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Population and Environment Bulletin

Housing, Water and Sanitation (HWS)
Survey of Slums in Mumbai

A Pop-Envis Initiative

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Envis Centre on Population, Human Settlement and Environment (Pop-Envis)
Funded By Ministry of Environment, Forests & Climate Change (MoEF&CC)

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Brief about the HWS Survey

The study is conducted by the Population-Human Settlement-Environment centre (Pop-Envis) of the International Institute for Population Sciences (IIPS). Pop-Envis functions under the agies of the Ministry of Environment, Forest and Climate Change (MoEF&CC).

In Census 2011, a slum has been defined as residential areas where dwellings are unfit for human habitation by reasons of dilapidation, overcrowding, faulty arrangements and design of such buildings, narrowness or faulty arrangement of street, lack of ventilation, light, or sanitation facilities or any combination of these factors which are detrimental to the safety and health. Slums are categorized and defined as follows by Census 2011:

1. **Notified Slums :** All notified areas in a town or city notified as 'Slum' by State, UT Administration or Local Government under any Act including a 'Slum Act'.

2. **Recognized Slums :** All areas recognised as 'Slum' by State, UT Administration or Local Government, Housing and Slum Boards, which may have not been formally notified as slum under any act.

3. **Identified Slums :** A compact area of at least 300 population or about 60-70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities.

All types of slums mentioned above are considered for the survey. The survey has scientifically selected slum households from six wards that belong to two zones of slum concentration in Mumbai metropolitan region i.e. Zone I with higher concentration of slum population and Zone II with lower concentration of slum population. From each zone, three wards are selected systematically and then from each ward, slum pockets are selected randomly from an exhaustive list of slums. We have collected quantitative information (through household survey), as well as qualitative insights i.e. observation, focus group discussion and key informant interview. Sample size is calculated based on 42.6 percent slum population in Mumbai as per Census 2011. Total number of households covered in this survey is 1452. Adult women who are aware of household chores are our respondent. Water samples of slums are collected at source from selected wards and tested in an independent laboratory. The findings represent the overall situation of slum conditions in Mumbai.

The study aims to focus on the living conditions of slums dwellers with reference to housing, drinking water, sanitation, fuel use, hygiene, health, economic status with the following specific objectives:

a) To study the housing conditions of slums.
b) To investigate the drinking water and sanitation facility available for slum dwellers.
c) To analyse the quality of drinking water at source.
d) To understand the cleanliness habits and associated issues of hygiene.
e) To explore the suggestive measures of slum dwellers on the above issues.

Aparajita C
(Editor, Pop-Envis)

INDICATORS

Key Indicators	
Indicators	**Value**
Basic Information	
Number of households	1452
Households in authorized slum[1] (%)	76.6
Religion (%)	
Hindu	82.0
Muslim	12.2
Other	5.8
Caste (%)	
Scheduled Caste	13.4
Scheduled Tribes	6.4
Other Backward Class	43.1
Others	28.2
Caste not mentioned	8.9
Native place (%)	
Maharashtra	50.8
Uttar Pradesh	25.6
Tamilnadu / Karnataka / Andhra Pradesh	8.5
Gujarat	7.4
Others	7.7
Mother tongue (%)	
Marathi	46.8
Hindi	34.4
Gujarati	7.0
Tamil / Telugu / Kanada	5.8
Others	6.0
Can read and write any language (%)	65.9
Duration of stay in the same community (%)	
0 - 5 Years	6.8
5 - 9 Years	12.5
10 - 14 Years	10.5
15 Years and Above	70.2
Economic Condition	
Mean monthly income of household (Rupees)	10445.0
Earning mainly from unorganised sector (%)	71.1
Main occupation (%)	
Service	59.0
Own Buisness	18.5
Industrial Labour	11.7
Housekeeping	4.3
Others	6.5
Household assets (%)	
Mobile	95.7
TV	86.1
Mixer	79.7
Bed	36.0
Refrigerator	29.9
Bike / Scooty	7.0
Sewing Machine	6.9
Computer / Laptop	3.3
Housing	
Pucca house[2] (%)	80.9
Main material of the roof (%)	
Cement	51.5
Asbestos/ Tin	41.3
Plastic	5.9
Others	1.3
Own House (%)	71.2
Mean monthly rental charges (Rupees)	3169.0
Household with 1 room	63.4
Perceived adequacy of natural light and air in house (%)	70.5
Cooking	
Household with separate kitchen (%)	34.1
Type of cooking fuel (%)	
LPG	75.5
Kerosene	47.5
Wood / Crop residue / Dung cake	14.4
Coal / Charcoal	1.7
Mean monthly expenses for cooking fuel (Rupees)	768.9
Drinking Water	
Main source of drinking water	
Pipe Water	65.6
Public tap / Stand pipe	31.2
Well / Handpump / Borewell	1.3
Tanker / Truck	1.0
Others	0.9
Location of water collection point (%)	
At Home	31.2
Near	52.9
Away from home	15.9
Household treating drinking water[3] (%)	33.8
Mean hours of water availability	6.0
Median hours of water availability	3.0
Average time spent for water collection per day (minutes)	96.5
Mean monthly expenses for drinking water (Rupees)	262.3

Key Indicators	
Indicators	**Value**
Quality of Drinking Water[4]	
Parameters	**Desirable** / **Observed[5]**
Turbidity	Max 1 / < 1
Colour	Max 5 / < 1
pH Value	6.5 - 8.5 / 7.28
Odour	Agreeable / Agreeable
Taste	Agreeable / Agreeable
Electrical Conductivity	Not Specified / 130.6
Total Dissolved Solid	Max 500 / 85.0
Total Alkalinity	Max 200 / 23.8
P-Alkalinity	Not Specified / < 1
Total Hardness	Max 200 / 44.1
Chlorides	Max 250 / 9.9
Calcium	Max 75 / 9.7
Magnesium	Max 30 / 4.8
Sulphates	Max 200 / 1.53
Reactive Silica	Not Specified / 20.0
Total Bacterial Count	Not Specified / 10.8
Coliforms	Absent / Absent
Escherichia coli	Absent / Absent
Sanitation	
Use own flush toilet (%)	9.0
Female members of houshold practising open defecation at night (%)	12.5
Disposing child's stool in drain / passage way (%)	57.9
Community toilet	
Mean distance of community toilet (Meters)	58.0
Irregular water supply to community toilet(%)	84.6
Need to carry own bucket of water (%)	82.7
Perceived poor cleanliness (%)	83.5
Community toilet perceived to be unsafe at night (%)	84.6
Average waiting time in morning hours (Minutes)	20.0
Mean monthly expenses for using community toilet (Rupees)	76.0
Reported Morbidity [6]	
Respiratory Diseases (%)	89.6
Digestive Problem (%)	41.6
Aches / Pain (%)	37.8
Eye related Problem (%)	20.7
BP / Heart Problem (%)	12.8
Skin Problem (%)	12.5
Diabetes (%)	9.0

Key Indicators	
Indicators	**Value**
Cleanliness	
Perceiving unclean slum surrounding (%)	43.8
Any member of household with head lice (%)	28.9
Members do not clean hands after latrine with soap (%)	9.5
Members irregularly wash hands before meal (%)	21.5
Clean utensils with mud / ash (%)	4.3
Keep domestic animal inside or very close to house (%)	18.9
Reported problem due to insects / animals (%)	
Mosquito	98.0
Rat	80.4
Coakroach	34.4
Fly	23.5
Bed Bug	5.6
Snake	1.0
Reported pollution problem (%)	
Sound	46.6
Foul smell	72.7
Smoke	32.8

Note:

1. Authorized slum: Household that have legal document related to housing and electricity.
2. Pucca houses: A pucca house is one, which has wall, roof and floor made of permanent and sturdy material.
3. Treating drinking water: Improving the quality of drinking water through boiling or by using alum or filtering through a cloth or water filter etc.
4. Drinking water sample (8 samples) collected from selected wards and tested in a laboratory.
5. Mean value observed in the water samples.
6. Reported by the respondent. The survey asked whether any member of the household suffers from listed morbidity in the past one year.

GRAPHS

Fig 1: Household Assets (%)

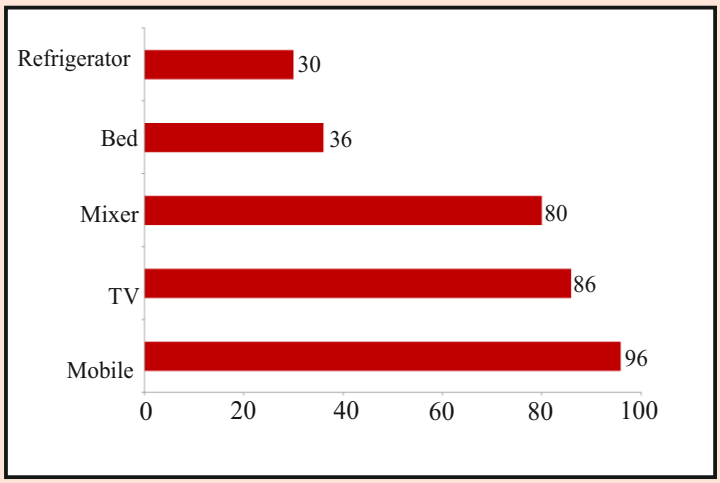


Fig 2: Monthly income & expenditure of households(Rupees)

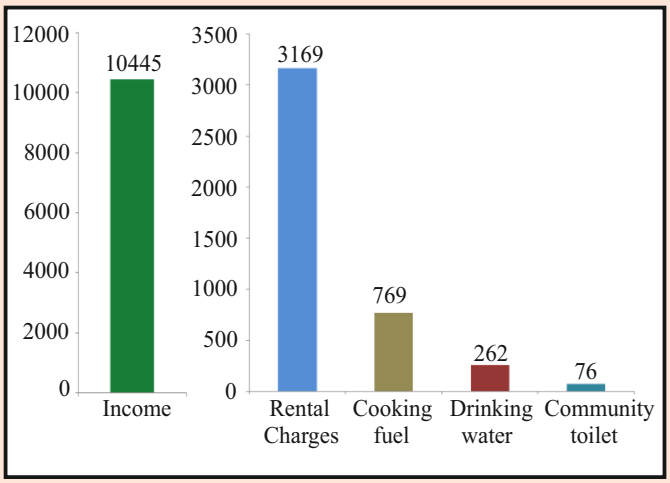


Fig 3:Drinking water and sanitation: Selected indicators(%)

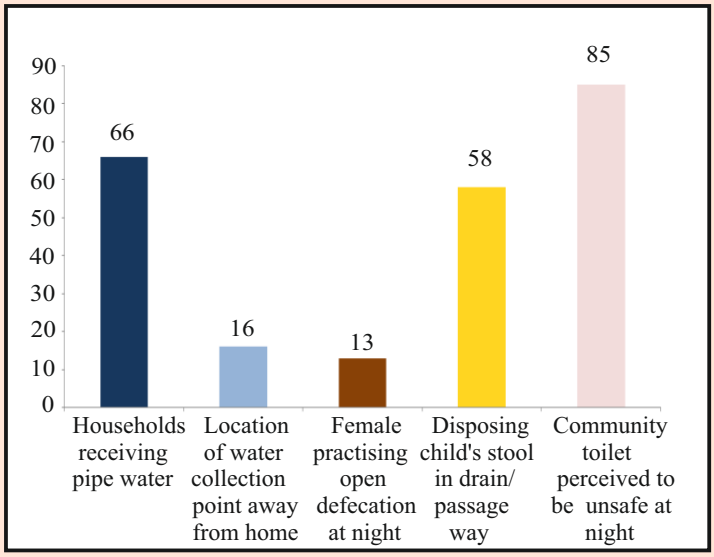


Fig 4: Time spent for drinking water and waiting time for community toilet (minutes)

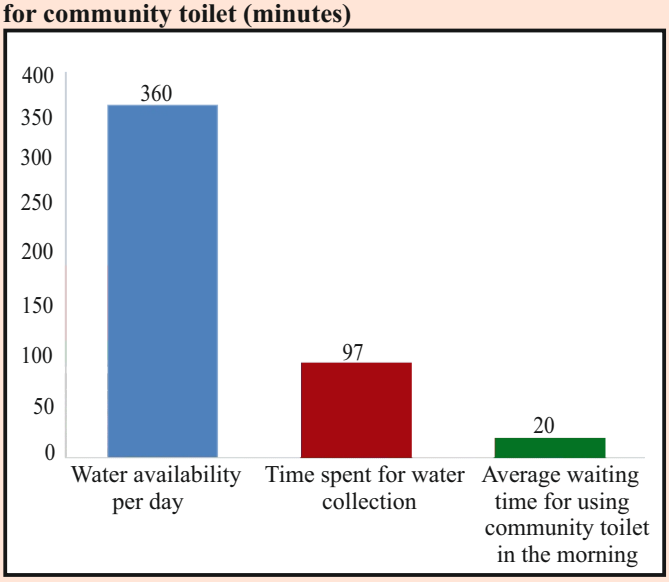


Fig 5: Cooking Fuel Use(%)

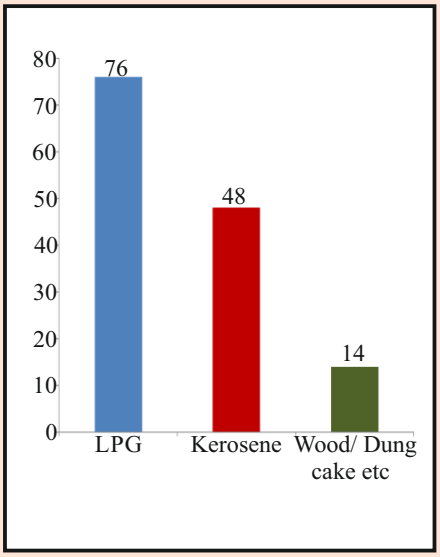


Fig 6: Indicators of community toilet (%)

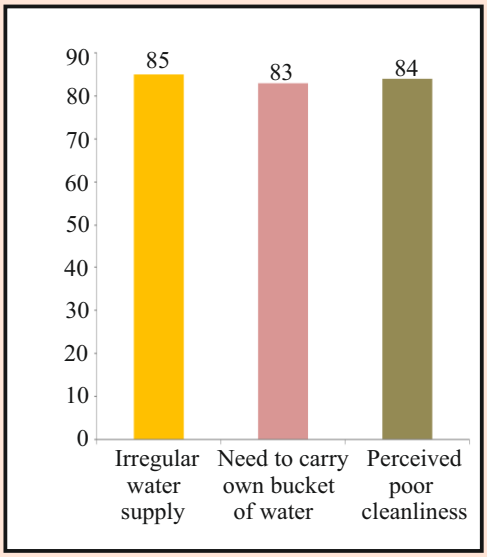
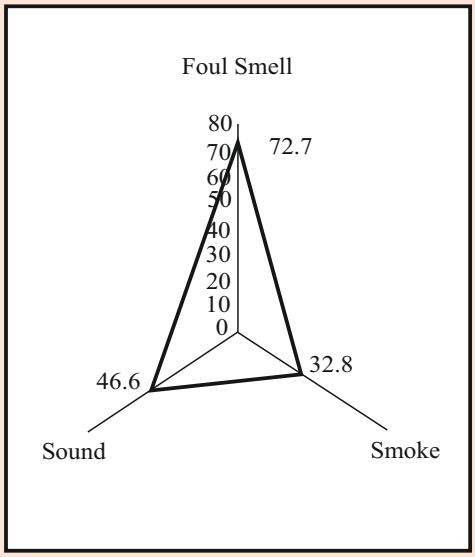


Fig 7: Reported problem of Pollution (%)



Findings based on qualitative data

General Observations

- Houses are small with one or two rooms with few extended rooms made up of tins or asbestos on the top.
- Plastic pipes connecting taps from main water connection to the houses are a common site.
- Live open wire connections clubbed together outside the houses in many slums.
- Garbage dumping bins are present, generally located in the middle or nearby slums which are mostly over flooded with garbage, leading to scattered garbage thrown on the ground nearby causing foul smell and flies.
- Municipality provides garbage clearance services in most of the notified slums but that is irregular and unsatisfactory.
- Unauthorised slums have no proper system of garbage disposal. Most of the slums experience water logging during monsoon.
- Clean fuel i.e. gas is mainly used for cooking. However most households do not have separate kitchen and chimney facility.
- Cold and cough, seasonal flu and diahoreaa are common diseases in the slum areas.
- Most of these slums don't have the facility of public hospital nearby and they go to local quacks for treatment.

Sanitation

- Slums have 2 or 3 public toilets each for men and women separately, generally comprising of 6 to 8 latrines within each toilet.
- Toilets are located in the middle of the slums or at the periphery of the slums. Mostly they are observed as poorly maintained with dirty water and mud outside the toilets and foul smell in and around the place.
- None of the community toilets observed have adequate water facility inside the toilets. People have to carry water with them. It is more troublesome for children and elderly who have to be accompanied by someone to carry water to the toilets.
- In authorised slums, toilets are cleaned by the municipality and since the services are not regular, almost all slums surveyed had a private party to regularly clean the toilet on payment basis ranging from 10 – 20 Rs per household every month.
- Toilets also lack disposal facility, facility for hand wash or bathing. The toilets are generally in poor condition – primarily because of poor care by the users and poor maintenance by the municipality.
- Toilet specially designed for children is lacking. Open defection of small children is very common.
- Community toilets do not have lights, making it difficult for women to go to the toilets at night due to safety issues like theft, lack of privacy, being stalked or attempts of physical abuse.
- Men's toilets are relatively in better condition as compared to women's toilet. Generally they pay 2-3 Rs per use of toilet if some private party is there to provide water and regulate the usage of toilets. But no such system was found in women's toilet.
- Most of the households have a small separation for bathing purpose where they either have a shared tap connection or water stored in big drums for bath.

Drinking Water Facility

- Most of the households have drinking water facility near or close to their house. They fetch water from 50-100 meter away from tap.

- Mostly, households get water once a day for 3-4 hours. Due to stringent timings, women have to store water in plastic drums, pots, jars, and vessels for drinking, cooking, washing and sanitation.
- Many slums are observed sharing of taps from one main connection, providing water to 4-5 households. It is commonly done on payment basis.
- Women in all slums reported strict water timing as the biggest hurdle in constraining them from doing any productive work for earning. They have to be at home in very odd hours for water collection.

Slum Rehabilitation Scheme

- Most residents of the authorised slum know about the slum rehabilitation scheme and have positive hope towards this initiative.
- But they have poor experiences and apprehensions about the slum transition camps as they are not well structured for families to live and especially it affects those who work from home or have business set up at home.
- They fear that the contractor and mediators may take a share of this slum development project and will use low quality materials and may take money for allotments of houses within the building.
- People residing in slums showed concern of unjustified allotment of houses as those with big families find it very difficult to accommodate in single room houses under the slum rehabilitation scheme. They think that allotment should be according to the basis of the household population.

IIPS Vision

"To position IIPS as a premier teaching and research institution in population sciences responsive to emerging national and global needs based on values of inclusion, sensitivity and rights protection."

IIPS Mission

"The Institute will strive to be a centre of excellence on all population and relevant issues through high quality education, teaching and research. This will be achieved by (a) creating competent professionals, (b) generating and disseminating scientific knowledge and evidence, (c) collaboration and exchange of knowledge, and (d) advocacy and awareness.

About ENVIS

Realising the importance of Environmental Information, the Government of India, in December, 1982, established an Environmental Information System (ENVIS) as a plan programme. The focus of ENVIS since inception has been on providing environmental information to decision makers, policy planners, scientists and engineers, research workers, etc. all over the country. Since environment is a broad-ranging, multi-disciplinary subject, a comprehensive information system on environment would necessarlly involve effective participation of concerned institutions/ organisations in the country that are actively engaged in work relating to different subject areas of environment. ENVIS has, therefore, developed itself with a network of such participating institutions/organisations for the programme to be meaningful.ENVIS due to its comprehensive network has been designed as the National Focal Point (NFP) for INFOTERRA, a global environmental information network of the United Nations Environment Programme (UNEP).

Pop-Envis is one of the Envis centres that handles issues related to population, settlement and environment.

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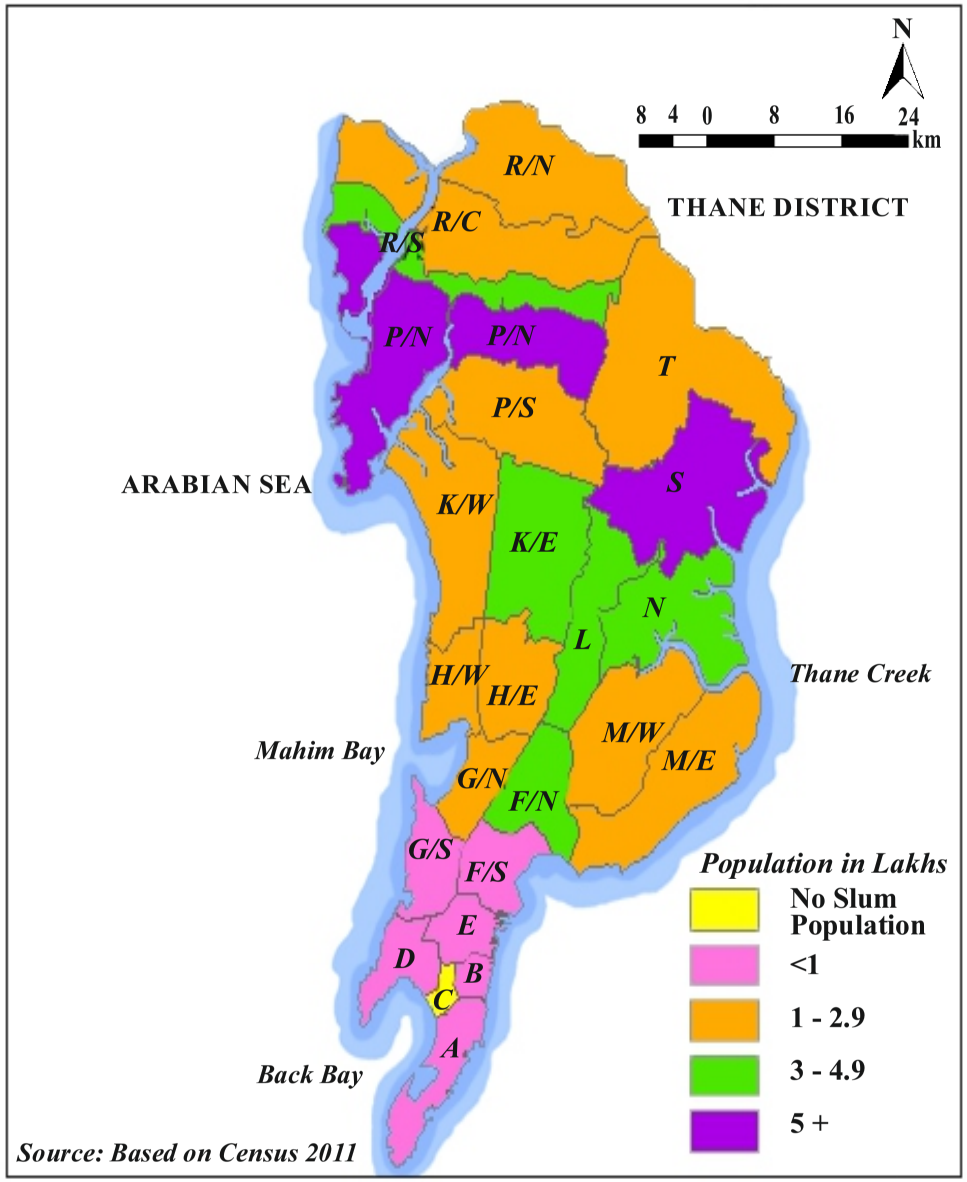
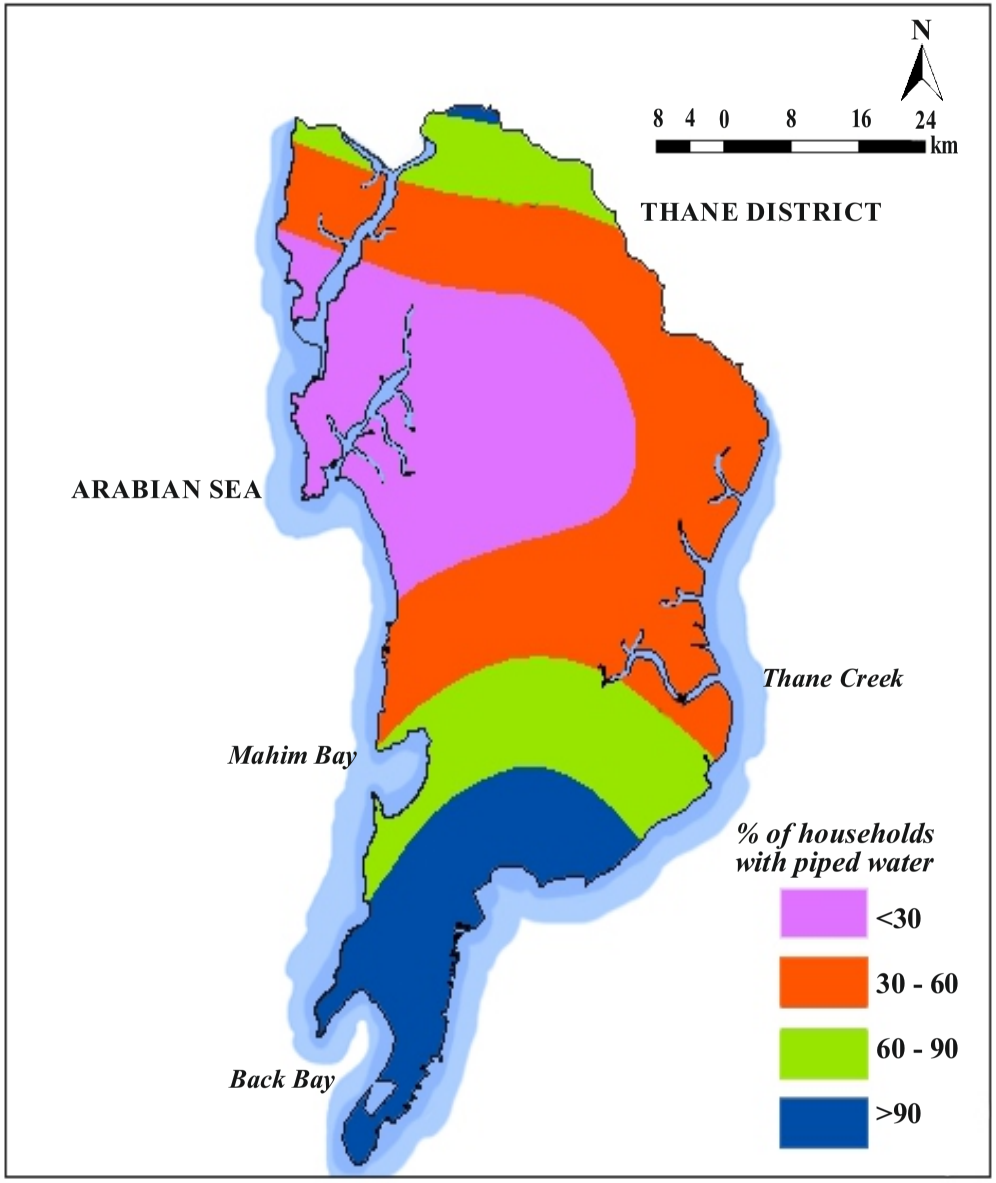
MAPS

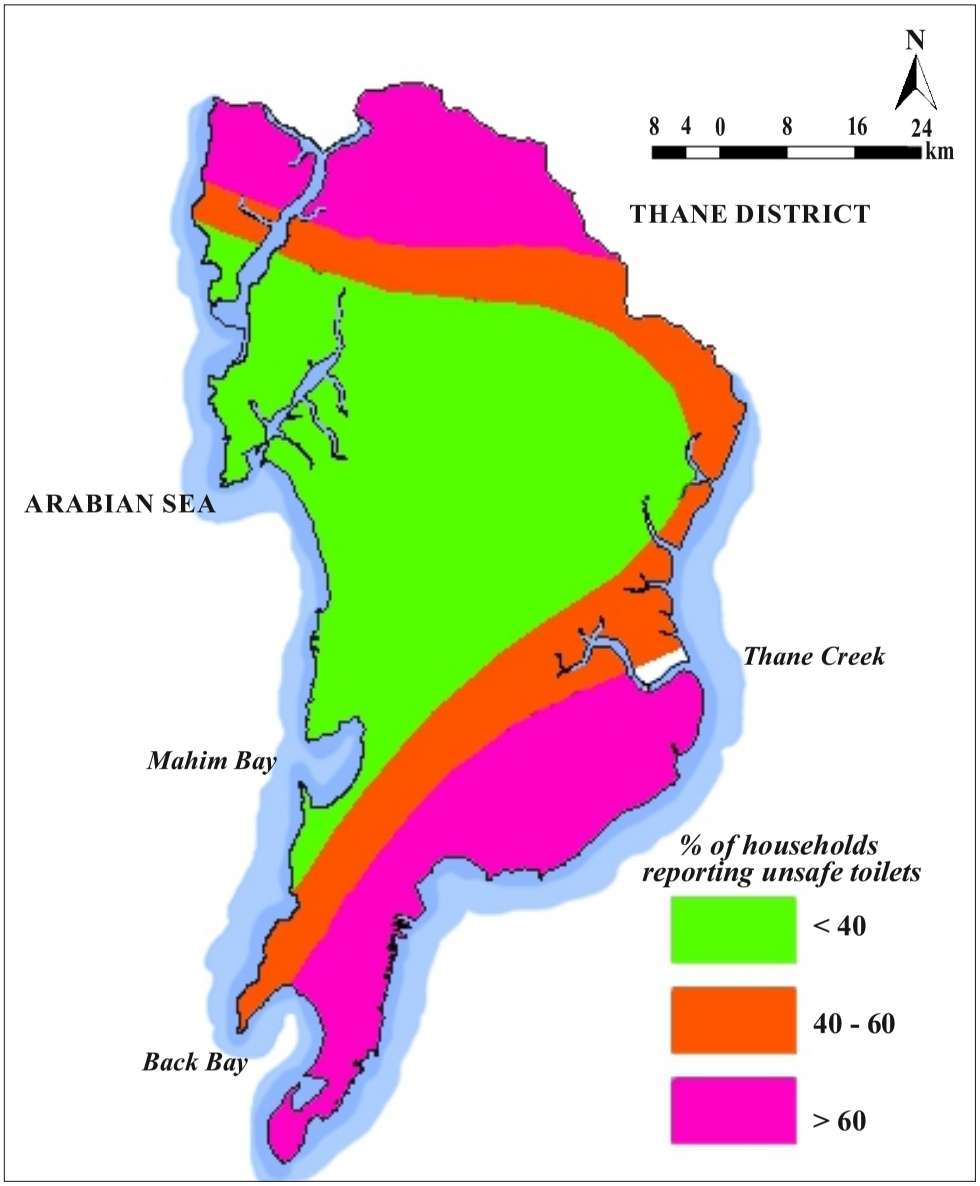
Total Slum Population (2011) by wards



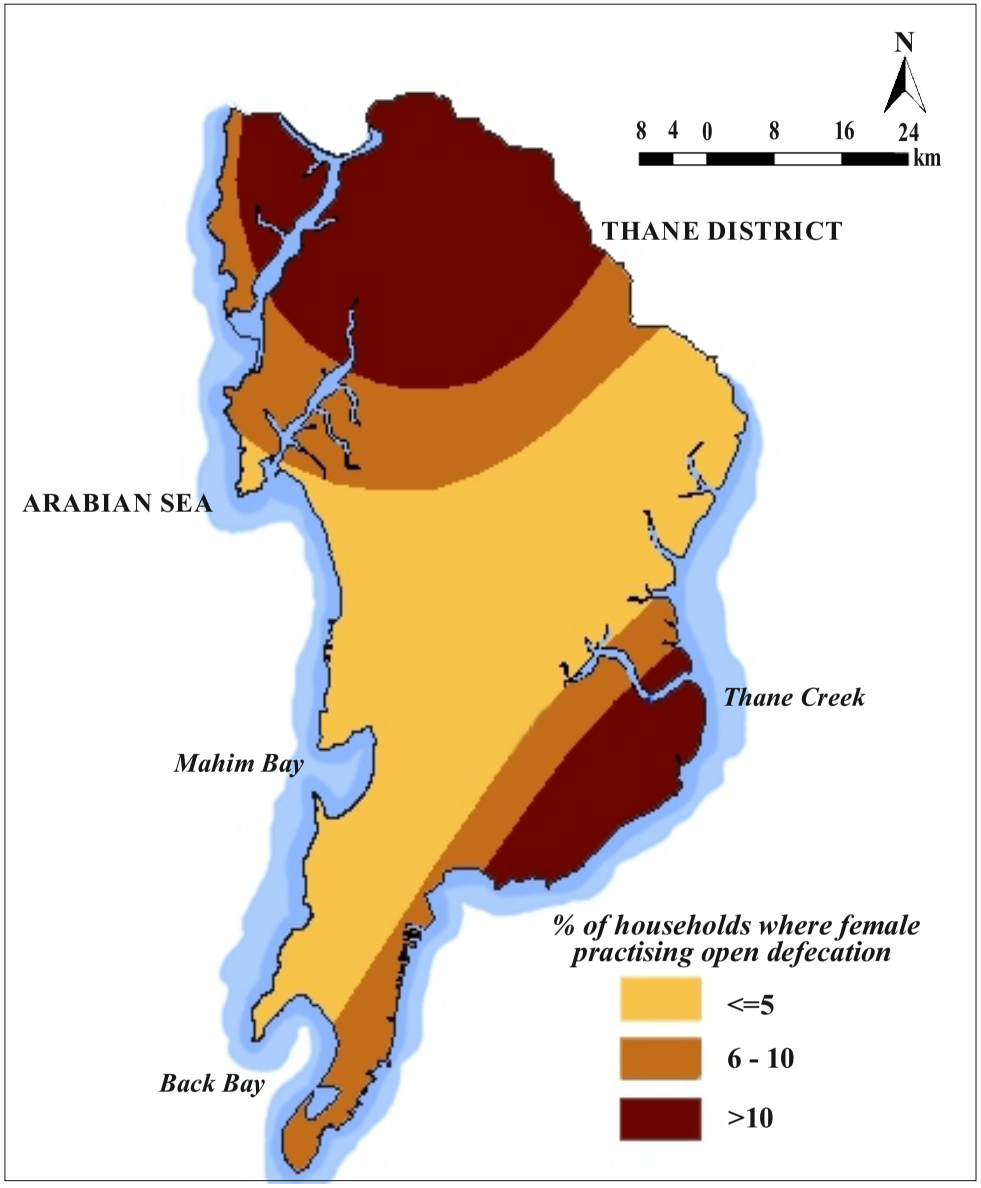
Households having Piped Water



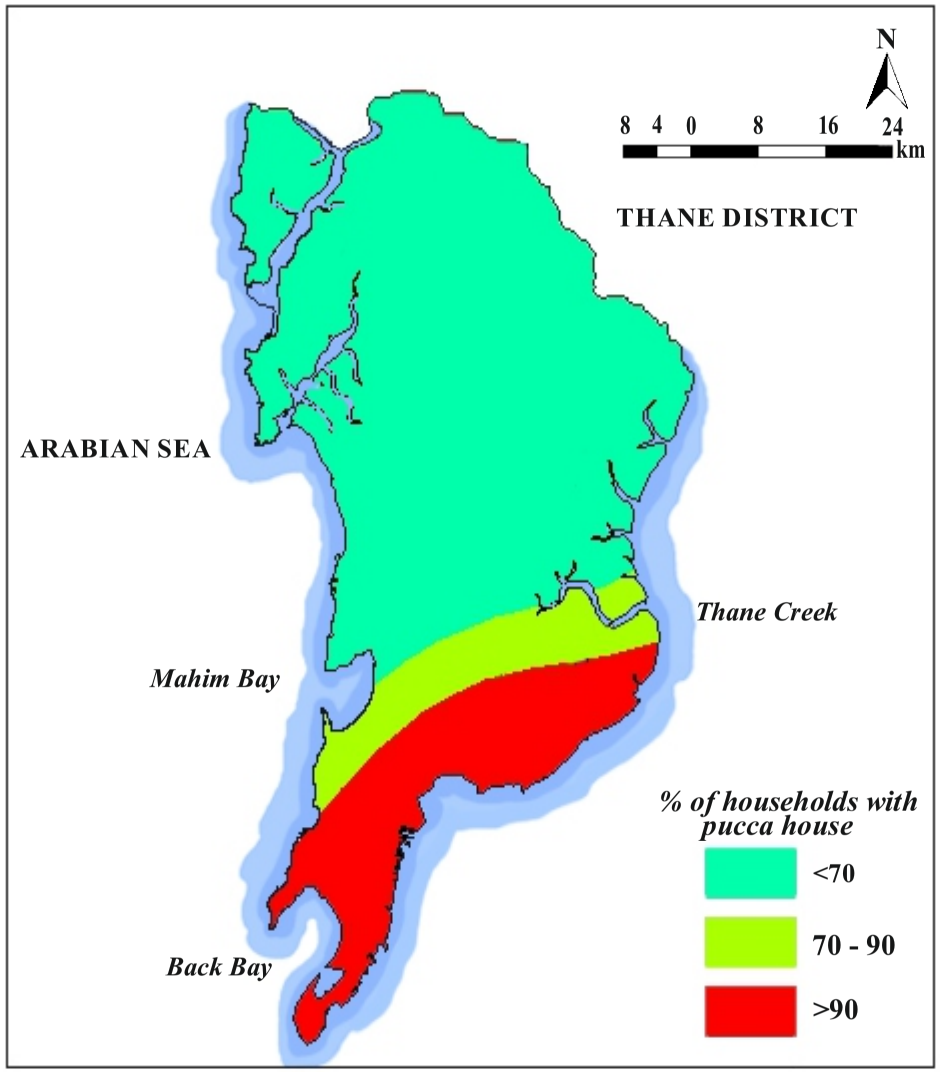
Community Toilets Perceived to be Unsafe at Night for Women



Females Practising Open Defecation at Night

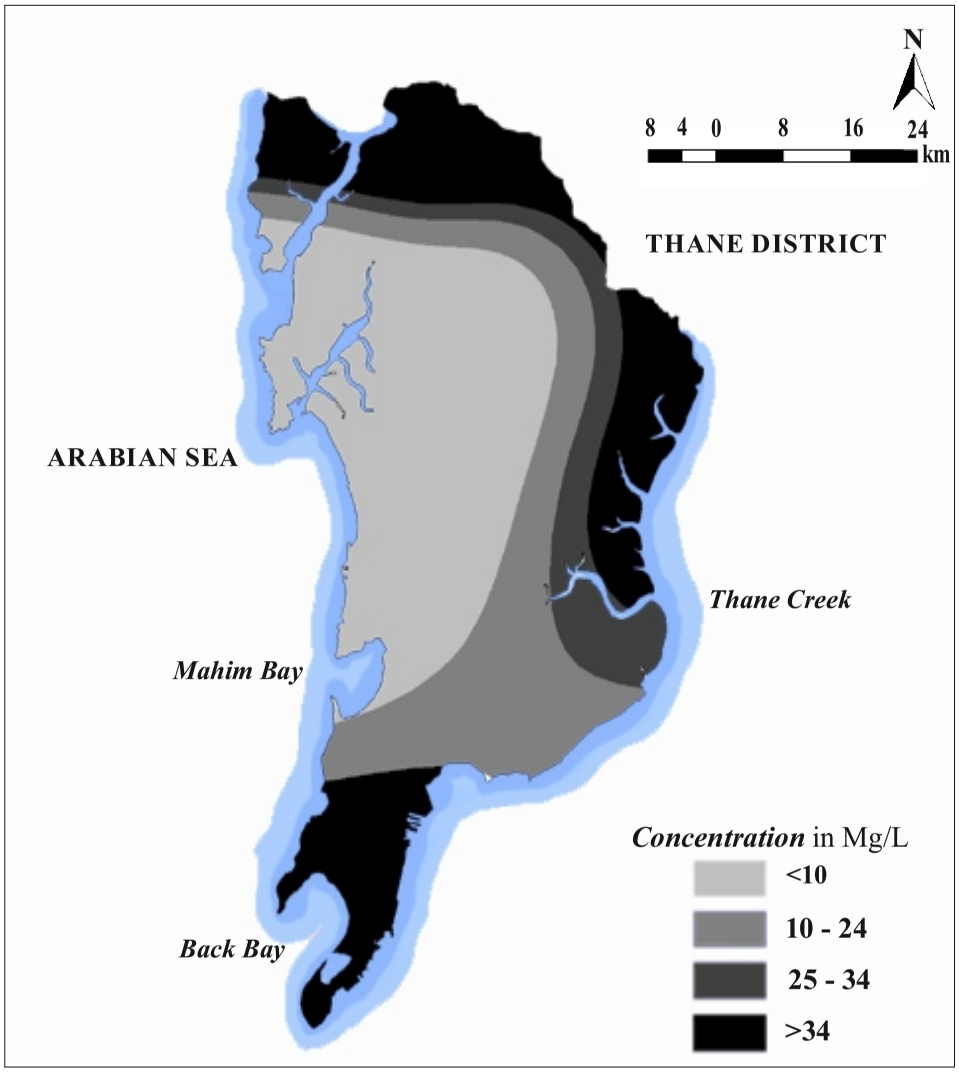


Households with Pucca House



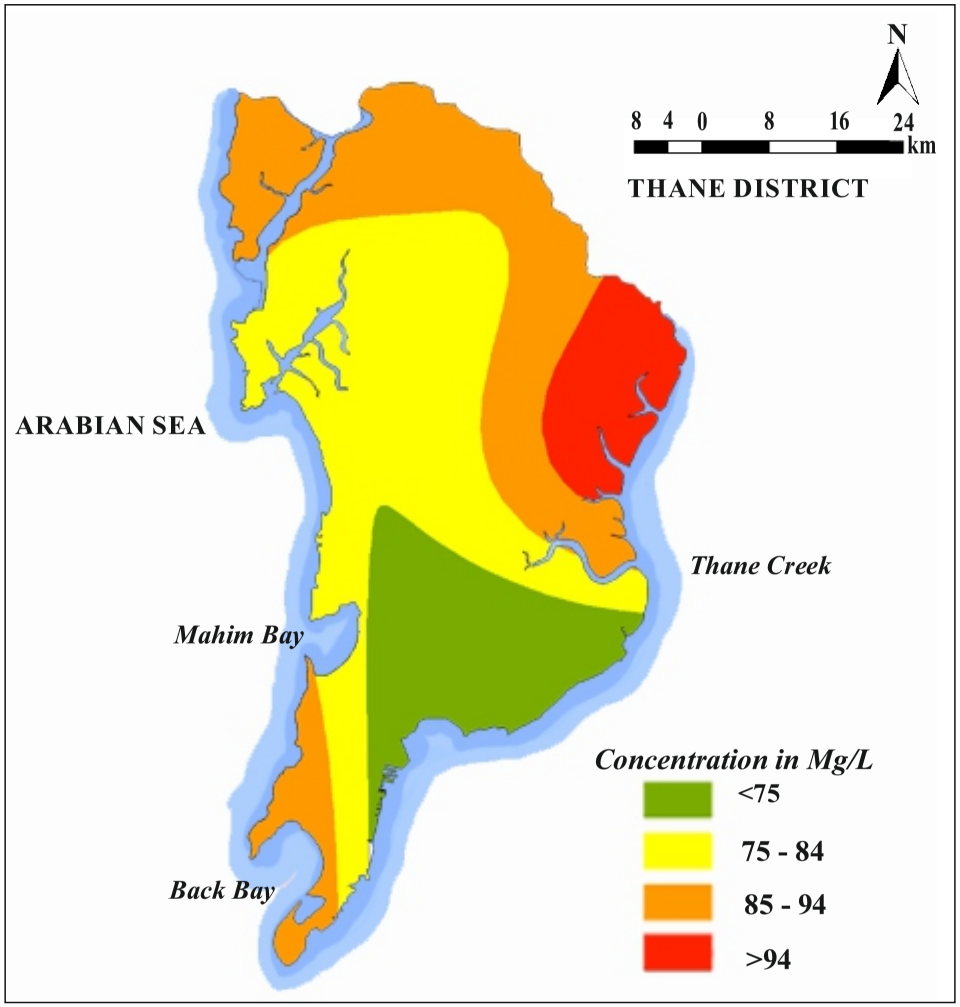
Note: *A* ***pucca house*** *is one, which has wall, roof and floor made of permanent and sturdy material.*

Total Alkalinity Observed in Drinking Water



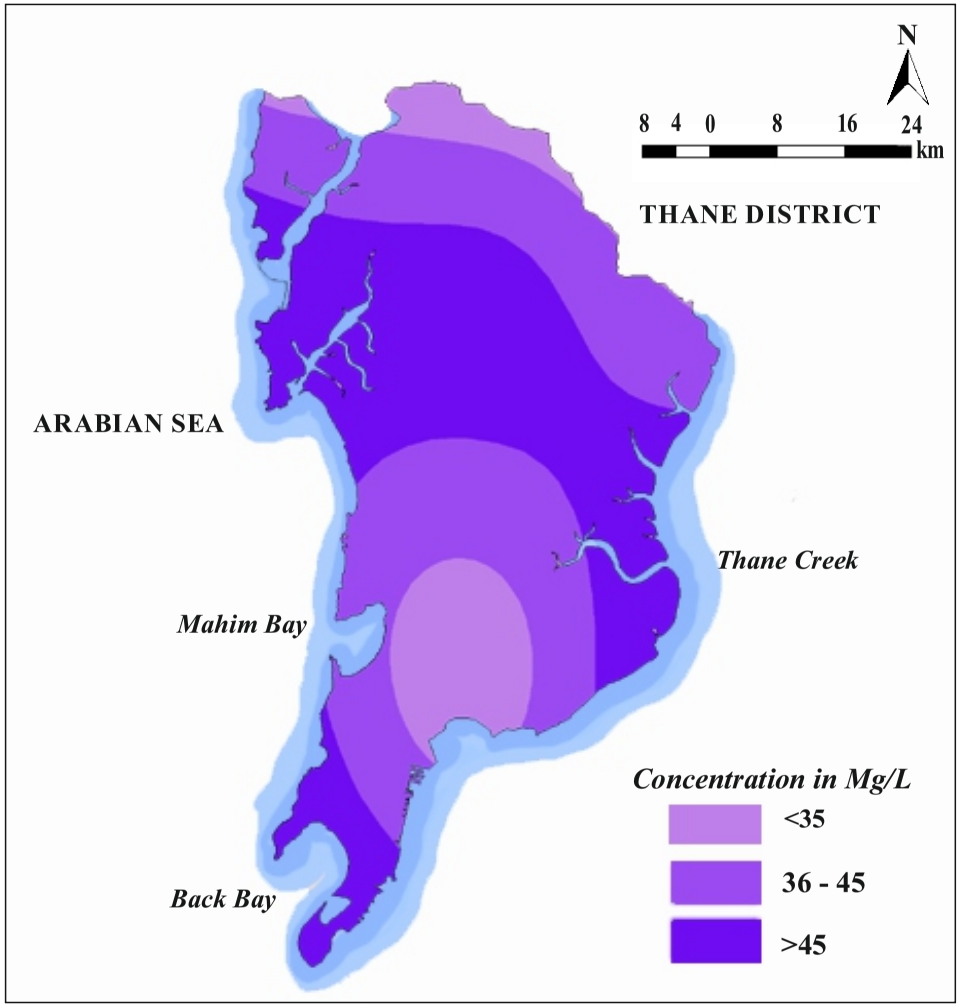
Note: ***Total alkalinity*** *is the total concentration of bases in water. These bases are usually bicarbonates and carbonates, and they act as a buffer system that prevents drastic changes in pH. Alkalis, when dissolved in water, create a bitter taste. Highly alkaline waters, above pH 9.0, can cause drying of the skin.*

Total Dissolved Solids Observed in Drinking Water



Note: ***Total dissolved solids (TDS)*** *used to describe the inorganic salts and small amount of organic matter present in solution of water. Water with TDS less than 500 mg/l is considered potable. The presence of dissolved solids in water may affect its taste. High concentration of TDS in the drinking water causes aesthetic problems (such as undesirable taste, salty and bitter taste). Certain mineral salts may pose health hazards. The most problematics are nitrates, sodium, barium, copper sulphates and fluoride.*

Total Hardness Observed in Drinking Water



Note: *Water hardness is due to the presence of dissolved calcium and magnesium in water.* ***Total Hardness*** *is defined as the sum of calcium and magnesium hardness. Total hardness of water less than 200 mg/l is considered potable. Hardness makes the water taste bitter.*

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