COMMUNITY ASSESSMENT OF GROUNDWATER EXPLOITATION & IT'S AWARENESS A CASE STUDY OF KARVENAGAR LOCALITY OF PUNE CITY MAHARASHTRA

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Abstract:

The city of Pune lies in the rain-shadow region of the Western Ghats in Maharashtra. Karvenagar lies in the south-western suburban region of Pune and is a residential area. Though the annual rainfall of the city is 722mm, the maximum rainfall is received by Pune from June to November so the city faces water scarcity during summer. The city is supplied with water from four reservoirs nearby but in summer the supply is reduced to minimize the usage of water. Residents hence augment the supply by using bores to meet their needs. A large number of bores have been constructed in the past few years in parts of Karvenagar, which if overlooked can lead to a significant decrease in the groundwater levels, leading to various socioeconomic turbulences in the locality. This paper articulates the mapping and assessment of the indiscriminate digging of bores in parts of Karvenagar, the pattern that is followed for the digging, as well as the existing water harvesting plans. It also portrays the awareness of the status of groundwater as a resource and its importance among the local residents by using primary methods of data collection and social media as a tool for surveying and for guiding and creating awareness among the community. Community based research has been carried out to enhance people's participation The use of open street mapping has been done for plotting and assessing the area accordingly. The paper concludes with convenient and implementable solutions that can be considered for conservation of the groundwater table in the study area.

Keywords:

Ground water exploitation, Community based research, Open street mapping, Bore-wells, Pune, Karvenagar

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Introduction:

Groundwater is an important support for economic and social development in India as it accounts for one-fifth of the country's total water resources. The main problems on groundwater exploitation and utilization include the unreasonable distribution of groundwater exploitation, the degradation of groundwater environment, and serious groundwater contamination (Dongguang, Wen and Xuanmin WU 2005). This information works in terms of micro level operations that is by taking one of the growing smart cites of India; Pune. This paper articulates the digging of borewells in parts of Karvenagar (Figure 1) region without careful judgment for the availability of ground water in accordance. The paper also conceptualizes Level of Awareness in terms of indiscriminate digging which correlates groundwater availability in the region. The use of groundwater, suggestions on what measures should be taken to conserve groundwater and the rainwater harvesting plans that the residents have implemented are taken into consideration to frame the level of awareness. It is based on 'community research'. Further to that, this paper also states a few measures in order to increase the existence level of awareness which will in turn lead to participation among the residents. Karvenagar, as described by an old resident, had a few safety tanks and two unbanked canals in the region which allowed infiltration naturally and continuously, ultimately replenishing groundwater.

Much research about ground water exploitation has been conducted in Maharashtra by Groundwater Surveys and Development Agency (GDSA) which states that out of 1503 watersheds in Maharashtra, 34 are 'Dark' (Ground water report, GDSA). But it is important to make the residents aware to plan out co-relation between ground water exploitation and digging of borewells in our locality now when situation is still in hand.

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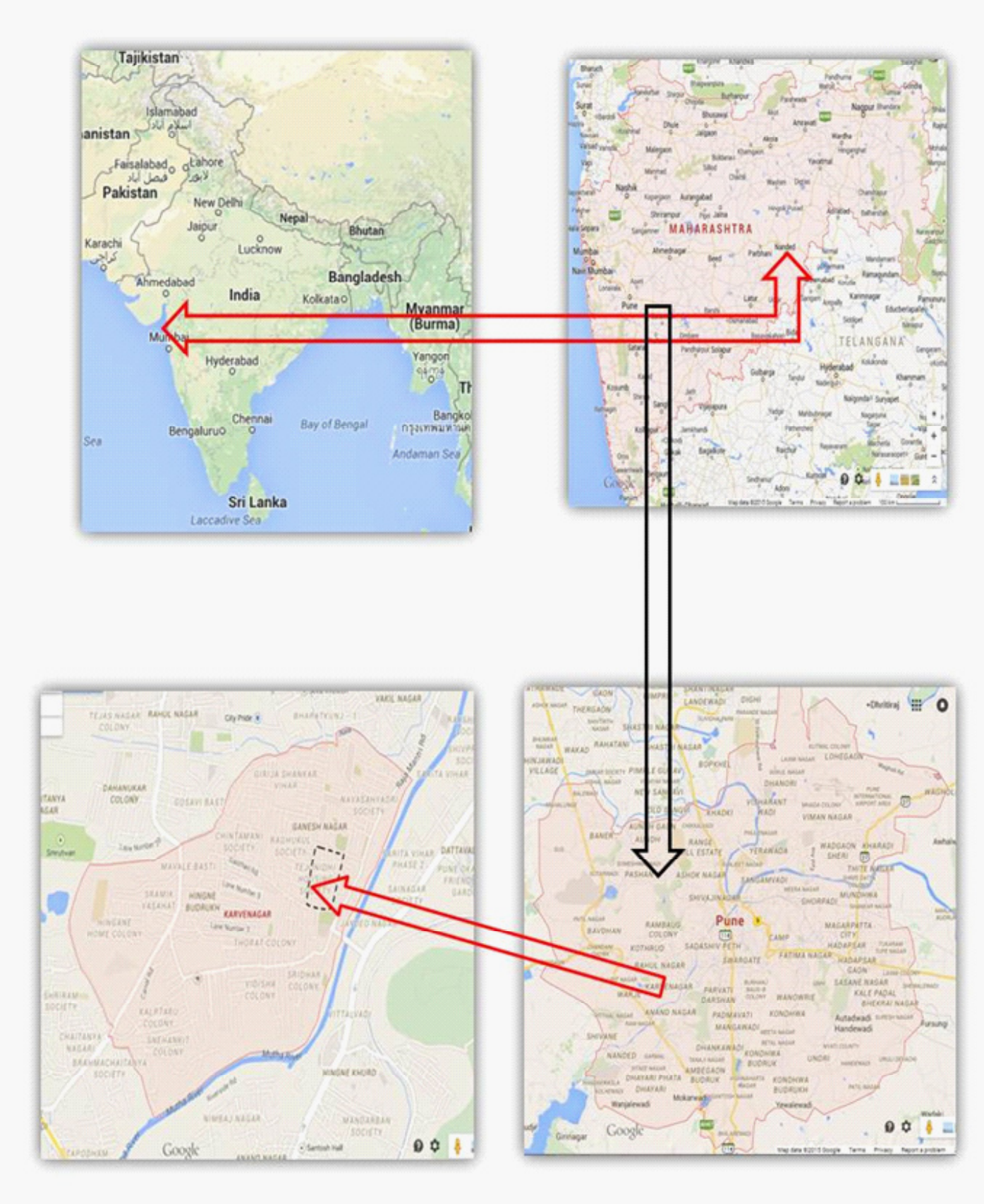

Figure 1- Study Area

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Methods & Materials

1) Conducted personal interviews using simple text questionnaires: Door-to door interviews were conducted in order to involve local residents for the research work. The primary aim was to acquire the data regarding usage of water from the borewells and also to check the initiatives undertaken by societies in order to conserve water.

2) Prepared graphs and tables to represent the above mentioned data.

3) Adopted the method of community assessment in research: Describing a community of people, identifying their needs and providing solutions accordingly.

4) Used popular mobile applications for sharing location and mapping the borewells

5) Usage of Cartography was done as a medium of societal communication.

Results & Discussions

The study area consists of approximately 35-40 Bungalows and 35 buildings. The following results for bungalows and buildings have been drawn separately after statistically sorting and grouping the data.

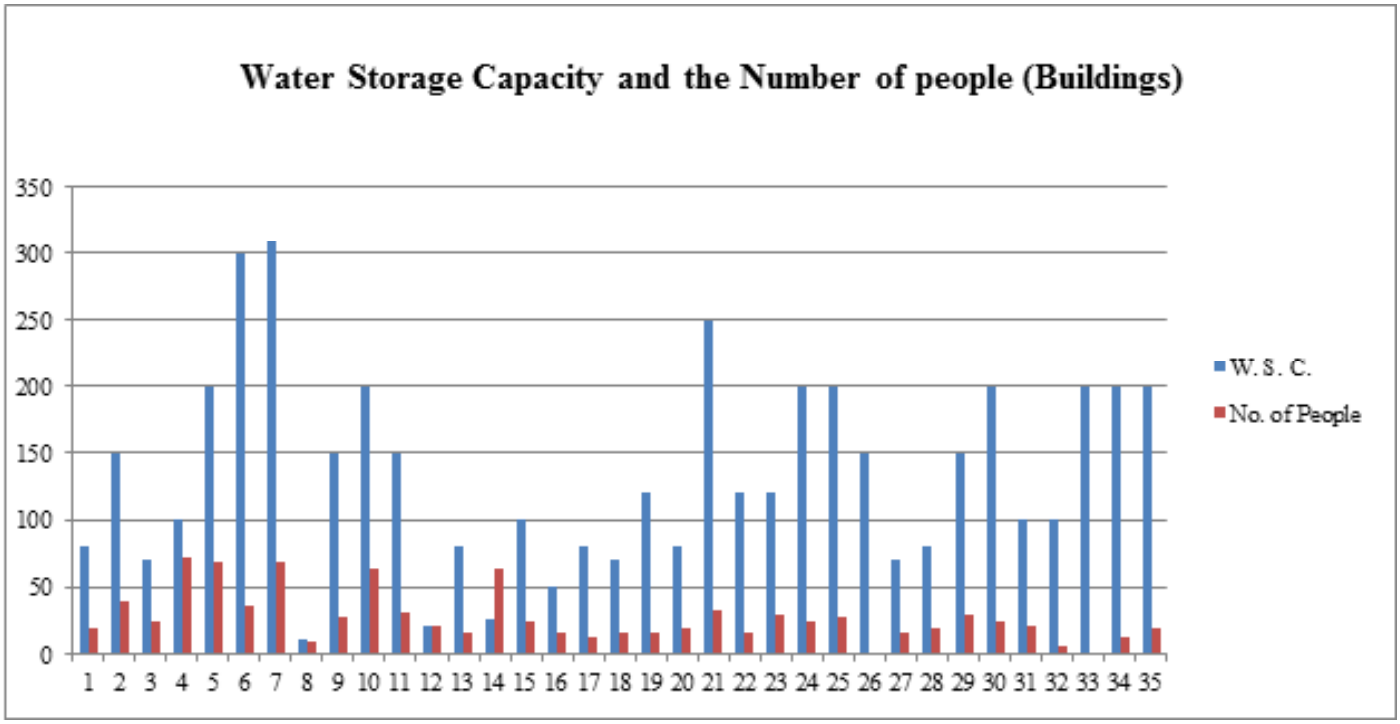
For Buildings

1. Total number of buildings surveyed: 35

2. Number of people residing in the buildings (approximately): 925

3. Sum of the water storage capacities of the tanks for buildings: 468500 (These tanks are refilled every 2-3 days)

4. Graph 1 below shows the water storage capacity of tanks in 100 litres of the buildings and the total members residing in the buildings.



Graph 1

Water Storage Capacity of Buildings to the number of people. (X-axis shows no. of people, whereas Y-axis shows water capacity of tanks in Liters)

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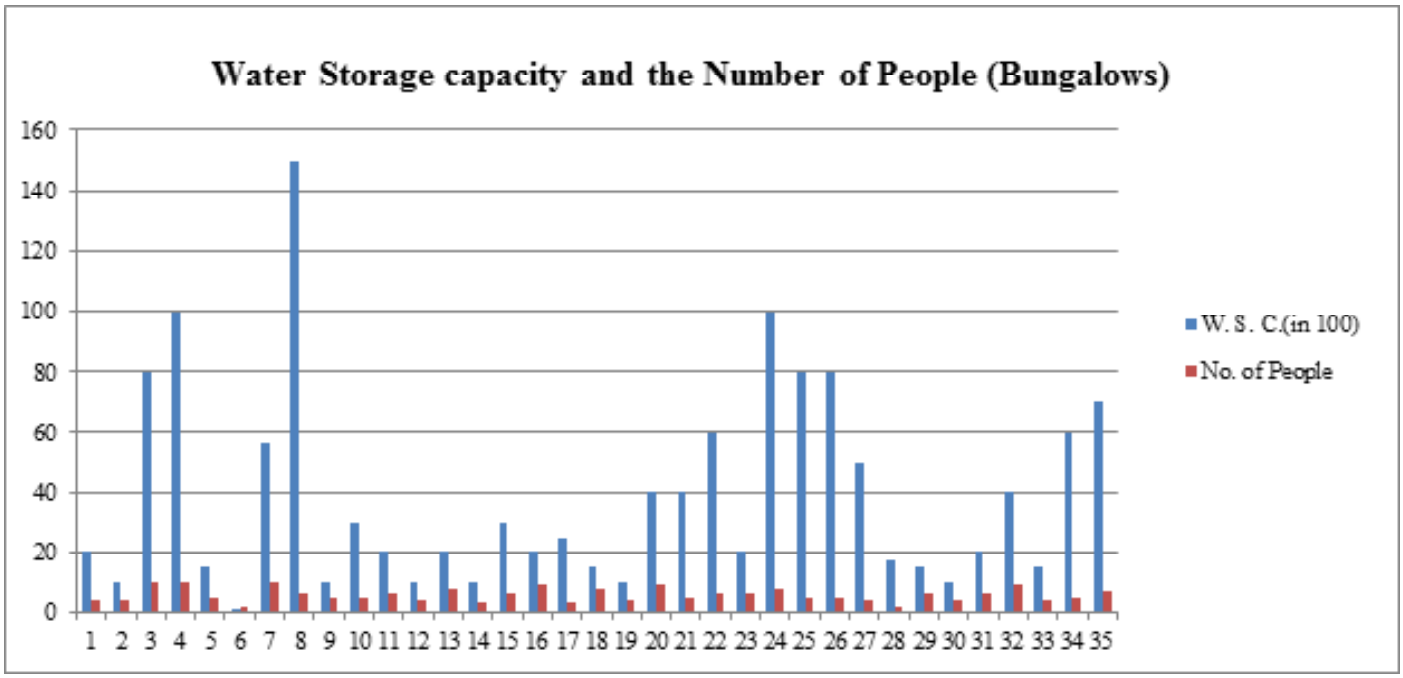
5. *Total number of buildings having borewells: 27*
6. *Total number of borewells that are regularly in use (almost on a daily basis): 22*
7. *Number of buildings using the water from borewells after testing it in the laboratory: 22*
8. *The amount of water required per person per day (approximately): 253 litres*
9. *Number of buildings having rainwater harvesting systems (water discharged into a recharge pit): 4*
10. *Number of buildings where the water has been directed from roof tops to open soil spaces for infiltration: 7*
11. *Total number buildings where the borewell cannot supplement water anymore due to exhaustion of the groundwater: 3*

For Bungalows

1. *Total number of bungalows that have been surveyed in the study area: 35*
2. *Number of people residing in the bungalows (approximately): 205*
3. *Sum of the water storage capacities of the tanks for bungalows: 134900 liters (These tanks are refilled after every 2-3days)*
4. *Graph 2 below shows the water storage capacity of tanks in 100 litres of the bungalows and the total members residing in the bungalow.*



Graph 2

Water Storage Capacity of Bungalows to the number of people X-axis shows no. of people, whereas Y-axis shows water capacity of tanks in Liters)

1. *Total number of bungalows having borewells: 21*
2. *Total number of borewells that are regularly in use (almost on a daily basis): 17*
3. *Number of bungalows using the water from borewells after testing it in the laboratory: 16*
4. *The amount of water required per person per day (approximately): 330 litres*
5. *Number of bungalows having rainwater harvesting systems (water discharged into a recharge pit): 1*
6. *Number of bungalows where the water has been directed from roof tops to open soil spaces for infiltration: 4*
7. *Total number bungalows where the borewell cannot supplement water anymore due to exhaustion of the groundwater: 1*

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The residents were asked to rate how much were they aware about the groundwater availability and its exploitation from 0-10. The following table portrays the level of awareness (T-1) of the residents.

Table 1 - Level of Awareness

Rating	*Number of votes (%)*
0	*31.6*
1	*13.33*
2	*1.66*
3	*13.33*
4	*8.33*
5	*11.66*
6	*6.66*
7	*5*
8	*3.33*
9	*5*
10	*0*

The table (T-2) below represents the percentage of groundwater used for various daily chores by the residents on a regular basis

Table 2 - Percentage of Groundwater used per day

Sr No.	*Purpose of Use*	*Percentage*
1	*Drinking*	*1.35*
2	*Domestic*	*31.08*
3	*Construction*	*8.11*
4	*Gardening*	*35.13*
5	*Carwash*	*24.32*

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Table 3 - Year wise distribution of digging of bore wells

Sr No.	Class of Years	Number of borewells dug
1	1995-2000	6
2	2001-2005	7
3	2006-2010	4
4	2011-2015	30

Discussion

1) Analyzing the above statistics it can be concluded that,

1. There is a rapid growth in the digging of borewells in the past five years and its effects have started taking effect as a few plots in the area cannot supplement groundwater anymore due to its exhaustion. At this rate it's highly possible that the groundwater table gets exhausted within the next few years.

2. Most of the residents use the groundwater for domestic use including gardening and car wash on almost daily basis. According to the WHO Water Sanitation Health Program, an average of 20 litres of water is required per capita per day and the stated requirement per capita per day in India on an average is 135 litres(The Hindu), but in this region the usage is comparatively much higher than required. Hence it becomes mandatory to make aware people about this and to apply methods which can bring positive outcomes, helping conserve water.

3. People's approach towards extracting groundwater is mostly just to meet their requirements and nearly 70% of them are unaware of the condition of the groundwater exploitation and the consequences that might take place.

2) Taking necessary steps has become utmost important because at this stage when the groundwater is available in sufficient quantities we can still conserve it for sustaining the equilibrium between exploitation and replenishing the groundwater. Hence the following solutions can be taken into consideration:

1. With the advent of technology and latest social media tools (3), we urge to implement the use of such tools in order to spread awareness among people. Uploading daily consumption of water and weekly meetings could be arranged using social media tools. This will help in enhancing people participation in decision making towards judicious use of water. Social media is indeed a powerful media if it is directed in a proper way.

2. Cartography is yet another tool for human communication. It is very important to empower young students of the locality in understanding these geographic issues and use cartography to represent their views. By using open source GIS software is it would be very easy to locate leakages in pipelines, map buildings with rain water harvesting systems etc. These maps will further add up in decision making process. Some of the key open source softwares are OSManD, GoogleEarth etcetera which are available of several app stores.

3. Schools and colleges must assign such assignments to their students where they can take up these projects. This would give real sense to environmental education.

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4. Frequent upgradation should be made in terms of LEVEL OF AWARENESS among people of the localities. Students and residents can take up such initiatives to survey the awareness level. This will help in understanding if the social media and mapping tools are being effectively used or not.

5. During the survey, residents gave various suggestions as an attempt to solve this issue like keeping track of every single borewell being dug and charge accordingly, commercialization of rainwater harvesting, restricting of automated systems of pumping water, open areas in the city should be used extensively recharging grounds, making aware people like maids, servants, laborers, etc to efficiently use water and reuse wherever possible, making water systems leakage proof, cutting down the abundant supply of water provided by corporation during monsoon and winter seasons hence making surface water sufficiently available throughout the year. If these suggestions are followed groundwater would not be necessary for the supplementation.

Images of borewell being dug in the study area on 02.02.2015

Reference

1. *Cloke, P. (2004) Practicing human geography.*

2. *Chatterjee. R. Ray. R. (2014)*

3. *Karen, Bakker. (2012) "Privatizing Water: Governance Failure and the World's Urban Water Crisis". 1-5. https://radicalantipode.files.wordpress.com/2012/07/book-review_punjabi-on-bakker.pdf.*

4. *Mighty Things. D. (2005)*

5. *Nalewajek, M, Mącik, R. (2013)*

6. *Pauchauri, R.K. (2014) "90% Pune citizens feel climate change is occurring". http://www.teriin.org/files/EnvSurvey-Pune-PressRelease.pdf*

7. *Kumar Jain, P. (2009)*

8. *Vega-Pacheo. R, (2009)*

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