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Water infrastructure: Rural Urban Nexus

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Abstract: **Importance of water is not a new concept for human kind, everyone knows and is well aware of the various reasons why water is vital for the human society, what is perhaps more ambiguous is the extent of this importance. This paper reflects upon the importance of water in a societal point of view, through various examples of issues and difficulties faced by areas having less to no access to water. The difference of rural and urban areas, with respect to availability of water and its consequences is established. Also the paper tries to identify the various traditional indigenous techniques, reflecting the geographical peculiarities and cultural uniqueness of different communities with the example of Dholavira, Indus valley civilization city and Mandu fort from Madhya Pradesh. The paper explains how efficient the water harvesting systems were and how various regions adopt vernacular techniques to save the precious resource. Lastly the paper sheds light on how and why these techniques can and should be adopted in modern and more urban context with amalgamation of new technology and how participation at neighborhood level can be a vital approach to the concept of rain water harvesting and water conservation.**

Keywords: Infrastructure, Accessibility, Contamination, Water Wives, Water Wars, Sustainability, Cost-Effective, Indigenous.

1. INTRODUCTION

What makes an urban area different from a rural area in India? The life of people living in an urban area is very different from that of a rural area. We are often told that these are the good times that we live in, because we get a lot of facilities that were not there a decade or two ago. Similarly it is observed that living in general is considered more advanced and developed in urban areas. So it is evident that apart from the physical nature of the two areas, be it the activities or the population, urban and rural areas are indeed different. While many facilities are provided in the urban context in terms of infrastructure provision, they too just like a rural area, face different challenges.

1.1 Urban and Rural

The urban area differs from rural areas in the way of lifestyle. Facilities are provided on the door steps of urban areas where as in the rural parts of our country people have to struggle to get access to those same facilities. Water for instance is one such basic service that people in urban areas get by just opening a tap whereas in rural areas people have to walk for miles. So the basic difference of an urban area from a rural area is not just in terms of the population which is only felt when outside the home, but the lifestyle and the facilities that are cherished inside the house, like the tap water, the flush system of a toilet or the WiFi network for the home.

Infrastructure is a vital element in urban areas for distributing resources and essential life services. The growth and development of the society depends on these services i.e. the infrastructure for distributing the resources which are the basic needs of people. Thus the quality and efficiency of the infrastructure affects the quality of life, health and wellbeing of the society. These services affect the economic initiatives and are very important from a societal point of view. However convenient the access to these services might seem in urban areas, the accessibility will come to cease with each passing decade if not managed in a more efficient way.

1.2 Accessibility to water

In the parts our country where people do not have access to piped connections, women of the house find and provide water for the family's need for drinking, washing, cooking and cleaning. They typically spend 1/3rd of their lives fetching and queuing for water, walking five miles a day.

Women walking to get water

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When women can't collect as much as is required by the family due to any reason, their daughter must help. She will have to walk the same miles as her mother and collect water. While education for all 6 to 14 years old is compulsory, girls as young as 8 years old drop out to fetch water and take care of their siblings. Water in these wells from where women collect it might be contaminated but they don't have much of a choice. There are only two options available certain death without water or a disease which may or may not cause death. So walking all those miles seems to be the better option in those areas. If a supply line is laid in this area the mother or the women would not have to walk miles she can do something else in this time and also the daughter can go to school in those morning hours which she usually spends walking. Education would inform her of her rights and give her the ability to make choices and take decisions, well informed, educated decisions which in turn bring a social development of the area and the lifestyle of people would improve, just as it does in case of urban areas.

2. IMPLICATION OF NON AVAILABILITY OF WATER IN RURAL AREAS

Water wives of Maharashtra

In a more societal point of view one can underestimate the role of water. But it gets a whole new perspective, of the limits that people will and do go to have access to water. In Maharashtra, villages like Denganmal, have a concept of water wives. Denganmal is located in a region which routinely experiences drought-like conditions. In the summer months, the heat is so severe that wells run dry and cattle die. There is no water connection in this village. It's in a remote, hilly area, isolated from other villages. The only solution is to walk to a well or to river, carrying vessels to fill up with water. Neither is close by. It can take up to 12 hours to go there and return home. So once there are kids born in a family, the wife cannot leave her child and the home for so long, which is why the man of the family would marry again. So this new wife or wives in some cases are just married to have an extra pair of hands to fetch water for the family. One cannot blame them, what other option is there in an area where water is available after a 12 hr journey. One might argue that this is an injustice to the other wives, but then if we see it from the point of view of Denganmal, they are just doing what they can to sustain. Some of these water wives are widows that were previously ostracized after their husbands died, but now these women gained status and respect in society once more as "Pani Bais" or "Water wives". So water in some way or the other has come to the rescue in such places in more than just survival but also in a sociological perspective.

So there is a strong sociological connect attached with water. It might not be as evident has the physical attribute of it but it is there, deeply rooted in the culture and tradition and with the example of the water wives we see that in some cases water has the power of altering the cultural identity of a place as well. Just like what we see in urban areas. Here water availability is not as major a issue as it is in rural areas and thus we do not see such significant deviations in the societies of urban areas. But then even in urban areas the life is disrupted if the normally smooth distribution of water is discontinued. If the rural areas have water wives due to lack of water the urban areas have much worse, they have water wars due to the same.

3. IMPLICATION OF NON AVAILABILITY OF WATER IN URBAN AREAS

In 2016, there was one such water war between Karnataka and Tamil Nadu over the access of water from Cauvery River. There was violence all around Bangalore city just to protest the order of Supreme Court to release water from the Cauvery River to the neighboring state of Tamil Nadu. Violence for water, it is not uncommon in urban or rural areas for that matter. 4 days of no water supply can shut down a city, its various functions and life in general. It's not just social implications of non availability of water that create a misbalance but the economic factor as well. Economic returns on investments in water supply and sanitation indicated that every US$1 spent on water supply and sanitation services could lead to an economic return of between $5 and $46, with the highest returns in the least-developed areas

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Normal life has been disrupted in Bangalore.

4. TRADITIONAL METHODS OF WATER HARVESTING AND CONSERVATION

Terms like sustainability, green architecture or eco friendly have got just names to be understood now, the meaning has always been there if one peeps in the history of architecture, giving us a clear and effective way to learn. Most people when attempting to solve building design issues often look towards high-tech and expensive solutions. But that is not necessary, as a study of historical and traditional building techniques provides low-tech and cost-effective answers to all the problems. Ancient India employs traditional building techniques that work with the surrounding environment making such solutions sustainable.

4.1 Dholavira Indus Valley Civilization

The roots of water conservation and management were laid down on our country during the Harappa and mohenjodaro, Indus valley civilizations. Cities like Banawali, Kalibanga, Lothal etc had extensive water conservation systems functioning due to lack of availability of portable water. Dholavira was one such settlement of that time which an expansive water management system was established. Dholavira is an important site of Harappan civilization having complex system for collecting and storing rain water within several reservoirs. It has a prolonged history of droughts, thus the Harappans were aware of the possibility of and were consciously practicing water management.

The site of Dholavira gives ample evidence of rainwater harvesting network, a system of tanks and ponds that supply water and even a sewage system way advanced for its times.. The city was built between the seasonal rivulets of Mansar and Manhar. The water from these streams was accumulated with the help of dams from which water was let into the reservoirs. Water conservation of Dholavira speaks volume of the innovativeness of those people who has managed to develop a system that depended on rainwater harvesting. The rain water thus collected was stored in yet another reservoir that was carved out in the western half of the city. Huge stone drains are seen which were used to direct storm water to the western and northern section of the lower town that had been separated with the help of bunds.

The city has also yielded a good system of sanitation. The site has a total of sixteen reservoirs built on eastern, western and southern sides which were internally linked. Rock cut reservoirs were part of a rather complex water system that made use of rainwater and partly from ground water which reveals an enormous, elaborate system of water harvest.

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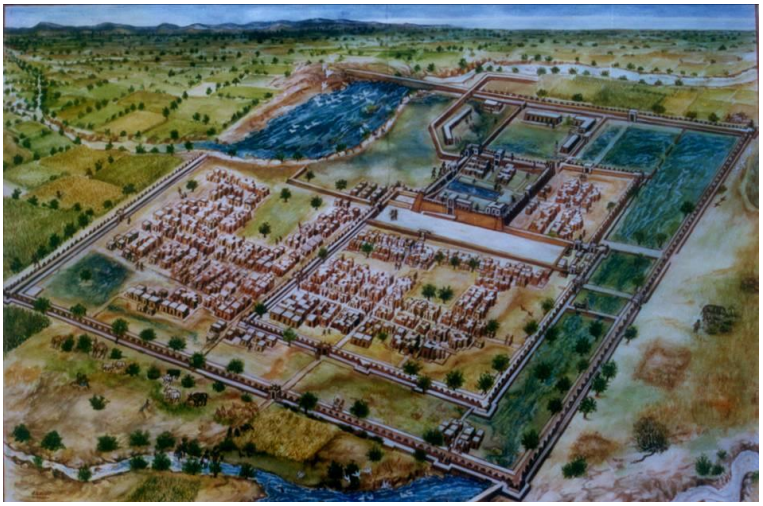

Dholaviar, Indus Valley civilization

The water management system at Dholavira is based on highly advanced hydraulic engineering, which is preferred and employed by even modern day technicians. Also, development of water resources and its conservation in this town was not only the responsibility of the higher authority but also the duty of the local community, which can be one of the approaches that the modern urban areas of today can focus upon.

4.2 Mandu Fort, Madhya Pradesh

Another such very interesting example lies in Mandu in Central India, a fort town at 2000 ft above sea level with no aquifers or ground water and had to depend on a system of rainwater harvesting for the year-round water supply. The system comprised more than 1,200 water tanks, catching rainwater and supplying it through channels to the entire fort. Technology 1400 years old conceived perhaps by Hindu Paramars and perfected by Turkish rulers of Malwa was responsible for it. It is one of the many ancient rainwater harvesting techniques of India. Currently a few residents still use one of the rain-fed stepwells (baoris) with electric pump for water but none of the complexities survive.

Intricate water channels to help sedimentation of suspended particles in water while slowly distributing the water, Mandu Fort, Jahaj Mahal, Madhya Pradesh

5. OTHER EXAMPLES OF TRADITIONAL INDIGENOUS TECHNIQUES

When we turn the pages of the historical epitomes of India we find numerous such examples of efficient water harvesting systems through the means of various traditional indigenous techniques, reflecting the geographical peculiarities and cultural uniqueness of different communities, like the talab/Bandhis of the bundelkhand region, Baoris, Johads and kunds of rajasthan, Jhalaras of Gujarat, ahar pynes of bihar, Bhandara phad of Maharashtra, Kuhls of Himachal Pradesh, Zabo of Nagaland, Jackwells used by the Shompen tribe of the great nicobar islands, the pat system of Madhya Pradesh, and Eri system of Tamil nadu.

So it is evident that each region depending upon its requirement and resource available, over the years, has developed techniques that are efficient in water harvesting,

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conservation and management. These methods suit the community and have become ingenious practices that have eventually over decades started to loose the significance and usage. Thus the urban communities can revive these techniques.

6. CONCLUSION

Thus water supply plays an important role in the economic, social and political landscape of urban areas. It contributes in improving the quality of life by directly having access to water in less time and indirectly by significantly affecting the mentality and health of people, increasing the chances of access to sanitation, and also through urban water management cities learn to co exists and share the resource with its proper distribution and management. Lessons in this regard can be taken from the historical cities of our country which have shown that even with limited resource and technology, efficient, community specific and need based techniques can be evolved and applied.

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