



Dear readers!

This issue is dedicated to the life source of Earth, Water ! As India is struggling with acute water crisis and drought, The NITI Aayog's composite water management index, 2018 rate the situation as one of the worst water crisis in the history!

The honourable Prime Minister of India has also emphasised the need of conservation and responsible usage of water in his Mann Ki Baat 2.0 on 30<sup>th</sup> June 2019. GUIDE approach the water conservation as an integral part of climate resilience building process and undertakes watershed development and capacity building activities in the drylands of Gujarat State.

Thus, this issue focuses on responsible usage of water, pathogens that results water borne diseases, traditional water conservation systems of Kachchh and civic participation in water quality management. Opinions and ideas related to the articles can be emailed to the editors @ [selvakumar0275@gmail.com](mailto:selvakumar0275@gmail.com)

**Editors : Dr. V. Selvakumar and Dr. S. Sivaraj**

**Gujarat Institute of Desert Ecology**

P.O Box No. #83, Opp. Changleshwar Temple, Mundra Road

Bhuj – 370001, Kachchh, Gujarat – India

Telephone: 02832-235025

[www.gujaratdesertecology.com](http://www.gujaratdesertecology.com)

E-mail: [desert\\_ecology@yahoo.com](mailto:desert_ecology@yahoo.com)



## Content

1	<a href="#"><u>WATER MANAGEMENT: A ZERO HOUR PROGNOSIS</u></a> Salman Farissi <sup>1</sup> , Gado, A. A <sup>1,2</sup> , Muthukumar, M <sup>1*</sup> <sup>1</sup> Department of Environmental Science, School of Earth Science Systems, Central University of Kerala, India. <sup>2</sup> Department of Physics, Kebbi State University of Science and Technology, Aleiro, Kebbi State, Nigeria.	1
2	<a href="#"><u>PATHOGENS AND ASSOCIATED WATERBORNE DISEASES</u></a> Nadirsha P.S Nawab, Shipla Padmanabhan, Anbazhagi Muthukumar* Department of Environmental Science, School of Earth Science Systems, Central University of Kerala, Kasaragod, Kerala	3
3	<a href="#"><u>CITIZEN SCIENCE AND WATER QUALITY IMPROVEMENT IN URBAN POOR COMMUNITIES</u></a> V.Selvakumar Gujarat Institute of Desert Ecology, Bhuj, Kachchh, Gujarat	6
4	<a href="#"><u>કચ્છની જળસંચયની પરંપરાગત પદ્ધતિઓ</u></a> Kumarsawan Shakya, Chirag Patel Department of Social Work, KSKV Kachchh University, Kachchh, Gujarat, India.	8
5	<a href="#"><u>Events at GUIDE</u></a>	12
6	<a href="#"><u>Invited Talks / Acted as Resource Person</u></a>	16
8	<a href="#"><u>Publications</u></a>	
9	<a href="#"><u>Upcoming Conferences</u></a>	



## 1. WATER MANAGEMENT: A ZERO HOUR PROGNOSIS

**\*Salman Farissi<sup>1</sup>, Gado, A. A.<sup>1,2</sup>, Muthukumar, M<sup>1\*</sup>**

<sup>1</sup>Department of Environmental Science, School of Earth Science Systems,  
Central University of Kerala, India.

<sup>2</sup>Department of Physics, Kebbi State University of Science and Technology,  
Aleiro, Kebbi State, Nigeria.  
[mmuthukumar@cukerala.ac.in](mailto:mmuthukumar@cukerala.ac.in)

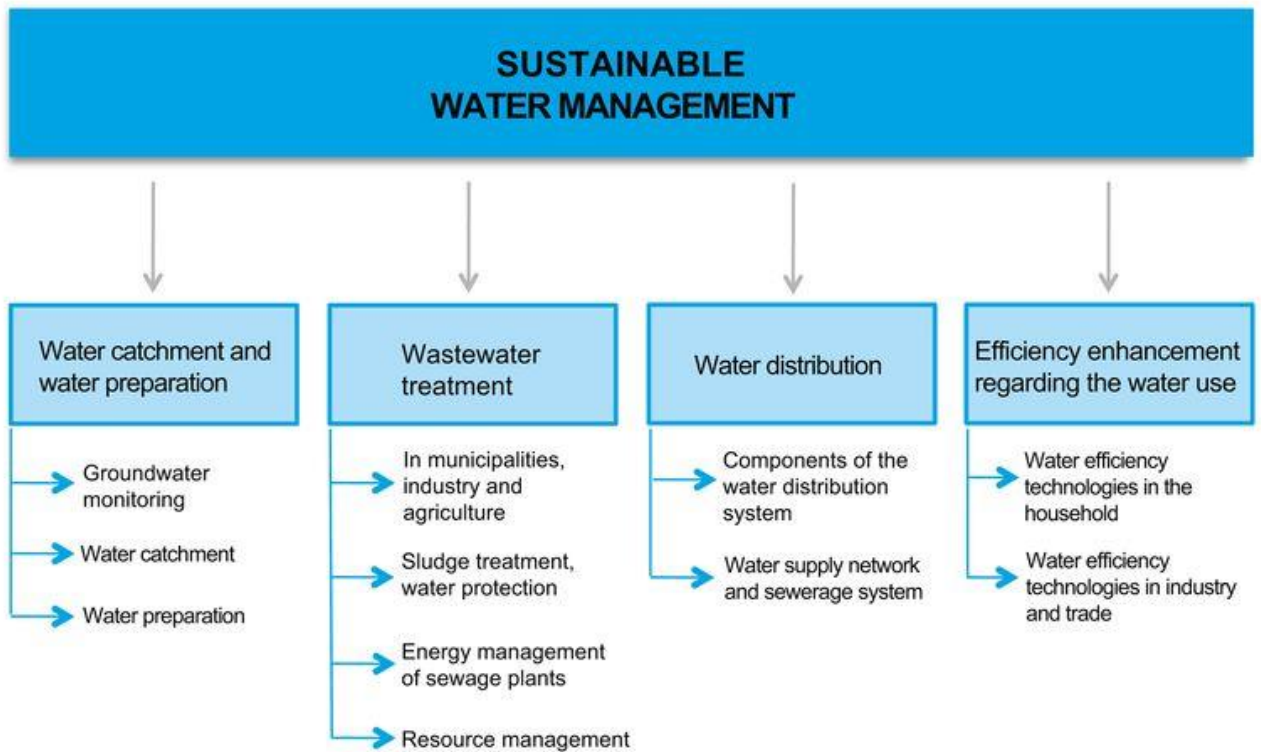
The 21<sup>st</sup> century is often hailed as the age of computers with the world becoming smaller in a poetic sense due to major technological advances. As humans were heralding upon the fruits of their intelligence, we started moving away from the very system, we were part of Nature or Earth. Our callousness prompted us to think that all our shortcomings could be solved by technology (shallow ecology) rather than changing the human behaviour and values. This thought process results unwarranted exploitation of natural resources.

In this present day, as we write this article, the South Indian City of Chennai is going across an unprecedented water crisis with people forced to spend on an average Rs.12000/month for getting potable water. According to National Institution for Transforming India (NITI Aayog)'s recent water crisis report, it is estimated that 21 major cities including Delhi, Mumbai, Bengaluru, and Hyderabad are going to be water-deficient due to depletion of groundwater. The same report estimates that by 2030, 40% of Indian population is going to have no access to drinking water. As a blame game is being played with global warming-induced climate change as the sole culprit, experts point out that its gross mismanagement of water resources that have caused this havoc.

It is estimated that most of the water used by Indians for domestic, irrigational and even industrial purposes are coming from underground. However, the ground water recharging is way behind to the extraction from the ground. With unchecked urbanization in the form of buildings, construction, roads, and other forms of structures drastically reduced the quantity of land available for water infiltration to the ground.

Further, the illegal pumping of industrial waste water into the ground is also causing a serious ground water quality depletion. The environmental pollution happened in Minamatabay is the typical example in this context. Minamata disease is methylmercury poisoning that happened in humans who ingested fish and shellfish contaminated by methylmercury discharged in waste water from a chemical plant (Chisso Co. Ltd.). It was in May 1956, that Minamata disease was first officially "discovered" in Minamata City, south-west region of Japan's Kyushu Island. In the last for the past 36 years, of the 2252 patients who have been officially recognized as having Minamata disease and 1043 have died.

As the solution, waste water management and recycling need a concrete effort from all the relevant stakeholders at the individual, household, community and Government or policy levels. In addition, reusing of waste water for the purposes other than drinking is a potential strategy to reduce the ground water extraction. Indian government has launched Jal Shakti Abhiyan campaign in 2019 by mobilizing the officers, groundwater experts and scientists and facilitated to work with state and district officials in India's most water-stressed districts. The focused efforts are being taken for water conservation and water resource management by making water conservation a Jan Andolan.



Source: <https://www.cleantech-ost.de/cio-lead-markets/sustainable-water-management/?L=1>

At the household level, creating rainwater harvesting construct to collect the rain that falls on the roof, storing it for future use or allowing it to flow underground can be a potential technique to increase the ground water table. Tamilnadu made it mandatory of constructing rainwater harvesting structure to obtain the building approval for new residential buildings in 2001. Further, the grey water (the wastewater that is released from bathtubs, bathrooms, washbasins, washing machines and floor cleaning) other than the water released from toilets and food waste tanks could be reused without treatment for watering the plants or trees and for flushing in the toilets.

There are other sources of water in a typical modern-day household which has a higher level of standard from greywater. For instance, water comes from air conditioning system and a waste water released from the mechanized Reverse Osmosis (RO) purification systems can be used for watering the plants and all the domestic purposes.

In agriculture, the Indian Government introduced the Drip Method of Irrigation during the mid-1980s with the view of saving a substantial amount of water. and then, many schemes have been introduced since the early 1990s, the National Mission on Micro-Irrigation (NMMI) introduced during 2010-11 and the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) launched in 2015 have significantly increased DMI adoption. As a result, the area under DMI has risen from a mere 1,500 ha in 1985-86 and 70,859 ha in 1991-92 to 4.24 million ha as on March 2017. The watershed management based on water budgeting and selective crop planting can show us the way towards sustainable water usage and management. All these initiatives require awareness and the will to implement it by educating people about the way of sustainable living.



## 2. PATHOGENS AND ASSOCIATED WATERBORNE DISEASES

Nadirsha P.S Nawab, Shipla Padmanabhan, Anbazhagi Muthukumar\*  
Department of Environmental Science, School of Earth Science Systems,  
Central University of Kerala, Kasaragod, Kerala  
sanbazhagi@cukerala.ac.in

Water is a basic need for life and our human body requires about 5 liters of water per day for the functioning of metabolic activities. The quantity of freshwater on earth is inadequate to satisfy all human needs, and it also depleting due to improper utilization. By the year 2025, half of the world's population will be severely affected by water scarcity (WHO, 2019). WHO (2011), reported that 21% of the communicable diseases are spreading by drinking contaminated water in India. In addition, studies also recorded that about 1,600 children under five die every day due to waterborne diseases (Dhanasekar *et al.* 2017). The pathogenic microorganisms such as virus, bacteria, fungi, protozoa, and helminths (NIH 2007) present in the contaminated water cause serious diseases such as diarrhea, cholera, shigellosis, typhoid, and poliomyelitis (Petri, 2008). This article list outs the major/common waterborne diseases and the causative agents with its scientific classification (Table ).

Table. Pathogens and associated waterborne diseases (Adapted and modified from Karanis, 2006)

Family	Microbe	Associated illness
Adenoviridae	Adenoviruses	Conjunctivitis, Gastroenteritis, Respiratory disease
Astroviridae	Astroviruses	Gastroenteritis
Picomaviridae	Enteroviruses	Gastroenteritis, HFMD, Encephalitis, Conjunctivitis
Picomaviridae	Hepatitis A Virus	Hepatitis
Picomaviridae	Hepatitis E Virus	Acute viral hepatitis
Caliciviridae	Norovirus	Gastroenteritis
Reoviridae	Rotavirus	Gastroenteritis
Polyomaviridae	Polyomavirus	Hemorrhagic cystitis (BK), Multifocal leukoencephalopathy (JC).
Herpesviridae	Cytomegalovirus	Fever, fatigue, tiredness
Campylobacteraceae	<i>Campylobacter</i> sp., <i>C. jejuni</i>	Gastroenteritis 1 Meningitis, septicemia, Guillain- Barre syndrome.
Burkholderiaceae	<i>Burkholderia pseudomallei</i>	Melioidosis
Legionellaceae	<i>Legionella pneumophila</i>	Acute respiratory illness, pneumonia (legionellosis)
Mycobacteriaceae	Non-tuberculous mycobacteria	Pulmonary disease, skin infection





Family	Microbe	Associated illness
Pseudomonadaceae	<i>Pseudomonas aeruginosa</i>	Infections in lungs, urinary tract, and kidney can cause inflammation and sepsis
Enterobacteriaceae	<i>Salmonella enterica, Serotype typhi</i>	Typhoid fever, paratyphoid fever, and another serious salmonellosis
	<i>Salmonella</i> spp., <i>Shigella</i> spp.,	Gastroenteritis, reactive arthritis Bacillary dysentery or shigellosis
	<i>Yersinia enterocolitica</i>	Diarrhoea, reactive arthritis
	<i>Escherichia</i> spp.,	Acute diarrhoea, bloody diarrhoea, and gastroenteritis
Vibrionaceae	<i>Vibrio cholera</i>	Gastroenteritis, cholera
Helicobacteriaceae	<i>Helicobacter pylori</i>	Chronic gastritis, ulcer disease, and gastric cancer
Entamoebidae	<i>Entamoeba histolytica</i>	Dysentery, liver abscess
Hexamitidae	<i>Giardia intestinalis</i>	Diarrhoea, malabsorption
Cryptosporidiidae	<i>Cryptosporidium</i> sp.,	Diarrhoea
Balantidiidae	<i>Balantidium coli</i>	diarrhoea, dysentery
Sarcocystidae	<i>Sarcocystis</i> sp.,	Diarrhoea, muscle weakness
Sarcocystidae	<i>Toxoplasma gondii</i>	lymphadenopathy, fever, congenital infections
Sarcocystidae	<i>Neospora caninum</i>	Abortion, meningoencephalitis, myositis
Eimeriidae	<i>Cyclospora cayetanensis</i>	protracted diarrhoea
Microsporidia (division )	Microsporidia (division )	enteritis, hepatitis, peritonitis, kerato-conjunctivitis
Leptomyxidae	<i>Acanthamoeba</i> sp.,	Granulomatous amoebic encephalitis, amoebic keratitis, primary amoebic meningoencephalitis, headache, fever, abnormal behaviour, intense pain, photophobia, vomiting, loss of consciousness



## Reference

1. Dhanasekar, S., Yamasani, B., Palpandian, S., Ethirajulu, S., Bhaskaran, S., & Ramachandran, S. (2017). Prevalence of water-borne diseases and wash practices in a rural and urban population of Chennai. *International Journal of Medical Science and Public Health*, 6(12), 1718-1722.
2. Karanis, P. (2006). A review of an emerging waterborne medical important parasitic protozoan. *Japanese Journal of Protozoology*, 39(1), 5-19.
3. National Institutes of Health. (2007). Understanding emerging and re-emerging infectious diseases. Biological sciences curriculum study. NIH Curriculum Supplement Series. National Institutes of Health, Bethesda, MD. <https://www.ncbi.nlm.nih.gov/books/NBK20370/>
4. Petri, W. A., Miller, M., Binder, H. J., Levine, M. M., Dillingham, R., & Guerrant, R. L. (2008). Enteric infections, diarrhea, and their impact on function and development. *The Journal of clinical investigation*, 118(4), 1277-1290.
5. WHO (2019). Drinking-water, <https://www.who.int/news-room/fact-sheets/detail/drinking-water>
6. WHO Edition, F. (2011). Guidelines for drinking-water quality-4th ed. Geneva, Switzerland. *WHO Chronicle*, 38(4), 104-8. [http://www.iasaude.pt/attachments/article/660/WHO\\_Guidelines%20for%20drinking-water%20quality.pdf](http://www.iasaude.pt/attachments/article/660/WHO_Guidelines%20for%20drinking-water%20quality.pdf)



## 3. CITIZEN SCIENCE AND WATER QUALITY IMPROVEMENT IN URBAN POOR COMMUNITIES

V. Selvakumar

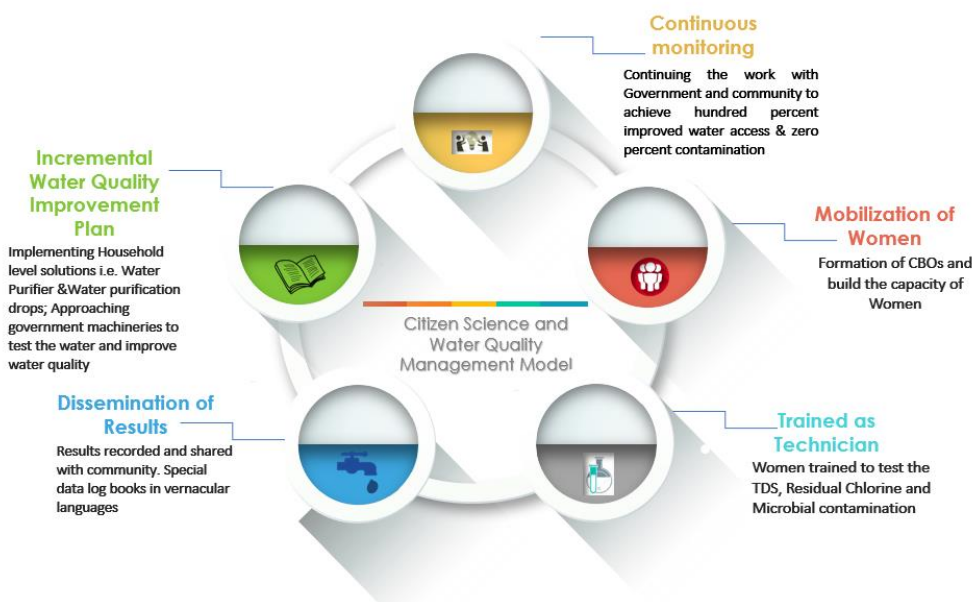
Project Scientist (Sociology), Gujarat Institute of Desert Ecology, Bhuj, Kachchh.

Water quality, a term that compares the physical, chemical and biological parameters with the set standards. Testing the water for its potability is not easy as the centralised water testing systems are not largely widespread in the countries like India. On the other hand, we are aiming for clean drinking water for all by 2030 as the 6<sup>th</sup> goal of Sustainable Development Goals (SDGs) emphasizing. The United Nations World Water Development Report, 2009 reported that ‘Half of the world population do not have the access of piped drinking water at household levels.

In India, the accessibility is steadily improving but the quality of water supplied still needs more attention. The estimates reveals that about 37.7 million Indians are affected by waterborne diseases, 1.5 million children die of diarrhoea and 73 million working days are lost due to waterborne diseases annually, leading to an economic burden of USD 600 million a year.(www.indiawater.gov.in)

Ministry of Drinking water and sanitation reported as “out of the total 17,13,303 habitations in India, 1,76,177 were found to be contaminated as per the laboratory tests conducted over FY 2015-2016”.(www.indiawater.gov.in)

In Urban context, slums are facing water scarcity and supply of contaminated water. The inadequacy in supply also forces the slums to use untreated water sources that are more prone to the presence of heavy metals and pathogenic microbes. This water crisis further instigated by the climate change and its adverse effects. The research studies conducted on water access to urban slums argues for a shift from the mere water supply coverage to an emphasis on quality water distribution.(Satapathy, B. K.2014). Further, World Health Organization accentuating to have an effective risk communication mechanism which engage and realizes the community on the risk of infected by waterborne diseases.







With this context, citizen science approach can help the communities to improve their supplied water quality and enable evidence-based advocacy. Citizen Science approach based projects train the community members to collect, analyze and disseminate the data. Studies prove that community led data collection and dissemination improve the water quality by reinforcing the voice of poor through data driven advocacy and collective actions. In addition, the surveillance also assist the communities to realize their vulnerability towards drinking water quality and promote water quality improvement investments at individual, household and community levels. Thus, building capacities of the less advantaged communities as Citizen Scientists will bring a greater difference in water governance of India.

## Reference

<sup>1</sup><http://www.indiawater.gov.in/misc/Docs/ProvenTech.pdf>

<sup>2</sup>[http://indiawater.gov.in/IMISReports/Reports/WaterQuality/rpt\\_WQM\\_QAffectedHabByLabTesting\\_D.aspx?Rep=0&RP=Y](http://indiawater.gov.in/IMISReports/Reports/WaterQuality/rpt_WQM_QAffectedHabByLabTesting_D.aspx?Rep=0&RP=Y)

<sup>3</sup>Satapathy, B. K. (2014). Safe drinking water in slums. *Economic & Political Weekly*, 49(24), 51.



## 4. કચ્છની જળસંચયની પરંપરાગત પદ્ધતિઓ

**Kumarsawan Shakya, Chirag Patel**

**Department of Social Work, KSKV Kachchh University, Kachchh, Gujarat, India.**

**kumarsawan.shakya@gmail.com**

The article briefs about the traditional water conservation techniques of Kachchh, an arid district of Gujarat.

આપણામાંથી ઘણાં બધા લોકો મોટા શહેરોમાં રહેતા હશે અને ભૌતિક સુવિધાયુક્ત જાહોજલાલીવળી જીવનશૈલીમાં જીવન જીવતા હશે. સ્વીમીંગ પુલ અને ડેકોરેટીવ ફુવારા વગેરે જેવી જાહોજલાલીમાં આપણે ભૂલી ગયા છીએ કે પાણીના આવા નિર્થક વ્યયની પર્યાવરણ પર શું અસર થશે?

વધતા જતા શહેરીકરણના લીધે હવા, જમીન અને પાણીનું પ્રદુષણ વધ્યું છે જેનાથી પુરવઠા અને માંગ વચ્ચે અસંતુલન પેદા થયું છે. વધતી જતી પાણીની માંગને સંતોષવા માટે જમીન પરનું અને ભૂગર્ભજળનું ઉપયોગ વધતો જાય છે. જો આમઆદમીને પાણીનાં સંગ્રહ, રિસાયક્લિંગ અને ફરીથી પાણીનાં ઉપયોગનો મહત્વ નહિ સમજાવવામાં આવે તો ટૂંક સમયમાં જ પાણી એક દુર્લભ વસ્તુ થઈ જશે.

ભારતમાં પાણીનો સૌથી વધુ ઉપયોગ ખેતીમાં થાય છે. પાણીનો મૂળ સ્રોત વરસાદ છે તેથી જ્યારે વરસાદ પડે ત્યારે પાણીનાં સંગ્રહનો પ્રશ્ન ઉભો થાય છે. જો પાણી સંગ્રહેલું હશે તો ઘર વપરાશ, ખેતી અને ઉદ્યોગોના વપરાશ માટે પુરતો પુરવઠો મળી રહેશે.

વરસાદી પાણીનાં સંગ્રહનો શ્રેષ્ઠ ઉદાહરણ જેસલમેર શહેર છે. જે રાજસ્થાનના રણ વિસ્તારમાં આવેલ છે. આ શહેર વરસાદી પાણી સંગ્રહ કરીને પોતાની પાણીની જરૂરિયાતો સંતોષે છે. જ્યારે આખા વિશ્વમાં સૌથી વધારે વરસાદ પડે છે એવા ચેરાપુંજીમાં પણ પાણીની અછત હોય છે તેનું કારણ વરસાદી પાણીના સંગ્રહનો અભાવ છે. જો વરસાદી પાણીનો યોગ્ય રીતે સંગ્રહ કરવામાં આવે તો પાણીની અછતનો પ્રશ્ન હલ થઈ શકે છે.

### પાણી સંગ્રહની પરંપરાગત પદ્ધતિઓ(કચ્છ)

ભારતમાં વરસાદી પાણી સંગ્રહવાની અનેક પરંપરાગત પદ્ધતિઓ છે જેવી કે કાચા તળાવ, પાકા તળાવ, બાવરી, ટાંકા, બચ, કુંડ, બંધ-પાળા, ડેમ, ઝીલ, વગેરે. ભારતમાં આવી અનેક પદ્ધતિઓ છે પણ અહિયાં આપણે કચ્છની જળસંગ્રહની પરંપરાગત પદ્ધતિઓની વાત કરીશું.

#### 1. કાચા તળાવ

નાના ગામનાં પાણીની જરૂરિયાત સંતોષવા માટે કાચા તળાવ બનાવવામાં આવતા હતા. આ તળાવ બનાવતી વખતે જે માટી નીકળે છે એ માટી એ તળાવની પાળે રાખીને એ તળાવ બાંધવામાં આવતું હતું. તેમાં કોઈ પાકું બાંધકામ કરવામાં આવતું નથી. કચ્છના લગભગ દરેક જુના ગામમાં ઓછામાં ઓછું એક આવું કાચું તળાવ જોવા મળે છે. તેનો પાણીનો ઉપયોગ ઘરવપરાશ, પશુઓને પીવામાટે થતું હતું.

Small Lake (કાચા તળાવ) in the Village of Kachchh





### 2. પાકા તળાવ

આ તળાવ મોટા ગામ કે શહેરની જરૂરિયાત સંતોષવા માટે બનાવવામાં આવતા હતા. આ તળાવ સાઈઝમાં મોટા અને ઊંડા હતા. તેમાં પાકું બાંધકામ પણ થયેલ હતું. તેના પાણીનો ઉપયોગ ધરવપરાશ, પશુપાલન કે અન્ય નાના ઉદ્યોગોમાં થતો હતો.

ઉદાહરણ : હમીરસર તળાવ, ભુજ કચ્છ.



Hamirsar lake, Bhuj Kachchh (Photo credit: Darpan Dodiya)

### 3. બંધ-પાળા

આ જળસંગ્રહની પદ્ધતિનો ઉપયોગ ખેતરમાં પાણીનાં સંગ્રહ માટે થાય છે. ખેતરમાં જ્યાંથી પાણી વહીને બહાર જતું હોય ત્યાં બંધ બાંધીને પાણીનો સંગ્રહ ખેતરમાં થાય એવી વ્યવસ્થા કરવામાં આવે છે. આથી ભૂગર્ભજળ સપાટી ઉપર આવે છે અને ખેતી પણ સારી થાય છે. પાણીનાં સંગ્રહ સાથે જમીનનું સંરક્ષણ પણ થાય છે.



Farm in Dhrobana village Bhuj, Kachchh, Gujarat

### 4. ડેમ

ખેતી માટે પાણીની જરૂરિયાતને સંતોષવાના ઉદ્દેશ્યથી પાકા તળાવથી પણ મોટું બંધ બાંધીને જે વ્યવસ્થા ઉભી કરવામાં આવે છે એને ડેમ કહેવાય છે. ડેમમાં પાકું બાંધકામ કરવામાં આવે છે અને ક્યારેક પાકું બાંધકામ કરવામાં આવતું નથી. ડેમ નાના મધ્યમ અને મોટા આમ ત્રણ પ્રકારના હોય છે. તેના પાણીનો ઉપયોગ ખેતી, ધરવપરાશ અને ઉદ્યોગોમાં પણ થાય છે. માછીમારી ઉદ્યોગ પણ વિકાસ પામે છે. કચ્છમાં લગભગ ૩૮ જેટલા નાના મોટા ડેમ જાણીતા છે જેમાં રૂદ્રમાતા અને ટપ્પર ડેમ મુખ્ય છે.





Rudramata Dem, Bhuj Kachchh (Photo Credit: Adipur group kanya shala No. 1)

### 5. બચ

'બચ' આ પદ્ધતિ ખાસ કરીને ડુંગરાળ વિસ્તારમાં ઉપયોગમાં આવે છે. વરસાદી પાણીનો વહેણ જ્યાં સાંકડો થતો હોય ત્યાં પથ્થરો નાખીને બંધ કરવામાં આવે છે. ત્યાં જે પાણીનો સંગ્રહ થાય છે એનો ઉપયોગ ડુંગરાળ વિસ્તારમાં રહેતા લોકો અને માલધારીઓ તેમના રોજીંદા વપરાશમાં કરે છે. જ્યારે તે પાણી સુકાઈ જાય ત્યારે ત્યાં નાનો ખાડો કરીને પણ પાણીની જરૂરિયાત સંતોષી શકાય છે. અહીંયા જે નાનો ખાડો કરવામાં આવે છે તેને પ્રાદેશિક બોલી માં 'વિયરી' કહેવામાં આવે છે. આ પદ્ધતિનો ઉપયોગ કાળા ડુંગરના માલધારીઓ કરે છે. કાળા ડુંગરમાં અત્યારે લગભગ 50 જેટલી બચ જોવા મળે છે. 'બચ' એ પ્રાદેશિક બોલીનો શબ્દ છે.

### 6. ઝીલ

ઝીલ એ એક પ્રકારનું કાચું તળાવ છે. તે કચ્છના બન્ની વિસ્તારમાં જોવા મળે છે. અહીંયાની માટી પાણીને વધારે સમય સુધી સંગ્રહી રાખે છે. અહિયાં પાણીનું સ્તર 10 ફૂટ થી નીચે જતું નથી તેથી જ્યારે તે સુકાઈ જાય છે ત્યારે નાનો ખાડો કરીને પણ ત્યાં રહેતા લોકો અને માલધારી સીમમાં પોતાની પાણીની જરૂરિયાત સંતોષે છે.

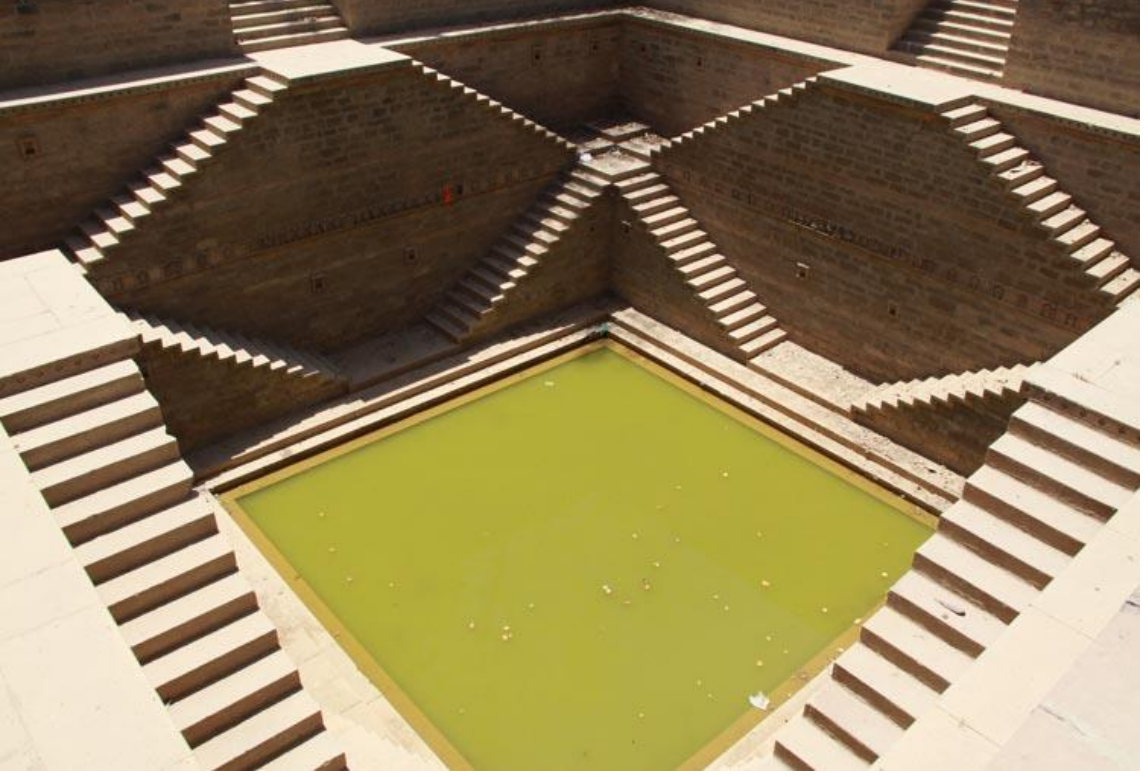


Zeel at Dhordo village, Near White Rann, Bhuj, Kutch Gujarat ( Photo credit: Mustak)



### 7. કુંડ

કુંડ એ એક પ્રકારનું કુવો છે. તેમાં વરસાદી પાણીનો સંગ્રહ વધુ સમય સુધી થાય છે. જેમાં પાકું બાંધકામ પણ થયેલ હોય છે. તેમાં ભારતની સ્થાપત્ય કલાનું પ્રદર્શન થાય છે. તેનું ઉદાહરણ ભુજ કચ્છમાં સ્થિત રામકુંડ છે. જે ઘણું જુનું છે. તે રાજાશાહીના સમય બંધાયેલ છે. રામકુંડ એ પરંપરાગત તેમજ ઐતિહાસિક સ્ત્રોત છે.



Ram Kund, Bhuj Kutch (Photo Credit: Gujarat Tourism)

વધતી જતી વસ્તીને લીધે કુદરતી સંસાધનો જમીન પાણી જેવા અન્ય સંસાધનો પર ભારણ વધતું જાય છે. જો આપણે સંસાધનોના ઉપયોગ વિષે સજાગ નહિ થઈએ તો આવનાર ભવિષ્ય અંધકારમય હશે. આપણે આપણી પરંપરાગત પદ્ધતિઓની જાળવણી કરવી એ પણ આપણી જવાબદારી છે અને આ પરંપરાગત પદ્ધતિઓ આપણને મળેલ એક વારસો છે તેથી અત્યારથી જ આપણે આપણી પરંપરાગત પદ્ધતિથી આ સંસાધનોનો રક્ષણ અને સંવર્ધનની સહિયારી જવાબદારી નિભાવી આવનાર પેઢીને સારું અને સ્વસ્થ વાતાવરણ પૂરું પાડીએ. તો આવો, આપણે આપણી સહિયારી જવાબદારીઓ નિભાવીએ.



**Events at GUIDE**

## Save The Frogs Day

Save The Frogs Day was observed on 1<sup>st</sup> May 2019 at GUDIE to increase the awareness about frogs: amphibians found on land and water both. Frogs are predators and play a vital role in sustaining the environment during its lifetime. Extinction of frogs is a serious threat and it is instigated by many reasons such as deforestation, low rainfall and decrease in water bodies etc. As part of the event, Dr. Arun Kumar Roy Mahato delivered a talk on “Most Threatened class of Vertebrates”. Senior officials from Arid Communities and Technologies (ACT), Bhuj-Kachchh were also attended the event.



## International Biological Diversity Day

**International Biological Diversity Day** was celebrated on 22<sup>nd</sup> May 2019, in which Dr. V. Vijay Kumar delivered a special talk on “Gandhiji and Environment” and emphasized the need of adapting Mahatma’s idea of Vasudhaiva Kutumbakam (the world is one family) as a solution to address the environmental issues of the century. In addition, Dr. Arun Kumar Roy Mahato delivered a data backed technical talk on “Biodiversity Crisis”. His talk centred on the importance of conservation of biodiversity and its nexus with various ecological components and food security.





## World Environment Day

**World Environment Day** was celebrated on 5<sup>th</sup> June 2019. As part of the event, plantation activities were undertaken in GUIDE campus. Dr. V. Vijay Kumar and Dr. K. Karthikeyan attended the environmental day celebration organised by Jindal Saw Limited, Mundra, Kachchh.

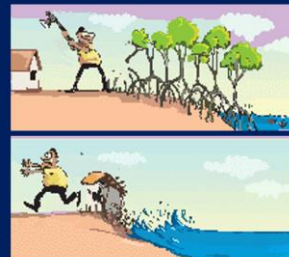
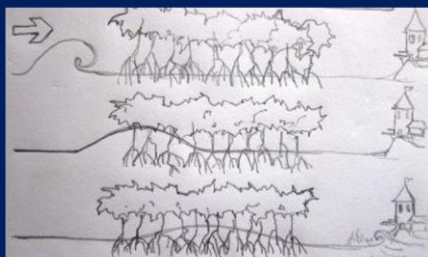


## World Mangrove Day

GUIDE has organized the “International day for the conservation of mangrove ecosystems on 26<sup>th</sup> July 2019” which was attended by representatives from Forest Department, Kachchh. In this event, Dr. K. R. Saravanan delivered a talk on “Wondrous Mangrove” and Dr. Rachna Chandra delivered a talk on “Multi-species Mangrove Restoration activities by GUIDE”.

### Duty - conserve ?

Mangroves are ecosystem engineers that shape, build and maintain the integrity of their surrounding physical and biotic environment



No mangrove ! No fish ! No protection !





### Coastal Clean Seas Campaign was celebrated at Mandvi Beach, Gulf of Kachchh

The Coastal Clean Seas Campaign as a part of the “International Coastal Clean-up Day” and “Swachh Bharat Abhiyan” was celebrated on 21<sup>st</sup> September 2019 at Mandvi beach, Gulf of Kachchh. The objective of the program is to engage and create awareness on the importance of the coast and to become better stewards of our environment. Gujarat Institute of Desert Ecology (GUIDE), Bhuj conducted the program in collaboration with the National Centre for Coastal Research (NCCR), Chennai, Ministry of Earth Sciences (MoES), Government of India. Under the direction of Dr Vijay Kumar, Director of GUIDE, Campaign was coordinated by Dr Durga Prasad Behera, Project Scientist, GUIDE.

The Senior Scientists of GUIDE Dr. K. Karthikeyan and Dr. K. R Saravanan were presided and explained the motto of the cleaning drive. Range Forest officer Mr. K.N Kher inaugurated the campaign along with Sri R.M Zala, RFO Social forestry (Retd) and Mr Soni from Nagarpalika of Mandvi. 120 student volunteers from R.H.P Higher Secondary School, Maska, Khimji Ramdas Kanya Vidhyalay, Coast Guard school, Government Science college of Mandvi along with the researchers from GUIDE, the workers from the Mandvi municipality and the tourists were part of the event. The volunteers went as rally to sensitize the local communities on plastic pollution and also collected the plastic waste along the coast. The volunteers collected 480 kg of plastic garbage and the same was safely disposed by the Mandvi Municipal solid waste management team.

  
કચ્છમિત્ર

### કાલે માંડવી દરિયાકિનારે ગાઈડ દ્વારા સ્વચ્છતા અભિયાન

ભુજ, તા. ૧૯ : આ વર્ષનું દરિયાકિનારાની સ્વચ્છતાનું અભિયાન એ આંતરરાષ્ટ્રીય દરિયાકિનારા સ્વચ્છતા દિવસ અને સ્વચ્છ ભારત અભિયાન અંતર્ગત ૨૧મી સપ્ટે. સ્વચ્છ અખાતના માંડવીના દરિયાકિનારા ઉપર ગુજરાત ઇન્સ્ટિટ્યૂટ ઓફ ડેઝર્ટ ઇકોલોજી (ગાઈડ) ભુજ ક્ષેત્ર દ્વારા સાંખવામાં આવ્યું છે.

આ અભિયાનનો મુખ્ય હેતુ દરિયાકાંઠાના વિસ્તારોને સ્વચ્છ કરવા અને આપણા પર્યાવરણને સમૃદ્ધ બનાવવા માટે લોકોમાં જાગૃતતા કેળવવાનો છે. આ આયોજન ગાઈડ દ્વારા એનસીસીઆર-નેશનલ સેન્ટર ફોર કોસ્ટલ રિસર્ચ-ચેન્નાઈ, એમઆઈએસ-મિનિસ્ટ્રી ઓફ સ્વાચ્છ ભારત સરકારની સાથે રહીને કરવામાં આવ્યું છે. આ અભિયાનની શરૂઆત ગાઈડના નિયામક ડૉ. વી. વિજયકુમારે સારસ્વતમતી માતા આર.એચ.પી. હાઇસ્કૂલ મસ્કા, ખીમજી રામદાસ કન્યા વિદ્યાલયના વિદ્યાર્થીઓ અને સરકારી વિજ્ઞાન કોલેજના છાત્રો તથા માંડવી નગર સેવા સહન. ગાઈડના વૈજ્ઞાનિકો, પ્રોજેક્ટ સ્ટાફ તથા કર્મચારીઓ દ્વારા આ અભિયાન હાથ ધરવામાં આવ્યું છે.

સકાંઈ અભિયાનમાં લોકજાગૃતિ લાવવા તથા શહેરીજનોને જોડાવવા ગાઈડ દ્વારા અપીલ કરવામાં આવી છે.

Kutchmitra Main Edition  
20 Sep, 2019 Page No. 12  
Powered by : eReleGo.com

  
કચ્છમિત્ર



**માંડવીના દરિયાકિનારાની સફાઈ કરનાર ટીમ :** આંતરરાષ્ટ્રીય દરિયા કિનારા સ્વચ્છતા દિવસ અને સ્વચ્છ ભારત અભિયાન અંતર્ગત તા. ૨૧ના ગુજરાત ઇન્સ્ટિટ્યૂટ ઓફ ડેઝર્ટ ઇકોલોજી (ગાઈડ) ભુજ દ્વારા નેશનલ સેન્ટર ફોર કોસ્ટલ રિસર્ચ, ચેન્નાઈ, મિનિસ્ટ્રી ઓફ સ્વાચ્છ ભારત સરકારની સાથે મળીને ભારતના નેશનલ કોર્ડિનેટર વૈજ્ઞાનિક ડૉ. પ્રવર મિશ્રાનાં માર્ગદર્શન હેઠળ સ્વચ્છતા અભિયાન કર્યું, જેમાં ખીમજી રામદાસ કન્યા વિદ્યાલય, સારસ્વતમ સ્કૂલ, સાયન્સ કોલેજના ૧૨૦ વિદ્યાર્થીઓ, અદાણી ફાઉન્ડેશન સ્કૂલના ૮૦ વિદ્યાર્થીઓ, નગરપાલિકા, વન વિભાગ, પ્રવાસન નિગમ, કોસ્ટગાર્ડ વગેરેના સહકારથી માંડવી દરિયાકિનારે સ્વચ્છતા અભિયાન કર્યું, જેમાં ગાઈડના નિયામક ડૉ. વી. વિજયકુમાર, પ્રોજેક્ટર વૈજ્ઞાનિક ડૉ. દુર્ગાપ્રસાદ બહેરા, માંડવી આર.એ.કે.ઓ. કે.એન. બેર, આર. એમ. ઝાલા, સાયન્સ કોલેજના પ્રિન્સિપાલ પી. કે. મહેતા, ગાઈડ ઓફિસના મુખ્ય વૈજ્ઞાનિક ડૉ. કાર્તિકેન, ડૉ. કે. સરવનન, વૈજ્ઞાનિકો ડૉ. જી. ચિટ્તમરન, કાપેશ પરમાર, મુકેશ કોલડિયા, સારસ્વતમ સ્કૂલના મુલેશભાઈ જોશી વિગેરે ઉપસ્થિત રહ્યા હતા.

Kutchmitra Main Edition  
24 Sep, 2019 Page No. 9  
Powered by : eReleGo.com



## Coastal Clean Seas Campaign was celebrated at Mandvi Beach, Gulf of Kachchh







## Invited Talks / Acted as Resource Person

- ❖ Dr. V. Vijay Kumar delivered a talk on “Climate Change & Eco-System based Adaptation” as part of the “Eco-System Conservation for Disaster Risk Reduction” programme organized by Gujarat Institute of Disaster Management (GIDM), Gandhinagar, Gujarat on 29<sup>th</sup> May 2019. In the said event, Dr. Rachna Chandra, Senior Scientist from GUIDE has also delivered a talk on Rapid Environmental Impact Assessment (REIA) and Integrating Ecological-Disaster Risk Reduction (Eco-DRR) in Disaster Recovery and Reconstruction in Gujarat”.
- ❖ Dr. Arun Kumar Roy Mahato delivered the lecture in the seminar on “Air Pollution” organized on the occasion of World Environment Day 2019 by the Department of Environmental Science, M S University of Baroda, Vadodara on 5<sup>th</sup> June 2019.
- ❖ Dr. K. Karthikeyan attended the meeting of MoEF&CC on “World Day to Combat Desertification” on 17<sup>th</sup> June 2019 at New Delhi on behalf of Director, GUIDE.
- ❖ Dr. V. Vijay Kumar visited Germany during 10-12<sup>th</sup> of September 2019 to meet and interact with the Scientists from the University of Münster located at city of Münster and Karlsruhe Institute of Technology (KIT). KIT has invited him to explore the innovative energy model developed by KIT researchers in Germany. He also delivered a talk on ecological models development at KIT and it was appreciated by the Scientists.

## Publications

1. Dhananjayan, T., K. Karthikeyan, 2019. Occurrence of total petroleum hydrocarbon and total organic carbon in the sub-tidal and inter-tidal sediments of Vadinar coast, Gulf of Kachchh. *Int. J. Life Sci. Res.*, 7 (2): 252-258.
2. Dhananjayan, T., K. Prabhu., K. Karthikeyan, 2019. Bioaccumulation of heavy metals in marine and freshwater fishes of Sikka, Jamnagar coast of GoK, Gujarat. *Int. J. Life Sci. Res.*, 7 (2): 179-185.

## Upcoming Seminars / Conferences

- ❖ International Conference on Plant & Soil Science (ICPSS-19) on 3<sup>rd</sup> November 2019, Singapore <https://allconferencealert.net/eventdetails.php?id=1001460>
- ❖ International Conference on Researches in Science and Technology (ICRST-19) on 13<sup>th</sup> November 2019, George Town, Malaysia <https://allconferencealert.net/eventdetails.php?id=1015072>



Gujarat Institute of Desert Ecology (GUIDE), is a research institute established in Kachchh, Gujarat, India in 1995. The mission of GUIDE is to catalyze the process of ameliorating hardships to human beings in desert ecosystems of Gujarat, following sound ecological principles and carefully using scientific knowledge, imaginative technology and capital.

Research processes of GUIDE involve the stakeholders including communities, developmental organizations (NGOs), government departments and industries to find reliable and sustainable solutions to the problems encountered by the dry land and coastal communities of Gujarat. GUIDE has implemented a range of national and internationally funded research and developmental projects in Gujarat and beyond.

We offer consultancy services in the areas of environmental assessments, capacity building and implementation of community development programmes to achieve the Sustainable Development Goals (SDGs).



## Services offered by GUIDE

### Research and Development

- ❖ Ecological Health Assessment
- ❖ Terrestrial Biodiversity Assessment and Conservation Studies (Biodiversity Action Plan and Wildlife Management Plan)
- ❖ Marine Ecological Impact Assessment Studies of port and coastal industries
- ❖ Remote sensing & GIS applications for Ecology, biodiversity conservation & environmental planning
- ❖ Climate Vulnerability Studies
- ❖ Environmental Impact Assessment (EIA) & Environmental Management Planning (EMP)
- ❖ Environmental monitoring of matrices such as Air, Stack, Water, Soil, Sediment & Industrial effluents etc.
- ❖ Environmental Auditing
- ❖ NABL Accredited Laboratory services as per ISO / IEC 17025: 2005
- ❖ Social Impact Assessment (SIA), Social Impact Management Plan (SIMP) and Social Audit
- ❖ Feasibility studies for Developmental projects
- ❖ Monitoring and Evaluation
  - Forest Resource Survey and Plantation Monitoring
  - Biodiversity Status Assessment and Wildlife Population Monitoring
  - Coastal and Mangrove monitoring
  - 3<sup>rd</sup> party evaluation for CSR projects
- ❖ Geo-tagged, mobile app-based surveys, Data analysis and visualisation

### Capacity Building and Knowledge Management

- ❖ Provide Trainings , develop knowledge products, education and communication (IEC) materials in the areas of sanitation, hygiene, health, water conservation & safe usage, environmental awareness, biodiversity conservation, Natural Resource Management, Laboratory Analytics, and Mushroom cultivation.
- ❖ Capacity Building of NGOs in real time data collection and to take data driven decisions

### Community Outreach and Implementation Activities

- ❖ Mangrove Restoration and plantation activities
- ❖ Implementing Government / CSR funded Watershed development, carbon neutral livelihood projects and environmental conservation initiatives.
- ❖ Build community based climate resilience technologies and cool roofs
- ❖ Promote social / village forestry in the rural and urban areas to increase biodiversity and to reduce heat stress

### Membership

- ❖ Global Network of Dryland Research Institutes (GNDRI), Israel
- ❖ International Society of Zoological Sciences (ISZS), China
- ❖ International Union for Conservation of Nature (IUCN), Switzerland
- ❖ Ocean Expert, Intergovernmental Oceanographic Commission of UNESCO

### Client Sectors

- ❖ Mining and Minerals
- ❖ Coastal and marine developments
- ❖ Ports and Harbours
- ❖ River basin studies and irrigation projects
- ❖ Metal Processing industries
- ❖ Thermal Power Plant
- ❖ Cement Manufacturing (Clinkerisation)
- ❖ Jetty Projects (Industries)
- ❖ Biomedical Waste Management
- ❖ Chemical Manufacturing (Caustic soda etc.)
- ❖ CETP of Electroplating association.