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Gujarat Ecology Society
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THE ORGANISATION

Gujarat Ecology Society (GES) is a non-profit organization registered in January 1995 under the Bombay Public Trust Act and the Societies Registration Act. GES is being managed by prominent individuals from diverse disciplines with a proven commitment to environmental conservation and ecological restoration. GES derives its strength from networking and integrating the inputs by associates and eminent visiting scientists and specialists in distinct disciplines from various agencies in the country in general and Gujarat in particular.

Mission: "To pursue, promote and disseminate knowledge, information and processes that enable conservation, restoration and development of natural resources concerning their ecological sustainability".

- Notified Under Section 35(1)(ii) of the Income-tax Act, 1961.
- Recognized as a Scientific and Industrial Research Organization by the Ministry of Science and Technology, Government of India
- Registered under The Foreign Contribution (Regulation) Act, 1976
- Member of International Union for Conservation of Nature

SOCIETY MEMBERS

SHRI HASMUKH S SHAH, CHAIRMAN
DR. VIREN J PATEL, VICE CHAIRMAN
SHRI L RAJAGOPALAN, BOG MEMBER
SHRI PRADEEP KHANNA, BOG MEMBER
Dr. DATTA MADAMWAR, BOG MEMBER
PROF. ANJANA DESAI, BOG MEMBER
SHRI SAMIR PARIKH, BOG MEMBER
DR. DEEPA J GAVALI, SECRETARY

SHRI VIMAL PATEL, LIFE MEMBER
MRS NILA SHAH, LIFE MEMBER
DR. SHISHIR RAVAL, MEMBER
MRS NEHA SARWATE, MEMBER

THRUST AREAS

- Biodiversity Conservation
- Coastal and Marine Ecology
- Dynamic Ecology
- Restoration Ecology



MULTIDISCIPLINARY TEAM

Creation of multidisciplinary ecological database is considered as one of the main components of all programmes of GES. The Society has, on its rolls, a team of highly qualified and experienced professionals/scientists, on subjects like

- Environmental Sciences
- Marine Sciences
- Wildlife science
- Biostatistics
- Botany
- Zoology
- Geology
- Hydrogeology
- Aquatic sciences



CURRENT YEAR PROJECTS

The beginning of the financial year 2020-21 was marred with a lockdown period and COVID19 pandemic resulting in low activity as compared to the previous years.

COASTAL AND MARINE ECOLOGY

Project 1: Marine Environmental Monitoring around Birla Copper installations in the inshore waters of Gulf of Khambhat, off Dahej plant

Gujarat Ecology Society has been involved in the marine environmental monitoring around Birla Copper installations since 2000 every two years. As part of the routine monitoring programme the study was carried out. The research findings indicate an increase in salinity in the Gulf mouth attributed to the reduced flow of freshwater from the River Narmada. Other environmental variables were within range.



BIODIVERSITY CONSERVATION

Project 2: Formation of Biodiversity Management Committee in Vadodara district

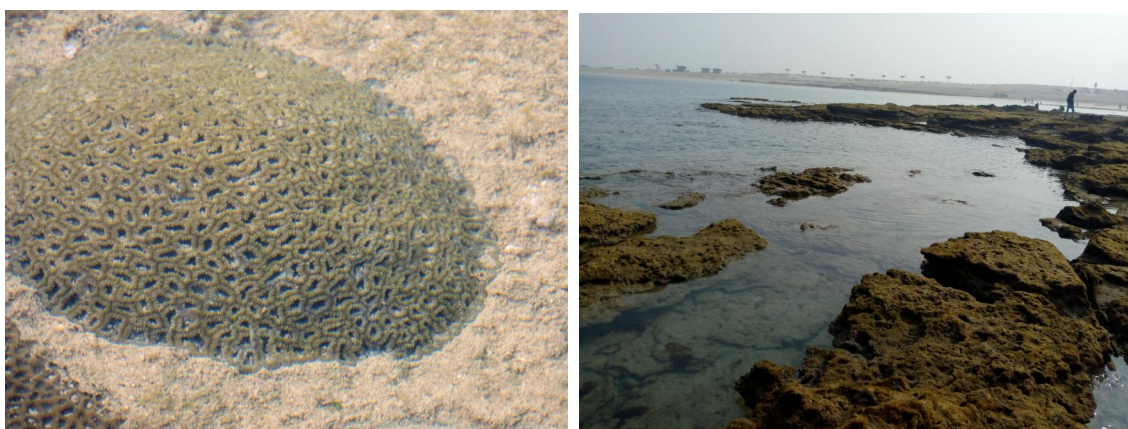
India as a signatory of the Convention of Biodiversity (CBD) and has a major task of documentation of biodiversity at the village level and traditional knowledge. As a part of this exercise, Gujarat Biodiversity Board is implementing the National Biological Diversity Act of India (2002), by forming Biodiversity Management Committees (BMCs) and People's Biodiversity Register (PBR). Gujarat Ecology Society is impaneled with Gujarat Biodiversity Board, Gandhinagar as a technical support group (TSG) for Vadodara District. The training was imparted to the

Biodiversity Management Committee on the National Biodiversity Act and their roles.



Project 3: Monitoring and assessment of Corals of Shivrajpur under the Blue Flag project

Gujarat Ecology Society in the past had documented the presence of corals in Shivrajpur beach and simultaneously worked on the ecology of the corals in the area. GES prepared the status report of the corals in Shivrajpur beach for the purpose of obtaining clearance under the Blue beach programme and is the first beach in Gujarat State to be declared by Blue beach.



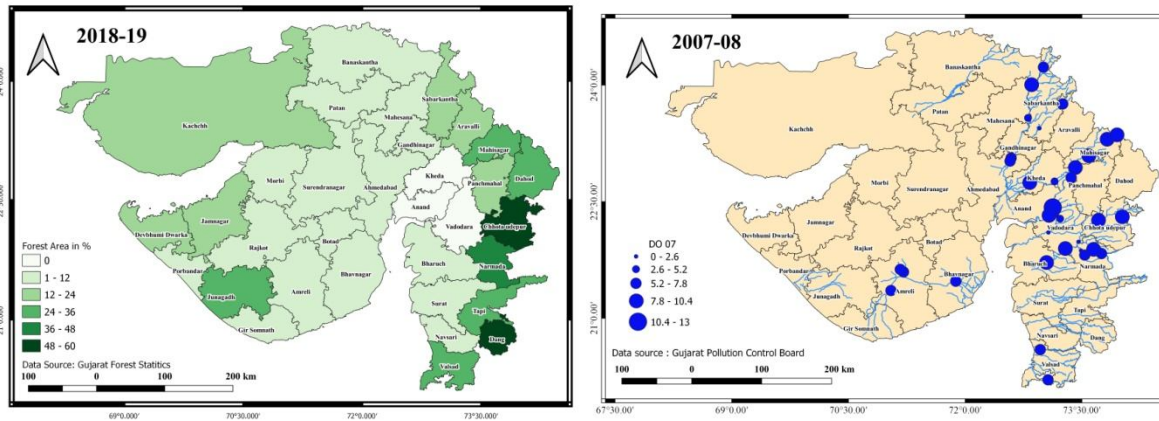
DYNAMIC ECOLOGY

Project 4: Preparation of State Environment Atlas

The State Environment Atlas is a compilation of environment-related information in the form of maps, texts, and statistical data. These Atlases prove handy for the policy and decision-makers while working out on the management issues to understand the dynamics of the changes taking place in different sectors. Gujarat Ecology

Commission, Gandhinagar has awarded the present work to prepare an easy and usable atlas comprising important variables to GES.

GIS maps were prepared for 118 variables and each map comprised data for 33 districts. Important ones include pollution levels across different cities in Gujarat, calamity vulnerable maps like drought, floods, or cyclones.



Project 5: Source-To-Sink Spatio-Temporal Variability in Sediment Fluxes and Their Control on Coastal Sediment Dispersal Systems in Gujarat

This is a Ministry of Earth Sciences, New Delhi, sponsored project. There are five institutions involved in the project viz., M S University of Baroda (lead institution); Indian Institute of Seismological Research, Gandhinagar; M G Science Institute, Ahmedabad; Gujarat Institute of Desert Ecology, Bhuj and Gujarat Ecology Society. The broad objectives of the project include,

1. To understand Source-to-Sink sediment transport in the two river systems of different climatic regimes.
2. To carry out validation of conventional palaeo-environmental proxies in known climate regimes.
3. To understand ecological linkages with sedimentation patterns.



Gujarat Ecology Society has undertaken the component of study of ecological aspects of Dadhar river basin.

ACTIVITIES

PAPERS PUBLISHED

1. Nisheeth C. Desai ,Nipul B. Kukadiya, Jignasu P. Mehta¹, Dinesh R. Godhani, Jayendra Lakhmapurkar and Bhart Dave 2020. Elucidation of tidal spatial-temporal variation of physico-chemical and nutrient parameters of estuarine water at South Gujarat . *World Scientific News. An International Scientific Journal*.Pp: 79-102
2. Panseriya H Z, H B Gosai, Amita O Sankhwal, B K Sachaniya, Deepa J Gavali and Bharti P Dave (2020). Distribution, speciation and risk assessment of heavy metals: Geochemical exploration of gulf of Kachchh, Gujarat, India. *Environmental Earth Sciences*: 79-213. **(IF: 2.784)**
3. Lakmapurkar, J., Gavali, D., Kumari, S., Panseriya, H.Z. and Rathod, J., 2020. Bio-accumulation of heavy metals in muscle tissues of a few benthic species in South Gujarat, India. *J. Mar. Biol. Assoc. India*, 62(2), pp.22-30. **(NAAS IF: 5.5)**
4. Desai, N.C., Kukadiya, N.B., Mehta, J.P., Godhani, D.R., Lakhmapurkar, J. and Dave, B.P., 2021. Assessments of Heavy Metals and Contamination Indices in Surface Sediments of Selected South Gujarat Estuaries at the West Coast of India. *Environment and Ecology*, 39(1A), pp.256-266. **(NAAS IF: 5.25)**

Online workshop attended

Due to COVID 19 and travel restrictions online workshops were attended.

1. Dr. Deepa Gavali and Dr. Sonia Thadani. Webinar on "*Climate resilient cities*" organized by Institute of Climate change research, MS University, Baroda on 5th June 2020.
2. Dr. Deepa Gavali and Dr. Sonia Thadani. Webinar on "*Rejuvenating climate actions: Think global act local*", organized by Institute of Climate change research, MS University, Baroda on 5th June 2020.
3. Dr. Jayendra Lakhmapurkar attended a online Orientation workshop of National Children's Science Congress 2020 programme on 23rd July 2020
4. Deepa Gavali and Dr. Sonia Thadani. Webinar on "*Climate change and COVID - 19*", organized by Gujarat Energy Development agency on 26th June 2020.

5. Ms. Priyal Gandhi and Mr. Anuva Shah. Online training on “*Satellite Photogrammetry and its application*” organized by IIRS, Dehradun from 29th June to 3rd July 2020.
6. Dr. Deepa Gavali. Webinar on “*Role of cultural and natural heritage in tourism based economy*” organized by IUCN, India/ 1st July 2020.
7. Deepa Gavali and Dr. Sonia Thadani. Webinar on “*Challenges of identifying geographic trends in Covid - 19 cases and effect of Covid -19 lockdown on air quality in India*”, organized by Department of Geography, MS University, Baroda on 10th July 2020.
8. Dr. Deepa Gavali and Dr. Sonia Thadani. Participated in e-faculty development program cum training workshop on “*Environment, water and Disaster Risk Reduction*”, organized by National Institute of Disaster Management, New Delhi from 13th - 16th July 2020.
9. Dr. Deepa Gavali. CMCC webinar- “*Urban climate and heat Islands*” organized by Cento Euro- Meditterreno, EU on 16th July 2020.
10. Dr. Deepa Gavali attended the webinar on 'Informing catchment management decisions based on ecosystem services modeling in the Himalayas' organized by India- UK centre on 26th July 2020.
11. Dr. Deepa Gavali attended online Webinar on “*Conserving Mountain Biodiversity: Addressing Climate Change, Disaster Risk Reduction through Nature Based Solutions*” organized by Ministry of Environment Forests and Climate Change (MoEFCC) in Collaboration with National Institute of Disaster Management (NIDM), Ministry of Home Affairs & International Union for Conservation of Nature (IUCN) on 11th December, 2020.

INVOLVEMENT AS AN EXPERT

1. Dr. Deepa Gavali was invited to deliver talk on Urban Forests: Pollution Mitigation & Ecosystem Services by CERC-ENVIS on 14th July 2020.
2. Dr. Deepa Gavali was invited to deliver talk on “*Landscape changes and disease outbreak*” by GIDM, Gandhinagar as part of capacity building for the officers on 17th September 2020.
3. Dr. Deepa Gavali was invited to deliver talk on “*Life in water –How we can safe it*” by Srushti Sarjan School on 11th November 2020.
4. Dr. Jayendra Lakhmapurkar was invited as a judge for selection of project at District Level for National Children's Science Congress Regional Community Science Centre on 2nd December 2020.

NEXT YEAR PLAN

RESEARCH PROGRAMMES

- Restoration of grasslands for sustainable livelihood in Kachchh region.
- Improving the livelihood of the locals through value addition of important medicinal plants.

COVERAGE IN MEDIA

Gujarat Samachar 2.5.2020

પર્યાવરણ એમએસ યુનિવર્સિટીના ઝૂલોજી સહિત અન્ય શૈક્ષણિક સંસ્થાઓને કેટા સોંપાયો : 'કેડી' દ્વારા અનોખો પ્રયાસ

લોકડાઉન દરમિયાન શહેરી પક્ષીઓ ઉપર હાથ ધરાશે વડોદરાનો સૌથી મોટો ઓનલાઈન સર્વે

નવગુજરાત સમચ > વડોદરા

પક્ષીઓની ઓળખ માટે ફોટા પણ રખાયા છે

કોરોના વાયરસના સંક્રમણને કારણે એક મહિનાથી પણ વધુ સમયથી ચાલી રહેલા લોકડાઉનને કારણે પર્યાવરણ ઉપર તેની સાચા અર્થમાં સકારાત્મક અસર થઈ છે. વડોદરાના ઘણા વિસ્તારોમાં દેખાવો કે પક્ષીઓનો ક્લરવ સંભળાવવા, આ પરિવર્તન વડોદરાવાસીઓએ સોશિયલ મીડિયામાં ઠગલા બંધ પોસ્ટ દ્વારા વર્ણવ્યું છે.

આજે જ્યારે માનવ પોતે જ બનાવેલા પિજરામાં જાતેજ કેદ છે અને પક્ષીઓ કોઈ બીક વગર ઉડી રહ્યા છે ત્યારે બાબકોના પર્યાવરણ શિક્ષણ માટે સક્રિય એવી કિડ્સ ફોર એન્વિરોન્મેન્ટલ ડેવલપમેન્ટ ઈનિશિયેટીવઝ (કેડી) દ્વારા વડોદરાનો લોકડાઉન દરમિયાન ઘનાર સૌથી મોટા અર્બન બર્ડ્સ એટલે કે શહેરી પક્ષીઓના ઓનલાઈન સર્વેનું આયોજન કર્યું છે.

શહેરી પક્ષીઓ માટેનો આ અતિ

સર્વે ફોર્મ બનાવવું પણ એક જટિલ કાર્ય હતું તેમ હિતાર્થ પંડ્યાએ જણાવ્યું હતું. ભલે આ સર્વેના અંતમાં આવનારા આંકડાનો ઉપયોગ વૈજ્ઞાનિક વિષયોમાં થાય પરંતુ ખે સર્વેમાં પૂછેલા પ્રશ્નો અટપટા કે અઘરા હોય તો સામાન્ય માણસો તેનો સારો જવાબ ના આપી શકે અથવા તો ખોટો જવાબ આપી શકે. પક્ષીઓના વિશેષજ્ઞો જેમ કે પ્રોફેસર ગીતા પડતે, ડો ટીપા ગવળી જે ગુજરાત ઈકોલોજી સોસાયટીના એક્ટિંગ ડિરેક્ટર છે. સામાન્ય માણસને પક્ષીઓની ઓળખાણ કરવામાં તકલીફ ના પડે તે માટે ફોર્મમાં વિવિધ પક્ષીઓના ફોટોગ્રાફ્સ પણ રાખવામાં આવ્યા છે. એમ એસ યુનિવર્સિટી, નવરચના યુનિવર્સિટી તેમજ પર્યાવરણ ઉપર કામ કરતી સંસ્થાઓ જેમ કે ગુજરાત ઈકોલોજી સોસાયટી, ઓબ્જે નેચરલ હિસ્ટોરી સોસાયટી તેમજ અન્ય સંસ્થાઓને મોકલવામાં આવશે જેથી કરીને તેનો ઉપયોગ શહેરી પક્ષીઓની સંખ્યાને લઈને થતી રીસર્ચમાં થઈ શકે.

મહત્વ સર્વે તારીખ ૧લી મે થી શરૂ થશે અને ૭મી મેના રોજ પૂરો થશે. આ સર્વે માટેનું ફોર્મ સોશિયલ મીડિયા તેમજ વોટ્સએપ થકી શહેરીજનોને પહોંચાડવામાં આવશે.

આ વિષે વધુ વિગત આપતા કેડીના ફાઉન્ડર હિતાર્થ પંડ્યાએ જણાવ્યું હતું

કે, લોકડાઉનના લગભગ દસ દિવસ બાદ પક્ષીઓનું વર્તન તદ્દન બદલાતું જોવા મળ્યું હતું. અમુક પક્ષીઓ જેવાકે સિલ્વર બિલ્, કિંગ ફિશર અને રોઝ રીન્ગડ પેરાકીટ જે સામાન્ય સંજોગોમાં માછસોથી દૂર રહેવાનું પસંદ કરે છે તે કોઈ પણ દર વગર ઘરના કમ્પાઉન્ડમાં

કે સોસાઈટીના ગાર્ડનમાં વધુ સંખ્યામાં જોવા મળવા લાગ્યા હતા. એમ એસ યુનિવર્સિટીના ઝૂલોજી ડીપાર્ટમેન્ટના પ્રોફેસર ગીતા પડતેનો સંપર્ક કરતા તેમણે જણાવ્યું કે, જો અર્બન બર્ડ્સનો સર્વે થાય તો આ એક સીમા ચિન્હ થતના બનશે કારણકે દર વર્ષે જ્યારે પક્ષીઓનો માળા બનાવવાનો સમય આવે ત્યારેજ યુનિવર્સિટીનું વેકેશન પડી જાય અને વિદ્યાર્થીઓ પોતાના ઘરે જતા રહે છે અને તેના લીધે જ આવી સર્વે થઈ નથી શકતો. આ સર્વે માં ભાગ લેશે તો એક અત્યંત મહત્વનો આંકડો મળી શકે છે. સાહજિક રીતે તેઓ પોતાની આસપાસના પક્ષીઓને નજીકથી નિહાળશે તેના વિષે વધુ જાણશે, તે પક્ષીઓને માળા બનાવવા માટે કેવા વાતાવરણ તેમજ કઈ રીતના ઝાડ, તેમજ છોડની જરૂરિયાત રહે છે તે પણ જાણશે. અને આજ સમાજ વડોદરાવાસીઓને પક્ષીઓને રહેઠાણ પુરું પાડવા માટેના પગલા લેવામાં મદદરૂપ થશે.

Times of India (4.5.2020)

Times of India (28.7.2020)

Citizens to conduct online survey on urban birds

Tushar.Tere@timesgroup.com

Vadodara: With humans indoors for over a month, sightings of birds in urban areas have gone up in the city. In a bid to understand their habitat, a city-based environmental organization has initiated an online survey of birds' nesting. It is a first-of-its-kind survey where citizens, especially schoolchildren, will upload information about the nests in their areas.

"Due to lockdown, people are at home and have all the time to observe, click photos of birds and participate in our online survey. The participants have to simply observe their surroundings and see if they can locate nests of birds. If they spot any, they have to fill up our survey form," said Hitarth Pandya, who runs Kids for Environmental Development Initiative (KEDI).

"And those participating in the survey should observe the surroundings from their home. No one should flout lockdown rules," Pandya added. The survey form has names and photos of nearly 30



Citizens will have to upload information about bird nests

urban birds, including Indian silverbill, magpie robin, tailor bird, laughing dove, house sparrow, brahminy starling, green bee-eater, rose-ringed parakeet and many others.

KEDI took help of Dr Deepa Gavali, acting director of Gujarat Ecology Society, and Dr Jitendra Gavali, director of Community Science Centre, for initiating the study.

"Once the survey is done, we will analyse the results. The idea is to find out presence of urban birds and which locality has which species of them. The study will help experts in future," Pandya said.

Heavy metal contamination found in Gulf of Kutch

Paul.John@timesgroup.com

Ahmedabad: Environmental scientists have warned of heavy metal contamination in the Gulf of Kutch, after they found accumulation of toxic metals like chromium, copper, nickel, lead and traces of mercury, in a first comprehensive geochemical study of the Gulf's sediments to assess the heavy metal concentrations.

The scientists were worried of copper contamination, sediment quality and their ecological risk in the coastal sediments. Samples were taken from 10 stations spread across a 150km stretch.

According to a study published in the journal of Environmental Earth Sciences in April this year, metal presence in the sediments was measured in micrograms per gram. Copper ranged between 17.83 micrograms to 61.41 micrograms, nickel ranged from 11.31 micrograms to 37.43 micrograms, chromium ranged from 32.26 to 67.44 micrograms, cadmium ranged between 0.01 and 0.3 micrograms while lead was found to be between 8 and 16.4 micrograms at these 10 sampling stations.

The locations considered for the study were Okha, Gopi, Pindara, Dhani, Salaya, two places in Narara, Sikka, Rozi, and Jodiya. The study observed that the presence of heavy metals in tissues of aquatic organisms like fish, planktons, molluscs and algae inhabiting coastal areas has also been reported. Bioaccumulation of heavy metals in marine organisms contributes to genetic damage by inducing double-strand



DEADLY TRIO
CHROMIUM: Chromium was found at Dhani sediments at 67.4 microgram per gram ($\mu\text{g/g}$), followed by Okha 54.8 $\mu\text{g/g}$ and Narara 61.6 $\mu\text{g/g}$. Least concentration was recorded at Salaya 32.3 $\mu\text{g/g}$. Elevated concentration of chromium was due to the effluent released by the large- and medium-scale industries such as metallurgical, agriculture and chemicals situated along the Gulf of Kutch.

COPPER: Copper was a major contributor of heavy metal contamination at most of the 10 sites. Maximum concentration of copper contamination recorded was at Pindara 61.4 $\mu\text{g/g}$, followed by Rozi 59.8 $\mu\text{g/g}$ and Salaya 53.1 $\mu\text{g/g}$. Possible reason for similar pattern of Cu concentration could be domestic waste released at the above sites. Moreover, almost all the sites are exposed to domestic waste and inorganic chemical wastes with the presence of old ports.

CADMIUM: Cadmium contamination at Okha could be due to heavy domestic as well as minimal industrial wastes. At Dhani and Salaya, it could be due to discharge of paint and fuel for boat, transportation of metalloids components, agricultural and domestic wastes of Salaya city.

breaks in DNA and inhibits critical proteins in DNA repair pathways

The study involved department of life sciences, Maharaja Krishnakumarsinhji Bhavnagar University, Bhavnagar, department of biosciences, school of sciences, Indrashil University, Rajpur and Gujarat Ecology Society, Vadodara.

The study found maximum concentration of heavy metals at Pindara, followed by Jodiya and Rozi. Least concentration was detected at Sikka.

The researchers Hareesh Panseriya, Haren B Gosai, Amita Sankhwal, Bhumi Sachaniya and Deepa Gavali po-

inted out that the origin of these heavy metal contaminants were from the central part of gulf which includes about 37 large- and medium scale industries having plants such as cement, fertilizers, woollen cloth, petrochemicals, oil refineries, solvents, bauxite, soda-ash and caustic soda.

A similar scenario was also observed at Okha in the western part of the gulf where metallurgical, agro-based industries, mineral-based and chemical industries were located. "Land mining activities near Pindara are a major influencing factor for sediment contamination," the study claimed.

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TIMES CITY

Flouride-laced groundwater threatens Gen-next Barodians

Will Pose Health Risks Such As Liver And Kidney Dysfunction

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Vadodara: Barodians are staring at a parched future, caught between municipal corporation's turbid tap water and the highly unhealthy groundwater.

While the tap water is rendered unfit for consumption owing to leakages and other pipeline issues, citizens face a bigger health hazard from the underground water table, claims a study done by Anuva Saha and Priyal Gandhi, students of MS University's environmental science department, with support of Gujarat Ecology Society (GES).

The study reveals that in the last five years, fluoride concentration in Banyan City's groundwater has exponentially increased and reached a level now which is way above the prescribed limit by the Bureau of Indian Standards.

HEALTH HAZARD

The researchers collected samples of groundwater through geographic information system (GIS) mapping of different administrative wards of Vadodara Municipal Corporation. These samples suggest that the fluoride concentration in western, northern, southern and central parts of the city has raised by an alarming level in five years.

The revealed that the high fluoride concentration will pose several health risks such as fluorosis, ligament calcification, developmental disorder in children, liver and kidney dysfunction as well as nerve weakness.

A similar study done by GES in 2014 shows that in these areas the fluoride concentration was 1 milligram per litre (mg/l) or even less than that, but the study of 2019 shows that the fluoride concentration is in the range of 1.5-2 mg/l.

"In some parts the water



Heavy rains reduced TDS last year

The study also suggested that last year's heavy rainfall improved TDS concentration in groundwater across the city. According to the 2014 study, the mean TDS range was 433.77-2577.5 mg/l. But deluge and two-day massive flooding in August last year brought down the level to 511.11-1748.57 mg/l. The north-eastern part of Harni, however, has a high TDS concentration in the range of 5000-6000 mg/l.

table has decreased to the level of the lower aquifer where fluoride concentration is high. This concentration will continue to remain high until groundwater is recharged," said

Times View

Vadodara Municipal Corporation (VMC) provides tap water from Ajwa reservoir, Mahlsagar river and Narmada canal. But keeping a check on groundwater in the city is also its responsibility. The civic body cannot stop citizens from extracting groundwater, but it surely can make efforts to recharge the water table. While bringing up the water table will take some years, VMC, in the meantime, should make sure that the quality of tap water it provides improves and expands its pipeline network in isolated pockets.

Dr Deepa Gavali, director of GES, adding that groundwater recharge has also reduced as the city is losing urban wetlands.

Gavali further said that Va-

dodara city has lost 40 hectares of urban wetlands since 2005. "This area is equal to the size of eight Sursagar ponds," she said.

While the problem of total dissolved solids (TDS) in water can be resolved through the household RO systems, fluoride concentration cannot be reduced through RO or boiling.

"High fluoride concentration will lead to several health disorders if the groundwater quality goes unchecked," Gavali warned, adding that health risk appraisal already indicates fluoride carcinogenicity high in children than in adults and negligible in infants.

The fluoride concentration can be checked only if the groundwater is recharged, she added.

THE STAFF

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