CHAPTER VI

WATER SUPPLY SYSTEM: A HISTORICAL PERSPECTIVES OF AURANGABAD
Several periods of prosperity are quite discernible in the history of India. Numerous documentaries and field evidences which attest to the then existing water systems which in turn were based on well conceived planning and regulation, are extant in different parts of India. The methods of water development of respective periods have long been closely linked to the Indian climate, social setup and living style. Innumerable inspiring examples such as the millennium old canals off-taking from Kaveri near Tanjawar in Tamil Nadu, the water supply system is still existing in the empire of Vijaynagar, the method of guaranteeing water in drought - prone area of Rashtrakutas and Yadawas, the Phad irrigation system ensuring equitable distribution of water existing in Khandesh, Maharashtra are spread all over India.

The history of India has left a considerably large legacy in the sector of water conservation. The dictum "Where there is water, there will be a habitation" is the very beginning of this legacy. Therefore, no habitation appears to have set up in the ancient and medieval periods unless assured water existence.

The historical growth of the city can be traced back to the second century B.C. which indicated that it was located on an ancient trade route from Ujjaini in the North to Pratisthan (Paithan), the centre of trade and the capital of Satvahanas. The district Aurangabad had attained a high level of prosperity during these days.
In 1960, A.D. Aurangabad city was founded by the great Malik Ambar, the Prime Minister of Murtaza Nizam Shah of Ahmadnagar on the sight of village Khirki. The village was named Khirki because it served as an opening between the North Indian culture and the South Indian culture. Thus small village took the shape of a capital of Nizamshahi Kingdom.

The village Khirki was situated at the Southern part of the present Aurangabad from Kala Chabutra to Bhadkal gate. Malik Ambar developed the village Khirki within a span of six years. Malik Ambar was succeeded by his son Fateh Khan, who changed the name of Khirki to Fatehnagar (Victory Town) with the capture of Daulatabad by the imperial troops in 1633, the Nizam Shahi dominions including Fatehnagar came under the possession of the Moghals. In 1653, when Aurangzeb was appointed the Vice Roy of the Deccan, he made Fatehnagar his capital and called it Aurangabad. Since then the city is known as Aurangabad.

Aurangabad district is situated in the central part of the Maharashtra State and lies between 19°18' and 20°41' north latitudes and 74°34' and 76°4' east longitudes. Aurangabad district has an elevated land and incised by the Godavari river and its tributaries in the Southern part. Aurangabad district covers an area of 10107.00 Sq km which accounts 2.80 per cent of the State. In geographical view the district may be broadly divided into two regions. One is the Shivna-Godavari basin and another is the Ajanta plateau and the Northern piedmont slopes.
The urban development of Aurangabad city was started in 17th century now which is a Divisional Head Quarters of the Marathwada region, and occupies a place of pride in the history of India. Lying at the cross-roads of ancient trade routes and nested centrally in the Deccan plateau, Aurangabad has naturally been the scene on which a great many cunning passages of history have been enacted and unfolded. Endowed with a rich cultural past, and a capacity for absorbing the shocks and transformations of historical change into its own characteristic personality, the city occupies an important place on the tourist map of the world. The city is festooned all around with an amazing variety of monuments, such as the rock-cut temples in the mountain ravines of Ellora and Ajanta, strategic forts such as the one at Daulatbad and mosques and mausoleums with their minerals and domes such as Bibi-Ka-Maqbara. The dimensions of antiquity, which the city's hoary past represents, trace a significant curve in Indian history from 4th century B.C. to 18th century A.D. recording the rise and fall of dynasties, empires, cultures and civilizations. Aurangabad, through its monuments thus reveals the exuberant vitality of historical India and thus stands as a link between the past and the present.

Aurangabad city typifies the landscape and the climatic conditions of the entire Marathwada region. The locals of the city is singularly fascinating as it is structured on the undulating landscape bordered by parallel running mountain chains towards the north and south of the city. These mountain sub-ranges form a part of the Vindhayas.
The Vindhya ranges add a new vertical dimension at various points as a relief to the vast stretches of the Deccan plateau. Unlike in other mountains, there appears to be in these a total absence of granite rock; and the mountain escarpments which constitute the so called 'trap rock' of a porous nature are ideal for carving out caves will primitive and traditional instruments, and have always provided the sculptor, architect and artist at once a challenge to overcome adventurously, and an opportunity to fulfil in creative plenitude. This could possibly be the major explanation for the unique, and almost endemic existence of the cave architecture only in the western part of India.

The water supply system of Aurangabad City also has an historical background. In ancient times, the city of Aurangabad used to procure water through the system of Nahar. Malik Ambar the founder of Aurangabad discovered subterranean water table or mountains elevated valley around the city. He practically manipulated and procured a stable water supply to solve the acute problem of water for the Aurangabad city. This underground water supply system of Aurangabad is a unique technological marvel. Such an extensive network of underground Nahar is found only in Aurangabad without any parallel in medieval India.

Malik Ambar in his kingdom, studied the topographical conditions of the city and developed Nahar system. These Nahars are nothing but the aqueducts flow under gravity. The *aque-duct* comes from the Latin words i.e. *aqua* (water) and *ducere* (to lead) which means
Carrier of water. Aque-duct is a underground pipe structure that transports large quantities of water from a source to a point of use. In a broad sense an aqueduct is a channel build to transport water chiefly for providing a supply of fresh water to city (The Columbia Encyclopedia, 1954).

Aqueducts were of two types which were as follows:

i. An aque-duct which carries water flow in a channel that is not full and not under pressure (non pressure aque-duct).

ii. It is an aqueduct - channel which is full and the water is under pressure (Pressure aqueduct).

The town of Aurangabad receives its water supply from underground springs connected with number of aqueducts which are classified under two principle types of aqueducts i.e.

i. Living aqueducts,

ii. Dead aqueducts.

The Aurangabad District Gazetters mention the existence of following 14 Nahars (Shaikh, 1982):

i. Living Nahars (Aqueducts)

1) Nahar - e - Ambari,

2) Nahar - e - Panchakki, (Plate 2)

3) Nahar - e - Begumpura, (Plate 3)

4) Shah Ali Nahar,
ii Dead Nahars (Aqueducts)

5) Nahar - e - Palsi ,
6) Open - irrigation channel near cantonment,
7) Sukar Bavli pipe line,
8) Lall Munkirar's pipe line,
9) Latchman Dass Bairagi's pipe line,
10) Dul Badul's pipe line ( near Garkheda),
11) Chausar garden pipe line,
12) Deolai pipe line,
13) Satara hills pipe line,
14) (Name is not available).

Bashiruddin Ahmed Dehalvi gave the same list of aqueducts as noted in Aurangabad Gazetters but Bashir Ahmed Dilkash found the existence of the following additional Nahars

1) Nahar - e - Nasarullah (dead),
2) Nahar - e - Kirad pura (alive),
3) Nahar - e - Garkheda (dead),
4) Nahar - e - Kotala (dead),
5) Nahar - e - Shahnoor Hamvi (alive),

Malik Ambar developed new scheme of water supply for the city called as Nahar system which was
aptly named as Nahar - e - Ambari. It is the biggest Nahar originated at the North side of Kham-river situated 5 km away towards North Side of city. It is a gravity water supply scheme started in 1616 and completed in 1618. *Nahar - e - Ambari* is also called as *Khair - e - Jari* means free supply of water to citizens because Nahar - e - Ambari was the only Nahar which served the common public at that time. All other canals constructed later on by other nobles were for private use. After completion of Nahar - e - Ambari the system of Nahar was adopted by Vijapur and Gowalkonda kingdom (Gazetters Of Aurangabad, 1984).

Nahar - e - Ambari originated at the foot of the Joban hills, north side of Aurangabad and flew downwards the town. Nahar - e - Ambari is a *rock-cut-canal*. The rock was cut deep (40 feet) below the surface of the ground and its side walls are raised vertically in bricks masonry and closed at the top in an archway form. This was continued throughout the canal. The scheme includes 100 manholes. The manholes were given serial numbers from MH 1 to MH100 which are still visible at some places. These manholes are to reach the bottom of the Nahar which are in-built on rockey bed of Nahar and projected upwards the level of the ground. These manholes are at varying distance of 200 feet to 300 feet. They are close to each other when the Nahar flows close to the river but the distance between them increases when the Nahar is away from the river (Kham). The distance at the source and at the end is again wider between one and the other manhole. These manholes are square shaped.
and have been provided with brick steps to move up and down. The Nahar is 2½ feet in width and 7 feet in height on an average althrough the canal.

The Nahar of 3'6" size covers a range of about 3.5 km from its origin to end and moves zig-zag along the right bank of kham river. The uneven surface of the ground has been levelled off by cutting the rock. The whole canal was so constructed that it remained hidden underground. The manholes were also sealed below the level of the ground probably to avoid pollution and to protect from enemies.

The Nahar which starts from MH1 comes to an end at MH 100 and this place is known as Gaimukh. Here, at Gaimukh a cistern is made where water accumulates. Gaimukh is about one mile away to the north from the city. The cistern at Gaimukh is small in size, 100 feet in length and 8 feet in breadth and the water that flows in canal was made to fall into the cistern through the mouth of a cow (hence named Gaimukh). Even today also one does not know any trace of such sculpture eleswhere. From Gaimukh the distribution system starts for the city. From this point, water was diverted and supplied to the city through earthen pipes. From 1 km to the south of Gaimukh, there is another Khazana or reservoir inside the Delhi gate which is close in proximity to the commissioner office. Earthen pipes were stretched from Gaimukh reservoir to Delhi gate reservior and from there water was supplied to the town through earthen pipes of varying sizes.
Study of water supply system and management in Aurangabad city

For effective and equal distribution with equal pressure air towers were constructed which starts from Delhi gate and moves along with the earthen pipes. Innumerable air towers are now inside the residential places of the people. At the top of the tower there is an arrangement to store water. The height of tower varies with starting point of Nahar and elevation area to which water is to be supplied. From these towers the water was supplied to various areas through pipelines, sometimes a single line but at some places upto six pipes stretched downwards. The engineers of the Nahar also visualized the possibility of getting these pipelines chocked due to silt and provided an arrangement to clean these. The pipes which were stretched downwards, were also provided holes at different places. From these holes people, who could not afford to get earthen pipe connections, used to take water. Thus, these holes served as common taps. The air towers served to control and maintain the pressure of water uniform all over the localities.

Most scientific system was adopted to distribute water among the localities. Hundreds of tanks were built at each corner of locality. The network of the earthen pipe lines of various dimensions were spread all over the town. The poor localities were given free supply of water and gardeners using water of the aqueduct charged double of the regular tax. The water delivery centres i.e. cisterns and air towers etc. were treated as government property. Nahar - e - Ambari was the largest aqueduct among all other aqueducts of Auranagabad. More than 600 cisterns
Study of water supply system and management in Aurangabad city

(Hauz) were built to collect water from these cisterns and that is why the wells are not built except two or three in the populous area of Aurangabad (Shaikh, 1982).

The Nahars which were constructed later on, made use of the one or the other techniques of Nahar-e-Ambari. After the death of Malik Ambar his son, Fatah Khan made extention of the Nahar to meet the growing need of the city (Elliot and Dowson, 1964). From Gaimukh reservoir to Rouza Baugh a separate branch of the Nahar was cut. The extended double Nahar is joined to a well which is now in the Maulana Azad College Campus. From this well, water was supplied to the Palace of Islam Khan who was Subedar of the Deccan and the garden, its cisterns, cascades and fountains. The excavation of Nahar further to Islam Khan's Rouza Baugh is the first and last example when the Nahar has been extended. All those who reigned this region later on made use of the Nahar water by extending or increasing the earthen pipe lines. Some part of this valuable cultural heritage of water supply system is now vanished and at some places is on the verge of extinction.

Like Nahars, Panchakki (water wheel) takes its name from the mill and cascade is also a rock-cut canal system. It is world famous place for tourists. It's unique and mysterious structure of aqueduct, water mill and water fall is appreciated. The mill, which was used to grind grain for pilgrims and disciples of Saints as well as for troops of the garrison. It was designed to generate energy via water, brought down from a spring on a
mountain. Malik Ambar himself built it, in 1695. It also has the tomb of Baba Shah Muzaffar, a Sufi Saint. Dating back to the 17th century, ingenious watermill was designed to generate energy via water. The energy was, further, used to turn the large grinding stones of the flourmill. In 1624, a Sufi Saint who was much revered by Aurangzeb was buried here; the gardens and fish tanks serve as his memorial.

A mountain spring about 8 kms away from the water source for running the mill; a maze of underground earthen pipes cleverly channeled the water to feed elevated masonry tanks. When water tanks were full, these water would siphon out in the form of a perennial waterfall moving the blades of the grinding wheel. Underneath the reservoir of Panchakki there are spacious, cool chambers, which are used during summer by pilgrims. The water distribution system is a marvel of hydrology and was the engineering feat of Malik Amber, architect of Aurangabad city. The supply of water to this unique water fall of Panchakki is a mystery to visitors till today.

The ancient Nahar water system was very scientific and technologically advanced. It has various advantages which are given below.

- As the system works on gravitational principle, no need of electricity for pumping.
- At that time it gave water supply for 24 hours.
- No maintenance hence economical.
Natural filtration of water takes place thus, no addition treatment required.

The whole system is closed thus no loss of water through evaporation takes place and the water is also safe and clean.

Elango and Ramachandran (2002) studied the water supply and sanitation of an ancient town, Thajavur (Tamil Nadu) and mentioned that, during 1535 A.D. the Naikes King Sevappa Naicken who established 'Jalasutra System' for the supply of potable drinking water. He had constructed Sevappa Naicken Vari (canal) and Eari (Lake) for the purpose. From this lake water flew to Sivaganga Tank, from where water was supplied to particular tanks, Ayyankulam and Samanthankulam, located in two different spots of the town. Water flew to important wells in the palace and other areas of the town through a canal. Thus a perfect system of public drinking water which flew very effectively during the regime of Naike. During the Maharatta's period in 1825 a massive drainage system was established by the King Serfoji, which continues to serve the old Thanjavur town. During the British period in 1895 the Vennar River System was established for supplying drinking water to the town.
PLATE 2: A view of NAHAR-E-PANCHAKKI
(A historical monument)
located in Kohinoor Colony.

PLATE 3: A view of NAHAR-E-BEGUMPURA
(THATTE HAUD) located in Begumpura.