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"KHAZANA BAWALI" HISTORICAL WISDOM NEEDING PROTECTION

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ABSTRACT

The Vijaynagar Dynesty is known for its glorious historical water management and techniques and practices and even today number of water management principles can be unearthed through the studies done by various scholars working in this field which could be well useful and relevant even for today's modern India. 'Khazana Bawali' (Treasure Well) is also a glorious example of historical water management and could be equally important to be studied and put before the people. It was constructed about four hundred and thirty years back during Nizamshahi rule in western India. Most of the cultivable land in this kingdom was arid and this was probably first public facility for irrigation. Barring negligible small portions irrigated by private wells, agriculture was dependent on insufficient and uncertain rains. Project is said to be once irrigating 1000 acres, but it is gradually on the decrease. Except in the recent past, project was managed by self disciplined beneficiaries. Now, a state department looks it after.

Irrigated land was considered to be prize possession. Transfer of ownership was rare. Dry farming and very few army services were the only vocations. They did not generate enough money for purchase of irrigated land. Now, different means have given sufficient resources for such purchases to many. Original beneficiary families could not now resist temptation of lucrative prices. Lands under this project have changed hands. Vehicular assistance has made it possible to cultivate and supervise lands from a distance. Rich peasantry as a class has become influential in political life. This fact has many-sided effects. There is a tendency to flout rules to great personal benefit. Social ethics has lost its primacy and tendency to grab all benefits has replaced it. It has become difficult to enforce discipline and regulate the use of public amenities. Problems, which are posed by the present state of this project are of general importance and are relevant in consideration of similar projects.

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Introduction :

'Khazana Bawali' (Treasure Well) situated about six kilometers from Beed, a district place in Maharashtra, was constructed about four hundred and thirty years back during Nizamshahi rule in western India. Most of the cultivable land in this region there was arid and this was probably first public facility for irrigation. Barring negligible small portions irrigated by private wells, agriculture was then dependent on insufficient and uncertain monsoon.

This project is a large well of 20 meters radius in which rain water oozing from nearby hills is brought through underground tunnels and then used for irrigation by taking it through masonry channels under gravity. Ventilators provided at regular distance in this channel allow fresh air helping water purification and space also allows occasional manual cleaning. Underground construction below bed of the river crossing is one of the engineering feats.

Project was once irrigating 1000 acres, but it is gradually on the decrease. Record shows that about 500 acres were irrigated thirty-five years back and now it is further reduced to 165 acres

In the gazetteer published by the government of Maharashtra in 1969, following information is found on page no 659 regarding this well

" Khazana Bavli : A little over four kilometers (three miles) West of Bid near the village Pali is a large well called the Khazana bavli which was constructed about 1582 A.D. by the then Jagirdar of Bid. There are three inlets which feed the well and only one outlet. The source of water supply has not yet, been traced. It has channels built for Irrigation purposes which irrigate over a thousand acres of land. Its water level remains the same at all times of the year."

In the above information, there is a mention of three Inlets; however, at present there are only 2 inlets. In the same manner, area irrigated is mentioned as 1000 Acres, however, as per available information it can irrigate about 525 acre of land. Except in the recent past, project was managed by self disciplined beneficiaries. Now a State Department looks it after. Earlier, the management and maintenance work of the well was with the

Tahasildar (Revenue Department). In 1962, it has been transferred to and now being looked after by the Beed Irrigation Division, Beed.

Irrigated land is still considered to be a prize possession in India; it was much more so in historical past. Nobody was prepared to part its ownership. Transfer of ownership was rare. Agriculture, merely dry farming and occasional army service were then only major occupations and were not much remunerative. They did not generate enough money for purchase of irrigated land. Now the situation has changed. Different means have given sufficient resources for such purchases to many. Original beneficiary families could not resist temptation of getting lucrative price. Many lands irrigate under this project have since changed hands. Automobiles have made cultivation of agricultural lands from distance possible.

Rich peasantry as a class has become influential in Indian for political life. Assurance of political support has made at least some of them bold enough to disrespect and ignore rules for personal benefit. Ethic has lost its primacy in social values and tendency to grab all benefits has replaced it. It has become difficult to enforce discipline and regulate the use of public amenities, Secondly; even leaders coming from peasant class are not wedded to interest of small farmers. They have their own preferences. Protection of farmers' interest and facilities available to them is not always a priority with them.

This project is just in the vicinity of Beed town. Process of unregulated urbanization has swallowed thousands of villages near the cities in India and Beed is no exception, which has also swelled in all directions. Once Khazana Bawali was also providing some water for this town besides irrigation. Now that has stopped. Portion of these water channels, siphons and other regulatory mechanics has already been destroyed and rich, fertile irrigated land is put to residential use. About 225 Acres from the beneficiary zone has already been used to build houses. If this continues unabated, result would be that the whole project would be redundant. Maharashtra State has only 16% cultivable land irrigated. Irrigation facility constructed from public money should not be allowed to be rendered useless. It would be criminal waste.

Fate of this project, once a pride for the region, today hangs in uncertainty. If immediate steps are not taken to serve its usefulness, it is likely to remain as a Historical

monument witnessing wisdom of the past and callousness of the present. Questions that are posed by this State are of general importance and they are relevant in respect of may other projects. When would we appreciate fully the value and importance of such facility? When wisdom would dawn on and we would stop mad run for urbanization at the cost of our forests and rich fertile lands.

Need For Research:

Although, the Basalt rock, of which the Balaghat range is constituted of, is very hard, it is fractured in nature and possesses horizontal cracks. 8 to 12 m depth of the sloping hilly watershed of this well constitutes of a porous mixture of sand, gravel, stone and rubble. Water percolates through these layers in the ground and finds an outlet somewhere in the low level areas. It is geographically presumed that this water must have been tapped for the Khajana Well by constructing tunnels up to the well.

One earthen pipeline was earlier taken out from this well and was connected to a fountain located in the central area of the city. In the recent past, this fountain has been dismantled and a tower with watch is constructed, it is known as Fountain Tower.

So far no substantial research work has been done on this mesmerizing well that would throw light on its technical aspects. It is believed that the guiding principles of the well would still be very much useful for modern schemes and hence, it becomes necessary to undertake a study of this well to unearth its scientific principles.

Salient Features of Khazana Well

1	Year of Construction	1572 AD (991 Hizari)
2	Diameter of Well A) At Ground Level B) At 4.7 m depth	<u>Outside</u> <u>Inside</u> 20.0 M 19.10. M 12.6 M --
3	Total Depth of well (From GL	7.o m (4.7 + 2.3)
4	Inlet Tunnels	Two Nos of size 0.8 x 1.65 m
5	Outlet Tunnels	One no. of size 0.8 x 1.50 m
6	Length of outlet Tunnels Underground	2.5 km (8140 feet)
7	No of Ventilator valve / Repair Chambers On the underground Canals / Tunnels	52 nos.
8	No of ventilators on the inlet tunnels	91 (Now existing)
9	Length of open canal	3.91 kms
10	Water flow velocity	3.98 CuFt/sec
11	Total irrigable area	212 ha. (524 acres)

Main Well :

The well is constructed using header stones and lime mortar. Total depth of well from ground is 7.0 m. The inside diameter of well is 19.0 m up to the depth of 4.70 m and below this depth it is 12.6 m. On this offset of 6.4 m between these diameters, a lime concrete is laid to form a nice platform.

Inlet Tunnels

There are two no of inlet tunnels lower portion of the well where diameter is 12.60 M and depth is 2.5. M. These tunnels fetch water for the well. The size of tunnel is 0.80 x 1.65 M and is constructed in header stones. It is mentioned that the left side tunnel is about 4 to 5 meters below ground and extends 540 m towards south up to the flow of the Bindusara River. However, the tunnel has been tracked from inside up to a length of 150 M with the help of some laborers. It is seen that the tunnel is closed at that point where a stone mesh is fixed from which water percolates in the tunnels. There had been 3 to 4 air on this tunnel. it is felt that these vents might have been closed by the dwellers in coarse of time.

The right side tunnel as can be seen from inside is only of the length of 5.4 m and it ends further. That way, it can be clearly understood as to how long originally the tunnels have been dug. These tunnels are of 5 Ft in height and built in header stone masonry and therefore a man can easily walk inside and have an inspection of it. These inlet tunnels fetch water into the well and water constantly remains in it up to a depth of 2.5 to 3.0 M and it is the peculiarity of the well that one does not experience any incoming or outgoing flow, it is very steady. The most special thing of this scheme is that even in the period of scarcity, although water level lowers a bit, it is seen that the well has never been dry. The longevity and sustainability of this scheme indicates the maturity of planners of those days who planned this wonderful scheme in such a scientific manner.

Outlet Tunnel:

The outlet tunnel located in the east side of well is 0.80 x 1.50 M in size. It is constructed in header stone masonry. The seal level of this tunnel is 20 cm higher from the

bottom level of well and runs up to the Bindusara River to a length of 213 M. It extends further beneath the river bed to a length of 213 M.

The total length of tunnel till it comes to ground level for irrigating the land is 2448 M. There is further an open canal of 3.90 km in length. There are 11 outlets constructed on this canal which irrigate an area of about 212 ha.

To plan a tunnel beneath the riverbed in this way in a big river is sufficiently indicative of the progress made by the then people in the field of construction and irrigation management.

Underground Tunnel And Open Channel Distributory :

This scheme can be termed as the feet in the history of civil engineering. A construction like old step well has been done at the point where the water comes to the surfaces in the open channel. It also has got one nice arch. There is a jeep able village road constructed by ZP to reach this spot. After this well constructed open channel of 100 M length, it is converted further in open unlined canal which irrigates the land.

Outlet Ventilators: (Repair / Air Circulatory Vents) :

For the maintenance and repairs of the underground tunnels taken out through the well and also to have a proper oxygen / air supply in to it, ventilator / manholes have been constructed in a header stone masonry at periodical distances. Likewise, there is a mention of 9 such ventilators existed on the intake channels of the well. However, today, there exists only one on the left intake tunnel. It is presumed that the farmers might have closed these vents.

There are in all 53 vents constructed at an interval of 25 to 82 M on the 2.50 km long underground tunnel. These repair vents are like the old well constructed wells in stone masonry with a depth of 5 m to 5.50 m having diameter of 2 feet, which differs from vent to vent according to the location.

Air Circulatory Vents in the Riverbed :

Bindusara riverbed is about 213 M long from the well and the underground tunnel has been passed beneath the riverbed which is 170 M in width. There are four vents in the

riverbed. The second vent, which located on the Right Bank, is 3.5 M high and 12 M in diameter and it is open. The other vents are generally of the height of 1 to 1.5 ft in the riverbed and closed with lime gravel concrete. One thing is especially notable about this concrete is that even after bearing the hammering flow of river for 440 years, this concrete is still in good condition. The second vent in the riverbed is also tall as the second one and although being open, it is above the H.F.L. The farmers of even the current life observe that water never crosses the vent level which is indicative of the technical knowledge possessed by those people who constructed this well.

After crossing the river, there an outlet is there in vent No 23 to release excessive water of underground flows. There is a gate on this outlet, however, it could not be seen. This practice of that time is indicative of the knowledge of C.R. and Escape structures they possessed which is required for maintenance and safety of the structures.

Regeneration in Bindusara River :

One of the great features of civil engineering of this well is that the infiltration gallery of the underground tunnel constructed below the riverbed also acts as an underground barrage in the riverbed and that way it retains water on its upstream side which again percolates back in to the tunnels and is used as an augmentation for the irrigation. It happens to be a novel scheme in a manner that in this layer of the riverbed, wide gaps have been kept so that the water standing on the riverbed percolates in the tunnels and is made use of for irrigation. And so, this can be termed as an ideal example of conjunctive use of water.

The bed as well as the top level lime concrete is in a good condition yet even after laps of 440 years and after bearing brutal natural aswell as man hammerings. It may, therefore, be very interesting and worthwhile to unearth the technical know-how in it.

Details of the Command :

The command area of the Khajana Well is 212 ha. (524 Acres) comprising of Balgujar Inam, Kaman, Khasbaug etc areas. The land in this area is mainly BC soil and more productive in nature. crops in all the three seasons viz : Kharif, Rabi and H.W. are taken. The main crops are Jawar, Wheat, Gram etc as well as Mangoes. Lot of wells have

been dug in the command in last thirty years including the area under Khajana Well. There are 4-5 wells surrounding Khajana well and the water level in these wells is seen to have almost maintained with the level in Khajana well.

Irrigation Management :

In bygone times, irrigation was being done by ' Shejpali ' method and the 'Patkari' (Canal Inspector) used to supervise the overall work and for the purpose he was getting a share from the produce of the farms from the farmers. So, this may be termed as an ideal example of Participatory Irrigation Management.

There was one another method also in which the Patkari was given some land as a Inam (reward) for looking after the maintenance and repair work.

Afterwards in Nizamshahi regime, the Patkari became the government and he was being paid for this job. One Mr. Abdul Karim, a retired person used to work as a Patkari in the command of Khajana well, (even his ancestors too used to work as Patkaris) and he was familiar to every information of the land in the command including the survey numbers. According to his saying, there were 11 outlets on the open canals and through that 16.5 acres of land was being irrigated per day at the rate of 1.5 acres per day per outlet and all the area of 524 acre was fully irrigated in 20 t0 25 days.

In the southern side of the city there was one flourished agricultural land known as Khas Baug located by the side of Tulja Bhavani Temple on the bank of river, which was famous for its horticultural, floricultural as well as forest plants and trees. However, due to negligent approach of the local machinery, people encroached in that area to convert it in to a hutment. It is told that water was supplied to this area six hours a day from the Khajana well. This special aspect of the Khas Baug points directly to the upcoming concept of 'Irrigated Agriculture'.

Present Irrigation Status:

As per available information, the water in the well has been reduced to some extent since the famine of 1972-73 and the discharge has been reduced to 2.50 Cuft / Sec from 4.0 Cuft/sec. The command has also been reduced due to the growing civilization which has further reduced by 60 acres as private wells have been dug in the command by some 45

people. People have also purchased 90 acre of land inside the command for residential purpose and in this way out of 212 ha 150 ha has been reduced making it to a mere of 62 ha. However, it has been still able to irrigate an area of about 425 ha at least in Rabbi Season. The year wise details of irrigation are given at the end.

It may be definitely a notable thing to say that the 440 year old scheme is still holding its full capacity to irrigate the lands. However, the emerging picture of this glorious system is that it is fast becoming a victim of the growing civilization.

Conclusion And Suggestions :

If we are to save Khajana Bawali and similar irrigation projects existing in the vicinity of cities and towns, we will have to take some legislative and administrative steps urgently. Some of them are listed below:

A) Legislative Measures :

- Looking to the smaller extent of irrigated land, transfer of irrigated land, particularly owned by small holders should be prohibited.
- Conversion of irrigated agricultural land for any non-agricultural purpose should be prohibited, except for exceptional public purpose.
- Historical irrigation facilities which witness traditional wisdom like dams, reservoirs, wells, channels and controlling towers etc. should be included in and treated as historical monuments and should get protection from legislation protecting them.

B) Administrative Measures

- Equitable distribution of water between entitled beneficiaries should be strictly enforced as per rules and supervised by independent machinery.
- Breach of rule and use of unauthorized water by force should be met with penalty debarring such person from use of water from that project.
- Parts of the channel and mechanism of this project is damaged. There is urgent need to restore them by repairs.

Table showing Year wise Area Irrigated on the Khazana well

Year	Kharif Season	Rabbi season	Hot Weather	Total Area Irrigated
1971-72	22.31	167.90	13.07	203.28
1972-73	--	--	--	--
1973-74	13.18	91.37	10.67	115.22
1974-75	33.46	153.07	29.63	216.60
1975-76	45.99	175.07	34.03	255.08
1976-77	82.66	135.38	14.96	233.00
1977-78	54.83	139.03	38.18	232.04
1978-79	65.17	133.30	27.06	255.53
1979-80	22.00	134.91	37.47	194.38
1980-81	59.32	137.90	51.79	249.01
1981-82	05.68	91.92	00.20	97.80
1982-83	00.20	35.04	03.20	38.44
1983-84	--	76.41	12.96	89.37
1984-85	04.72	71.79	03.20	79.71
1985-86	08.96	51.80	--	60.76
1986-87	13.98	40.41	--	54.39
1987-88	--	36.99	--	36.99
1988-89	--	30.48	--	30.48
1989-90	--	62.98	--	62.98
1990-91	--	67.39	--	67.39
1991-92	--	61.88	--	61.88
1992-93	--	32.64	--	32.64
1993-94	--	61.13	--	61.13
1994-95	--	--	--	--
1995-96	--	35.61	--	35.61
1996-97	--	58.18	--	58.18
1997-98	--	60.00	--	60.00
1998-99	--	104.00	--	104.00
Source : Bid Irrigation Circle, Bid, Government of Maharashtra, India.				