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Original Article

STEPWELL: A HUMAN-MADE MARVEL

(Exploring the History of Stepwells of Rajasthan and Gujarat:-With a Special Focus on The Relationship Between Stepwells and Women)

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ABSTRACT

Stepwell is a man-made subterranean construction that dates back to the seventh century CE. They played an important role in community well-being by being a meeting spot for women when collecting water and for males while resting. Physics, mathematics, and chemistry were all used to create them. While mathematics contributed to the calculation of the stepwell size, physics governed the wall's strength to withstand the enormous water pressure. Chemistry was employed to determine the quality of the water. Stepwells have cultural significance as well. They are claimed to be the homes of various spirits with life-giving abilities, as well as structures for household and communal functions. Because they are placed within the temple compound, many stepwells are closely related to it. They also aid in rainwater gathering, which benefits the environment. They also prevent extreme climate conditions such as drought and aridity. Because many of them have become inadequate due to weathering, floods and collapsing, immediate action should be taken to save them. They are essential for disseminating historical knowledge and serving as a supply of water in the present. Thus, this study will discuss the stepwells' historical, environmental, scientific, social and feminine relevance.

KEYWORDS: Stepwell, Community Well-Being, Historical Knowledge, Environmental, Scientific, Social & Feminine

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INTRODUCTION

Water is a critical natural resource that is required for survival. It is an essential commodity for a variety of reasons, from making up 60% of the human body to massive rain showers, from home to commercial applications, from washing to irrigation. Water covers 71% of the Earth's surface, with 97% of that in the form of saltwater in the oceans. Glaciers are responsible for storing 2% of the world's water. Indians believe *jal hee jeevan hai*, *which* means ‘Water is Life’. Since ancient times, people have largely depended on rain water as a source that filled up the seasonal rivers, irrigating their fields. Western India has a long history of droughts, experiencing 26 major dry spells between 1870 to 2018 circa. Throughout history, Indians have devised various methods to store and use rainwater to prevent water shortages; small wells eventually evolved into structurally complex stepwells, which stored water for present and future use for numerous purposes. A stepwell is a well or slight pond, where this resource is preserved. The functional yet beautiful stepwells that can be found all over Western India are an important part of the architectural evolution that resulted in outstanding monuments like the Sun temple in Gujarat and the Jain temple in Rajasthan. Reservoirs, cisterns, wells, baths, dams, and docks are among the ancient water systems. It's possible that the stepwell was erected to give water during a drought. The earliest archaeological evidence of wells, water tanks, and reservoirs with steps going up to them may be found in Dholavira, in the Kachchh district of Gujarat. They were primarily used as a source of freshwater, but they were also used as meeting

places, temples, and rest stops for travellers. These stepwells were a great aid for

people, especially women. They offered a source of water for all household chores carried out by women. They also served as a place for women to meet away from the prying eyes of males and socialise. Geographical settings, historical periods, and the goal of constructing these structures dictated the overall configuration (size, shape, and sculptural inputs) and application of concepts of passive cooling, daylighting, and climatic architecture in the stepwells and natural depressions.

EVOLUTION OF WATER STORAGE SYSTEMS

The Indus Valley civilization left one of the first pieces of evidence of water management. Dholavira is one of the greatest Harappan Metropolitan cities. There are no perennial water sources in this area, and the groundwater is saline. As a result, the residents of Dholavira constructed multiple reservoirs to catch the monsoon runoff that was running down the streams of Manhar (South East) and Mansar (North West). Stone bunds were erected at various spots to channel the flow of the streams toward the reservoirs in the sloping areas (Bisht 1991). Apart from reservoirs, different traditional methods were used to conserve water, some of them being the construction of kunds, wells, *johads, bandhs* etc. Scholars have discovered about 700 wells in only a small section of Mohenjo Daro (Mackay 2000), leading them to assume that these 'cylindrical brick-lined wells' constructed by the Indus Valley civilisation were antecedents to the sophisticated and remarkable architectural creations known as stepwells. These came into being with gradual improvements in architecture. In stepwells, we reach the water level by descending a set of steps. These stepwells are also known as 'Baoli or Baori' in Hindi and 'Vav', 'Vavdi', 'Vai', 'Kalyani', or 'Pushkarini' in Gujarati. According to the Sanskrit Shilpa-Shastras and Ancient inscriptions, they are referred to as 'Vapi' or 'Vapik'. Some of the earliest stepwells date back to the 9th century CE, like the Chand baori (Abhaneri) in Rajasthan Built under the rule of King Chanda of the Nikumbh dynasty. Being the deepest stepwell in the country, this stepwell has 3500 stairs that go as deep as 20 metres making it a 13 storied baori. Another example is Maata Bhavani Ni Vav, which dates back to the 11th century CE.

Naada/ Bandha

Naada/bandha is a common feature in South Eastern Rajasthan. It is a small check dam, constructed across a stream or gully, to capture monsoon runoff on a stretch of land. Submerged in water, the land becomes fertile as silt deposits on it and the soil retains substantial amounts of water.

Johad

Johad is a small earthen check dam, which is raised to hold rainwater. It contributes to recharging the groundwater and works as a lifeline for villagers, particularly for animals. Of course in ancient times these structures may have been an important source of drinking water.

CONSTRUCTION OF STEPWELLS

Taking into account the hot and arid to semi-arid climate with erratic and often insufficient yearly rainfall in western India, the only way to get water during the dry season was to harvest rainwater during the monsoon season and store it in wells that could be easily accessed by anyone. This technique was the motivation behind the creation of Stepwells (Sriparvathy & Salahsha 2021). In India and Pakistan, most step-wells are essentially utilitarian constructions, while others might feature elaborate stonework and even temples. They are most commonly seen in India's and Pakistan's desert regions. They

come in a variety of forms, but they all have a

central well that reaches down into the underlying water table. When compared to other options such as wells or storage tanks, the use of steps makes it easier for people to access and maintain the water supply. Stepwells were constructed by excavating various stories underground to access a certain site's water level. After the excavation was finished, the wells and walls were lined with masonry (typically without mortar), and staircases of various designs were built from the ground level to the water reservoir (Lautman 2019).

Stepwells generally have two parts: a vertical shaft from which the water is drawn, which is sheltered from direct sunlight by a full or partial roof, and the surrounding inclined subterranean passageway, chambers, and stairs that enable access to the well. The surrounding area's lattice-like walls, beautifully carved columns, and ornamented towers have made them an extraordinarily rich monument (McFadden 2020). Stepwells are divided into categories based on their size, design, materials, and shape: they can be rectangular, round, or even L-shaped; they can be made of masonry, rubble, or brick; and they can have up to four separate entries. Whether simple and functional or complex and decorative, no two stepwells are alike, and each has its own personality. Where, when, and by whom they were commissioned determine a lot. They're all extremely magnificent architecturally. The patronage effect can be seen not only in the architectural adornment but also in the structural construction of the stepwells. Constructions from the 12th century CE, which were built during Muslim authority, show this change. The arch and the "true" dome were introduced by Muslims, whereas Hindu builders used post and-lintel architecture with corbel domes. Deities, humans, and animals were depicted in Hindu sculptures and friezes, while depictions of any human figure were absolutely forbidden in Islam. Most stepwells doubled as Hindu temples, with flights of stairs leading down to the water's edge and colonnaded pavilions adorned with exquisite stone carvings (Chandra, Sharad 2015). When the two traditions collided in Gujarat around 1500 CE, a pair of spectacular stepwells called the Rudabai Vav and the Dada Harir Vav arose as a sort of conceptual cousin. Both were commissioned by female clients and built by Hindu artisans under the supervision of Islamic authorities. Although they are ornately adorned, there are no deities or human beings to be found on them.

Most stepwells had covered pavilions on each succeeding level, which were approached by ledges as the water level rose and served as crucial sun shade mechanisms while strengthening the walls against intense pressure. Many stepwells constricted as they descended from the surface to the lowest tier, where the temperature stayed cold at all times. A reverse architecture was developed by building underground rather than above ground.

TYPES OF STEPWELLS

Stepwell design and construction differ based on natural characteristics, soil type, rainfall pattern, and underground water level. They can be distributed into different categories based on their plan shape, number of entrances, location and usage, and period of construction.

A. Plan Structure

- A single entrance and straight-stepped corridor: This type of stepwell is distinguished by its single entrance. These stepwells include lateral staircases that shorten the corridor and make it easier to go to the lower levels.
- Three entrances and straight-stepped corridor: Three flights of stairs are positioned clockwise and connected to the stepped corridor in this style of the stepwell.

- L-shaped: This structure is unique to Gujarat, with an L-shaped layout and a stepped corridor that bends at right angles. This is one of Gujarat's oldest forms of stepwells (Lakshmi 2010: 3). The most elaborate Mughal examples of 'L' shaped stepwell are at Shah *bawri*, Fatehpur Sikri and Navlakhi vav, Laxmi vilas palace of Baroda. In these stepwells, corridors are open and the well descends over stories. They have pillared galleries in the corridors. Underside, they have the capacity to store two large water wheels, through which water may be lifted and stored in separate deep basins. They have two octagonal chambers and the wells are cool in the summer. At Fatehpur Sikri, where many buildings exhibit a whole range of architectural influences from Gujarat, it may be genuine to quarrel in favour of direct Gujarati influence. But for most other regions, such as West Bengal, Maharashtra, Madhya Pradesh, Karnataka and Andhra Pradesh, with their clear examples of stepwell architecture, this would seem unjustifiable (Nath 1985).
- Stepwells with circumambulatory passage around them: with rooms and chambers beneath the surface in various floors.
- Stepwells with cross-shaped ground plans: The central well, which has been extended to make a pond, is the meeting point of four descending tunnels. Starting at the entry, the descending stairs could be a simple open hallway or a series of internal cross-constructions constructed as open pillared halls or pavilion-like structures. These are incorporated into the stairway at regular intervals to counterbalance the inward thrusts at the sidewalls and maintain structural stability. The soil characteristics, as well as the underground level of the water table in the area, dictate the length and breadth of the stairs, the depth of the well, and the design of the supporting structures: the lower the groundwater level, the deeper the well had to be dug.

B. Number of Entrances

On the basis of entrances, stepwells are divided into four categories:

- Nanda: Stepwells with only one entrance.
- Bhadra: stepwells that consist of two entrances.
- Jaya: Stepwells that consist of three entrances.
- Vijaya: Stepwells that consist of four entrances.

Stepwells belonging to the Vijaya type are usually the largest and most intricate and are known as "Dirdhika," which means a length of 3,000 bows.

C. Period of Construction

- Pre Solanki period (8th to 11th century)
- Solanki period (11th to 12th century)
- Vaghela period (mid-13th century to 14th century)
- Sultanate period (14th century onwards).

D. Location and usage

- Religious purposes: in the vicinity of a temple or containing a temple.
- For agriculture or gathering: within or on the boundary of a village.
- For travellers looking for a cool shelter to stay: on trade routes or outside villages.

VI. SIGNIFICANCE OF STEPWELLS

Our ancestors have considered Water a vital part of many rituals and traditions such as funeral rites, festivals and other auspicious events conducted around the world. Indians have always associated water with births, marriages, and funerals. Water, according to Indian auspicious rig Vedas, carries medicinal healing properties and exceptional magical and transformative powers. The holy waters of the River Ganga are being used to bless a newborn or to spread the ashes of a dead person with a belief of purifying a person's soul and freeing them from past sins. The hot sulphur springs in Ganeshwar, a village in Rajasthan are believed to cure skin ailments, simply by taking a dip in the water. To obtain water during the dry season and to make it easily accessible to all, for centuries, the only option was to harvest the Monsoon rainwater in wells (Mishra 2001). This process initiated the evolution of wells into stepwells. In western India, stepwells became a hub for washing, bathing, and drinking. Pilgrims, traders, travellers and caravans stopped by in their route to use stepwells as cool sanctuaries during the heat of the day (Tod & Crooke 1990). These splendid feats of architecture served much more than the purpose of just reservoirs. During scorching days, these provided life-giving water to people, animals and birds, while also making the soil in the surrounding areas more fertile. Besides being a source of water, stepwells were also landmarks for socializing and for observing festivals and performing sacred rituals. Abundant with carvings of deities, stepwells also functioned as subsurface temples. Most of these images were of various avatars or incarnations of Lord Vishnu and Shiva. Sculptures of deities attracted devotees to do prayers, offerings and ritual bathing at stepwells. In fact, although groundwater is much less accessible today, some stepwells continue to function as temples, an example of which belongs to the 11th century CE temple at Mata Bhavani Vav in Ahmedabad (Sriparvathy & Salahsha 2021 and Jain-Neubaur 1981).

VII. MOST IMPORTANT STEPWELLS IN WESTERN INDIA

A. Rani Ki Vav

It is thought to have been built in remembrance of King Bhimdev-I of the Solanki dynasty of Anahilvada Patan by his widow, Queen Udayamati, circa 1050 CE at Patan, Gujarat. The Saraswati River inundated the 210-foot long, 65-foot-wide stepwell, which was excavated by the Archaeological Society of India (ASI) in the late 1980's. More than 500 major sculptures and over a thousand minor clean exquisite carvings of various gods and goddesses can be found in the stepwell, which is separated into seven levels. Lord Vishnu is prominently featured in the carvings, which include the Dashavataras (Ten forms of Lord Vishnu). There are also carvings of other divine legendary forms such as Vishkanyas (ladies with snake-like poison) and Apsaras (celestial women) (Mazumdar 2016 and Gautam 2019).

B. Rani Ji Ki Baori

Rani ji ki Baori, or 'Rani ki Vav,' also means "Stepwell of Queen". At Bundi, Rajasthan, in 1699 CE, Queen Nathavati constructed the stepwell. Bundi is also known as the city of stepwells since it has around 50 tanks and Baoris. Twenty-one of the fifty tanks are said to have been built during Queen Nathavati's reign. The abundance of stepwells in this area demonstrates how vital tanks for water conservation were in Rajasthan's desolate desert.

C. Adalaj Ni Vav

Adalaj ni Vav is another prominent stepwell in Gujarat, located about 18 kilometres north of Ahmedabad. The existence of this stepwell has a tragic backstory. The area's king, Dandai Desh, had begun construction on

the stepwell but was assassinated in 1499 CE by a Muslim ruler who attacked and devastated the province. The Muslim ruler was similarly smitten by the queen of the slain king. The queen agreed to marry him on the condition that he complete the stepwell in remembrance and honour of the king who had died. As a result, the Muslim ruler combined Hindu sculptures with Islamic construction to create the stepwell. The queen, on the other hand, gave her life by jumping into the well when it was finished (Mankodi 1991 and Mazumdar 2016).

D. Chand Baori

King Chanda of the Nikhumbha dynasty of the hamlet Abhaneri constructed it between 800 and 900 CE. The largest and deepest stepwell in India is Chand baori. This stepwell is over 13 stories tall and has 3500 steps. It is thought to have been built in one night. It is located just across from the Harshat Mata temple, which is dedicated to the goddess of joy and happiness. The steps form a fantastic maze and have a perfect geometrical design. The resulting dance of light and shadow on the structure creates an enthralling appearance. It is built in the shape of a rectangular courtyard (Gautam 2019).

E. Surya Kund

As a tribute to the "Surajdevta," or sun god, it was erected in Gujarat's renowned Modhera Sun Temple. This stepwell was constructed in the 11th century under the reign of Bhima-I of the Chalukya dynasty, not only for water storage but also for religious rites. Lord Ganesha, Vishnu, and other local gods are represented by 108 miniatures in the stepwell, with 108 being a significant number in Hindu beliefs. It's thought that its builders aimed to establish a collection of smaller shrines to bow down to the sun temple's grander majesty (Hegewald 2002: 145-146).

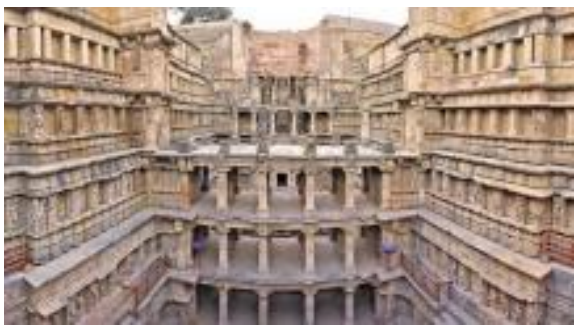
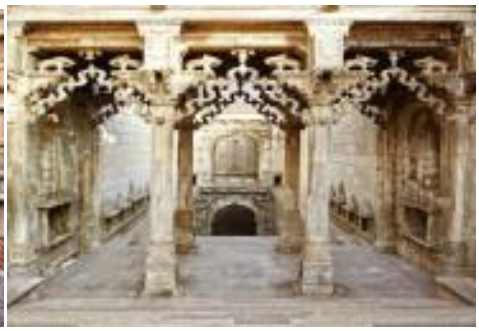

Figure 3: Rani ki vav. Figure 4: Rani Ji Ki Baori.

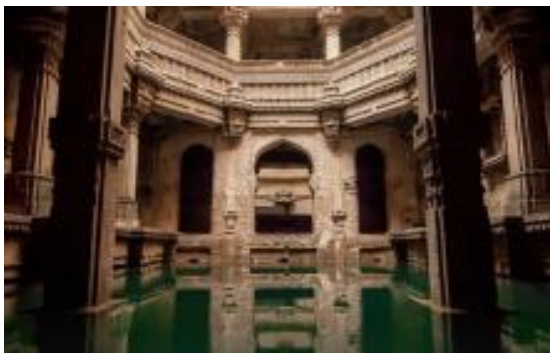
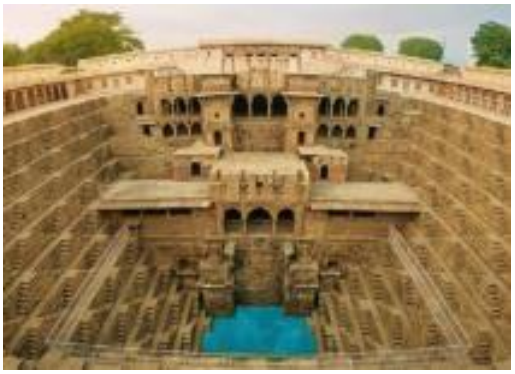

Figure 5: Adalaj Ni Vav. Figure 6: Chand Baori.

Figure 7: Surya Kund.

VIII. RELATIONSHIP BETWEEN WOMEN AND STEPWELLS

Many legends regarded waters as feminine and maternal. Many rivers in the country like the Ganga and Yamuna, Narmada, Tapietc are regarded as female deities (Kashyap, D. 2015 and Bhatt, Purnima Mehta 2014). Water is a basic need of all creatures on the planet that brought these women together and holds a special significance in their lives. For all women across the globe, educated and uneducated, from different regions, lower and higher economic class, stepwells Created opportunities for women. It created strong bonds and instilled a sense of solidarity between women from different backgrounds. Being home keepers, women required water for performing their basic duties- cooking, bathing, cleaning the house etc. Women, generally restricted to their homes, had no opportunities to go out in public, form networks or exercise powers. Going and collecting water from stepwells gave women an opportunity to move out from their domestic households to the public realms. They could now afford a brief measure of freedom and autonomy, away from their daily lives full of restrictions in a patriarchal society where they were treated as mere subjects by their families, in-laws etc. Gathering at stepwells allowed women to express their joys, sorrows and frustrations and perhaps seek solace and support from other women away from males and strangers. In addition, Vavs and Kunds formed essential spaces of culture and social life open to all regardless of gender, class or religion. The wells became a place for worship and religious activities. Many sculptures in these wells are dedicated to fertility goddesses. There are also images depicting domestic life, composed of deities, humans and animals. On the contrary, Islamic stepwells had images of trees and plants because religion prohibited the depiction of any kind of creature. Therefore, even though stepwells were designed as gender-neutral spaces, they are evidently associated with domesticity, earth, and fertility, through the symbols carved into them. Of course, several examples of moat are known belonging to the Historical and Medieval times across the country. Also there are examples of forts raised in islands or surrounded on three sides by meandering river(s). Selecting such a naturally protected location or creating a moat may have added additional safety to the forts or palatial buildings. Besides ditches, obstacles were also created by thorny bushes and trees. As we are dealing with water we have included only a few examples of moats in temporal order. Thus, stepwells came to be seen as a feminine space. Women's collective identity as part of a women's community was shaped by the communal, social and ritual activities associated with these places. Almost one fifth of the hundreds of stepwells in Gujarat have been estimated to have been built or commissioned by women - queens, royal women, wives of affluent traders, mothers and daughters and even servant girls. Some of these include Rani-ki-Vav and Rani-Ji-ki-Baori. Many of these stepwells have inscriptions with details of the name of the donor,

date of construction and purpose of its construction thus giving historical knowledge without which the women of the past would remain forgotten and invisible. They were also often constructed in honour of an exemplary wife, a dear mistress, a benevolent mother or a local goddess. The delicate ornamentation inside stepwells often expresses feminine character (Bhatt, Purnima Mehta 2014).

IX. PRESENT CONDITIONS OF STEPWELLS AND THE NEED TO RESTORE THEM

Stepwells in ancient India were fundamental to life. Built by rules - kings or queens as acts of benevolence, the Indian subcontinent is dotted with thousands of stepwells, ranging from northwestern states of Rajasthan and Gujarat, central states of Madhya Pradesh, Uttar Pradesh and Delhi, to the southern peripheries of Tamil Nadu, Karnataka) (Piplani & Kumar 2019).

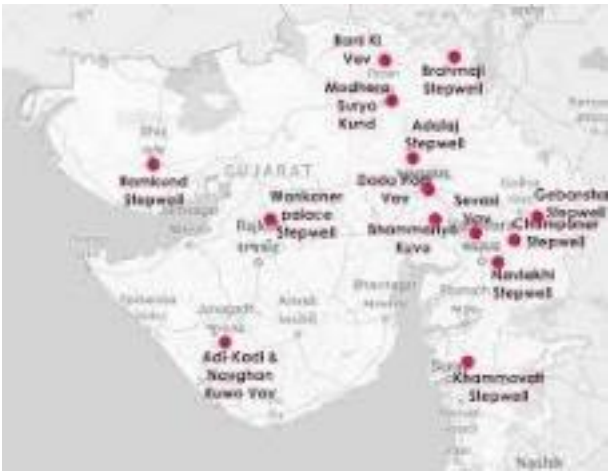

Figure 8: Stepwells in Gujarat.

The social, cultural, religious feminine space applauded by all came to be seen as unsanitary and a breeding ground for diseases. They were either destroyed or filled in. After independence, they were split up due to negligence and financial hardships. The early 21st century saw only a handful of stepwells usually visited by tourists that remained in decent conditions. Now, the majority of Indian stepwells have fallen into disuse as they are worn out. The inability of the water table to reach these stepwells and diversion of the depleting groundwater for industrial usage has caused these stepwells to dry up. Ignored by their communities, stepwells became garbage dumps, latrines, mining areas or storage spaces. If not the latter, they were simply left to decay. The past few years have seen ignition in the efforts of people and the government for reviving these intricately constructed Indian heritages. Important sites in Gujarat have seen major restoration. The stepwells in Patan and Adalaj are looked after by the Archaeological Survey of India (A.S.I.), and the archaeology department has around 20 stepwells in its care. They have restored the Sapa Vav, among others (Rahman 2019).

With the uneven distribution of water across the country, the majority population falls prey to water shortages. The need to revive stepwells prevails now, more than ever. The constant depletion of groundwater poses a large threat to 90% of the population of Rajasthan, which depends on groundwater for fulfilling their basic needs. Many towns, villages face great strains as they face lesser yields of water from hand-pumps, wells etc. women walk long distances in unbearable temperatures to wells miles and miles away to fetch water for basic tasks. Rajasthan is home to lakhs of people involved in agriculture who are mainly dependent on wells, hand-pumps and rainwater as a means to irrigate their fields. Being states

that receive uneven and inadequate rainfall the farmers face crop failures leading to less agricultural produce and thus eventually food shortages. Since 2018, Gujarat has been receiving little or negligible rainfall and faces acute water scarcities. Saurashtra, Kachchh and northern Gujarat see much worse situations. All water reservoirs except for Narmada dam, and Sardar Sarovar canal have been exhausted.

Restoration and revival of these complex architectural structures provide greater water storage for rainwater which might be useful at times of water shortages, or droughts. Being cultural, religious, social centres, their revival will also lead to a newfound socio-cultural community. People across the globe travel to India to have a look at her world heritage monuments. The revival of these splendid stepwells will attract new tourists to pay a visit, thus also adding a share in the Indian economy.

While on one hand stepwells may help in combating the water shortages, on the other, the present generation will be more aware and proud of the Indian heritage of these stepwells holding historic, cultural, and religious significance.

X. CONCLUSIONS

In this paper, the authors have researched about stepwells, their evolution, construction and types, with a special emphasis on the historical relationship between stepwells and women. By researching and referring to several studies, and theories, this study established the religious, traditional, cultural, emotional and historical significance of stepwells in ancient north-western India. It elaborated on the importance that stepwells held in the historic periods and how they acted as a place for socialisation. Furthermore, while this research was conducted to highlight the significance of stepwells by exploring their history and variety, the special emphasis on their relation to women is to bring into focus the often ignored involvement of women in their construction, the association of water to femininity and the importance of stepwells to women. Additional research pointed out that over time what Indians called as their special heritage -“stepwells” were left to degrade and in the present are simply acting as waste disposal or storage areas. This study also stated the need of reviving stepwells as a method to combat the present water crisis in western India. Future research into stepwells and other historical water management structures should focus on the benefits of reviving them for current use and the methods to do the same.

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