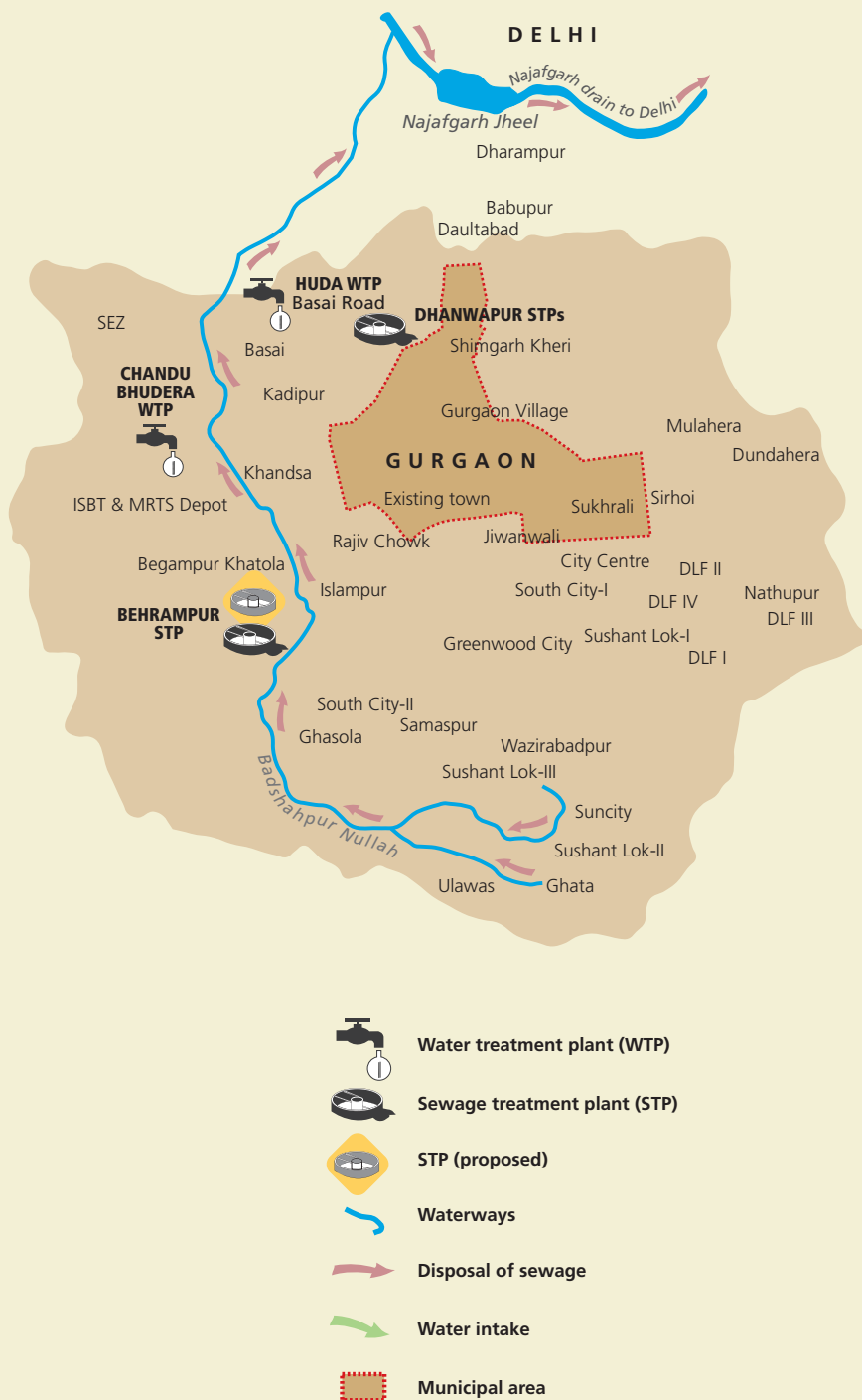
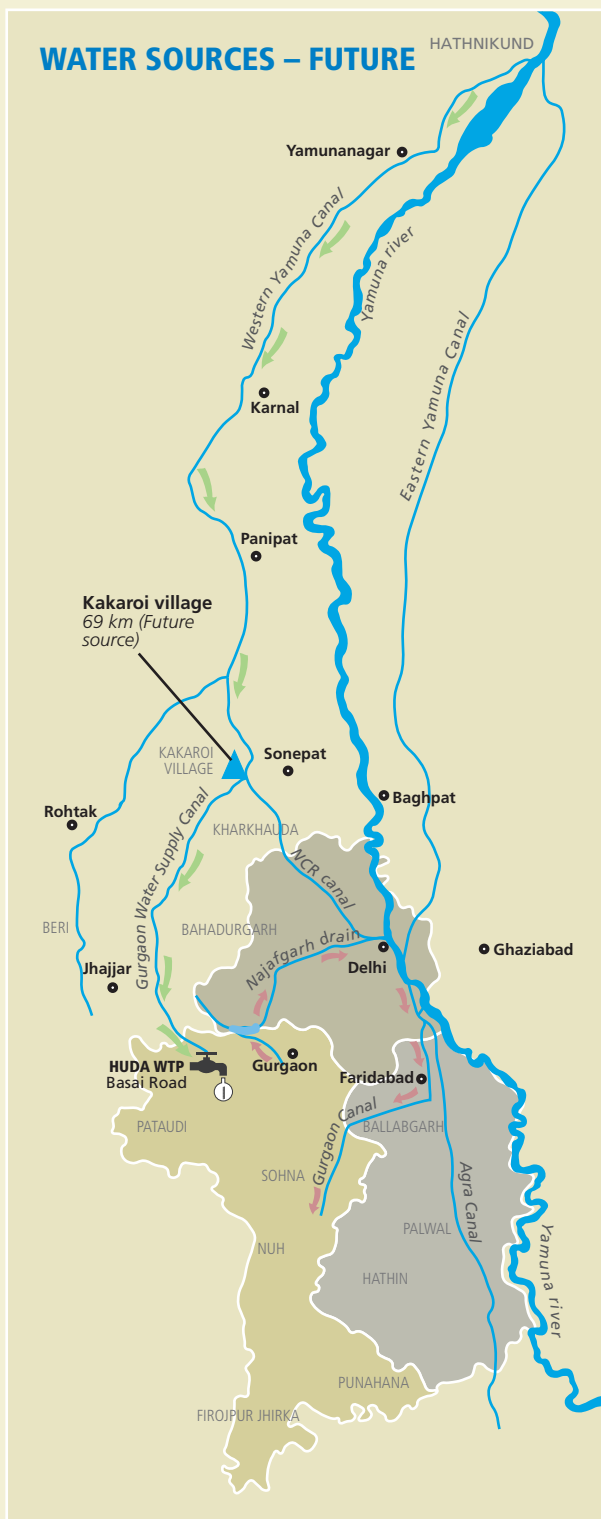


## GURGAON

### THE WATER-WASTE PORTRAIT

The millennium city of the National Capital Region is seriously water-stressed. Under the shadow of its gleaming highrises, residents are fighting a desperate battle to save their groundwater from being decimated by real estate developers and builders



Source: Anon 2011, 71-City Water-Excreta Survey, 2005-06, Centre for Science and Environment, New Delhi

# Gurgaon

Gurgaon, in Haryana, a part of the National Capital Region (NCR), has grown extensively in the last decade, largely because it adjoins Delhi. According to legend, Gurgaon was named after Dronacharya, the renowned *guru* (teacher) in the epic Mahabharata. The region was given as *gurudakshina* to him by his students, the Pandavas, and hence came to be known as *Guru-gram*, which over the centuries became Gurgaon.

The city presents an excellent example of a township where the state's initiative of involving the private sector in urban development has been successful. However, the government itself has failed to keep pace with the growth led by the private sector and develop first class civic infrastructure.

This has resulted in patches of new, gleaming, planned housing structures – but in areas that are dilapidated and poorly connected, lacking adequate water or power supply, and having no proper sewage handling mechanisms. With more than 40 malls hugging the skylines and more on the way, the city is on its way towards becoming the 'mall capital' of India. Groundwater is the key source of water, and the construction sector is the main guzzler. This unsustainable development has led to some obvious consequences with wells running dry and the city turning into a concrete desert.

## WATER

### DEMAND, SUPPLY AND DISTRIBUTION

There are two agencies supplying water in Gurgaon, depending on the administrative divisions: the Public Health and Engineering Department (PHED) is responsible for the old city area (municipal limits), while the Haryana Urban Development Authority (HUDA) takes care of the new city. The two seem to share a symbiotic relationship. Raw water sourcing and treatment is the overall responsibility of HUDA. While the HUDA sectors receive water directly from the Authority, the PHED gets bulk water transfers from HUDA for supply in the old city limits.<sup>1</sup>

Official estimation of the overall demand for water in Gurgaon is almost 51 per cent higher (see Table: *The water*) than the figure arrived at on the basis of the norm set by the Central Public Health and Environmental Engineering Organisation (CPHEEO). Supply does not match either demand estimation: the gap between official demand and supply is about 42 per cent.<sup>2</sup>

According to a 2006 draft report prepared by the Delhi-based engineering and construction consultancy, CH2M HILL, the total water supply in Gurgaon's PHED limits amounted to a little over 30 million litre a day (MLD) for a population of 0.295 million, at a rate of 103 litre per capita daily (LPCD). The estimated water

THE CITY	
Municipal area	120 sq km
Population (2005)	0.8 million
Population (2011), as projected in 2005-06	1 million
THE WATER	
<b>Demand</b>	
Total water demand as per city agency	184 MLD
Per capita water demand as per city agency	225 LPCD
Total water demand as per CPHEEO @ 150 LPCD	123 MLD
<b>Sources and supply</b>	
Water sources	Yamuna, groundwater
Water sourced from surface sources	94%
Water sourced from ground sources	6%
Total water supplied	107 MLD
Per capita supply	130 LPCD
Leakage loss	15%
Actual supply (after deducting leakage losses)	91 MLD
Per capita supply (after leakage losses)	111 LPCD
Population served by water supply system	64%
Per capita availability in the served area	157 LPCD
Demand-supply gap (after leakage loss)	93 MLD
<b>Treatment</b>	
Number of WTPs	3
Total treatment capacity	273 MLD
Actual treatment	246 MLD
<b>Future demand and supply</b>	
Demand (2011), as projected in 2005-06	247 MLD
Augmentation needed to meet the demand	140 MLD
Required increase in supply	131%
THE SEWAGE	
<b>Generation</b>	
Sewage generated as per CPCB	80 MLD
Sewage generated as per city agency	80 MLD
<b>Collection</b>	
Length of sewerage network	45 km
Population covered by sewerage network	30%
Area covered by sewerage network	50-60%
<b>Treatment</b>	
Number of STPs	3
Total treatment capacity	150 MLD
Actual sewage treated	137 MLD
<b>Disposal</b>	Yamuna river

Source: Anon 2011, *71-City Water-Excreta Survey, 2005-06*, Centre for Science and Environment, New Delhi

**TABLE: NOT ADDING UP***Gurgaon residents claim official figures are all wrong*

Agency	Population (in million)		Water demand (in MLD)	
	2007	2021	2007	2021
Official figures	0.9	3.7	162	666
JAFRA's estimates	1.8	6	324	1,080

**Source:** Personal communication with JAFRA office bearers in May 2008**Notes:** MLD: million litre daily

demand in this area was about 35 MLD. The PHED has divided its area into 11 water supply zones (about 400 km of pipelines); an estimated 35-40 per cent of the water it supplied, however, remained 'unaccounted for'.<sup>3</sup>

The HUDA, on the other hand, has geographically divided the city into three sections with respect to water supply. Phase I covers Palam Vihar and the HUDA sectors to the west, including Gurgaon town. Phase II covers the major colonies and HUDA sectors in the east, while Phase III covers DLF 4 and DLF 5, Sushant Lok 2 and Sushant Lok 3, South City 2 and HUDA sectors 45, 55, 56 and 57.

According to information received in 2006 from HUDA, water was being supplied to individual households through a 506-km piped network. About 0.6 million to 0.7 million people availed of this supply, and around 95 per cent of the connections were metered. The HUDA was spending Rs 15 crore annually in operation and maintenance of the distribution network. R P Rohila, who was the then joint engineer at HUDA's Basai water treatment plant (WTP), claimed that all areas in Gurgaon were being provided with water from the Western Yamuna Canal (WYC), except some parts in Phase III where lines were still being laid.<sup>4</sup>

But Gurgaon does suffer from unequal distribution – only 64 per cent of the city's population had access to piped water in 2005-06. The per capita water supply for the served population, thus, worked out to be 157 LPCD.<sup>5</sup>

In fact, the Joint Association of Federation of Residents Welfare Associations (JAFRA), an umbrella organisation of Gurgaon citizens, has dismissed all calculations of government agencies. The JAFRA claims that its surveys on various issues such as population and water indicates clearly that the estimates provided by government agencies are faulty, and tend to understate almost all figures (see Table: *Not adding up*).

According to estimates arrived at the time of the CSE survey in 2005-06, Gurgaon's water demand was expected to increase by 34 per cent by 2011 – which could lead to a demand-supply gap of about 57 per cent. Based on these calculations, the city would have had to increase its supply substantially to meet this jump.<sup>6</sup>

## SOURCES

Gurgaon gets its water from the Yamuna river's Tajewala headworks near Yamunanagar. The water comes through the WYC near Sonapat and then through the 70-km Gurgaon Water Supply (GWS) Canal from Kakaroi village to Basai in Gurgaon.<sup>7</sup> It is

designed to carry almost 245 MLD of water at the head at Kakaroi village. About 50 per cent is lost while in transit through evaporation and diversion to villages and a township *en route*.<sup>8</sup>

However, the canal meets just 30 per cent of the city's water needs, says R S Rathee, president of the Qutub Enclave Residents' Welfare Association of DLF, which has been part of protests against rampant extraction of groundwater by about 265 construction projects across the city. As a result of the gap in supply, there has been large-scale extraction of groundwater by private tubewells, many of which are feeding these construction projects. The city's water table has fallen rapidly since the city started expanding in the 1980s, says Rathee.<sup>9</sup>

Officially, HUDA does not supply groundwater in its sectors. At the time of the CSE survey, the old city, where the PHED manages water supply, had 51 tubewells with a capacity to supply 9 MLD. About 40 of these tubewells were in operation, supplying about 8 MLD of water.<sup>10</sup> Thus, officially, groundwater constituted just 6 per cent of the supply in Gurgaon.

## GLUED TO GROUNDWATER

But the actual scenario is something else. Gurgaon, ever since it came into being, has been drawing groundwater at an alarming rate. The withdrawals accelerated after the Haryana government invited private enterprises to set up base in the city. Housing and office complexes came up at dizzying speed, and went on guzzling even larger amounts of groundwater – all free of cost – using better water 'mining' technologies.

The inevitable result: with the city's expansion in the 1980s, Gurgaon's water table has fallen by over a metre each year, says Rathee.<sup>11</sup> By 2005-06, the water table had dwindled to as low as 40 metre below ground level (m bgl) in low-lying areas. Shockingly, there is no data on the number of borewells functional in Gurgaon, or how much groundwater is actually being extracted.<sup>12</sup>

According to the Central Ground Water Board (CGWB), as of 2005-06, almost 70 per cent of Gurgaon's supply came from ground sources.<sup>13</sup> As of 2004, according to A K Bhatia, senior scientist with the Board's Chandigarh office, 9,140 borewells were registered with the CGWB. "But this is only 50 per cent of the total number in the city," he said. He added that there were close to 18,000 borewells operating in Gurgaon district.<sup>14</sup>

A rough calculation of groundwater extraction from these wells, assuming a minimum discharge of 3,000 litre per hour, threw up an overwhelming figure of 54 MLD, which was almost 50 per cent of the total public water supply. Thus, the total estimated groundwater extraction from public and private sources worked out to 86 MLD.<sup>15</sup>

In 2011, the number of borewells has obviously increased. "Most colonies and commercial buildings here depend on wells because of inadequate piped water supply. There are more than 30,000 borewells across the city and almost half of them are illegal," says Vinay Shanker of the non-profit Mission Gurgaon Development. The authorities feign ignorance. "Some plots on Sohna road are not connected – except those, 95 per cent have access to piped water," says Pankaj Kumra, superintending engineer of HUDA.<sup>16</sup>

## GROUNDWATER, FOR BUILDING

### Are builders and architects forced to use groundwater?

Amit Bhatnagar, an architect, says that it is illegal to dig or own a tubewell in Gurgaon. The city's groundwater cell had sealed about 27 tubewells in January 2007. The violators included housing societies, malls, hotels and hospitals. But even while this drive was on, the Central Ground Water Authority gave an approval for installation of about 50-60 tubewells in different parts of Gurgaon.

Efforts to plug groundwater use in the city have been characterised by such disconnect. While getting building plans approved, builders in Gurgaon are supposed to give an application for a water supply connection. Builders and architects point out that the HUDA is supposed to provide water for construction, but in most cases, the supply is either completely inadequate or irregular. As a result, builders turn to groundwater. A case in point is that of the JMD Arcade mall. According to its site supervisor Anil Raj, about 10 kilolitre (kl) of water was needed every day for its construction, and another 0.5 kl a day was used up for drinking. As HUDA did not provide water during construction, it gave the builders permission for installing a 60-m deep tubewell. When the tubewell stopped working, the builders pressed tankers into service; these tankers too sourced their water from the ground.<sup>1</sup>

According to a survey done in 2004, two private colonisers owned 108 borewells between them: DLF (58) and Ansals (50). Shopping malls were also heavily extracting groundwater. The Sahara Mall had two private borewells and was taking out 100 kl or 0.1 MLD of water every day (see Box: *Groundwater, for building*).<sup>17</sup> The city is home to 40 malls. If each mall was assumed

to extract a similar amount, the approximate extraction from them would be around 4 MLD.<sup>18</sup>

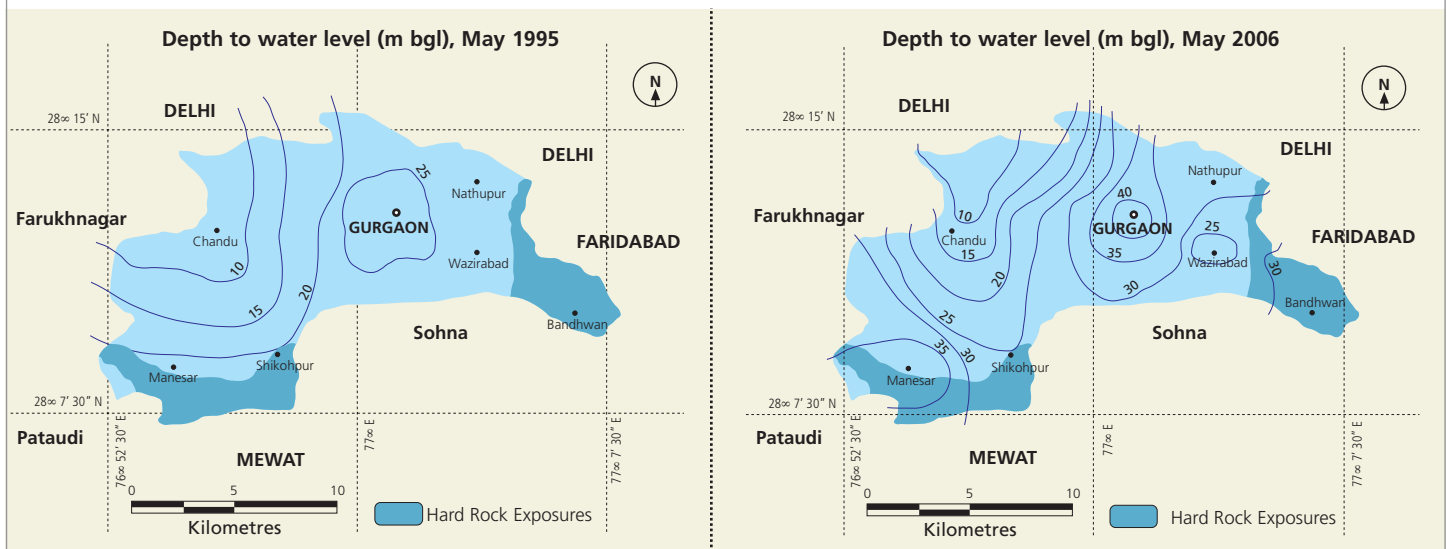
Naturally, water levels are dipping rapidly. According to the CGWB, the water level in Gurgaon in 2003 was 43 m bgl; in 2006, it declined to 51 m bgl – the fall in the water level has been a high 3 m per year in this period.<sup>19</sup> An integrated groundwater resource mapping of Gurgaon district during the period 2005-06 revealed that the water table was falling at a rate of 1-1.2 m annually (see Map: *Sucking it all up*). According to HUDA, the groundwater table had fallen from 12-15 m in 1986 to 35-40 m by 2006.<sup>20</sup>

The CGWB has warned that once the water table dwindles below 200 m, only rocks will be left. The alarming drop in Gurgaon's water table has woken up the Central Ground Water Authority (CGWA) under the Union ministry of water resources. In December 2000, it had issued directions under section 5 of the Environment (Protection) Act, 1986: "No person/organisation/agency (government or non-government) shall undertake the operation of drilling, construction, installation of any structure and any scheme/project of groundwater development and management in Gurgaon town and its adjoining industrial area, without prior specific approval of the Authority." It had also directed authorities to register all existing groundwater abstraction structures. Between July 2, 2001 and October 31, 2001, 8,500 such structures were registered.<sup>21</sup> But implementation of the order has been lax. Thus, the city has more wells than what the registration list shows. The office of the deputy commissioner is yet to compile a registry.<sup>22</sup>

Gurgaon's groundwater is also not free from the menace of pollution. It contains high concentrations of nitrate and fluoride because of naturally occurring fluoride-bearing minerals in its rock strata.<sup>23</sup>

### MAP: SUCKING IT ALL UP

The groundwater table has been falling at a rate of 1-1.2 metre in Gurgaon



Source: D Uma Kumar 2007, *Groundwater scenario in Gurgaon – need for groundwater conservation*, Central Ground Water Board, Faridabad



## GURGAON IS NOT LISTENING

*A High Court order fails to wean the satellite town off illegal wells*

Acting on complaints of severe water shortage in Gurgaon, the Punjab and Haryana High Court on May 20, 2011 asked the Central Ground Water Authority, or CGWA, to provide the details of groundwater levels in the city, setting August 5 as the deadline.

In February the same year, the court had ordered the city's authorities to restrict the use of groundwater, depleting at three times the recharge potential, to drinking and domestic purposes. It also ordered sealing of borewells used by builders and industrial units, and installation of water meters at all wells to monitor groundwater extraction. The court has made it mandatory for the existing tubewell owners to get permit from the CGWA. It has also restricted government departments, including Haryana Urban Development Authority (HUDA), from digging any new bore-well without its permission. The court also banned the use of underground water for supplying water tankers in residential areas and construction activities. As per the order, if any tubewell was found violating rules, it should be sealed and dismantled and its power supply disconnected.

The court's order was in response to two public interest petitions. The petition filed in 2008 by Sunil Singh, a lawyer, alleged that real estate giant DLF was illegally operating 28 wells to service its commercial office hub, Cyber City. The other petitioner, Qutub Enclave Residents Welfare Association of DLF, urged the court in 2009 to check rampant extraction of groundwater for 265 construction projects across the city. It also sought adequate supply from the piped water network to their area.<sup>1</sup>

The history of the citizens' campaign makes for interesting

reading. In May 2008, the Supreme Court had mulled the possibility of ordering a stay on grant of permissions to construct commercial complexes or malls in Gurgaon.<sup>2</sup> Following a petition filed by the Qutub Enclave Residents Welfare Association, Gurgaon, the court had issued notices to the state government, the ministry of water resource and the ministry of environment and forests on allegations that clearances are given in blatant violation of environmental laws. The petition had asked the apex court to order the state government to stop using groundwater for commercial and construction activities, besides banning the sale and use of water from borewells owned by developers.<sup>3</sup>

The petition had contended that in 2004, groundwater was 311 per cent overexploited in Gurgaon. It had alleged that Haryana had approved 52 special economic zones based on incorrect water data and urged the court to appoint a committee to look into all clearances granted after the year 2000. The petitioners had also called for a stay on clearances to all future commercial developments in Gurgaon until the residents are ensured adequate water supply.<sup>4</sup>

In that same month, around 150 residents of DLF Phase-III, a residential colony, had gheraoed the office of Colonel Soharu, service in-charge of DLF Phase-III, and demanded immediate restoration of proper water supply in the area. In south Gurgaon, residents of Sainipura had blocked the Alwar-Sohna highway demanding regular water supply.<sup>5</sup>

City magistrate K K Gupta says officials have sealed 172 illegal borewells since the order in February. But the petitioners say groundwater extraction for construction and industries continues unabated in connivance with the authorities. Very few are abiding by the directions. The residents' welfare association plans to file a contempt petition against the city authorities.<sup>6</sup>



**About 265 construction projects in the city are using up groundwater, says a petition in High Court – which has responded by asking civic authorities to restrict groundwater withdrawal. But nothing has changed**

**TABLE: PRODUCTION IN GURGAON***After leakage losses, a mere 107 MLD is supplied*

Water sources and installed capacity (MLD)	Water production in 2007 (MLD)	Water supplied (MLD)
Surface water (installed capacity 182)	HUDA: 91	77
	PHED: 28	21
	HSIDC: 1.5	1
	<b>Total: 120</b>	<b>102</b>
Official groundwater (installed capacity 9)	PHED: 7	6
	HSIDC: 2	1
	<b>Total: 9</b>	<b>8</b>
<b>Total installed capacity: 191</b>	<b>130</b>	<b>107</b>

**Source:** Anon 2007, Draft Report for the JBIC-aided YAP-II, preparation of master plan for sewerage, drainage, feasibility studies and detailed project report for eight towns, CH2M HILL, Gurgaon, *mimeo*

**Note:** HSIDC: Haryana State Industrial Development Corporation

## TREATING THE WATER

HUDA has three water treatment plants (WTPs) at Basai village near Sultanpur. The first was commissioned in 1995, with a capacity of 91 MLD. With the coming of the second plant in 2005, capacity went up to 182 MLD. But together, as per 2006 estimates, the plants could achieve just 56 per cent of their total installed capacity (see Table: *Production in Gurgaon*).<sup>24</sup> Since then, another WTP of 91 MLD has been added, bringing the total capacity to 273 MLD.<sup>25</sup>

## THE ECONOMICS

As of 2007, there were 27,000 connections in the PHED area, of which about 10,600 (about 39 per cent) were metered (see Table: *Meter map*). In other words, about 68 per cent of the connections were paying water charges on the basis of flat rates.

The water charge for domestic consumption in the PHED area is Re 1 per kilolitre (kl). For unmetered domestic connections, there are two types of flat charges: Rs 25 per month from houses having one toilet and Rs 48 per month from those that have more than one. The charges for commercial and institutional users have

**TABLE: METER MAP***An update on the metered connections in municipal limits of Gurgaon*

	Metered	Unmetered
Domestic	10,209	16,998
Commercial	371	12
Industrial	149	19
<b>Total</b>	<b>10,729</b>	<b>17,029</b>

**Source:** Based on personal communication with Janak Raj, sub-divisional officer, water supply, PHED, Gurgaon, June 2007

## PAYING MORE

*Gurgaon's residents are being charged more for water by private builders*

Private builders in Gurgaon have interpreted a Supreme Court ruling in a manner which enables them to charge high water tariffs from residents. The court had ordered the enforcement of an agreement between DLF, a private building construction group, and the residents welfare associations of DLF. According to it, the residents would now have to pay Re 1 per square yard as maintenance, plus water charges at the rate decided by HUDA (see Table: *Extra burden*). Taking advantage of the order, private builders are charging residents even for groundwater, which they get free of cost. This, when the court's order was delivered on the premise that the entire water would come from the canal.

**TABLE: EXTRA BURDEN***HUDA's rates for supplying water to residents of private colonies*

Quantity (in kilolitre)	Water tariff (in Rs/kilolitre)
1-15	1.25
15-30	2.5

**Source:** Anon 2004, 'Authorities misdiagnose Gurgaon's water problems', *Down To Earth*, Vol 13, No 4, July 15, Society for Environmental Communications, New Delhi

been revised in March 2007 from Rs 2.5 per kl to Rs 4, while for industries they have been revised from Rs 3.15 per kl to Rs 4. According to Janak Raj, sub-divisional officer with the PHED's water supply wing, the department spends about Rs 4.55 crore per year on water treatment, and recovers only Rs 1.2 crore. This amounts to about Rs 4 and Rs 1 per kl, respectively.<sup>26</sup>

In May 2011, the Haryana Electricity Regulatory Commission announced a new tariff plan for industrial connections. The new rates are Rs 4.40 per unit, plus the fixed charges for high and low tension connections. The fixed charges for low tension industrial connections are Rs 75/kw/month.<sup>27</sup>

Household sewerage tariffs have been based on the number of toilet seats, while commercial establishments were charged as per the amount of water supplied. The PHED has revised the domestic sewerage rates from Rs 6.25 per seat per month to Rs 8 per unit. In the case of commercial establishments, the charge is Rs 2 per kl. According to communication from the PHED in 2005-06, about Rs 9 lakh was being spent every month on sewage conveyance and treatment which works out to about Rs 0.93 per kl of sewage treated.<sup>28</sup>

The HUDA charges its domestic consumers only Rs 1.25 per kl till a consumption limit of 15,000 litre; its rate for institutional, industrial and commercial consumers is Rs 4 per kl. Water charges during construction are based on the area of the plot, and can

range from Rs 3 to Rs 4 per kl. Unmetered supplies are charged a flat rate. Sewage management costs are not a part of the water bill in HUDA areas.<sup>29</sup>

According to the HUDA superintending engineer at the time of the CSE survey, S K Sachdeva, HUDA was spending over Rs 8 crore on water treatment and more than Rs 2 crore on sewage treatment every year. A K Somal, executive engineer, HUDA put the production and supply costs at Rs 6.5 to Rs 7 per kl. Sachdeva pointed out that HUDA had to also pay raw water charges to the irrigation department.<sup>30</sup> HUDA's officials were unwilling to share with CSE their cost recovery data.

## SEWAGE

### GENERATION AND COLLECTION

According to the Central Pollution Control Board's (CPCB) report, *Status of Sewage Treatment in India* (February 2006), Gurgaon generated 17 MLD of sewage in 2001, at a generation factor of 98 LPCD.<sup>31</sup> Based on this generation factor, the quantity of sewage produced by the city in 2005 worked out to about 80 MLD.<sup>32</sup>

But sewage generation estimations for Gurgaon are not so clear or easy. On the basis of official water supply, the city was to generate about 85 MLD. But Gurgaon gobbled up at least 54 MLD of groundwater – which took the total water consumed by the city to about 161 MLD. Based on this figure, the city could be generating 130 MLD of sewage.<sup>33</sup> There are others too in the fray: the Haryana State Pollution Control Board said that Gurgaon produces 160 MLD of sewage, while JAFRA's population estimates put it at about 260 MLD.

A report by CH2M HILL, the New Delhi-based consultant appointed by PHED for preparation of detailed project reports on sewage management of Gurgaon for funding under the Yamuna Action Plan-II, had in fact declined to make an estimation. The report stated: "The private colonies, which do not have sewer connections, collect the sewage in septic tanks and empty it out into open areas or drains. Quantification of such flows is not possible..."

In terms of collection, only 50-60 per cent of Gurgaon is covered by a sewerage system; 95 per cent of this system consists of closed drains. The sewage collected is drained into the Khost

drain along the Sohna road; the Khost flows into the Najafgarh drain in Delhi, and finally into the Yamuna.<sup>34</sup>

The HUDA has divided the city into four sewerage zones – I to IV. According to the agency, the total length of the sewers in zones I, II and III is about 74 km, 92 per cent of which is laid and functional. Zone IV has 40 km of sewers, of which 32 km have been laid; the remaining has been held up due to litigation. Some of the new colonies remain either unconnected or partially connected to the main line; for example, only 40 per cent of the total DLF area is connected at present.<sup>35</sup> The PHED, on its part, claims that about 80 per cent of the population in the old city is connected to the official sewerage system.

### TREATMENT AND DISPOSAL

But all is not well with Gurgaon's sewers. The draft report prepared by CH2M HILL states that sewers in zones I and II are overloaded, while those in zones III and IV have silted up.

Gurgaon has three sewage treatment plants (STPs). One, located in Dhanwapur village, with a capacity of 67 MLD, is owned by the HUDA. A portion of the sewage from zones I, II and III is conveyed to and treated at this plant.<sup>36</sup> Another, in the same village with a capacity of 32 MLD, is owned by the PHED (see Table: *Gurgaon's STPs*). The sewage undergoes primary treatment; secondary treatment is rare.<sup>37</sup> According to a report in *The Times of India*, while the two are working to full capacity, a third 50-MLD STP under HUDA has come up in Behrampur village. As of December 2010, HUDA was working towards completing the laying of two main manholes, each about 9 m deep, on Sohna road (near Tikri village), which will cater to sewerage of all offices, malls, high-rises and other colonies from Ambience Mall onwards to Sohna road (on the south-eastern side of the Expressway) and connect them to the Behrampur plant. The HUDA administrator Nitin Yadav reportedly told the newspaper that approximately 11 MLD of sewage was being pumped across the Sohna road to be fed to the Behrampur plant.<sup>38</sup>

Despite all this hardware, it is the quality of water treatment in Gurgaon that is rather dubious. The HUDA, PHED and the STP operators claim that the treatment plants confirm to outlet standards. However, random samples tested by the Haryana State Pollution Control Board from the outlet of the 32-MLD STP raised doubts about the treatment efficiency. The Board also said that

**TABLE: GURGAON'S STPS**

*Despite these, the quality of treatment remains questionable*

Name	Location	Treatment capacity (MLD)	Utilisation capacity (MLD)	Disposal of treated effluents
STP owned by HUDA	Both are located at Dhanwapur village, near the railway line, behind Sector 4	67.5	90	Into an unlined channel which meets the Najafgarh drain
STP owned by PHED		31.5	36	
STP owned by HUDA	Behrampur village	50	11	Will be connected to Najafgarh drain
<b>Total</b>		<b>150</b>	<b>137</b>	

**Source:** Based on personal communication in 2007 with Praveen Kumar, in-charge, HUDA STP; and Amit Srivastav, chemist, PHED STP





RUHANI KAUR / CSE

*The Yamuna receives sewage from Gurgaon as well. The Khost drain near Gurgaon takes the city's muck into the Najafgarh drain in Delhi, which empties into the Yamuna*



sewage is often allowed to bypass the plants, especially during the rainy season.<sup>39</sup>

The treated effluents are disposed off into an unlined drain which travels about 8 km to meet the Najafgarh drain in Delhi. Here, they get mixed with untreated sewage discharged by the Khost drain, the Badshahpur *Nullah*, drain nos 1 and 2 from Gurgaon and several other drains falling in from Delhi, before meeting the river Yamuna. Some amount of the sewage that remains uncollected gets accumulated at various places creating cesspools and percolates to the ground.<sup>40</sup> In 2008, residents of the plush colony of Belvedere Park in DLF Phase III, for instance, were forced to contend with a stream of sewage floating outside their main entrance. Choked pipes had led to overflowing manholes, said Belvedere Park manager Ram Kumar Gupta, and the area's resident welfare association had to pump out the sewage. According to real estate developer DLF, Belvedere Park's sewage pipes were not connected to the city's main sewage system, leading to the unsightly backflow.<sup>41</sup>

# LOOKING AHEAD

## WATER

HUDA claims that efforts are being made to solve Gurgaon's water woes: these, however, are largely scattered construction activities in the form of either a doubling of the capacity of treatment plants, or digging of another canal, or laying of new pipelines. But increasing (doubling) the capacity of the WTPs cannot bring about much change in supply, as the plants are already running below their existing capacities.

According to a 2009 report in *The Times of India*, the Haryana government had planned to increase the per capita drinking water supply in Gurgaon from 111 LPCD to 135 LPCD. Among the various 'hardware' that presumably will help the satellite town reach this target is the 69-km Gurgaon Water Supply (GWS) canal, completed in 2011, which is expected to cover a population of 1.1 million. A third WTP has already come up at Basai, and another 300-MLD plant has been planned at Chandu Budhera village

(see Table: *Securing Gurgaon's water future*).<sup>42</sup>

But Gurgaon is growing at a phenomenal pace. In February 2007, the HUDA had revised the spread of Gurgaon's urban area, which resulted in a revision in the population figures for the planning horizon of 2021. According to this revision, the already developed areas of the city (8,000 hectare or ha) would house a population of 2.2 million by 2021. A notification issued by the town and country planning department of the government of Haryana on February 5, 2007 expanded the planning area by 21,733 ha, thereby adding another 1.5 million people to what would now be known as the Gurgaon-Manesar urban complex. Thus, by 2021, the population of this urban complex was expected to reach 3.7 million.<sup>43</sup>

According to the master water supply scheme prepared by HUDA, the water demand for a projected population of 3.7 million would be about 960 MLD.<sup>44</sup> However, a draft report prepared by a consultant for the implementation of the second phase of the Yamuna Action Plan considered the population as 2.2 million, instead of 3.7 million. The report said that the administration was planning to increase the per capita water supply within the already existing Gurgaon city and HUDA sectors to 204 LPCD by 2021. It also said that of the total 604.5 MLD supply planned for 2021, about 582 MLD would be sourced from surface water and the rest from groundwater. Of this, 475 MLD was earmarked for domestic consumption, 45.5 MLD for industrial and institutional demand, 62 MLD for irrigation and fire fighting, 16 MLD for the villages, and the rest for Maruti Udyog Limited.<sup>45</sup>

Caught amidst these conflicting estimates, can the authorities support the water needs of the expanding city? HUDA claims it has the infrastructure in place for the city's current population of over 1 million, and is in the process of securing water for another 2.7 million. The irrigation department has built another channel, NCR Canal, at a cost of Rs 275 crore that will draw water from the Western Yamuna Canal. Designed to carry 1,210 MLD (upgradable to 1,953 MLD), more than 60 per cent of its flow will be for meeting Gurgaon's needs. The canal will be commissioned towards the end of 2011 once the authorities put in place the storage structures, says V P Yadav, superintending engineer of the

TABLE: SECURING GURGAON'S WATER FUTURE			
While the 300-MLD plant at Chandu Budhera is expected to vastly augment the capacity, it may not be enough to meet Gurgaon's growing needs			
Location of water treatment plant (WTP)	Treatment capacity (MLD)	Status/targeted date of completion	Source of water
Basai	273	Existing	Gurgaon Water Supply Canal (Yamuna) (90%*); groundwater (10%)
Chandu Budhera (new)	100	April 2012	NCR Canal (Yamuna)
	100	April 2014	NCR Canal (Yamuna)
	100	April 2016	NCR Canal (Yamuna)
Total augmentation	573		

Source: Bharat Lal Seth 2011, 'Addicted to groundwater', *Down To Earth*, Vol 20, No 2, June 15, Society for Environmental Communications, New Delhi

Note: \*per cent of the actual supply

**TABLE: FUTURE SEWAGE SCENARIO OF GURGAON**

*The city will have to plan carefully to avoid being swamped by its sewage*

Agency	Population (million)		Water demand (MLD)		Sewage generation (MLD)		Sewage treatment capacity (MLD)		GAP between sewage generation and treatment capacity (MLD)	
	2007	2021	2007	2021	2007	2021	2007	2021	2007	2021
Official figures	0.9	3.7	162	666	129.6	532.8	100	255	34.6	272.8
JAFRA	1.8	6	324	1,080	259.2	864	100	255	164.2	604

**Sources:** 1. HUDA and PHED; 2. Anon 2007, Draft report of the consultancy for the JBIC-aided YAP-II preparation of master plan for sewerage, drainage, feasibility studies and detailed project report for eight towns, CH2MHILL, Gurgaon, *mimeo*; 3. Personal communication with office bearers of the JAFRA in 2008

irrigation department.<sup>46</sup>

According to a water allocation schedule prepared by the government of Haryana in 2007, about 2,500 MLD from the Yamuna will be diverted for various uses in the state. Of this, 37 per cent has been earmarked for Gurgaon's domestic, industrial and other needs. Although this will increase the water withdrawals from the Yamuna<sup>47</sup>, it needs to be seen how much of this water would actually be drawn to the water treatment plants and how much would be eventually supplied.

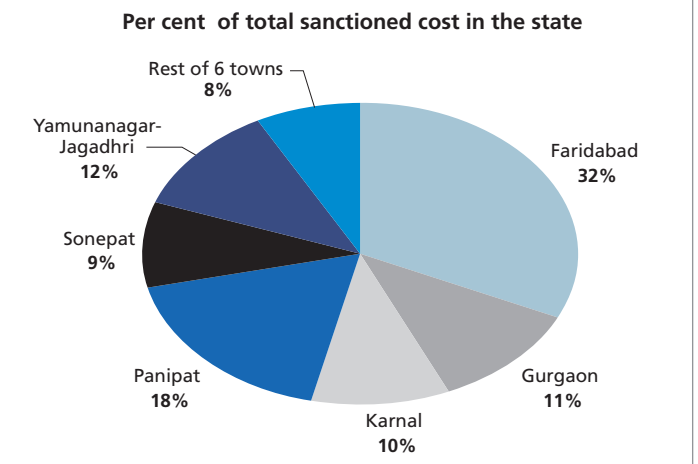
## SEWAGE

Under the Yamuna Action Plan-I (YAP-I) and its extended phases, a sum of Rs 248 crore was allocated for sewage management of 12 towns in Haryana, including Gurgaon. Of this, Rs 27 crore has already been sanctioned; about 11 per cent of the sanctioned amount has gone to Gurgaon (see Graph: *YAP fund disbursement in Haryana*). Under YAP, the town has invested in a 30-MLD STP (Rs 10.76 crore), sewer lines (Rs 5.5 crore), pumping stations, community toilets and crematoria.<sup>48</sup>

HUDA has proposed to build a 145-MLD STP at Behrampur village. A plant with a capacity to treat 50 MLD has already been constructed in the village at a cost of about Rs 22 crore; the Authority says that the remaining 95 MLD capacity will be added in phases. Besides this, a 10-MLD tertiary treatment plant has been proposed at Sector 52 A.<sup>49</sup>

But will this suffice? A demand gap analysis for various population scenarios throws up an interesting picture (see Table: *Future sewage scenario for Gurgaon*). According to it, once the

**GRAPH: YAP FUND DISBURSEMENT IN HARYANA**  
*Gurgaon has spent the money it got in building an STP, sewer lines, pumping stations, toilets etc*



**Source:** Anon 2005, *MIS report of programmes under National River Conservation Plan, Vol II*, Union ministry of environment and forests, New Delhi, *mimeo*

planned sewage treatment capacity is achieved, the total capacity would be 255 MLD. If this STP capacity is not augmented on the basis of realistic estimates, the gap between sewage generation and treatment can turn out to be massive: in range of 273-600 MLD (as per calculations done by HUDA and JAFRA). Is Gurgaon prepared to acknowledge this truth and act, or will it drown in its own muck?