ANNUAL PROGRESS REPORT FOR SDG 6 – 2024

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17.3.6. University publishes progress against SDG 6

Sustainable Development Goal 6 focuses on ensuring the availability and sustainable management of clean water and sanitation for all. It emphasizes access to safe and affordable drinking water, adequate sanitation, and hygiene, particularly for vulnerable populations. SDG 6 also promotes efficient water use, the protection of water-related ecosystems, and the reduction of pollution. By improving water quality, wastewater treatment, and sustainable resource management, this goal supports public health, environmental protection, and resilience against climate change—ensuring that every community can thrive with reliable and safe water systems.

Per captia water consumption in the building is calculated as per the water management plan (litres / person/ day).

Water consumption for various purposes S. No.	Types of consumption	Normal range (L/capita/day)	Average
1.	Per capita domestic consumption at hostel and canteen	93-126	114
2.	Industrial and commercial demand at laboratories	124 - 255	189
3.	Public uses including fire demand, transport washes	2378-3345	2620
4.	Losses and waste as routine consumption	37-53	37
5.	Daily use (day-to-day use)	64	28

To reduce the demand of water consumption rain water harvesting unit is implemented and practiced

Campus water sump used for reliable water collection and distribution across the university.

Borewells maintained and monitored as part of the institution's commitment to safe and responsible groundwater extraction.

- The institution has taken up several initiatives to sustain an eco-friendly campus towards the waste management of solid waste, liquid waste, bio medical waste, chemical waste and e-waste.

Waste segregation bins placed on campus to promote cleanliness and responsible waste disposal.

The Institute has a Sewage Treatment Plant to recycle the waste water. This plant treats the waste water and makes it fit for use in watering plants and trees.

On-campus water treatment and filtration system ensuring safe, clean, and reliable water supply for university infrastructure.

Cleanliness inside the campus is maintained by a dedicated group of maintenance staff

RO-based drinking water purification system installed on campus to provide safe and hygienic drinking water for all.

Promoting health and sustainability with free, clean drinking water available to students and faculty.

Strict protocols for handling laboratory waste and hazardous materials. Departments that deal with chemicals, reagents, biological samples, or solvents follow well-defined Standard Operating Procedures (SOPs) for waste segregation

Environmental Health Issues

Event Name: Environmental Health Issues

Programme Brochure

Organized by: Department of Microbiology

Date: 26.09.2024

Time: 09.15 am

The seminar titled *"Environmental Health Issues"* was conducted with the objective of creating awareness about the strong connection between environmental conditions and human health. In alignment with SDG 6: Clean Water and Sanitation, the program highlighted the vital role that safe water, proper sanitation, and hygienic practices play in preventing diseases and ensuring community well-being.

The seminar emphasized the health risks associated with contaminated water sources, poor waste disposal, and inadequate sanitation facilities. Participants were educated on the importance of protecting water bodies from pollution, adopting sustainable water-use practices, and supporting sanitation measures that improve public health. Practical insights were shared on water purification methods, community-level sanitation strategies, and ways to reduce exposure to waterborne hazards.

By promoting responsible water management and sanitation awareness, the seminar contributed to empowering individuals to take action towards a healthier environment and improved quality of life, thereby strengthening institutional commitment to SDG 6.

Program Title	**"Environmental Health Issues"**
Program Theme	To raise awareness of the importance of environmental health To promote actions to protect human health from environmental hazards
Duration of Event	Two Hours
Organized by	Department of Microbiology
Date and Time	26.09.2024 at 09.15 am
Co-ordinator	Dr. N. Gunavathy, AP/MICROBIO Dr. D. Gideon Moses, AP/MICROBIO
Facebook Link	https://www.facebook.com/share/p/rJ3sp3qkYN7DeZp2/?mibextid=qi2Omg
Linkedin Link	https://www.linkedin.com/posts/spiherchennai_microbiology-guestlecture-envhealthday-activity-7244040053994270726-FL0-?utm_source=share&utm_medium=member_android
Instagram Link	https://www.instagram.com/p/DARL_2_yxJY/?igsh=MXN0bHV5Y2Q1dGNpNA==
Organizing Secretary	Mrs. A. Nelofer, AP, MICROBIO
Convener	Dr. S. Ganesh Kumar, Asso. Prof/HoD/MICROBIO
Mode	Offline Mode
Resource Person	**Dr. Mona Sadasivam,** Scientist Grade – I, Shri AMM Murugappa Chettiar Research Centre (MCRC), Tharamani, Chennai – 6000113, India.
Venue	EEE Block Smart room No. 258, SPIHER
No. of participants	54
Key Points Discussed	➢ Impact of the environmental health issues ➢ Significance of environmental health in recent days ➢ Responsibilities to restore healthy environment

Felicitating the Chief Guest, Dr. Mona Sadasivam, Scientist Grade – I, Shri AMM Murugappa Chettiar Research Centre (MCRC), Tharamani, Chennai

Chief Guest giving lecture on environmental awareness

Public Links

https://www.instagram.com/p/DARL_2_yxJY/?igsh=MXN0bHV5Y2Q1dGNpNA==

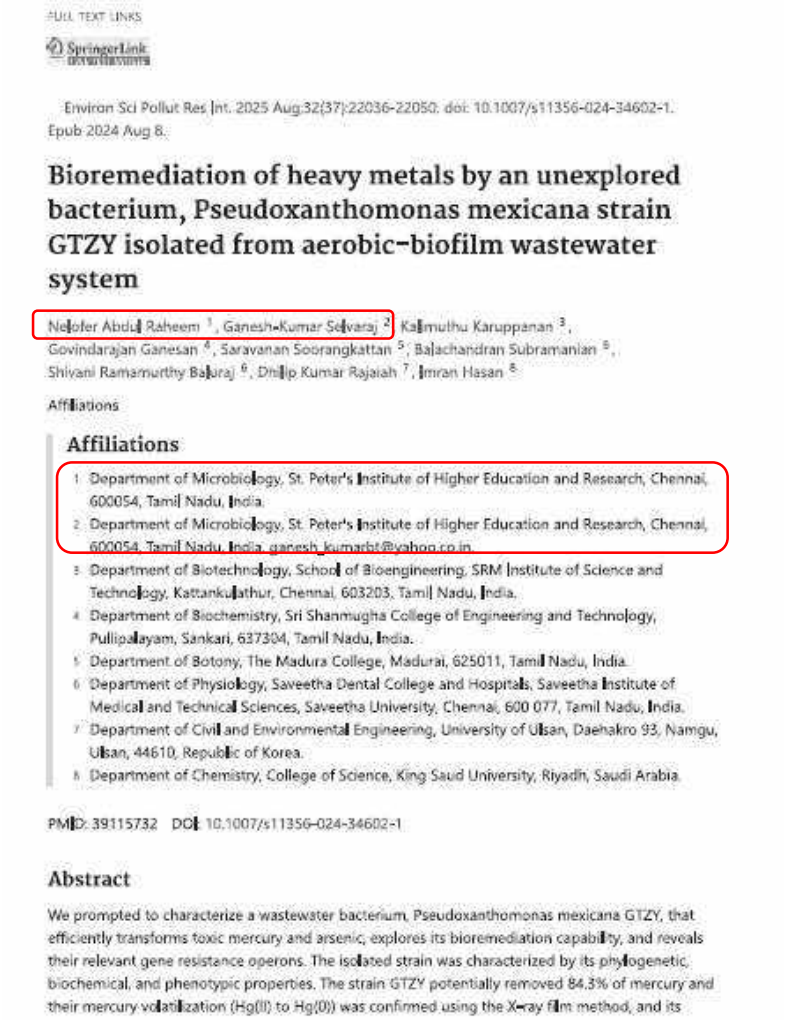
https://www.facebook.com/share/p/rJ3sp3qkYN7DeZp2/?mibextid=qi2Omg

https://x.com/SpiherIndia/status/1838274472685850721?t=icQehqgPfGrGgV9nPUZZSQ&s=19

https://www.linkedin.com/posts/spiherchennai_microbiology-guestlecture-envhealthday-activity-7244040053994270726-FL0-?utm_source=share&utm_medium=member_android

Research Articles published under SDG 6

1. Abdul Raheem N, Selvaraj GK, Karuppanan K, Ganesan G, Soorangkattan S, Subramanian B, Ramamurthy Baluraj S, Rajaiah DK, Hasan I. Bioremediation of heavy metals by an unexplored bacterium, Pseudoxanthomonas mexicana strain GTZY isolated from aerobic-biofilm wastewater system. Environmental Science and Pollution Research. 2024 Aug 8:1-5.



FULL TEXT LINKS

SpringerLink

Environ Sci Pollut Res Int. 2025 Aug;32(37):22036-22050. doi: 10.1007/s11356-024-34602-1. Epub 2024 Aug 8.

Bioremediation of heavy metals by an unexplored bacterium, Pseudoxanthomonas mexicana strain GTZY isolated from aerobic-biofilm wastewater system

Nelofer Abdul Raheem [1], Ganesh-Kumar Selvaraj [2], Kalimuthu Karuppanan [3], Govindarajan Ganesan [4], Saravanan Soorangkattan [5], Balachandran Subramanian [6], Shivani Ramamurthy Baluraj [6], Dhilip Kumar Rajaiah [7], Imran Hasan [8]

Affiliations

Affiliations

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8 Department of Chemistry, College of Science, King Saud University, Riyadh, Saudi Arabia.

PMID: 39115732 DOI: 10.1007/s11356-024-34602-1

Abstract

We prompted to characterize a wastewater bacterium, Pseudoxanthomonas mexicana GTZY, that efficiently transforms toxic mercury and arsenic, explores its bioremediation capability, and reveals their relevant gene resistance operons. The isolated strain was characterized by its phylogenetic, biochemical, and phenotypic properties. The strain GTZY potentially removed 84.3% of mercury and their mercury volatilization (Hg(II) to Hg(0)) was confirmed using the X-ray film method, and its

2. Pitchaimani VS, Joe RJ, Shyamala G, Manjula G, Hemalatha B, Babu MD, Ezhil SS, Ravindran G. Multivariate statistical and hydrogeochemical analysis of seasonal groundwater quality variations in coastal villages of Trivandrum district, south India. Discover Sustainability. 2024 Nov 1;5(1):372.

Discover Sustainability

Case Study

Multivariate statistical and hydrogeochemical analysis of seasonal groundwater quality variations in coastal villages of Trivandrum district, south India

V. Stephen Pitchaimani[1] · R. J. Jerin Joe[1,2] · G. Shyamala[2] · G. Manjula[4] · B. Hemalatha[5] · M. Dinesh Babu[6] · S. Shenbaga Ezhil[7] · Gobinath Ravindran[3]

Received: 18 August 2024 / Accepted: 17 October 2024
Published online: 01 November 2024

Abstract
This study attempts a detailed assessment of the quality of groundwater in the coastal region of Trivandrum District, Kerala where groundwater is the main source of drinking water. Forty groundwater samples were collected during the pre-monsoon and post-monsoon periods. The collected samples were analyzed for physical properties such as electrical conductivity (EC), pH, total dissolved solids (TDS), and total hardness, along with chemical properties, including major cations (Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}) and anions (Cl^{-}, SO_4^{2-}, HCO_3^{-}, NO_3^{-}). The analysis of groundwater quality reveals significant spatial and seasonal variations caused by both natural and manmade influences. Water Quality Index (WQI), hydrogeochemical plots, and Principal Component Analysis (PCA) were used to analyses the data. The results show that Vakkom, Kazhakottam, Veli-Attipara, and Pozhiyoor show significant deterioration, and areas such as Varkala, Ayroor, and Edava generally maintain good water quality. The Water Quality Index (WQI) assessment indicates that approximately 22.5% of the studied area falls under excellent quality, while 17.5% is classified as poor. The WHO standard and BSI standards were used to derive the WQI. Principal Component Analysis (PCA) identified electrical conductivity, total dissolved solids, and total hardness as the primary factors affecting groundwater quality, explaining 65.17% and 61.03% of the total variance in the pre-monsoon and post-monsoon periods, respectively. Hydrochemical plots collaborate these results, emphasize the influence of rock-water interactions as the main geochemical process, further compounded by pollution from agricultural runoff and urban development. These findings highlight the need for sustainable groundwater management strategies in coastal communities. Effective measures, including pollution mitigation, sustainable agricultural practice, proper waste management, and preservation of freshwater ecosystems, are essential for ensuring the sustainability of groundwater resources.

Keywords Groundwater quality · Principal component analysis (PCA) · Water quality index (WQI) · Hydrogeochemical facies · Spatial interpolation

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3. Rammohan B, Partheeban P, Ranganathan R, Balaraman S. Groundwater Quality Prediction and Analysis Using Machine Learning Models and Geospatial Technology. Sustainability. 2024 Nov 12;16(22):9848.

sustainability

MDPI

Article

Groundwater Quality Prediction and Analysis Using Machine Learning Models and Geospatial Technology

Bommi Rammohan [1], Pachaivannan Partheeban [2,*], Ranilhemamalini Ranganathan [3] and Sundarambal Balaraman [4]

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* Correspondence: dean.pd@citchennai.net

Abstract: The most prominent source of drinking water is groundwater, followed by lakes and reservoirs. Hydrological parameters like temperature, dissolved oxygen, pH, conductivity, ORP, and turbidity often change due to waste dumping into natural drinking water sources, particularly in densely populated areas. As a result, the water quality must be tested before public consumption to ensure healthy living in society. This research collected water samples from 129 wells in the Kanchipuram district in Tamil Nadu, India. An efficient integrated machine-learning-based prediction model has been proposed and modeled to determine the groundwater quality index (GQI). Several machine learning models were used to predict the water's quality, including the naïve Bayes model, the KNN classifier, and the XGBoost classifier. Water quality predictions in 2024 were made using a combination of classification algorithms and models based on long short-term memory (LSTM) neural networks. The projected water quality characteristics were analyzed using geographical information system (GIS) technology to better understand and visualize the results. The XGBoost classifier model outperforms prior findings in the literature, with an accuracy of roughly 94.6%. The classification and prediction model was validated using collected and tested current data samples from a selected well. The findings were accurate within the 5% error range, promoting sustainability.

Keywords: water quality index; extreme gradient (XG) boost classifier model; long short-term memory neural networks; geographical information system; prediction; sustainability

Citation: Rammohan, B.; Partheeban, P.; Ranganathan, R.; Balaraman, S. Groundwater Quality Prediction and Analysis Using Machine Learning Models and Geospatial Technology. Sustainability 2024, 16, 9848. https://doi.org/10.3390/su16229848

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1. Introduction

Hydrology, biology, and physical chemistry are the three major aspects that describe water bodies completely. Effective analysis of all these elements is needed for a full water quality assessment. The hydrological cycle connects all groundwater bodies from the atmosphere to the ocean. Freshwater bodies of lakes, rivers, streams, or groundwater are the hydrological cycle parts discussed in this article. In terms of direction and velocity, groundwater has consistent flow characteristics. The permeability and porosity of the geological substrates are primarily responsible for the average flow velocities observed in groundwater.

The chemical content of water bodies varies depending on local hydrology, temperature, the ocean's location, and soil cover, among other factors [1,2]. According to the response variable, if water bodies were fully unaffected by anthropogenic causes, 90–99% of freshwater would have natural chemical compositions suitable for marine life, as well as most human activities. Rare (approximately 1% and 10% of their geographical spread) and

4. **Priyadharshini DS, Ramesh GP. Remote sensing images for water quality monitoring based on deep learning model: A survey. InComputer Science Engineering 2024 Dec 20 (pp. 49-61). CRC Press.**

Chapter

Remote sensing images for water quality monitoring based on deep learning model: A survey

By D. Shofia Priyadharshini, G.P. Ramesh

Book Computer Science Engineering

Edition	1st Edition
First Published	2024
Imprint	CRC Press
Pages	13

ABSTRACT

Water quality is compatible with long-term effective consideration. Water quality has been monitored using remote sensing satellite data, which has shown to be unreliable. This paper examines the usefulness of Deep Learning (DL) algorithms for assessing water quality metrics such as PH, Dissolved Oxygen (DO), CODMn, and NH3-H. This review presents diverse models and methodologies on several Deep Learning (DL) architectures in the literature with regard to satellite remote sensing pictures for monitoring the water quality indicators. Remote Sensing (RS) technologies driven by Artificial Intelligence (AI) have emerged as one of the most sought-after approaches for automated water information extraction and hence intelligent monitoring. In

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NSF/BGCA/SPIHER/2022/25

This is to certify that St. Peter's Institute of Higher Education and Research, Avadi, Chennai - 600 054, Tamil Nadu has been honoured with "Best Green Campus Award" for maintaining the campus as per the "Green and Energy Conservation Building Code". The Organization imparts the thrust of innovating new ideas to accomplish eco-friendly environment to the stakeholders. Energy and Environment Management Audits such as 'Green Campus Audit', 'Environment Audit' and 'Energy Audit' were carried out on 10th March 2022.

This Certificate is valid till 11th March 2025.
Ref. No: ISO/NSF/SER/R/07

(Dr. S. RAJALAKSHMI JAYASEELAN) Chairman of NSF Certified ISO QMS, EMS, EnMS, OHSMS

(Mr. BSC. NAVEEN KUMAR) Faculty, Mahatma Gandhi National Council for Rural Education Ministry of Higher Education, New Delhi.

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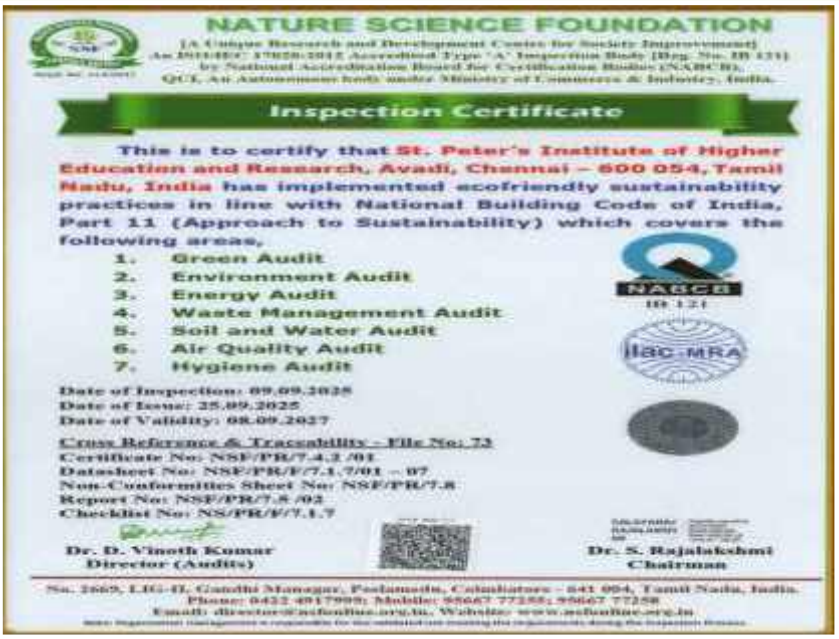
(Er. D. DINESH KUMAR) BEE Certified Energy Auditor Bureau of Energy Efficiency



NATURE SCIENCE FOUNDATION

Inspection Certificate

This is to certify that St. Peter's Institute of Higher Education and Research, Avadi, Chennai – 600 054, Tamil Nadu, India has implemented ecofriendly sustainability practices in line with National Building Code of India, Part 11 (Approach to Sustainability) which covers the following areas,

1. Green Audit
2. Environment Audit
3. Energy Audit
4. Waste Management Audit
5. Soil and Water Audit
6. Air Quality Audit
7. Hygiene Audit

Date of Inspection: 09.09.2025
Date of Issue: 25.09.2025
Date of Validity: 08.09.2027

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Non-Conformities Sheet No: NSF/PR/7.8
Report No: NSF/PR/7.8 /02
Checklist No: NS/PR/F/7.1.7

Dr. D. Vinoth Kumar
Director (Audits)

Dr. S. Rajalakshmi
Chairman

Conclusion:

In conclusion, the institution's initiatives under **SDG 17.3.6** strongly reflect its commitment to strengthening international cooperation through active participation in global community-based programmes, social impact activities, and collaborative humanitarian efforts. By engaging students, faculty, and stakeholders in initiatives that promote global citizenship and shared responsibility, the institution has contributed meaningfully to human-centered sustainable development.

These activities have helped build awareness on global issues, supported cross-border dialogue, and fostered partnerships that prioritize people's well-being. Through continued involvement in international community outreach and socially responsible programmes, the institution actively advances **SDG 17.3.6**, reinforcing the importance of inclusive, compassionate, and globally connected human efforts toward sustainable progress.