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**Water Conservation: A Historical Study of well construction in Haryana**

(From Earliest times to Modern Period)

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Water is essential element for the being of life. It is generally available in natural sources like rain, rivers, lakes etc. Fresh water flowing through rivers is the basis to the fulfillment of human needs for daily life such as food, agriculture, animal husbandry, industries etc. The potable water available on Earth is either stored in the form of snow in huge glaciers or obtained in the form of rain. Generally, rainfall is a climatic phenomenon caused by the environmental changes such as (temperature, air pressure) and occurs at a specific time of the year which remains active during the year only for a period of a few days or sometimes a month. Most of the rain water flows again in the rivers, streams, evaporates or accumulates as groundwater and becomes part of the environmental cycle. Several perennial rivers not only hold the water during rainy season but also receives sufficient amount of water through the year due to glacial origin. Thus, in the process of development of human civilization, with the beginning of settled life, man chose river valleys as his habitat area. At the dawn of Neolithic phase, humans started to migrate from hilly terrains and settled in the fertile river valleys. Around 5000 BC, the early rural settlements started to take place which eventually led to the development of the world's first urbanized civilizations. Due to availability of natural resources in these river valley areas such as deposits of fertile soil, adequate amount of water throughout the year for animals and humans, growth of agriculture practices, led to an increase in human population. The Mesopotamian civilization (Tigris and Euphrates river valleys), the Egyptian civilization (Nile river valley), the Harappan civilization in

(Indus-Saraswati region) and the Chinese civilization (Huang-He river valley) were outcome of this phenomenon. Gradually population raised and human started to move out of these river valleys and spread towards remote areas. As a result, man kept moving away from natural sources of water and in such situation he had to develop a way for the conservation of water to ensure it's availability throughout the year. Measures like construction of canals, dams, tube wells were the result of such efforts made by man. While canals and dams are completely built from huge natural water bodies like rivers and their construction would have been no less then herculean task due to requirement of humongous amount of labor and poor technology, during the ancient period whereas tube wells are a modern technology developed due to the technical efficiency of man. At present times, from Snowy Mountain to sandy deserts, from vast grasslands to deltaic regions or salty beaches, humans have spread across the earth. In many areas of the world where there is lack of water resources, man has provided stability to the habitat by overcoming adverse geographical conditions with his intellectual efficiency. In the process of development of human settlement and population growth in such areas, the most important task was to ensure the availability of water. In such circumstances, humans took advantage of the natural relief and created reservoirs to store water. These reservoirs were meant to ensure the availability of water throughout the year by storing most of the rain water, but the irregularity of rainfall was the main hindrance in the availability of water in such reservoirs. In Haryana alonedetails of droughts are recorded for more than 20 years between 1900 and 1980.<sup>i</sup> Therefore, in such difficult circumstances, man's desire to survive would have led to the development of the measures of using underground water and we find the technology of construction of wells as an answer to this problem. Since the Proto-historic period several factors such as development of rural cultures, rise of population or climatic irregularities would have led humans to develop the technology of building wells, which would have ensured the availability of water throughout the year. Evidence of large number of wells, constructed during the protohistoric period has been reported from several harappan settlements such as Lothal,<sup>ii</sup> Harappa<sup>iii</sup>, Mohen-Jodaro<sup>iv</sup> etc. Therefore, the present research paper underlines the historical importance of the process of construction of wells in the context of water conservation in Haryana. In this research paper, light has been shed not only on the construction of wells, but their changing architectural form and their importance in normal life from the prehistoric period to the modern period also been highlighted.

## Haryana-

The State of Haryana is located in Northwest of India and was carved out on 1<sup>st</sup> of November, 1966 when the present state of Punjab was reorganized. With a geographical area of 44,212 Sq. Kms, it lies between 27°39' to 30°35' N. latitude and between 74°28' and 77°36' E. longitude.<sup>v</sup> The state is surrounded by Shivalik hills on the northern sides and the Aravalis in Southern sides. Yamuna is only perennial river which flows on the Eastern boundary of the state through the modern districts of Yamunanagar, Karnal, Panipat and Sonapat. While other parts of the state receives little water through the rainy streams like Ghaggar, Chautang in western and Sahbi, Dohan in South-eastern parts. Most of the land is either arid or semi arid and drought conditions are common in large tracts of the state particularly in Mahendragarh, Bhiwani, Rewari, Sirsa and Hisar districts. Almost entire southwestern half of the state is a part of desert belt extending to Rajasthan. There were 29 Excess monsoon years and 36 deficient monsoon years during the period 1901-2017<sup>vi</sup> (Excess means when the rainfall is more than 20% of normal and deficient is when rainfall is less than 20% of normal) which clearly indicates that artificial maneuvers to conserve water would have been a necessary requirement in day to day life in the area under consideration.

## Historicity of the water conservation

The region of Haryana state is exposed chronically to drought. It shares a long history of crops failure for inadequate soil moisture and intense heat accompanied by variation between day and night temperatures before the advent of modern technology. Such environmental condition



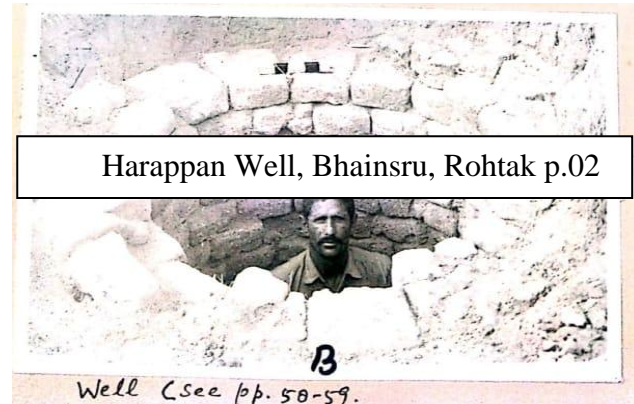
Harappan Well Banawali Photo. 01

would have posed a challenge to peoples who settled in this region during ancient times. As an answer to it, technique of water conservation was developed and construction of wells to acquire water available beneath the ground become a solution to such problem. The earliest evidence of the construction of well in Haryana region has been recovered from the Harappan Site of Banwali. During excavations a well made of sun dried bricks of wedge shape was recovered which has been

kept exposed for the public display (Photo no. 1, Courstey A.S.I) . Another well belonging from

Harappan period was reported from Bhainsru Khurd village of Rohtak district by Snehlata (a student of history dept., M.D.U.,Rohtak) during field exploration for her M.phil dissertation.<sup>vii</sup>(Photo no.2) Apart from it no significant evidence of well construction was reported from ancient period but some inscriptional evidence of construction of wells during ancient period is available in Indian history.

Mauryan Emperor Ashoka recorded in his 7<sup>th</sup> pillar edict about the construction of wells and hospital for the service of public.<sup>viii</sup> Evidence of construction of a dam has also been recorded in the Girnar inscription of Gujarat from early centuries of Christian era.<sup>ix</sup> Tosham rock inscription (4<sup>th</sup>



-5<sup>th</sup> century A.D.) also mentions construction of two water reservoirs points towards the tradition of storing water.<sup>x</sup>

### **Medieval Period ( 712 A.D. to 1857 A.D.)**

After the advent of Gupta rulers Indian witnessed a remarkable progress in the sphere of art & culture. Rulers belonging to different dynasties commissioned several monuments and during this period water conservation didn't remain a quest of survival but also become a symbol of architectural beauty and stepwells become a unique feature in the architecture of north-western India. Remains of large number of stewells can be located in modern states of Punjab,Haryana, Delhi, Rajasthan,Gujrat and M.P. as well. A Baoli or baori, is a deep well with adjacent set of steps that goes down to the water. It had multiple uses in the past. While on the one hand it served as a a source of water for agriculture and household use. Shady spots such as galleries and platforms were ideal for relaxing in the intense heat during the summer. Carvans on the road would stop to relax at baoris built along highways. The purpose of construction of wells wasn't limited to storing of water but the architectural evolution of wells in the forms of step wells become an iconic feature of ancient Indian architecture. Probably several factors such as the financial growth since the Later Mauryan period to the Gupta period, growth of population in the semi- arid areas like western and north western parts of Indian subcontinent, amalgamation of several indigenous and foreign cultures, rise of feudal of lords on local levels during early

medieval period and their wish of etching their name in the annals of history was collectively responsible for the construction of structures of mere water storage as an example architectural beauty. Chand Baori, a stepwell probably constructed during 9<sup>th</sup> century by a ruler name Chand of Nikumbha dynasty is oldest and remarkable example of water conservation along with architectural aesthetics in India. <sup>xi</sup> Built during the reign of Solanki rulers in modern district of Patan (Gujarat) Rani-ki-Vav is a comprehensive example of Indian underground architectural structure of the 11<sup>th</sup> century. Located on bank of river Saraswati, this seven-storied stepwell is built in Maru-Gurjara style and shows the story of the aesthetic development of structures built for the purpose of water conservation in India. <sup>xii</sup> .Till the advent of colonial powers almost all of the foreign invaders has entered through the north-western side and Haryana been a part of mainland north-west part of the country has faced a string of foreign invasions which has resulted in demolition of wealth. Ruins of Surajkund and Anangpur Dam (Modern district of Faridabad) built by Tomar ruler Anangpala around 1051 A.D. is the evidence of water conservation from early medieval period. <sup>xiii</sup> It is said, the step well of Tohana was also built by Tomar ruler Anangpala. At present the stepwell in state of ruins, but it still gives us a glimpse of development of means to conserve water through well construction. <sup>xiv</sup> Thus we don't found any significant architectural remains form the early medieval or sultanate period. During early medieval period significant efforts were made during the reign of Sultan Firoz Shah Tulaq (1351-1388). A network of canals was built between the area of Sutlej and Yamuna River was laid down in order to improve the situation of drought and agriculture conditions. Remain of a water tank can be located amongst the ruins of chamber complex situated at Hisar. Another step well (baoli)made of lime mortar used in mason, called Saraswati-Hanuman Mandir or Parwati mandir in Thanesar town built in about AD 1480 also represent an example of construction of wells in order to conserve the water. <sup>xv</sup> Significant remains of step wells in good condition in Haryana are of Mughal period. The Baoli of Saidu Kalal in Meham (District Rohtak) locally known as *Gyaani Chor Ki Baori* is a remarkable example of architecture of meant for water conservation is semi arid zone of Haryana. Built by Saidu Kalal chaubedar of Meham town, during the reign of Mughal emperor Shahjahan (1628-1658 A.D.) The baoli is built of brick and black Kankar, having three long flights of 101 steps leading to well located in end. Another step wells and building meant for water conservation throw welcome light on the importance of water

conservation and the historical evolution of the technique of well construction in Haryana. Tkhath Baoli (Baoli Ali Jan) ,Jal Mahal<sup>xvi</sup>, Mukundpur step well, Baba Khetnath Stepwell (17<sup>th</sup> Century A.D.), <sup>xvii</sup> Step well of Madhogarh fort in Mahendergarh District, Step well of Farukhnagr made by Jat Rulers in 18<sup>th</sup> cent.<sup>xviii</sup>, Badshahpur Baoli,<sup>xix</sup> District Gurgaon, Step well of Pinangwan built in the 17<sup>th</sup> Century A.D. by Qazi Dost Mohommad (Qazi of Pinangwan), district Nuh. In modern district of Jhajjar Dargoo wallah well at Dujana village, bulit by King Nahar Singh of Bharatpur in 1765, seems to be one of the most remarkable and oldest surviving well. It is quite impressive structure, made up of burnt bricks. The well had araised platform having a flight of steps. It has eight pillars on the rim of its cylinder having space for affixing twelve pulleys on it which shows the dependency on wells before the advent of modern technology was quite high.<sup>xx</sup> Step well in Luhari<sup>xxi</sup> and Silana<sup>xxii</sup> village in the same district also highlights the importance of wells in day to day life.

### Modern Period

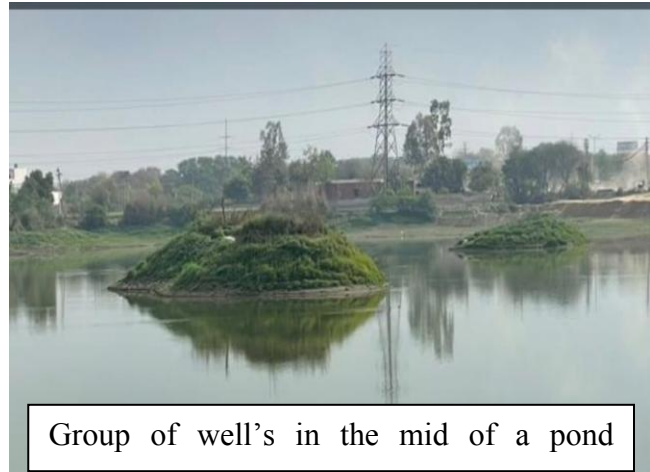
Apart from royal life wells were constructed specially near the ponds and tanks. Such ponds were generally formed in natural slops and opened modified or paved with masonry work in order to store the water for a longer period. Such wells were a source of naturally filtered water and their water would have been used for drinking for people and the water available in adjcent ponds would have been used for the cattle's or irrigation purpose . Remains of such structures are found in abundance even during the present times. During the present research noticed a unique technique of well building near the ponds that few well were built near the bank of pond while the few were built in the middle of the pond. Perhaps during the rainy seasons when the

ground water level rises water would have taken from the wells located on banks and in the extreme dry days or during droughts the wells located in mid of ponds would have carried the necessary amount of water. As majority of area of Haryana lies in semi-arid zone, which don't receive much



A Well Built on the bank of pond (Rohtak)

water from perennial river system, almost every village in Haryana would have been dependent for water on such wells and ponds to fulfill its daily needs. As mentioned earlier, droughts have been a common phenomenon in climatic zones like Haryana and heavily rely on monsoon for the fulfillment of its need of water. This would have created a situation of chaos and in such conditions these wells were no less than a boon. But, in present times after the advent of modern technology, these traditional measures have been no longer of use. Expansion of human settlements, growth of concrete structures, excessive use of chemicals and ignorance has left such specimens of human will to overcome natural obstacles in a miserable condition. Hence, a need to take strong measures to preserve the remains of a glorious part of human history.



Group of well's in the mid of a pond

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- <sup>xxii</sup> Singh, Dalip, *Op.cit*.