

Apocalypse of Water Born Diseases in Kolkata

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Abstract: Unwise growth and development of Kolkata is leading the city towards a typical health crisis. The bio-physical environment of city is degrading very rapidly because continuous diagonal subsurface flow of water is increasing the amount of soluble sediment, silt and clay along with huge amount of minerals. Thus these sub surface flow has generated voids and tunnels in the sub surface condition which are prominent in the either side of river Ganga and the either side of Adi-Ganga channel and Bag-jola canal. All these water bodies are carrying huge amount of coli form bacteria. When such polluted water is entering the sub surface voids and tunnels, they are contaminating ground water and by this way diarrhea like disease are spreading.

Unwise growth has also restricted vertical recharge and discharge of ground water. As a result when water is passing diagonally they are getting much more time and passage to pass and thus these polluted substances could easily reach to the level of ground water, not only that when water flow diagonally they also getting much more time and passage length and by this way the rate of arsenic contamination is also increasing day by day. All these together leading Kolkata towards a huge health crisis in near future.

Kolkata is a degrading city, not only in its altitude but also degradation has occurred in its ecosystem and bio physical environment. The historical growth perspective of the city like Kolkata indirectly indicates its causes of environmental degradation. So, to analyse its overall environmental condition we had organised field trips to identify the causes of such degradation.

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I. Introduction

Objectives:

The objectives of this study were to find out,

- (1) The causes of health hazard which experience in the parts of Kolkata.
- (2) To find out the actual health condition of the city at present.
- (3) To get a co relation between environmental degradation and such a health hazard.

Methodology: To analyse the present state of health hazard occurred in various parts of the city.

We have adopted the following methodologies.

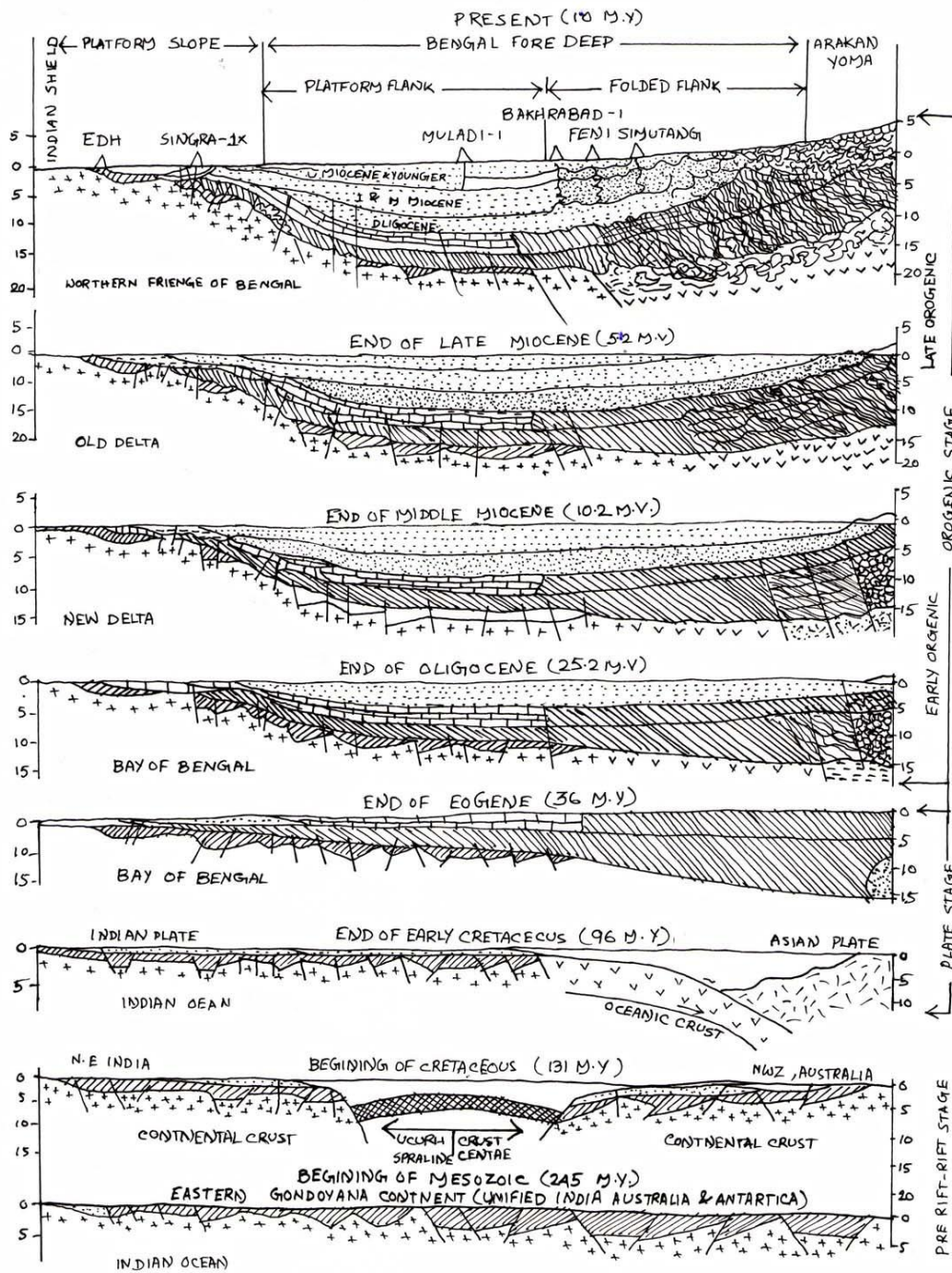
(1) Pre-field condition: In this level we had collected various secondary data from the various organisations which are normally working in this field and also have collected the data on sub surface stratification and the fluctuation of ground water in the various parts of the city. After getting all these data we have analysed the data statistically and have found the correlation between sub surface condition and health hazard.

(2) Field Condition: When we were working on the field we had surveyed the area properly by questioner survey and bio physical data analysis. It seems that the observed facts are very much related to the previous identified problems through secondary data sources.

(3) Post field condition: After our intensive survey in the pre monsoon and post monsoon period we have tried to analyse the data properly by various analytical methods and techniques and had generated hypothesis regarding the probable health crisis of Kolkata.

Analysis:

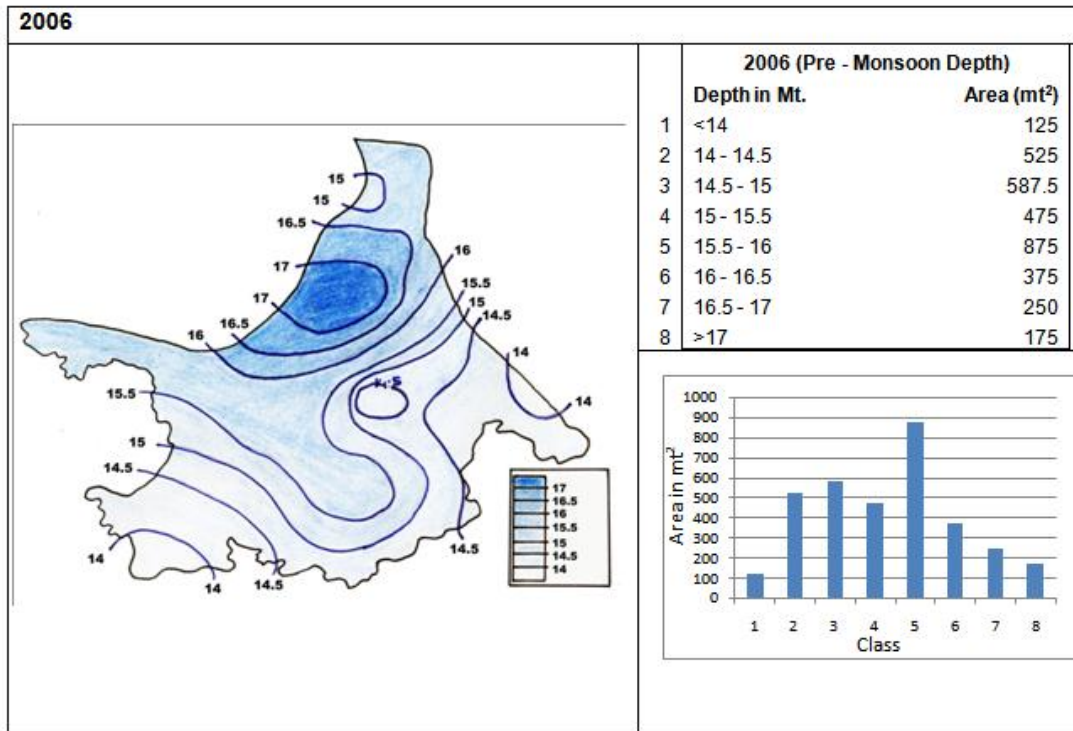
Kolkata a historical proud of the nation is dying day by day and presently it is on the verge of destruction with its enormous size of population, powerful cultural setup, huge knowledgeable and



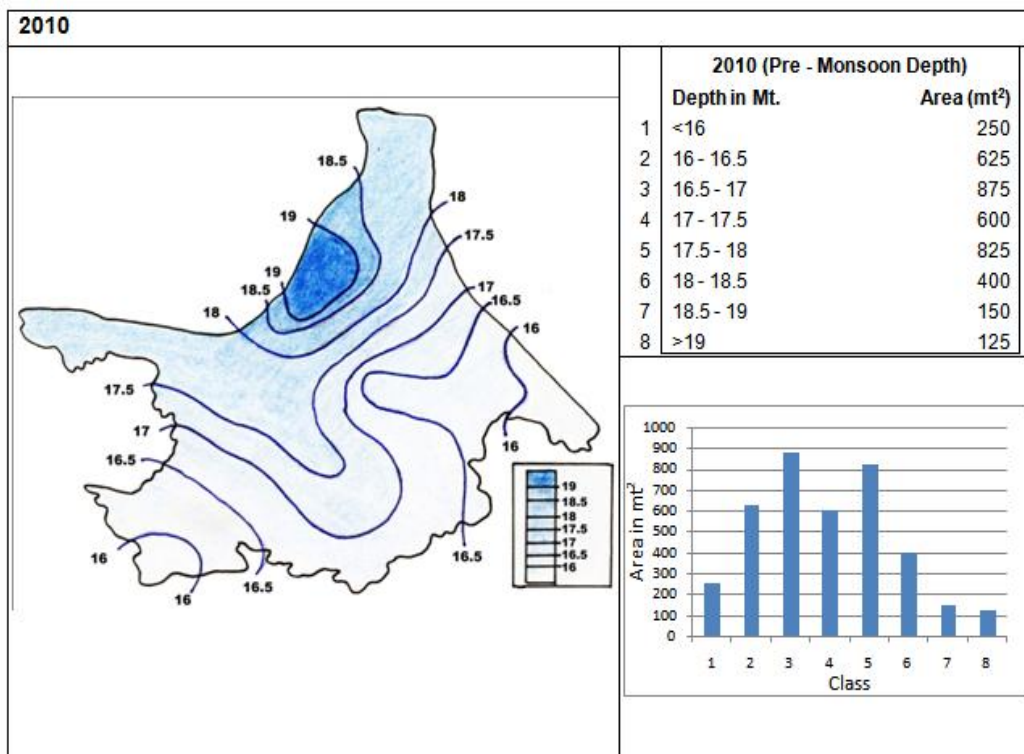
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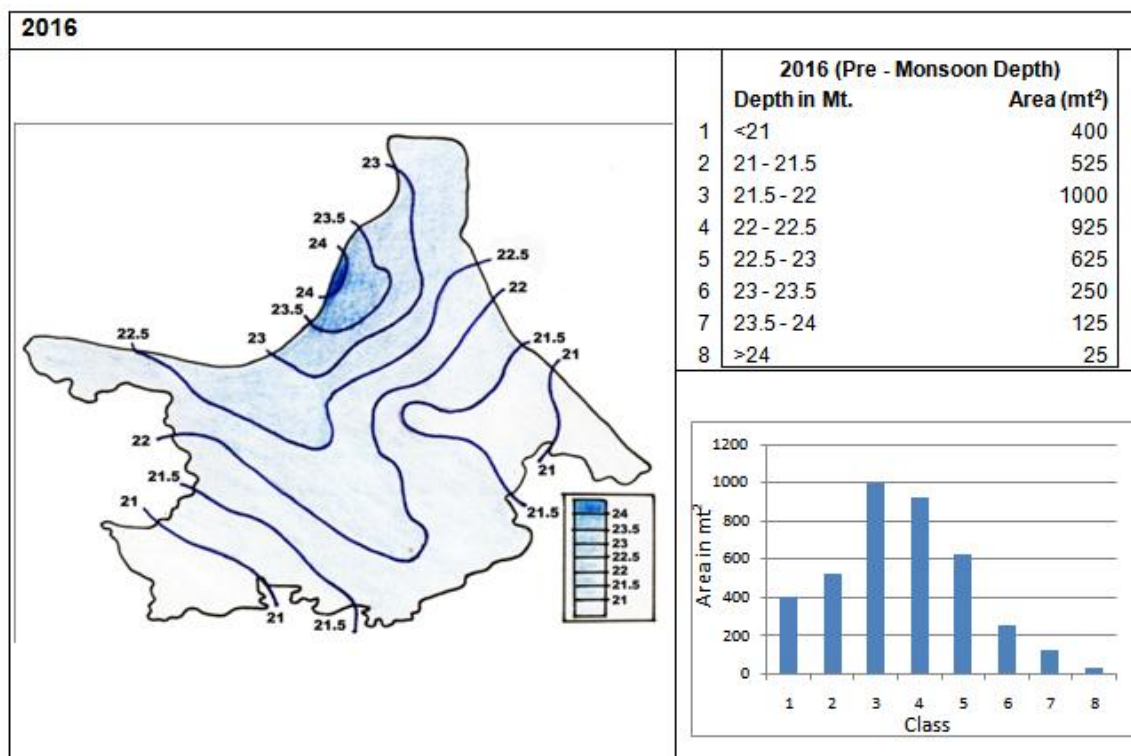
scientific skill and technology because the destruction of the city is beyond our control. The city is actually hanging on a cradle because lower part of the city area has been washed out by the continuous diagonal sub surface flow, which has wearing out the cities sub surface sand, silt and clay along with various types of minerals. The Pre-Monsoon depth variation of water has been increased to a greater extent. It is due to the continuous increase in population pressure and at the same time the increasing rate of the utilisation of ground water. The other most important cause is that day by day with the rate of increasing sub-surface flow the sub-surface tunnels formed by voids has extended their passage. As a result the saucer shaped sub-surface lithology is attracting the sub-surface flow towards the main river Ganga through the central part of the city. Due to such a typical flow condition of water contaminated water is spreading all through the city. Such a typical situation has come to the city due to its unequal and unwise growth and development in its various parts. The heavy construction over Kolkata is not only increasing the city's total weight but also it is hampering the isostatic balance of the surface.

Pre Monsoon Depth of Ground Water Level



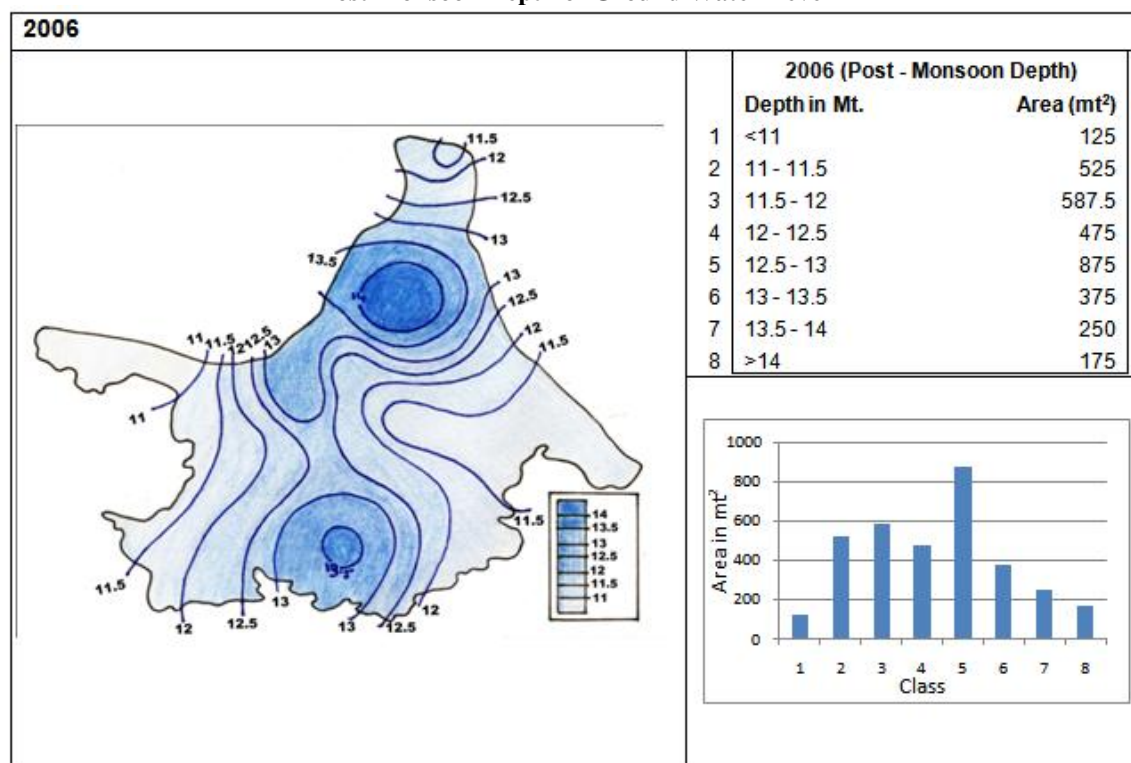
At the time of peak monsoon when water level raises upward they normally pump the ground water towards the sub surface condition with their huge energy. As a result the saucer shaped Kolkata normally receive excessive amount of water from the various water bodies surrounding Kolkata but the problem is that sub surface lithology indicates that the water is actually flowing towards Bay of Bengal because the rock stratas are inclined gently towards Bay of Bengal. As a result when this water pass away through the sub surface condition of the city they are normally creating huge amount of voids and vacuum spaces within the sub surface condition of the city.



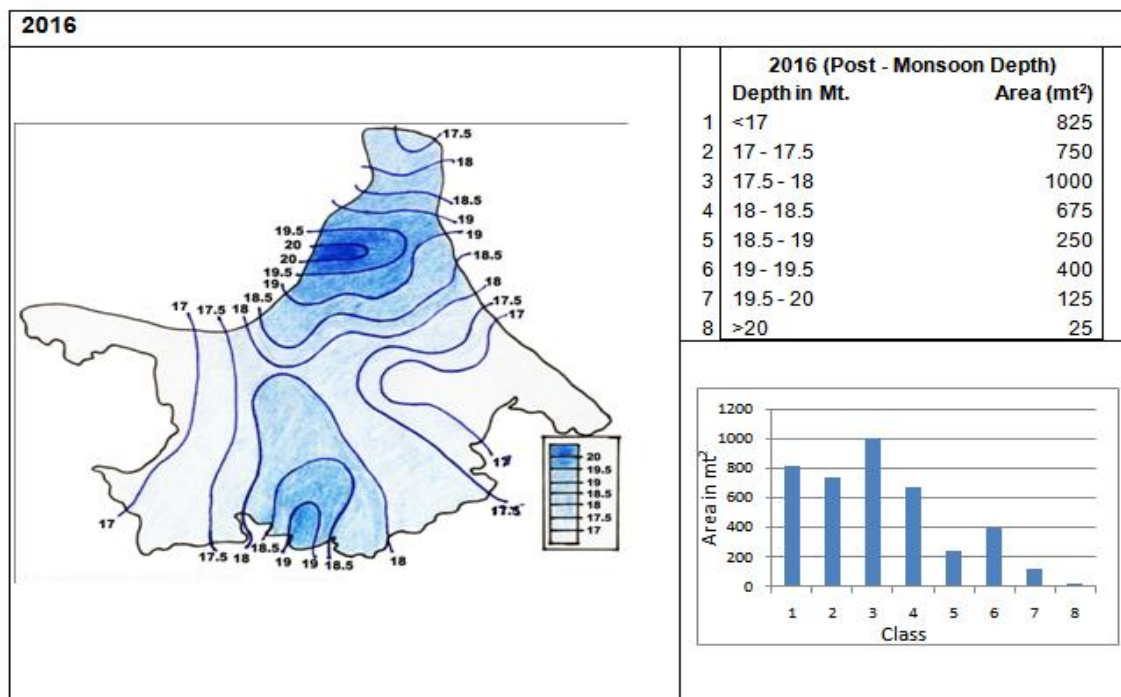
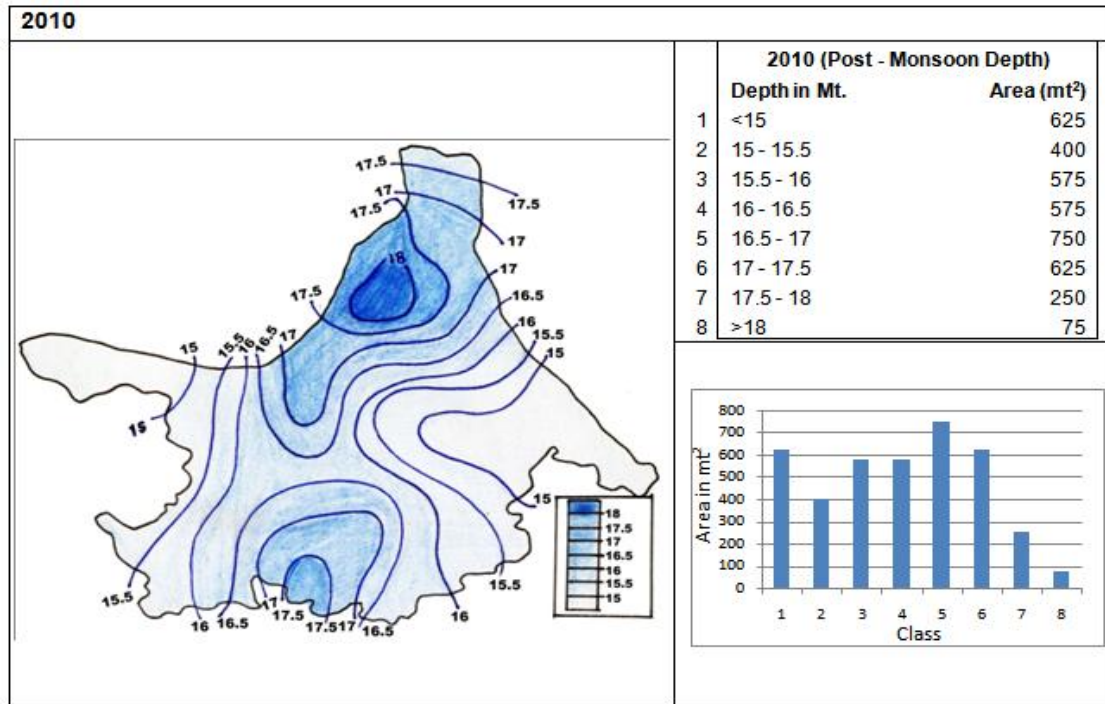


In the post monsoon period the ground water level reach to the surface. As the quantity of water increases it normally dilutes pollutants and as a result percentage of contamination decreases. That is why quality of water tends to be normal in the rainy seasons. Further more it is also important that the depth of ground water has also changed in the recent years it is because the surface is loosing it's stagnancy because voids and tunnel formed in the sub-surface condition has extended to a greater extent which is causing excessive ground water discharge towards Bhagirathi-Hooghly river and towards Bay of Bengal.

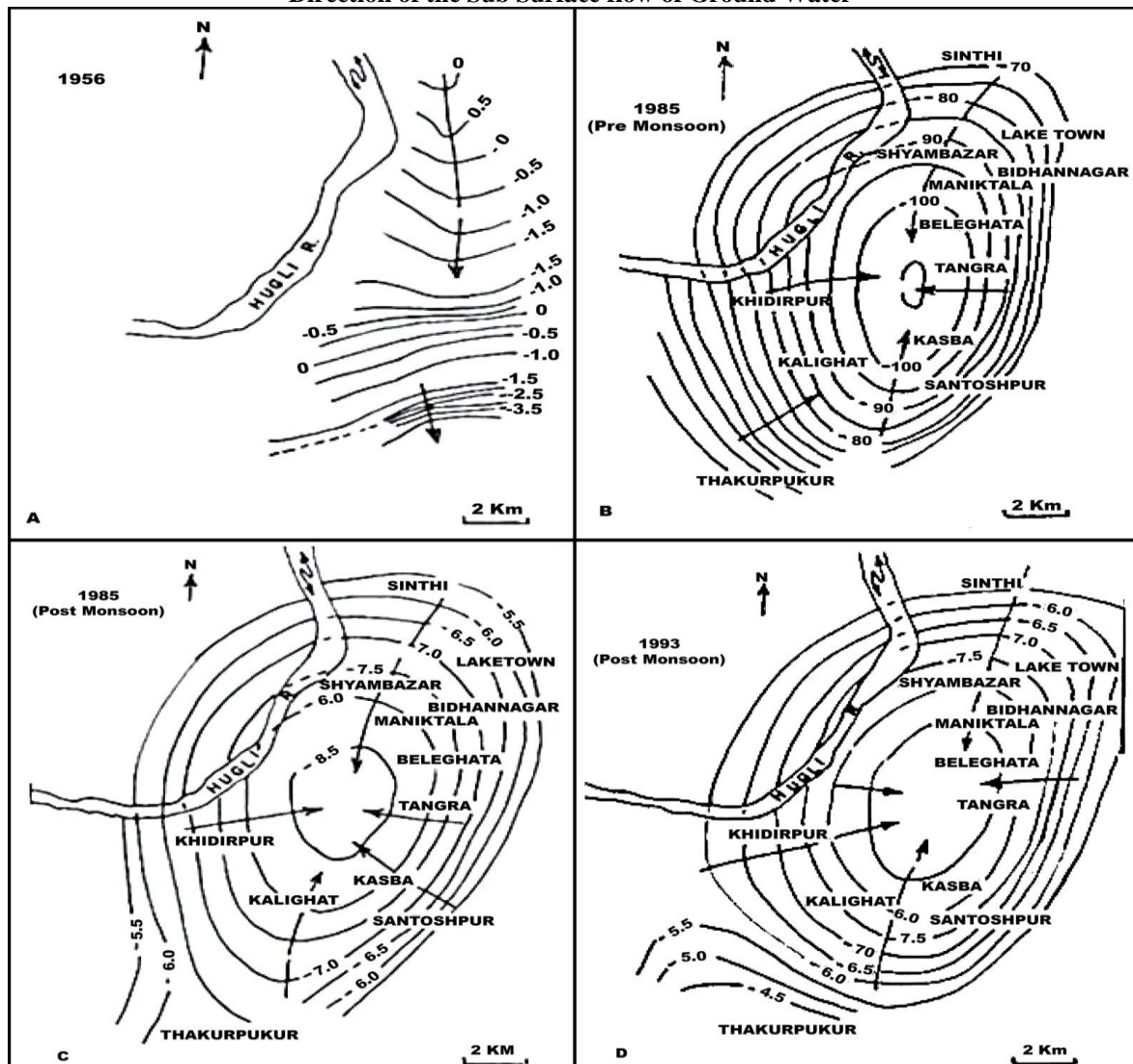
Post Monsoon Depth of Ground Water Level



As the sub surface flow has created sufficient amount of voids that is why recharged water from its surrounding area could easily flow through the sub surface litho-logy without any restrictions. When this water flow down ward according to their gradient they normally carry huge amount of coli form bacteria from the surrounding water bodies of the city. As this water flow horizontally within the sub surface condition they normally get lengthy passages for penetration of polluted water in the sub surface condition and by this way they are contaminating the ground water stratas. It is the main cause of diarrhea like disease spreading from the wells and tube-well water in the various parts of the city. In future such contamination may increase to a greater extent. Presently such contamination occurred in various seasons because it is related to the fluctuation of ground water level. But day by day as the level of ground water is declining very quickly that is why bacterial infection may be very common occurrence all round the year.



Direction of the Sub Surface flow of Ground Water



Source : Central Ground Water Board

The other most important factor is that the urban space is mostly covered by cement and concrete. As a result the vertical flow of ground water has already been decreased since long time. That is why when the sub surface strata receiving water from the surrounding areas they normally generate diagonal flow through the passages and voids which has already been formed within the urban area. At the time of their diagonal flow they are also dissolving arsenic bearing rock strata and by this way the rate of arsenic contamination is also increasing steadily.

Meteorological conditions influence, to a different extent for different microbial agents, the transport, diffusion, reproduction, and persistence of pathogens causing diseases such as diarrhea (Zhang et al., 2007). They also define environmental reservoirs of pathogens and human behaviour, and govern the timing and intensity of seasonal outbreaks (Jagai et al., 2009; Kolstad and Johansson, 2011; Zhang et al., 2007). So far, three studies applied climate projections for assessing, on a global scale, the increased risk of diarrhea as a result of changing temperatures (Campbell-Lendrum et al., 2003; Kolstad and Johansson, 2011; McMichael et al., 2004). Their estimates range between 8 and 11% change (in the 2030s). Uncertainties around these estimates mainly relate to the few studies that have characterised exposure-response relationship and inter-model discrepancy of climate models. Influences of other climate parameters on diarrhea in the future have not been assessed. A clear comprehensive quantification of the increased risks attributable to future climate change is, thus, still lacking (Haines et al., 2006; Hunter, 2003; Kolstad and Johansson, 2011; McMichael et al., 2006).

II. Findings

After the overall analysis we have found out so many aspects, these are

- (1) The sustainability of the Kolkata city is declining day by day, due to the unwise growth of the city.
- (2) The water bodies which were distributed previously in the various parts of the city were acting as the recharge point to the sub surface water reserve but presently due to the growth of human settlement and land hungeriness, Kolkata has lost these water bodies permanently.
- (3) Presently coli form bacteria and arsenic is very much active in the sub surface water but in near future various chemical composition of sub surface water may also be changed.
- (4) Various parts of the city are facing health hazard due to the contamination of ground water, but it is sure that in recent future Kolkata will face a typical health crisis.

Hypothesis:

Depending on the overall analysis with respect to our generated data, previous works and our experience we may generate hypothesis, these are

- (1) Unwise growth and development as well as lack of monitoring of the water bodies is the main cause of health hazard within the urban area.
- (2) Due to the global warming as the sea level is raising Kolkata's situation of ground water and its quality will be deteriorate and this situations may cause huge health crisis of Kolkata is near feature.

III. Suggestions

Depending on the generated hypothesis for the sustainability of the Kolkata at the sustainability of the health within the city of Kolkata, we may suggest -

- (1) The natural flow of water should be clear, so that coli-form bacteria could not take birth.
- (2) Proper monitoring of ground water is necessary by creating recharge pits, in per unit residential areas.
- (3) Ground water utilizations should be restricted to protect such epidermis.
- (4) Urban authority should be well aware about the probable contamination of ground water and changes in the chemical composition of the ground water.
- (5) Mass awareness programme should be conducted by the KMD from the proper health precautions.
- (6) Tap water should be extended in each and every corner.
- (7) Drainage system should be well maintained so that ground water contamination may be checked.
- (8) KMD authority should undertake proper monitoring skills in the various seasons.

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