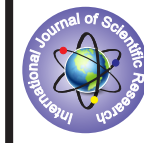


Access to Safe Drinking Water in West Bengal, 2011: A Household Level Analysis



Geography

KEYWORDS: Tap water, tube well, hand pump, relationship with urbanisation.

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ABSTRACT

Household access to safe drinking water in West Bengal is a very significant issue since last few decades. Many people especially in rural and slum areas of urban centres suffer from various water borne diseases for using unsafe drinking water from time to time. Government has taken some improvement measures but these are not kind enough to mitigate this problem entirely. Among various sources of safe drinking water, treated tap water is the safest source followed by the tube well and hand pump. But the facility of treated tap water is mainly confined in urban areas which are provided by municipalities. So the Government should take immediate initiatives to supply safe drinking water to each household to all over Bengal.

Introduction:

The provision of basic services such as safe drinking water, sanitation and electricity has been an important goal of Indian developmental planning. There are various types of basic amenities but fresh water plays the most important role for the survival of human beings. Fresh water has variety of uses like cooking, cleaning, irrigation, industry etc. out of which the most important and inevitable use is for drinking purpose. Availability of safe drinking water has the prime importance because consumption of unsafe water leads to various water borne diseases like cholera, dysentery, typhoid and gastro-enteric fevers which are a risk to life. The Census of India gives the distribution of households by main sources of drinking water and its location. Deep water sources like tube well, hand pump and treated tap water supply system are generally considered to be sources of safe drinking water. But now the question is which is the safest among these three, then the order will be like that – treated tap water, tube well and hand pump. People can get the location of these sources of safe drinking water within their premises, near the premises and away from the premises.

Access to safe drinking water is very closely linked with levels of urbanisation. There is a positive relationship between them. But as it has stated above that treated tap water is the safest source of drinking water and it has very highly positive relationship with levels of urbanisation. Interestingly if levels of urbanisation are increased then access to treated tap water is increased with higher rate than tube well and hand pump. So, it means levels of urbanisation and good availability of amenities grow simultaneously. For that reason quality of life is very high in urban areas.

Objectives:

The major thrust of the present study is to analyse the accessibility of households to safe drinking water sources, within the premises, like treated tap water, tube well and hand pump in West Bengal, 2011 and their relation with levels of urbanisation. The main objectives are as follows:

- To study the existing condition in West Bengal as a whole and urban West Bengal in terms of accessibility to safe drinking water, 2011.
- To analyse the spatial-variation in West Bengal as a whole and urban West Bengal in terms of household accessibility to safe drinking water, 2011.
- To study the relationship between levels of urbanisation and accessibility of households with safe drinking water.

Database and Methodology:

This study is based completely on the secondary source of data collected from Census of India 2011, Tables on Houses, Household Amenities and Assets and Primary Census Abstract, West Bengal Series – 22, Volume – I, Total. The indicators of this study are as follows:

- Percentage of urban population to total population, district wise.
- Percentage of households with safe drinking water facility in West Bengal as a whole and urban West Bengal.
- Percentage of households with treated tap water facility in West Bengal as a whole and urban West Bengal.
- Percentage of households with tube well facility in West Bengal as a whole and urban West Bengal.
- Percentages of households with hand pump facility in West Bengal as a whole and urban West Bengal.
- Correlation between levels of urbanisation and levels of accessibility of households with safe drinking water in West Bengal as a whole and urban West Bengal.

The study is based on following formulas,

1. Percentage of total safe drinking water sources to total drinking water sources, districtwise : (value of total safe drinking water sources of a district ÷ value of total drinking water sources of that district) × 100

2. Percentage of each safe drinking water sources (Treated Tap Water, Tube Well and Hand Pump) to total safe drinking water sources, districtwise : (value of each sources of safe drinking water of a district ÷ value of total sources of safe drinking water of that district) × 100.

3. Linear Regression Analysis.

4. Karl Pearson's Product Moment Correlation Coefficient.

Hypothesis:

Highly urbanised districts will have better accessibility to safe drinking water.

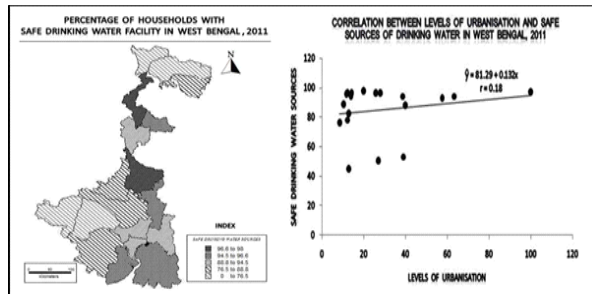
Introducing the Study Area:

West Bengal is on the eastern bottleneck of India, stretching from the Himalaya in the North to the Bay of Bengal in the south. This state is located between 20° 38' North to 27° 10' North latitudes and 85° 50' East to 89° 50' East longitudes. The state is bounded on the north by

the states of Assam, Sikkim and the country of Bhutan and on the south by Bay of Bengal, on the east by the country of Bangladesh. To the south west of the state, the state of Odisha lies and to the west, it is bounded by the state of Jharkhand and Bihar and to the North West by Nepal. The total geographical area of West Bengal is 88752 sq. km., out of which the rural portion is 85427.26 sq. km. and the urban portion is 3324.74 sq. km. West Bengal occupies fourth position in terms of population in the country. The total population is about 9,13,47,736 and the population density is 1029 persons / sq. km. (Census 2011). 62213676 and 29134060 people reside in rural and urban areas respectively. It is one of the rural based states, where 68 percent population of the total population live in rural areas, whereas the rest of the people reside in the urban areas.

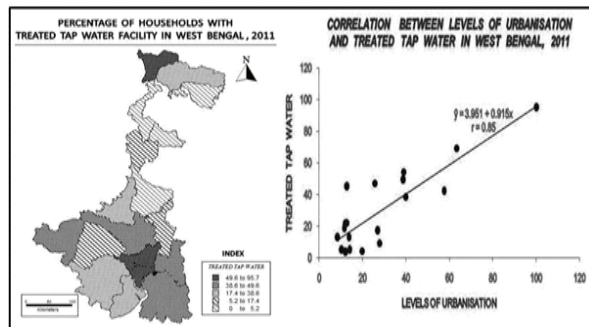
Analysis and Major Findings:

In case of the districtwise spatial variation of safe drinking water in West Bengal, it is observed that districts like Uttar Dinajpur, Dakshin Dinajpur, Murshidabad, Nadia, Kolkata, Purba Medinipur and South Twenty Four Parganas have highest concentration of safe drinking water sources and Darjiling, Jalpaiguri, Purulia and Bankura have very lower access whereas, rest of the districts have moderate access. Most of the safe sources of drinking water are confined in eastern part of Bengal and some areas of north Bengal. The very poor situation is observed in top most part of north Bengal and western part of Bengal specially in Purulia and Bankura, because these areas have very rugged topography, extreme climate, poor transport and communication network etc.



The above scatter diagram shows that the relationship between levels of urbanisation and safe sources of drinking water is positive in Bengal but the rate of increase is not too much high because here, West Bengal as a whole as well as all sources of safe water are taken into account. But it is also observed that except five, rest of the districts are above the line of best fit which means that most of the districts have higher accessibility than their expected values.

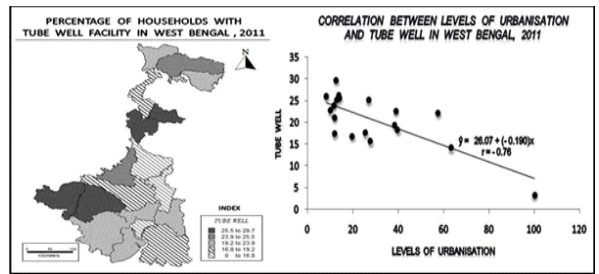
Treated tap water sources are mainly concentrated in southern parts of Bengal except



Bankura and Nadia. Darjiling and Jalpaiguri also have good access to tap water. But the condition is extreme worst in north Bengal. But the relationship between levels of urbanisation and tap water in Bengal is very highly positive in nature. Both variables are increasing simultaneously with very high rate which indicates that treated tap water will increase with growth of urban population in future.

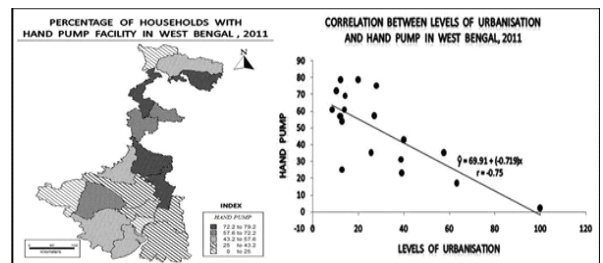
Condition of tube well facility is not very good in overall bengal. In

which areas tap water is not easily available, there has a better access to tube well like Bankura, Purulia,



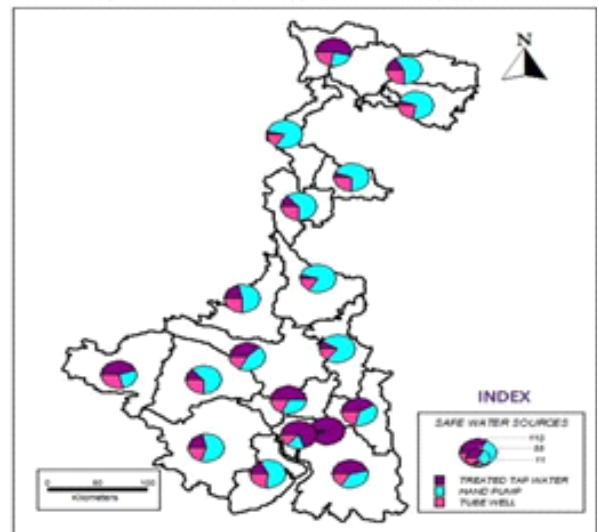
Dakshin Dinajpur, Maldah etc. Most importantly there is a strong negative relation between levels of urbanisation and access to tube well facility, which means the maximum access to tube wells are confined in rural or suburban areas. Here it can be conclude that in future access to tube well will decrease with increasing levels of urbanisation and tap water facility.

The final source of safe drinking water is hand pump. The hand pumps are mostly seen at rural areas. For that reason its relation with levels of urbanisation is strongly



negative. From the map the dominance of hand pump is observed in kochbihar, Uttar and Dakshin Dinajpur, Maldah, Murshidabad, Nadia, Bankura etc. Whereas, Darjiling, Purulia, Barddhaman, Haora, Hugli, Kolkata, North and South Twenty Four Parganas have very low access to hand pump, because other sources of safe water specially treated tap water is highly available in those districts.

HOUSEHOLD ACCESS TO VARIOUS SAFE DRINKING WATER SOURCES IN WEST BENGAL, 2011



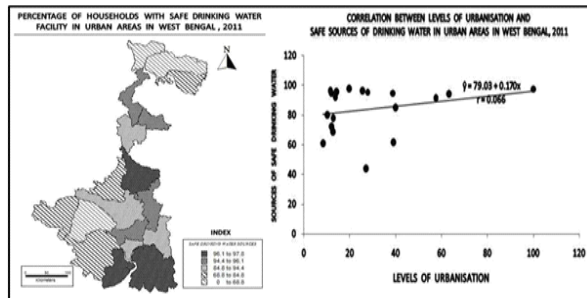
Ultimately to get a clear idea about districtwise distribution of each safe water sources in West Bengal and to know that which is the dominant function among all three of these sources a map with proportional pie diagrams is prepared by taking into account each safe water source. This map reveals that hand pump is the dominant function in most of the districts of Bengal. But, the situation is different in Kolkata and some of its adjacent districts, treated tap

water plays the role of dominant function in those districts because levels of urbanisation are very high here. Tube wells have a very little share in safe water sources in over all Bengal.

From the above discussions it is proved that treated tap water is the main drinking water source in urban areas and it has a very strong positive link with urban growth. But suburban and rural Bengal is experiencing hand pump and tube well as sources of their safe drinking water. As a result these two have a negative relation with levels of urbanisation.

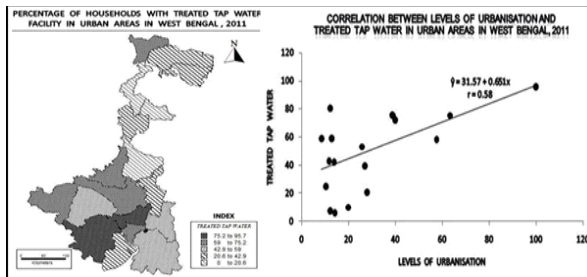
Now to get a more precious vision about household access to safe drinking water and its relation with levels of urbanisation, urban data has taken for further analysis.

In urban areas of West Bengal safe drinking water sources are greater in eastern part



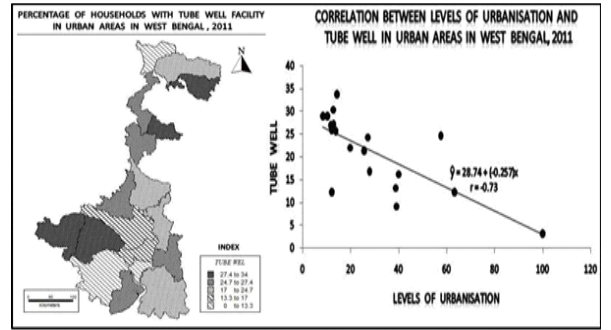
of Bengal and some parts of north Bengal. Districts like Uttar and Dakshin Dinajpur, Murshidabad, Nadia, Haora, Purba Medinipur and South Twenty Four Parganas have highest accessibility to safe drinking water. Whereas top most part of north Bengal and western part of Bengal are experiencing a very poor condition in terms of safe drinking water. It is previously stated that in case of West Bengal as a whole although the relation between levels of urbanisation and treated tap water is positive, but relation of tube well and hand pump is negative with levels of urbanisation. For that reason relation between levels of urbanisation and overall safe water sources is not very strong but it is positive. The same conditions are observed in case of urban areas also and the factors responsible for that purpose are more or less same.

Treated tap water plays a very vital role as a main source safe drinking water in urban areas of Bengal. Except northern part, the condition is overall good



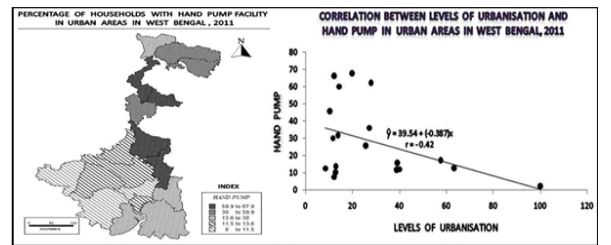
in terms of tap water from treated sources. The correlation depicts that there is a positive link between levels of urbanisation and access to treated tap water. But the relationship status is not as high as West Bengal as a whole, because beside tap water other sources of safe water may be available in urban parts of Bengal.

Tube well is another and very familiar source of safe water in urban areas and in case of West Bengal also there is no exception. This facility is mainly available where the access to tap water is not very good. But this source of safe water is negatively related with growth of urban population. Because when growth in levels of urbanisation takes place then the



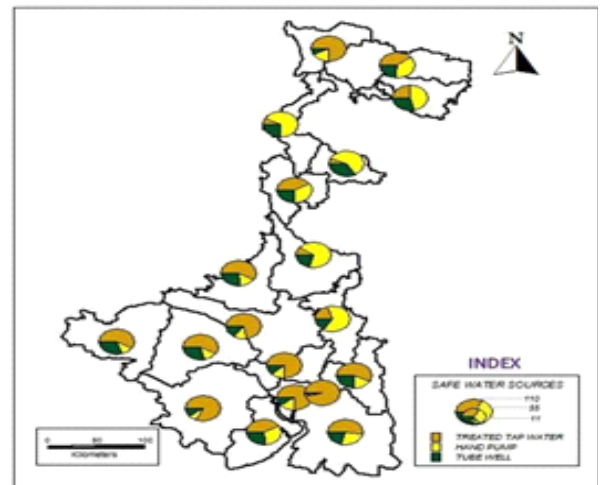
people tendency towards using tap water more, increases. It is mentionable that treated tap water is safer among all sources of safe water. When the financial status and livelihood pattern of people in urban areas rises with urban grown then they try to consume the best quality of services which is needed for their survival. So, same reason is responsible for the higher use of treated tap water than other two sources of safe water in urban areas.

Hand pump is the second highest dominant function in terms of safe water in those urban districts where the accessibility to treated tap water is not very gettable.



districts like Jalpaiguri, Kochbihar, both Dinajpur, Maldah, Murshidabad and Nadia have very good availability of hand pump. It is mentionable that the percentage urban population in those districts is very low. The bi-variate scatter diagram which has been drawn on the basis of levels of urbanisation and household access to hand pump in urban areas is showing that there is a moderately negative relation between this two, which means that this source of safe water is also available in urban areas to some extent but as not as treated tap water.

HOUSEHOLD ACCESS TO VARIOUS SAFE DRINKING WATER SOURCES IN URBAN AREAS IN WEST BENGAL, 2011



This diagram is showing the distribution of each safe water sources in urban areas of Bengal and it is also showing that treated tap water plays a role as dominant function in urban areas of Bengal. But in northern parts of Bengal has a very good access to hand pump. Tube well is available more or less in all of the districts of Bengal but the availability is not high as much as treated tap water and hand pump.

Conclusions:

The study reveals that hand pump is the most available source of safe water in West Bengal as a whole but in urban areas treated tap water is the main source of safe drinking water. Tube well is not a very significant source of safe drinking water in West Bengal as a whole as well as in urban areas. From the study it is also revealed that in West Bengal, there is a positive relationship between levels of urbanisation and all sources of safe drinking water as a whole. Similarly there is a positive relationship between levels of urbanisation and treated tap water as a source of drinking water. On the contrary tube well and hand pump both have negative relationship with levels of urbanisation in the state. However to avoid water born diseases, much more treated plants of drinking water are needed, which should be taken care of by the Government of West Bengal.

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