



Water Resource Functioning In Jorhat Town, Assam

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Abstract:

Water as a basic human need plays different functions in human life, particularly for domestic purpose. The availability of water for this basic function has not been adequate and safe in many parts of the world. This is truer in many urban centres of the world, and Jorhat town is no exception to it. Therefore, an attempt has been made in this paper to analyse functioning of water, especially for domestic purpose, in Jorhat town of Assam. It analyses the availability of different sources of water for domestic purpose, tapping of these sources through different means, and role of these sources in providing domestic water to the citizens of Jorhat town. It is found that people of Jorhat town depend on different sources of water for domestic purpose, which include piped water supply in some wards by three agencies, the Bhogdoi River, ponds and wells. Both surface and ground water sources have been utilised for domestic purpose. Despite presence of different sources of water in Jorhat town, the citizens face serious problem of shortage of water, especially in the lean period (February to May). The paper is based on the primary and secondary data collected from the study area.

Keyword: *Water resource functioning, sources of water, domestic water supply*

Introduction

Water is a prime natural resource for all forms of life. It is a basic human need and a precious national asset. Water plays different functions in biotic and abiotic components of the earth. In the life of man, different functions of water can easily be seen right from quenching of thirst, to irrigate agricultural fields and to the highest level of industrial operations. However, the primary function of water for human life is its use for domestic purpose, or to be precise for drinking purpose. It has been observed that the availability of water for this basic function, i.e., for drinking, has not been adequate and safe in many parts of the world, particularly in arid and semi arid zones. This is also true in many urban centres of the world and Jorhat town is no exception to it. It is therefore, an attempt has been made in this paper to analyse functioning of water, especially for domestic purpose in Jorhat town of Assam. The main aim of the study is to highlight the availability of different sources of water for domestic purpose, tapping of these sources through different means and role of these sources in providing domestic water to the citizens of Jorhat town.

Study Area

Jorhat town ($94^{\circ}12' E$ and $26^{\circ}44' N$) is one of the important towns of the middle Brahmaputra valley of Assam and it is the headquarters of Jorhat district. The town has an area of 9.20 sq km and comprises of 19 wards having a population of 67,588 persons and 14,508 households (2001 Census). The main river is Bhogdoi which passes through the town along with other streams like Tocklai, Rowriahjan, Athubhangajan etc. as the town stretches from the piedmont zone of the Karbi Anglong Hills to the plains of the Brahmaputra river. Besides, the town is dotted with number of ponds (locally known as pukhuri). The average annual rainfall is 2045 mm.

Data Base And Methodology

The present study is based on primary and secondary data. The primary data has been collected from the field, while secondary data has been collected from different departments like Jorhat Municipal Board, Assam Urban Water Supply and Sewerage Board, Jorhat and Public Health Engineering Department, Jorhat. Besides, data has been collected from various published and unpublished literature including journals, books, reports etc.

Results And Discussion

Both primary and secondary data were compiled, tabulated and depicted through diagrams. All this helped to analyse functioning of water in Jorhat town, which has been discussed in the following lines under major headings showing functioning of the water resources in the study area.

Availability Of Water Sources

There are two major sources of water, viz., surface and ground in Jorhat town. Both the sources are important from the point of view of availability of domestic water in different parts and seasons of the town. The different sources of water for domestic purposes are water supply, river, pond, and ground water. The water supply systems harness both surface and ground water for public distribution. Water supply is managed by three organizations- the Jorhat Municipal Board, Assam Urban Water Supply and Sewerage Board, Jorhat, and Public Health Engineering Department, Jorhat. The Jorhat Municipal Board is providing water supply to its consumers since 1951, whereas, Assam Urban Water Supply & Sewerage Board has started the supply since 1998. The Jorhat Municipal Board has four numbers of water supply projects (Table 1) for supplying of domestic water to the citizens through household connections and public taps as well.

Sl. No.	Water Supply Projects	Sources of Water
1.	Bhogdoi Water Supply Project	Surface water from river <i>Bhogdoi</i>
2.	Nehru Park Water Supply Project	Ground water
3.	Sonari Gaon Water Supply Project	Ground water
4.	Macharhat Water Supply Project	Ground water

Table 1. Water Supply Schemes of Jorhat Municipal Board, 2008

Source: Jorhat Municipal Board, 2008

Table 1 clearly shows that all the water supply projects are depended on ground water except the Bhogdoi Water Supply Project whose intake is from the *Bhogdoi* river. All other water supply projects are situated far from the river as they are depended on ground water sources.

Sl. No.	Water Supply Projects	Sources of Water
1.	Nehru Park Zone	Ground water
2.	Combined Bhogdoi and Na-Ali Zone	Surface water from river <i>Bhogdoi</i>
3.	Rajamaidam Zone	Ground water
4.	Dhenususa Zone	Ground water

Table 2. Water Supply Scheme of Assam Urban Water Supply and Sewerage Board, Jorhat
Source: Assam Urban Water Supply and Sewerage Board, Jorhat, 2008.

The Assam Urban Water Supply and Sewerage Board, Jorhat has constructed another water supply scheme for Jorhat town. Under this scheme, the whole town has been divided into seven water supply zones, but only five zones have been covered until now. The combined Bhogdoi and Na-Ali zone use water from *Bhogdoi* river (Table 2), as it is used under the Bhogdoi Water supply Project of the Jorhat Municipal Board. Ground water is tapped for Nehru Park, Rajamaidam and Dhenususa zones. Apart from it, ground water is min source of water supply under the Swajaldhara Scheme of Public Health Engineering Department, Jorhat. Most of the people of the town, who do not have piped water supply, depend on other sources of water such as *Bhogdoi* river, ponds, dug wells etc. However, many of them have been using water directly from the *Bhogdoi* river, which is not suitable for drinking purpose. Almost all the water bodies of Jorhat town have been polluted from different sources (Bordoloi, 2003). The people use about more than 10 public ponds (Table 3) as another important source of domestic water in Jorhat town. Some of the ponds are of historical importance, for example, Rajmao Pukhuri, Mitha Pukhuri, Tarajan Buhagohain Pukhuri, Padum Pukhuri, Rajamaidam Pukhuri and Sonari Gaon Pukhuri, as these were constructed by different rulers in different times. The different sources of domestic water in Jorhat town, their location and ownership are shown in Figure 1.

Sl. No.	Public Ponds	Location (in Municipal Wards)
1.	Mitha Pukhuri	Mitha Pukhuri Road (VIII)
2.	Pond inside Prince of Wales Campus	Gar Ali (IX)
3.	Rajmao Pukhuri	Old Circuit House Road (X)
4.	Tinkunia Pukhuri	K.B. Road (X)
5.	Tarajan Buhagohain Pukhuri	N.H. 37 (XII)
6.	Padum Pukhuri	Old Circuit House Road (XII)
7.	Choladhara Pukhuri	Choladhara Road (XIII)
8.	Barda Phukan Pukhuri	Phukan Road (XIV)
9.	Rajamaidam Pukhuri	Rajamaidam Road (XIV)
10.	Sonari Gaon Pukhuri	Sonari Gaon No.1 Road (XV)
11.	Atilagaon Pukhuri	PWD Road (XVI)
12.	Railway Pukhuri	Town Station Road (XVII)
13.	Bongal Pukhuri	Na-Ali (XVII)
14.	Dhenususa Pukhuri	Seuni Ali (XIX)

Table 3. Ward wise Distribution of Public Ponds in Jorhat Town
Source: Field Survey, 2008 (October).

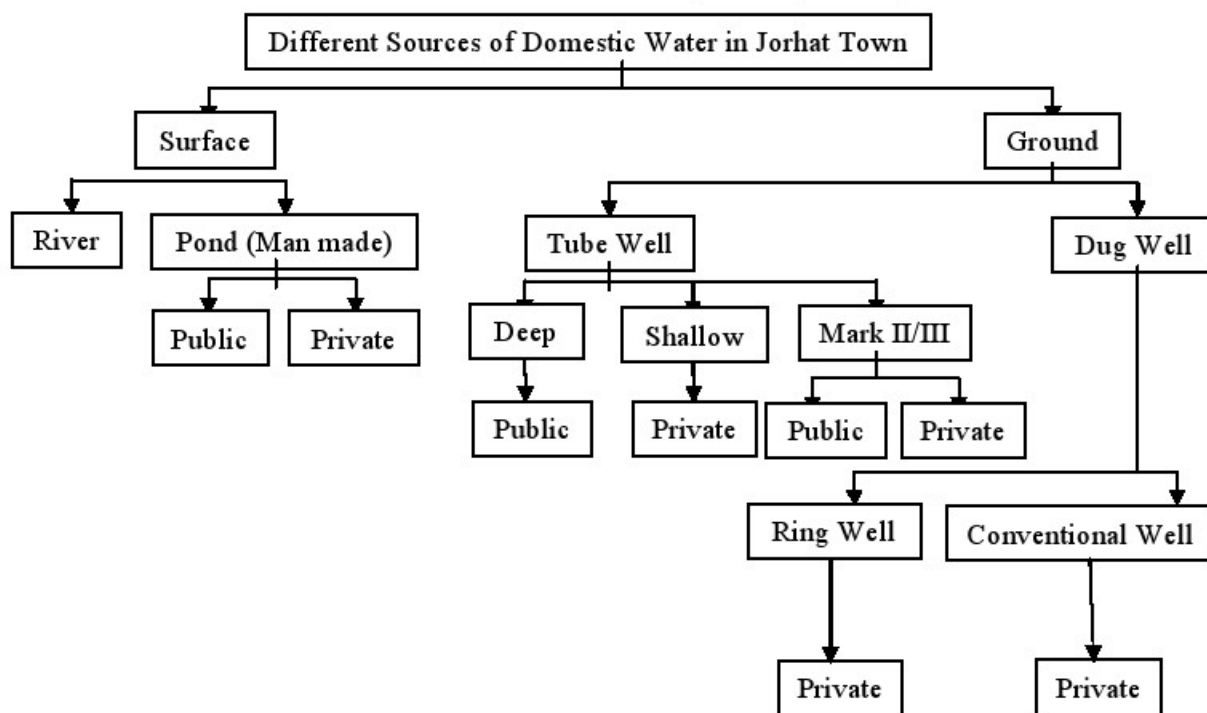


Fig. 1

Source: Field Survey, 2008

Sl. No.	Water Supply Projects	Daily Production (litre)	Location (in Municipal Wards)	Municipal Wards Covered
1.	Bhogdoi Water Supply Project	7,20,000	III	II, III, IV, V, VI, VII, VIII, IX & part of X & XVIII
2.	Nehru Park Water Supply Project	1,80,000	XII	XII, XIII & part of X
3.	Sonari Gaon Water Supply Project	1,80,000	XV	XV, XVII & part of XI
4.	Macharhat Water Supply Project	1,35,000	I	I, XIV & part of V

Table 4. Production of Domestic Water by Jorhat Municipal Board
Source: Jorhat Municipal Board, 2008.

Sl. No.	Municipal Wards	Total Households	Households Water Connection	Percentage of water connection with respect to total households
1.	I	1063	172	16.1
2.	II	944	159	16.8
3.	III	1039	164	15.7
4.	IV	776	91	11.7
5.	V	655	129	19.6
6.	VI	428	211	49.2
7.	VII	810	230	28.3
8.	VIII	352	266	75.5
9.	IX	632	241	38.1
10.	X	647	276	42.6
11.	XI	347	92	26.5
12.	XII	566	272	48
13.	XIII	859	197	22.93
14.	XIV	868	247	28.4
15.	XV	1178	385	32.6
16.	XVI	789	116	14.7
17.	XVII	1246	2	0.16
18.	XVIII	176	29	16.4
19.	XIX	1133	0	0

Table 5. Households Water Connection by Jorhat Municipal Board
Source: Jorhat Municipal Board, 2008.

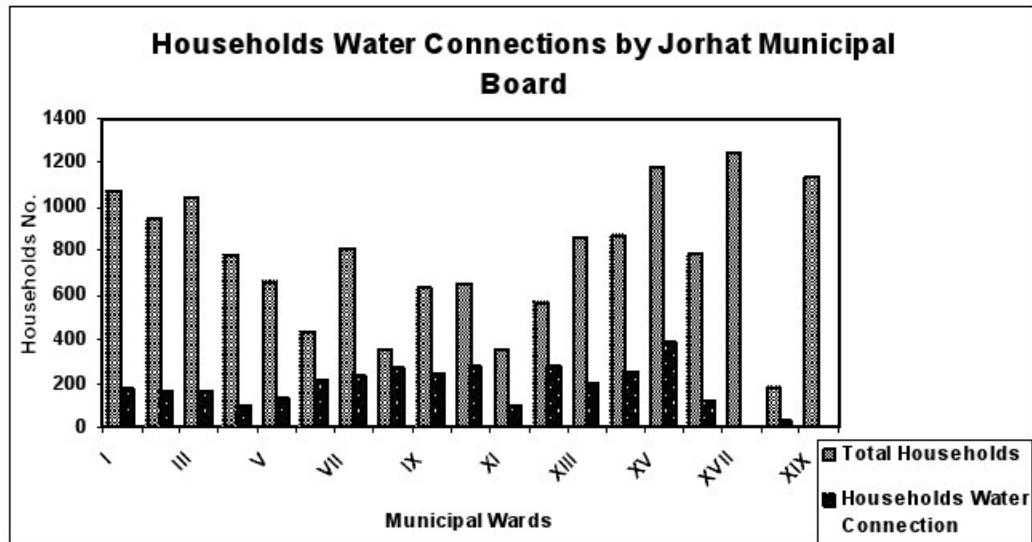


Fig. 2

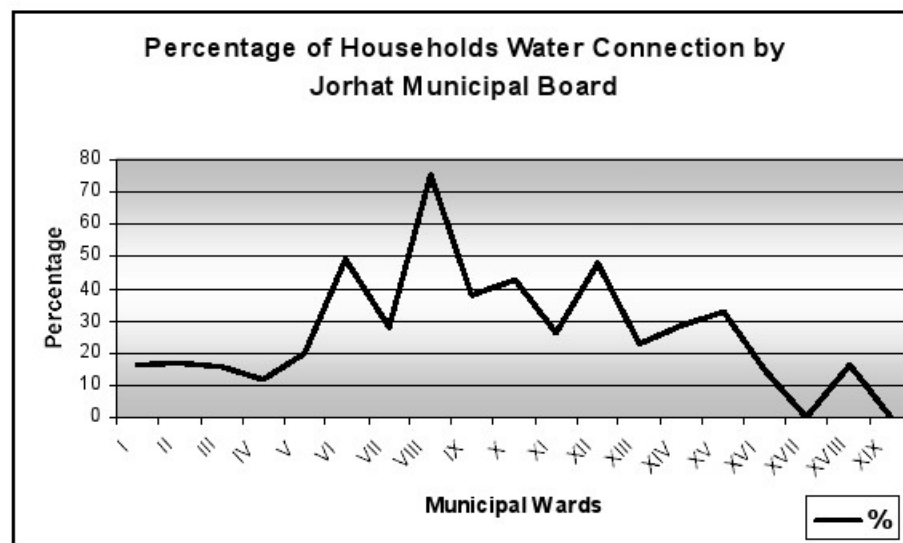


Fig. 3

Supply Of Domestic Water

The welfare state has the responsibility for the supply of basic resources as water and the life style, comfort and social welfare depend on the efficient and sufficient supply of this resource (Basu and Main, 2001). Jorhat Municipal Board is serving 22.6 per cent households of different wards (Fig. 2). The highest number of household connection is 75.5percent of ward number VIII (Fig. 3) providing water by Bhogdoi Water Supply Project and lowest is only 0.16 percent of ward number XVII providing water by Sonari Gaon Water Supply Project (Table 4). Because Sonari Gaon Water Supply Project is located in ward number XV, which is far from ward number XVII, though the total

household's number (1246) is highest in ward number XVII (Table 5). Bhogdoi Water Supply Project is located at ward number III and near to ward number VIII, therefore, the household connection of ward number VIII is highest. It shows that distance is one of the important factors for getting domestic water from supply sources. On the other hand, Bhogdoi Water Supply Project serves more wards because its production is highest than other water supply projects. It is clear that there is no municipal water supply connection in ward number XIX (Table 4). Besides these water supply projects, there are another 250 number of street hydrants are located in different wards in Jorhat town.

Sl. No.	Water Supply Projects	Daily Production (litre)	Location (in Municipal Wards)	Municipal Wards Covered	No. of Households Connection
1.	Nehru Park Zone	10,50,000	XII	X, XII & XIII	2725
2.	Bhogdoi Zone	10,50,000	III	VII, VIII & IX	1964
3.	Na-Ali Zone	14,10,000	X	VII, III, VI & XVIII	1255
4.	Rajamaidam Zone	14,80,000	V	I, II, V & XII	1375
5.	Dhenususa Zone	7,20,000	XIX	XIX	1068

Table 6. Production and Connection of Domestic water by Assam Urban Water Supply and Sewerage Board, Jorhat

Source: Assam Urban Water Supply & Sewerage Board, Jorhat, 2007.

The total household's connection is 57.8 percent providing by AUWS & SB from its distribution lines. This board does not have their water distribution lines in ward number IV, X, XIV & XVII. The daily production of NA-Ali and Rajamaidam zone are highest than other zones because it covers more wards than the other does. On the other hand, there is no household's connection in ward number XIX by Jorhat Municipal Board, but AUWS & SB is serving this ward (Table 6).

Under the Swajaldhara scheme of Public Health Engineering Department, 1,60,000 litres of water is supplied daily in ward number XV, which covers 1.32 percent households of town.

Months	P	PET	AET	WD	WS
January	23.50	53.30	39.61	13.69	0.00
February	29.40	70.90	47.12	23.78	0.00
March	61.20	116.50	78.34	38.16	0.00
April	194.80	133.40	133.40	0.00	38.45
May	260.90	125.20	125.20	0.00	47.10
June	363.60	113.60	113.60	0.00	250.00
July	385.80	116.50	116.50	0.00	269.30
August	356.80	114.50	114.50	0.00	242.00
September	238.80	104.60	104.60	0.00	134.20
October	119.80	97.50	97.50	0.00	22.30
November	30.40	69.00	64.43	4.57	0.00
December	12.10	51.10	38.65	12.45	0.00
Total	2076.8	1166.10	1073.45	92.65	1003.35

Table 7. Water balance Data of Jorhat District (based on average rainfall data of 50 years)

P = Precipitation, PET = Potential Evapotranspiration, AET = Actual Evapotranspiration,

WD = Water Deficit, WS = Water Surplus

Source: Soil Resource Atlas, Jorhat District, Assam.

As regard tapping of ground water, JMB, AUWS & SB and PHE department have installed tube wells with submersible pumps. It may be noted that deep tube wells and shallow tube wells go dry during summer with lowering of water level or drying up of aquifers. In winter season, climatic water deficiency has seen (Table 7). At that time people use other sources like *Bhogdoi* river, ponds, dug wells etc. The hand pumps have been installed in the areas inhabited by people of lower economic strata. Some households have dug wells in their own premises. It may be noted that ponds provide bathing and washing places for the poor people who do not have tap connections in their houses. On the other hand, some of the ponds have disappeared from the landscape due to dumping of solid wastes in them, and some have shrunken in area because of encroachment.

Conclusion

From the above discussion it is clear that the people of Jorhat town depend on different sources of domestic water like piped water supply, rivers, ponds, dug wells and shallow wells. The piped water supply is provided by the Jorhat Municipal Board, Assam Urban Water Supply & Sewerage Board and Public Health Engineering Department, Jorhat, however all the 19 wards have not been covered by the piped water distribution. Hence, people who do not have piped water supply, depend on other sources of water like ponds etc. But, unfortunately public ponds are not found in all wards of the town, and it takes lot of time for the households to collect water from the ponds located far away from the ponds. The water supply projects have tapped ground water sources more than the surface water sources because they are located far away from the Bhogdoi river- the main source of surface water. The total no. of households in Jorhat Municipal area is 14,508 (2001). Jorhat Municipal Board, Assam Urban Water Supply & Sewerage Board and Swajaldhara scheme are providing water to 22.6 percent, 57.80 percent and 1.32 percent households of town.

Summer is the crucial period when a number of tube wells and bore wells go dry because of lowering of water table or even drying up of aquifers. In such a situation, people depend more on the ponds whose water is polluted and unsafe for drinking. All these problems related with domestic water in Jorhat town have put its citizen in severe trouble and people are really hard pressed. They just strive for collection of safe and adequate domestic water. Therefore, it is suggested that the ponds of the town must be protected from encroachment and pollution. They provide not only water for on-site uses, but are also a major source of replenishment of ground water resources. Waste disposal should be planned in such a way that its leachates do not contaminate the ponds and ground water. Finally, the legislation of roof top rainwater harvesting should be implemented effectively to compensate for reduction in the ground water recharge area being caused by concrete constructions. Recently, the government has come up with a gigantic plan to bring water from the Brahmaputra river to solve the severe problem of domestic water in Jorhat town. Let us wait how much time it will take to complete and water problems of how many of the town it is going to solve. Until then it is pathetic situation of domestic water in Jorhat town, both in terms of quantity and quality.

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