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NEEDS AND METHODS OF WATER MANAGEMENT SYSTEM IN DECCAN SPECIFIC REFERENCE TO AHMEDNAGAR

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ABSTRACT

The paper specifically examines Ahmednagar (now Ahilyanagar), a city that has lost its historical importance over time. The Deccan's water management methods, influenced by the Qanat system, are explored, emphasizing the challenges faced in the southern region due to geographical constraints. The paper aims to revive the recognition of Ahmednagar's past glory, shedding light on its distinctive water system during the 16th-17th century, governed by the first Nizams and later the Mughals. The city's foundation, historical places, and neglected conditions are highlighted, providing an overview of the research's scope and objectives.

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INTRODUCTION

Water and the need for its management is a necessary thing for human beings from earliest times. Depending on the regional differences, different systems evolved. In north India methods of working with water are to do mainly with irrigation and water in flat lands. Deccan methods of dealing with water are first to do with storing water, keeping it clean in the natural environment and use it for different purposes. The south from the Narmada and away from the Godavari there is always a need for water management because while river exist the geography is such that water cannot be transferred easily. Therefor there is a need of system which is similar to the Qanat system which is originally from Iran and used in very few places of India including Burhanpur, Aurangabad and Bidar.

Ahmednagar is one of those cities who lost its importance, its uniqueness, its beauty in the course of time. The title of the paper suggests a lot more things related to the work as it mentions the Deccan area which means one needs to understand the geography of it and the methods of dealing with water. This paper will throw light on the glorious Period of the city and its unique water system. Here the technology will discuss briefly and much more in detail of the need of the system in the city, what kind of place the city had in the contemporary era.

Geography:

The city witnessed a glorious period of Nizamshahi. Ahmad Nizams'ah, the founder of the dynasty builds his capital at the village, known as Bingar (Bhingar), situated equidistant between Junnar and Daulatabad. According to Ferishta, "in the year A.H. 900 (A.D. 1494), he laid the foundation of a city in the vicinity of the Bagh Nizam, upon the bank of the Sena River, to which he gave the name of Ahmudnuggur. So great exertions were made in erecting buildings by the King and his dependents, that in the short space of two years the new city rivalled Bagdad and Cairo in splendour"[1] Ahmed Nizam Shah and his successors made this city very beautiful and created a unique underground water management system with the help of their Persian engineer's.

Need of Water Management System:

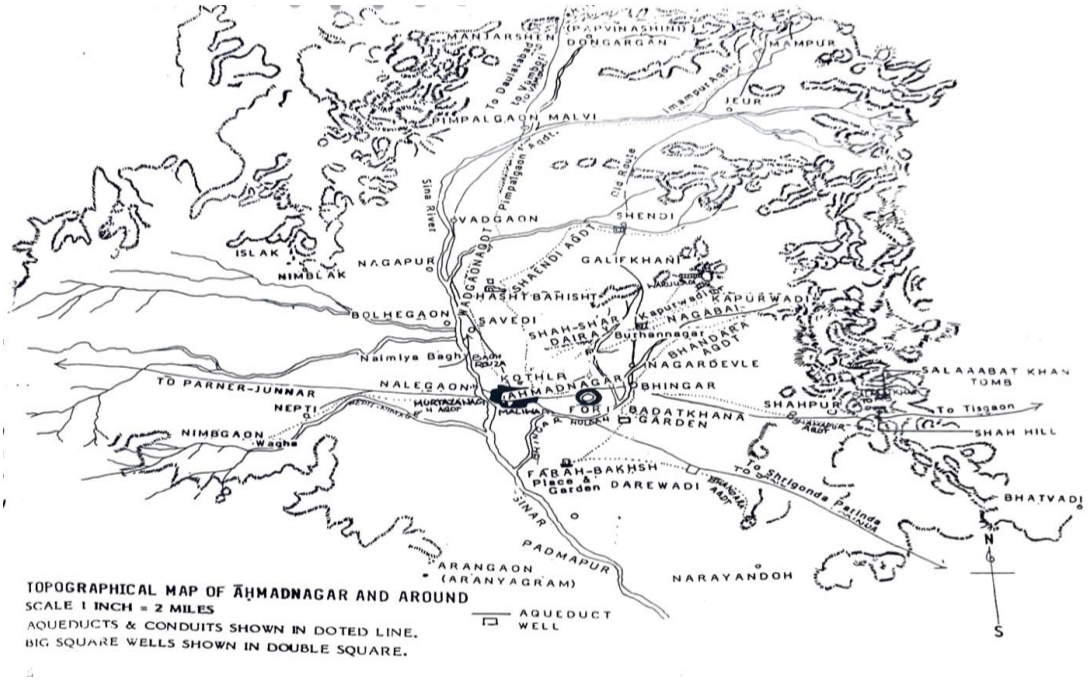
- To meet the needs of a newly established Capital - Water is the main component for any kind of development and if you are establishing a new Capital city, one needs to create a sustainable water supply system which satisfies the needs of the city. Before the establishment of Ahmednagar only Bhingar township was there. The Bhingar stream and the water of Sina River were the only water sources. After the establishment of the city, naturally their water sources were not enough to supply the water to the whole city. And the water of Sina river was salty, (we found the reference of Sina River as 'Khara Nullah') there was no use of this water for drinking purpose and only Bhingar stream was unable to satisfy the need of the city, so there was a need to create a good source of water to feed the new established city, the market places, locality, the gardens, palaces of the King and the nobles, fountains and the Hamamkhanis. So, the emperor, 'summoned surveyors, architects and builders to beautify the city with palaces, gardens and Houses'[2]

[1] Briggs John, (ed. & translated from the original of Tarikh-i-Farishtah), 'History *of the Rise of Mahommedan Power in India'*, (1st ed.), Low Price Publication, Delhi, 1997, Vol.III. p. 123

[2] Shyam Radhey, The Kingdom of Ahmadnagar, Motilal Banarasidas, Delhi, 1966, p. 38.

- On the other hand, this was also a very rich trading area which means there were lots of smaller towns, smaller areas and lots of trade routes, (most of the towns in the Nizam'sahi kingdom appear to be small in areal extent and population size[3]) so water needs to be available outside the river in specific areas. In the south the trade route takes you from Ahmednagar to Junnar, Bidar, Gulbarga, Masulipattanam or Ahmednagar up north into a Bharuch then into Khambhat. These are two directions and in between comes Ahmednagar which means Ahmednagar was a capital city, an urban settlement, and there was a trading, finance & obviously a political centre.

Methods of Water Management System



The above is the topographical map of Ahmednagar which includes directions of water channels, water ducts, reservoirs, and sources of the channels, which are in the dark green lines on the map.

It shows the water management system used in Ahmednagar, the method is similar to qanat but we have the indigenous version of it, which is made up of sets of earthen pipes, aqueducts, conduits and reservoirs. "The engineers in the service of Ahmed Nizam Shah tapped all the available sources around Ahmednagar to bring drinking water into the city these engineers were mostly foreigners especially from Persia"[4]. They brought water by underground conduits a system that was used in Persia. According to the needs of the city the king ordered his engineers to build a sustainable water system which could meet up the needs of the city. The engineers did detailed survey of the topography of Ahmednagar and tapped underground streams of water around the hills of the city and brought water from these sources to the various parts of the city by the underground conduits of earthen pipes, with the help of air shafts, water ducts, reservoirs, tanks.

According to the Bombay gazetteer, under the Nizam Shah Kings (1490-1636) 15 channels are supplied the city with pure and abundant water bought from the deep will at the foot of the neighbouring hills[5]. According to the P.B. Gadre, out of these fifteen, thirteen conduits were constructed during Nizam

[3] Ibid.

[4] Gadre P.B., op. cit. p. 64.

[5] Gazetteer of the Bombay Presidency, op. cit. p. 670.

Shahi period[6]. And two during Mughal period by the people named 'Anandrao'[7] and 'Bhavanipant'[8].

Based on the information provided by Dr P.B. Gadre, the following chart gives information about water channels of Ahmednagar, the book name is, Cultural Archaeology of Ahmednagar During Nizam Shahi 1494-1632[9].

Names of the Kings – Period of Construction	**Number of Channels (Total 15)**	**Name of Water Channels**
Ahmed Nizam Shah 1490 - 1508	4	1. Nagabai 2. Kapurwadi 3. Vadgaon 4. Shendi
Burhan Shah 1508 – 1553	7	1. Bhingar 2. Nagapur 3. Imampur 4. Pimpalgaon 5. Nimbgaon 6. Nepti 7. Shahapur
Husain Shah 1553 – 1565	2	1. Bhandara Duct 2. Varulwadi
Mughals 1600 – 1750	2	1. Anandi 2. Bhavanipant

The following chart mentions the names of engineers associated with the water Channels [10]:

Salabat Khan Gurzi	The Shendi, Vadgaon, Imampur and Pimpalgaon Channels
Salabat Khan Gurzi and Niyamat Khan Samnani	Bhingar and Bhandara Channels
Ikhatiyarkhan, Qasimkhan, & Siddi Samsher Khan	Kapurwadi Channel
Chengiz Khan	Nagapur
Niyamat Khan Samnani[11]	Nepti and Nimbgaon
Murtaza Khan Fakiti & Farhad Khan	Warulwadi
Salabat Khan II	Shahapur

The Deccan Sultanates, during the early 16th century, introduced the innovative construction of Nahars in Ahmednagar, Bijapur and Aurangabad to address the persistent issue of a reliable water supply

[6] Gadre P.B., op. cit. p. 64.

[7] Ibid, p. 66.

[8] Ibid.

[9] Ibid, pp. 64 – 67.

[10] Ibid, p. 71.

[11] Burhan-i-Maasir, Indian Antiquary, 1921, p. 328.

Niyamat Khan Samnani a foreign noble under Murtza Nizam Shah was titled as *Chashnigir* means office in charge of the Royal Gardens.

in the region. The oldest Nahar, built in Ahmednagar, was completed under the supervision of Salabat Khan a Persian engineer during the reign of Ahmed Nizam Shah (1490-1508)

These nahars totally 15 in number served the purpose of bringing water to Ahmednagar from a distance between 20 km to 30 km[12].

Parts of Nahar System:

1. Water source – Main water source from the bottom of the hills or *bavadis* or reservoirs.
2. Aqueducts – It is used in cases where water is carried through earthen, brick or stone pipes.
3. Airshafts – These help to release air pressure from the Nahars. At places, they also collect the silt from the water, which could be removed periodically during the maintenances of Nahars. They are called as "*ucchwas*" meaning to exhale out due to their function of releasing air pressure[13].
4. Cisterns – Water from the Nahars is collected into masonry cisterns known as "*haud*" They are usually located below the ground surface[14].

The Nahar system involves the transportation of water through underground tunnels called *Nal*, featuring aqueducts, airshafts, dipping wells, and cisterns, collectively forming an integrated water management network in the Deccan region.

Fig. No.	Figures	Figure Description
1.		Air shaft tower in front of New Arts College, in this tower inverted siphon system was used to clean the water and increase the force of water. The reference of this air shaft has been found in Dr. P.B. Gadre's book.
2.		Four side images of Bagh i Farah Bakhsh.

[12] Marathe M.R., Reimagining Water Infrastructure in its Cultural Specificity Case of Pune, INDIA, Darmstadt, 2019, p. 128.

[13] Ibid, p. 87.

[14] Ibid.

3.		Ruins of inside fountains Karanjas of Mahal.
4.		Holes of Karanjas from which water was supplied.
5.		Ruins of earthen pipes of Shendi Channel which were supplied water to Husht i Behisht Bagh & Hamamkhani.
6.		Husht-i-Behisht gardens, formed by Boorhan Nizam Shah I.[15] The Sendi Channel supplied the water to the pond around the Octagonal Palace. The pond and palace on its bank are located on higher ground the water from the pond was led to the garden through a double row of pipes fixed in the mortar[16].

[15] Briggs John, op. cit. p. 180.

[16] Gadre P.B., op. cit. p. 67.

7.		This is the picture of 'underground bath situated on the 500 yards south of the palace'[17]. One of the pipes of double pipe line fed fresh and pure water to this Hamamkhani. The tower like thing called '*Vadgirkhana'*[18] in Marathi.
8.		These are the images of Kapurwadi open well and air shafts which supply water to Kapurwadi channel.

CONCLUSION:

In the conclusion we can say, that in the context of India, the Deccan Sultanates introduced the qanat building technology to the Deccan region in the early 16th century. It became known here by the name of Nahar[19].The term "Nahar" was specifically chosen to denote these structures departing from the original qanat terminology. The shift in terminology signifies the local adaptation of the technology. The town's unique geographical layout, nestled in shallow regions surrounded by hills, proved advantageous for utilizing gravity to transport water from higher elevations. As a result, it effectively conveyed both groundwater and surface water stored in reservoirs. In essence, the construction of Nahars by the Deccan Sultanates stands as a remarkable engineering feat. It highlights their ability to innovate and adapt to local challenges, ultimately contributed to the sustainable development of settlements in their region.

NOTES & REFERENCES:

[17] Ibid, p. 68.

[18] *Vadgirkhana* means another type of Airshaft tower specially used for underground baths.

[19] Ibid, p. 83.