

## YAMUNANAGAR & JAGADHRI

### THE WATER-WASTE PORTRAIT

*They source from groundwater and dump waste into the Western Yamuna Canal. Ultimately, it is the Yamuna which carries the sewage load of the twin towns*



# Yamunanagar & Jagadhri

**Y**amunanagar and Jagadhri are twin industrial towns in the state of Haryana. Contrary to what the name suggests, Yamunanagar (and Jagadhri) is not located on the banks of the Yamuna river, but along the Western Yamuna Canal (WYC), some 220 km upstream of Delhi. It is Haryana's second largest urban agglomeration after Faridabad. Of the twin towns, Yamunanagar is a comparatively newer settlement, and has a higher density of population averaging 10,857 persons per sq km.

Neither town sources its drinking water supply from the river or the canal. Both get their water from tubewells, but they discharge their entire wastewater into the canal, which ultimately reaches the Yamuna, polluting it downstream.

## WATER

### DEMAND AND SUPPLY

Officials of the public water supply agency in the two towns (the Public Health and Engineering Department or PHED) are a divided lot: there is no consensus among them on the water these towns demand and the amount that is supplied. There are, however, indications that point to a steep rise in demand between 1993 and 2005 – from 40 million litre daily (MLD) to 60 MLD. An analysis of the available data suggests that supplies are way below demand, and the gap is of 25 MLD (see Table: *The water*).<sup>1</sup>

According to data received in 2005-06 from the PHED, Haryana, by 2011, the twin towns' water demand would have gone up by 156 per cent, hence the gap between demand and supply would increase to almost 254 per cent. The towns would have to increase their supply by 3.5 times to meet this rise.<sup>2</sup>

In 2005-06, there were 81 tubewells – 59 in Yamunanagar and 22 in Jagadhri – that drew water from the ground: the only sources of water in the twin towns. The PHED is in the dark about how much water these tubewells yield. According to it, in 2004, water supply to the twin towns had come down to 34 MLD from 47 MLD, though the number of tubewells increased.<sup>3</sup> This might be an indicator of declining water levels (see Graph: *Groundwater check*).

### DISTRIBUTION

There is considerable inequity in piped water supply at the user's end. Surendra Mohan, sub-divisional officer, PHED had told the surveyers from CSE: "Water is supplied three times a day for about 10 hours. The supply ranges from 70 to 125 LPCD – and on an average, 90 LPCD during summer." This, however, might have been true only for the 87 per cent connected population.<sup>4</sup> The

### THE CITY

Municipal area	27 sq km
Population (2005)	0.34 million
Population (2011), as projected in 2005-06	0.9 million

### THE WATER

<b>Demand</b>	
Total water demand as per city agency	60 MLD
Per capita water demand as per city agency	180 LPCD
Total water demand as per CPHEEO @ 100 LPCD	34 MLD
<b>Sources and supply</b>	
Water source	Groundwater
Water sourced from surface sources	Nil
Water sourced from ground sources	100%
Total water supplied	44 MLD
Per capita supply	130 LPCD
Leakage loss	20%
Actual supply (after deducting leakage losses)	35 MLD
Per capita supply (after leakage losses)	104 LPCD
Population served by water supply system	87%
Per capita supply to the served area	119 LPCD
Demand-supply gap (after leakage losses)	25 MLD
<b>Treatment</b>	
Number of WTPs	NA
Total treatment capacity	NA
Actual treatment	NA
<b>Future demand and supply</b>	
Demand (2011), as projected in 2005-06	155 MLD
Augmentation needed to meet the demand	111 MLD
Required increase in supply	254%

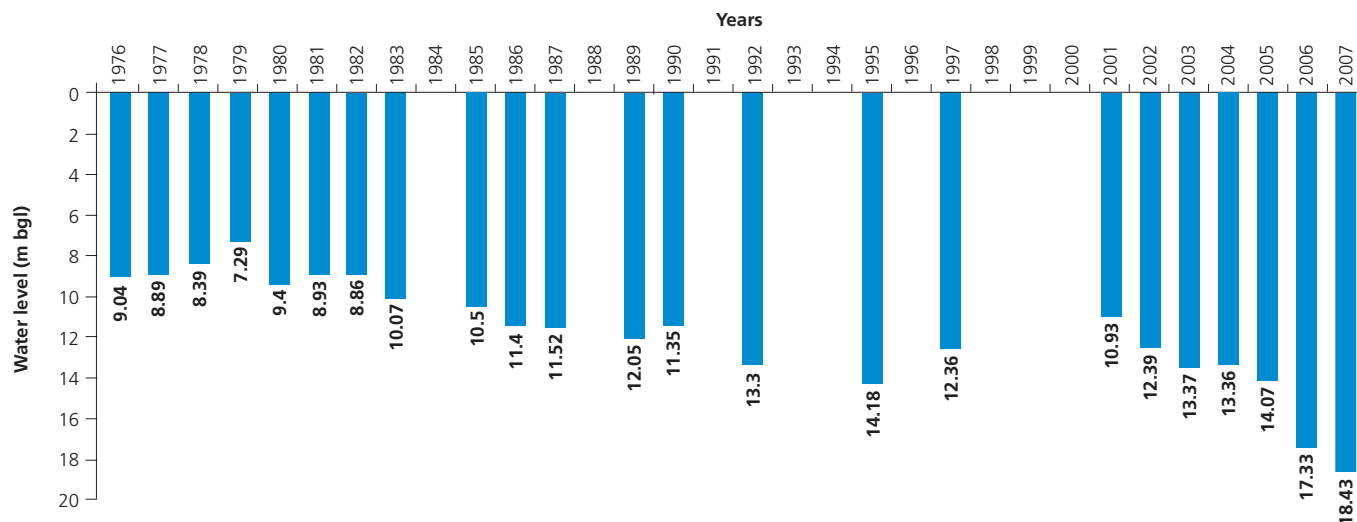
### THE SEWAGE

<b>Generation</b>	
Sewage generated as per CPCB	33 MLD
Sewage generated as per city agency	36 MLD
<b>Collection</b>	
Length of sewerage network	NA
Population covered by sewerage network	NA
Area covered by sewerage network	55%
<b>Treatment</b>	
Number of STPs	2
Total treatment capacity	35 MLD
Actual sewage treated	47 MLD
<b>Disposal</b>	Western Yamuna Canal

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

## GRAPH: GROUNDWATER CHECK – YAMUNANAGAR AND JAGADHRI

As per the CGWB, in 1976, the water level was 9.04 metre below ground level (m bgl); in 2007, it declined to 18.43 m bgl. Hence in 31 years, the level has dipped by 9.39 m at the rate of 0.30 m per year



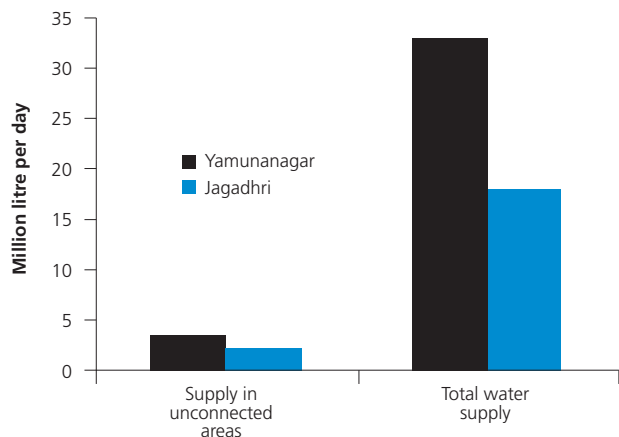
Source: National Data Centre, Central Ground Water Board (CGWB), Faridabad

unconnected have largely been left in the lurch (see Graph: *Inequity in supply*).

Privately dug tubewells have, naturally, proliferated. A significant quantity of groundwater is extracted by these tubewells. If we assume that groundwater extraction for this unconnected population of 13 per cent is done at the rate of 140 LPCD, then over 47 MLD is withdrawn from these private tubewells alone.<sup>5</sup>

## GRAPH: INEQUITY IN SUPPLY

About 87 per cent of the population is connected to the supply network. But for the unconnected, supply done through tankers is irregular and erratic



Source: National Data Centre, Central Ground Water Board (CGWB), Faridabad

## THE ECONOMICS

The municipal corporation of the twin towns collects Rs 25 per tap every month for unmetered connections and Re 1 for every kilolitre consumed for metered connections. There is a sewerage charge of Rs 6 for every toilet seat, collected per month towards water and sewerage charges. In 2005, the PHED had set itself a revenue target of Rs 0.097 crore – it had planned to realise Rs 0.91 crore as water charges and Rs 0.059 crore as sewerage costs. As against this, only Rs 0.91 crore was recovered.<sup>6</sup>

## SEWAGE

### GENERATION AND COLLECTION

As the twin towns have a strong industrial base, the sewage they generate is calculated as the sum of industrial and domestic wastewater combined. In 1993, when detailed project reports of the Yamuna Action Plan (YAP) were prepared, sewage generation was estimated to be 25 MLD based on a water supply of 150 LPCD; in 1998, the generation was projected to reach 35 MLD.<sup>7</sup>

At the time of the CSE survey in 2005-06, water demand was 60 MLD, which means wastewater generation would have been to the tune of 48 MLD. This includes the waste generated by the unconnected population – around 5 MLD – who get their water from private tube-wells. According to the Yamunanagar-based Yamuna Pollution Control Unit, domestic sewage generation was about 35 MLD.<sup>8</sup>

PHED officials claimed that 55 per cent of the population in both towns combined have access to a sewerage network. But the twin towns have only 8,733 sewer connections. Assuming that

**TABLE: SEWERAGE STATISTICS**

*The PHED's claims that 55 per cent of the population had access to sewerage facilities is belied by these figures*

Town	Population as per census of 2001	No of sewerage connections	Population connected to sewerage	Unconnected population (%)	Untapped sewage (MLD)
Yamunanagar	1,89,587	6,464	51,712	72.72	16.54
Jagadhri	1,01,300	2,269	18,152	82.08	9.98
<b>Total</b>	<b>2,90,887</b>	<b>8,733</b>	<b>69,864</b>	<b>75.98</b>	<b>26.52</b>

**Note:** Water supply taken as 150 LPCD

**Source:** Anon 2006, *Present status of water supply and sewerage – March 31, 2006*, Public Health and Engineering Department, Yamunanagar, mimeo

each connection serves eight people, the total population connected to sewers is less than 70,000. In other words, more than 75 per cent of the population lacked any sewage collection system in 2005-06 (see Table: *Sewerage statistics*).<sup>9</sup>

As per 2001 population figures, 76 per cent of the waste, or 26 MLD, went untapped by the sewer lines. In 2005, there was no change in the percentage of connected population though the volume of wastewater generated had increased to 36 MLD. The PHED said that notices were being served to the residents to take sewer connections. Data on sewer connections for 2004 and 2006 reveals that the number of connections had increased by only 219 in two years. While existing houses remained unconnected, the National River Conservation Directorate (NRCD) came forward and allotted more money for sewerage new areas.<sup>10</sup>

## TREATMENT AND DISPOSAL

The twin towns have two sewage treatment plants (STPs). Commissioned under the YAP, they were designed for treating only 35 MLD of sewage, keeping in mind the population of the two towns in 1998. Their capacity was not upgraded, and by the time they were commissioned in 2002, sewage generation greatly outstripped the treatment capacity.<sup>11</sup>

Pumping stations and other facilities to intercept and divert sewage were also constructed under YAP. Both the STPs have adopted the upflow anaerobic sludge blanket (UASB) technology. The total cost of the sludge beds and land acquisition for the STPs worked out to Rs 14.71 crore.<sup>12</sup>

Studies by the Central Pollution Control Board (CPCB) have estimated that both the STPs receive over 45 MLD of sewage. Treated discharge from the 25-MLD STP at Camp Area amounts to 36 MLD, while the 10-MLD plant discharges about 9.7 MLD after treatment. The STPs are also not meeting the coliform standards in their treatment processes: according to the CPCB study, faecal coliform count at the 10-MLD plant was in the range of 110,000-170,000 MPN/100 ml, while it was 80,000-160,000 MPN/100 ml in the second STP.<sup>13</sup>

PHED officials lament that the revenue generated is grossly inadequate to run the sewerage infrastructure in the twin towns. The 25-MLD STP treats waste at a cost of Rs 0.435 crore (Rs 0.5 per kl) a year. An additional cost of over Rs 8 lakh is incurred every year for pumping sewage. This takes the total cost to about Re 1 per kl. The PHED spends another Rs 0.25 crore

(Rs 0.70 per kl) a year to run the 10-MLD STP.<sup>14</sup>

The sewage from Yamunanagar and Jagadhri traverses two major drains, merging near the 25-MLD STP before flowing into the WYC. Here, the sewage accumulates as a bed of sludge, to be washed down by the barrage releases once a month. The waste flushed in this manner reaches the Dhanaura Escape and travels thereon for 15 km eastwards, to eventually join the Yamuna.<sup>15</sup>

Besides domestic wastewater, industrial effluents from paper, sugar and starch mills and distilleries are also discharged into the drains with or without treatment. So the WYC becomes a conveyor of a deadly cocktail of domestic and industrial waste. According to a performance review done in 2002 by IIT Roorkee, 85 per cent of the drains were tapped; the untapped drains were outside municipal limits. A recent evaluation by the PHED says that even with this arrangement, only 29 MLD of sewage gets intercepted. This is contrary to the claim of Haryana State Pollution Control Board (HSPCB) officials, who say that most of the interceptor drains are overloaded and they frequently overflow, as the volume of sewage has increased over time.

To tackle the pollution problem and manage the waste, industries, the PHED and the HSPCB have come together and are contemplating the idea of a parallel effluent drain to the WYC. This, they say, will help dispose off the waste flowing through the drains at Dhanaura Escape, 22 km downstream from Yamunanagar. No thought has, however, been given to treatment or to segregation of industrial and domestic wastes. A parallel drain might not be the solution as it will only push the pollution load to downstream towns.

## IMPACTS

### THE CANAL AND THE RIVER – DEFILED

The twin towns are estimated to contribute a pollution load of about 7,000 kg of BOD per day to the WYC, which ultimately merges into the Yamuna. About 50 MLD of wastewater is contributed by unidentified sources.<sup>16</sup>

The WYC has no freshwater flow for most part of the year and is seen almost as a 'disused' canal. Water is released into the canal only for five to seven days a month for irrigation, and in this period the accumulated waste also gets flushed out. For the rest of the month, sludge keeps on accumulating in the canal and the



## WASTED EFFORT?

*Not for people who actually need it in the unsewered areas*

Twelve community toilets were constructed under YAP in Yamunanagar (see table); eight of them were commissioned in 1998 and the rest in 2002. Out of these, four were closed down due to under-usage.

It is important to note here that the community toilet complexes were not constructed to serve the less-advantaged population of the town – the slum dwellers who are without proper sanitation and therefore, who need these facilities the most. The toilets were not located in the unsewered areas where they were mostly needed, but in places which had the potential of generating financial returns. Explains D P Mittal, executive engineer, PHED and the head of the Yamuna Pollution Control Unit, “Though the community toilets were initially meant for slums, due to the inadequate water supply in such areas they were relocated at bus stands and markets.”

**TABLE: COMMUNITY TOILETS IN YAMUNANAGAR**

Location	Number of seats	Average users per day	Expected users per day
Subzi Mandi	20	220	300
Chandipur	20	65	100
Azad Nagar	20	60	100
Bus Stand Yamunanagar	10	40	500
Mini Secretariat	10	125	150
Camp Area	20	65	100
Indira Market	10	180	200
Bus Stand Jagadhri	10	350	400

Source: Public Health & Engineering Department, Yamunanagar, May 2006

stretch between Yamunanagar to Kachwa village remains dry.<sup>17</sup> For instance, during the dry season of 2006 from January to May, there was hardly 15 days of freshwater flow through the canal (see Table: *Days of freshwater flow in WYC*).<sup>18</sup>

The CPCB estimated that during a span of 25 days of no

freshwater flow, a huge volume of 3,700 MLD of wastewater had accumulated in the canal. This is flushed downstream as a shock load when the water is released.<sup>19</sup> This polluted water feeds two of Delhi’s water treatment plants.

Downstream of the twin towns, the Yamuna is in its death



*The Western Yamuna Canal (seen here) is so polluted that it has no freshwater flow for most of the year*

**TABLE: DAYS OF FRESHWATER FLOW IN WYC (2006)***Almost none – the WYC is seen as a ‘disused’ canal*

Month	Number of days flow was observed in WYC
January	2
February	0
March	2
April	5
May	7
<b>Total</b>	<b>16</b>

**Notes:** 1. WYC, or Western Yamuna Canal receives flow when the flow in the augmentation canal exceeds 3,200 cusecs; 2. Data till May 15, 2006

**Source:** Hathnikund Barrage Circle, Jagadhri, May 2006

throes. The river appears to have lost its ability to bear and sustain life. For instance, on March 22, 2006, some 12 km upstream of Kalanaur, mass fish deaths were reported. According to the HSPCB, there is rampant ‘illegal’ dumping of industrial wastes through the Maskara *nullah*. Jagadhri has about 200 to 300 industries, of

which 50-60 are brass factories. These units discharge all their effluents into the drains which lead into the WYC and from there, to the Yamuna. About 52 polluting units and eight electroplaters in the town have not installed any ETPs yet.<sup>20</sup>

## LOOKING AHEAD

A sum of about Rs 29 crore was sanctioned and spent in Yamunanagar and Jagadhri under YAP-I and YAP-extended. Of this investment, 89 per cent – almost Rs 27 crore – went into physical construction works like laying down interception and diversion sewers and installing pumping stations to transport sewage to centralised treatment facilities. Crematoria and community toilets received little over 2 per cent of the funds.<sup>21</sup>

Under the YAP-I and YAP-extended, 16.5 km of intercepting sewers and 16.70 km of trunk sewers were also laid in the twin towns. Two pumping stations were built – the one at Camp Area has a design capacity of 45 MLD and feeds the 25-MLD STP, whereas the second station at the City Centre and Yamuna Gali, with a capacity of 18 MLD, feeds the 10-MLD treatment plant. Interceptors to divert sewage from the drains to the STPs have also been constructed at many places.<sup>22</sup>