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IWW

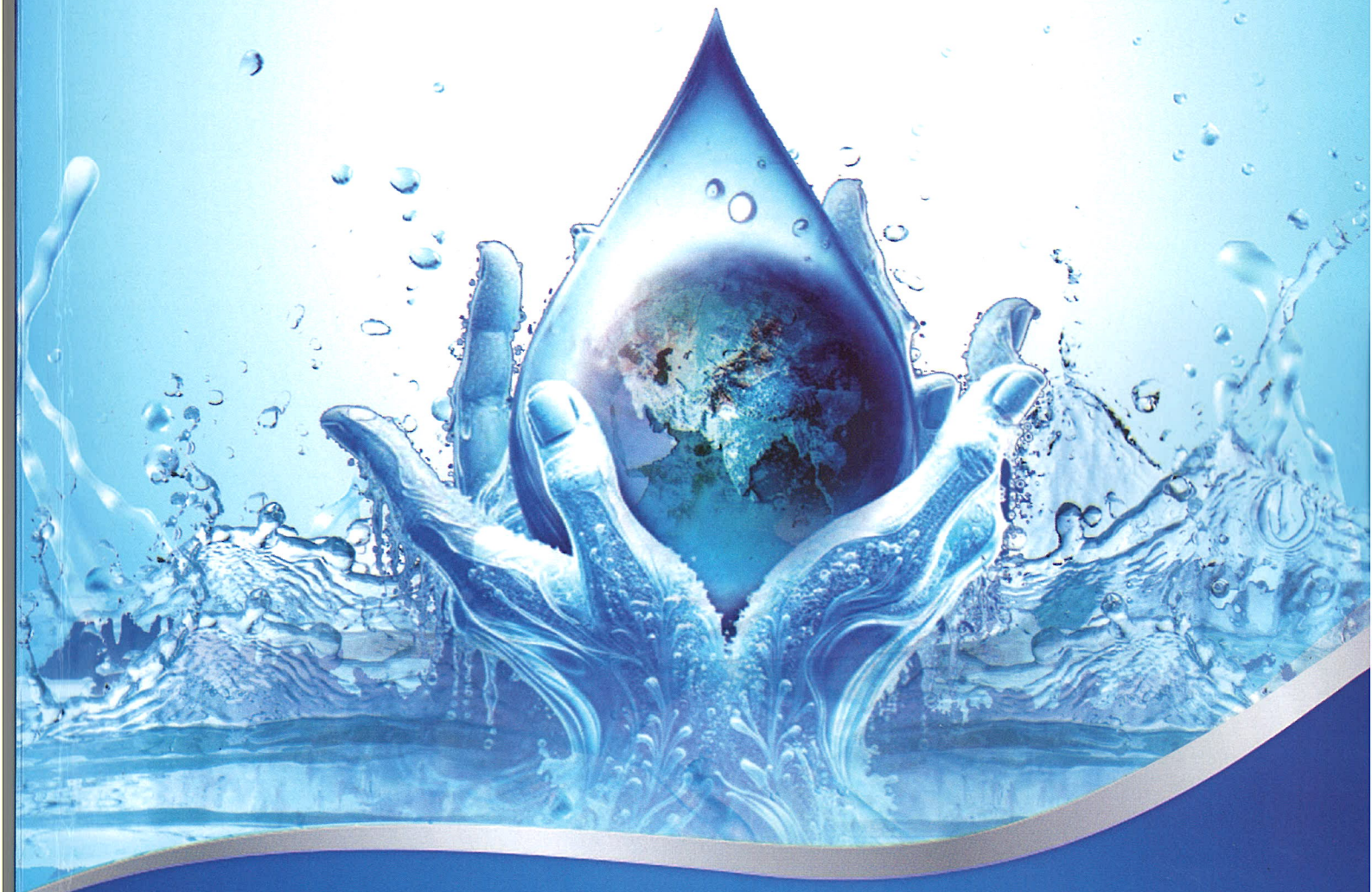
8th INDIA WATER WEEK- 2024

Partnerships and Cooperation for Inclusive Water Development and Management

17-20 SEPTEMBER, 2024

BHARAT MANDAPAM & HALL 12-A, NEW DELHI

PROCEEDINGS



- **Multi-Disciplinary** Forum
- **Promotional** Facilities
- **4,800 sq.m.** Exhibition
- **3000+** Delegates

INDIA'S INTERNATIONAL WATER RESOURCES EVENT

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Deriving a drinking water quality surveillance index and its mapping for Maharashtra

ABSTRACT

The paper discusses the derivation of a drinking water quality surveillance index, which helps identify vulnerable areas for surveillance of water pollution or water quality deterioration and which requires stringent monitoring. The index helps compute the vulnerability of an area to public health risks associated with poor quality of water resources. This composite index has three dimensions, viz., Threat, Exposure and Vulnerability and to cover these dimensions, seven sub-indices have been identified, as follows. 1] availability of drinking water resources and pollution; 2] accessibility of water; 3] infrastructure characteristics; 4] public health outcomes; 5] water quality index; 6] institutions and management index; and, 7] climate, population density and flood proneness. The number of "minor" factors (22 of them) which together are considered to have influence on the measure of these sub-indices, the underlying assumptions, the methods for methods and procedure to compute and the data sources are also discussed. Lower the value of the index, higher is the vulnerability of the region to public health hazards associated with exposure to contaminated or polluted water. The values of the index are computed for all the 354 blocks from the 36 districts of Maharashtra are computed using secondary data on all the and the areas that require surveillance are identified. Though the index is developed for the state of Maharashtra, it can be used for any region in the country.

Keywords: Water supply surveillance; water quality monitoring; water quality surveillance; composite index; public health risk

Integrated Hydrogeochemical Evaluation of Groundwater Quality for Diverse Water Uses in the Ayad River Basin, Udaipur, India

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ABSTRACT

Globally, about 5.25 billion people rely on groundwater, with quality significantly impacting human health and agriculture. Factors influencing groundwater composition include landuse, waste seepage, soil properties, and geological settings. In Rajasthan, primary groundwater quality issues are due to fluoride, nitrate, chloride, and calcium. This study analyzed data from the Ground-Water-Department (GWD) and Central-Ground-Water-Board (CGWB) from 2000-2021, along with citizen science data from 2022-2023, focusing on the Ayad River Basin, Udaipur. Physico-chemical parameters were evaluated to determine suitable and unsuitable areas for groundwater abstraction for drinking and irrigation. The Weighted Arithmetic-Water-Quality-Index (WAWQI) method was used to compute the Groundwater-Quality-Index (GWQI) from 2000-to-2023, revealing a decreasing quality trend from west to east. The southern basin areas, including Umarda, Ramgiri, Undri, and Hariyab, showed a GWQI below 50, indicating good quality, while Bhoyana, Khemli, and Sisarma had the highest indices. The results of the salinity hazard test showed that salinity is the major issue in the eastern Ayad River Basin. Though the groundwater is notably hard, a comprehensive analysis of various parameters nevertheless suggested its suitability for irrigation purposes. These findings provide critical insights for decision-makers to develop strategies to preserve groundwater quality.

Keywords: Hydrochemistry, arid regions, groundwater quality index, Ayad River Basin in the state of Rajasthan.

ne Pushkar City, Rajasthan. The various combinations of input variable were utilized based on monthly rainfall c
ging technique for the development of models. The rainfall data set collected from the water resources departm
Rajasthan, covers the period from 1986 to 2016. In the present study, random forest (RF) and hybrid (M5Ru
P) techniques were applied to predict monthly rainfall. The results obtained by RF and hybrid models were compa
n observed rainfall and predicted model based on statistical indices such as Nash Sutcliffe Efficiency (NS
relation Coefficient (CC), Willmott's Index (WI), Root Mean Square Error (RMSE), and Normalized Root M
uare Error (nRMSE). The results show that the performance of the RF model (NSE = 0.410, CC = 0.641, WI = 0.9
SE = 60.663 mm, & nRMSE = 1.480) with 10 input variables is found to be superior in comparison to the hy
del in estimating monthly rainfall for Pushkar city.

ABSTRACTION IDENTIFIABILITY THROUGH REGULARIZATION OF GROUNDWATER MODELS IN A DATA-SCARCE AREA EXEMPLIFIED BY THE AYAD RIVER BASIN

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Introduction

The groundwater system of Ayad River Basin, Rajasthan, India, is overexploited and the water demand is steadily increasing. Estimates of the water balance components are associated with large uncertainty, which complicates sustainable water management of the area. This specifically concerns groundwater abstraction, which in the study has been estimated through indirect methods. The hydrogeological data availability of the Ayad River Basin is relatively low. The water level has only been recorded twice a year, and surface water discharge measurements are not available. Further, the spatial distribution of hydraulic properties is not characterized. Intuitively, the available data will therefore likely only support a simpler groundwater model with lower data requirements.

The overall hypothesis we seek to address is whether the groundwater abstraction rate can be determined from a highly parameterized model in a data-scarce area. Indirect methods for estimation of groundwater abstraction can be applied based on e.g. water demand (Salem et al. 2017), closure term in water balance (Ruud et al. 2004) or water consumption (Pérez et al. 2019). Highly parameterized models offer an alternative solution, where the groundwater abstraction estimates can be estimated by calibrating against historical measurements of hydraulic head. In this study, we test different parameterization and regularization strategies and evaluate the reliability of the estimated groundwater abstraction estimates.

COMMUNITY PARTICIPATION IN TRADITIONAL WATER MANAGEMENT IN ASSAM

Dr. Luna Moni Das, Assistant Professor (SSc), NERIWALM
Dr. Sanayanbi Hodam, Assistant professor (WRE), NERIWALM

Abstract

Assam is a land of diverse tradition and culture spreading over vast alluvial plains of mighty Brahmaputra. The river Brahmaputra transcendent the beautiful state from east to west leading to the formation of many fluvial landforms and become the main source of water and life to the people of Assam. According to the Central Water Commission, the Brahmaputra river has the highest water resource potential, however, the water utilization is very less compared to other river basins of India. All the north bank tributaries of Brahmaputra that originates in Himalayas are flashy in nature and cause sever flood during rainy season whereas during dry spells many of these river dries out with critically low discharge. All the communities of Assam have developed certain ways to manage water related problems. This paper is a review of all the traditional water management practices in Assam involving community participation. Some of them that have included in this paper are the Paik System of Ahom, Thengal Kachari's community involvement in digging pits, Kare Okum construction by Mishing tribes, digging Khernai by Dimasa community and dong construction by Bodo community. This paper also gives recommendations for incorporation of technical interventions to improve their effectiveness and sustainability.

CITIZEN SCIENCE FOR WATER MANAGEMENT: COMPREHENSIVE APPROACH TO CONSERVE ECOHYDROLOGY OF AHAR RIVER BASIN

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Tanya Issar, Yogita Dashora
Keywords: Water quality, Biodiversity, water sustainability, water resource management, Citizen Science, Freshwater Lakes

Abstract

Water quality and public health are threatened by challenges faced by the River-Lake system of Ahar River basin, Udaipur, Rajasthan, India, such as nutrient pollution from leaching in the catchment area, reduced water holding capacity due to incoming silt, and water scarcity during drought periods. Additionally, urbanization around the lake is gradually affecting the shoreline, posing a threat to the water quality and public health. The key factors impacting the water quality of the Ahar River basin lakes include population growth, sewer drainage, irresponsible tourism expansion, overuse of fertilizers in the catchment, plastic waste, and proscribed dumping of medical biohazardous waste. These disturb the overall health of these drinking water supply lakes like Madar, Lakhawali, Govardhan Sagar, Pichola, and Fateh Sagar directly resulting in a threat to public health. The lakes' water spread area covers about ~25 percent of Udaipur city (64 sq km) which could be managed efficiently if the local citizens had contributed to monitoring and data collection. Studies have highlighted the potential for worldwide application of citizen science initiatives, using low-cost simple tools for generating long-term time series data sets, which may also help monitor climate change, generate awareness amongst citizens and contribute to scientific research. A similar initiative was undertaken in Udaipur where the citizen science network from 18 institutions monitored the chemical, biological and physical parameters of surface water bodies near respective institutions and represented the upper, middle, and lower basin of Ahar River as a whole. This was a collaborative research study between partners from India and Denmark using citizen science as a methodological tool. A cohort of 500 citizen scientists was formed through mobilization and awareness generation workshops. Citizen scientists, with assistance from researchers in a co-learning framework, acquired skills to collect water quality data from surface water bodies across the Ahar River basin, map contamination sources, and record flora and fauna species. The data collected shows water bodies lying in the lower basin to be most contaminated due to the mixing of city sewer loadings and industrial effluents draining into natural drains. The water bodies lying in the upper basin were found to be relatively cleaner. These inferences were drawn based on dissolved oxygen that was calculated. There was a presence of aquatic weeds like water hyacinth, Typha, pondweed, Lemna, and alligator weed were present in water bodies indicating biological as well as chemical contamination. Thus this study has proved to be helpful in the comprehensive assessment of the health of surface water bodies in Udaipur as well as in creating scientific literacy and awareness among citizens. This might further be used in water resource management planning, generating awareness to a wider group of audiences, and inducing climate change education in academia.

DAY-2
SESSION-3
DATE: 18.09.2024 **TIME: 14:15 to 15:45 Hrs.**

HALL	SESSION WISE PROGRAM (TIME: 14:15 to 15:45 Hrs.)	KEYNOTE SPEAKER/MODERATOR/CHAIR & CO-CHAIR	PANELIST/PRESENTERS
Audi-1	**COUNTRY FORUM (CF-3)** **Other Countries**	**Moderator:** Ms. Anju Gaur, Senior Water Resources Management Specialist, The World Bank **Chair:** Shri A B Pandya, Secretary General, ICID	**Presenter:** Representatives from invited Countries
Hall–1 (MR-6)	**WC-11 Ground Water Sustainability and Management.** (i) Ground Water Assessment — Tools & Techniques. (ii) Challenges in Sustainable Management of Ground Water. (iii) Water Security Plans at Local Level.	**Chair:** Shri S.K. Ambast Chairman, CGWB **Co-Chair:** Shri Sushil Gupta, Former Chairman, CGWB	**Paper Presenter:** 1. Shri Kanwar Parduman Singh 2. Shri Sushindra Kumar Gupta 3. Shri Bijit Dutta 4. Shri Vijay Gawade 5. Ms. Iti Gupta 6. Shri Kuldeep Pareta 7. Shri Abhilash Kumar Paswan 8. Shri Binaya Kumar Behra & Shri Sambit Samantaray
Hall-2 (MR-7)	**PF-5 Open, Integrated and Shared Water Data and Informatics**	**Chair:** Shri Gaurav Gupta ACS, Energy Department, Govt. of Karnataka **Co-Chair:** Dr. Alok Sikka, Country Representative, IWMI	**Presenters:** 1. Shri Gaurav Gupta, ACS, Energy Department Karnataka. 2. Dr. Alok Sikka, Country Representative, IWMI. 3. Shri Anand Mohan, Joint Secretary (RD & PP), MoJS 4. Dr. Anish Kumar, Senior Hydro-informatics Consultant, World Bank 5. Shri Bijay Kumar Bhagat, SE, WRD, Jharkhand 6. Shri Prashant Kumar, Director, Mathematical Modelling Centre, WRD, Bihar
Hall-3 (MR-19)	**WC-8 Challenges in Water Sector Infrastructure** **4.** Water Sanitation and Hygiene (WASH). **5.** Improvement in Water Use Efficiency in Existing Water Infrastructure.	**Chair:** Ms. Dina Umali-Deininger, Regional Director, Sustainable Development, The World Bank **Co-Chair:** Shri Anshuman Director, TERI	**Paper Presenter:** 1. Shri Tuhin Banerji 2. Shri Pradeep Bhalage 3. Shri Sreekanth Sampath 4. Shri Dilip Durbude 5. Shri Hodam Sanayanbi
Hall-4 (MR-10)	**COUNTRY FORUM (CF-4)**	**6th INDIA EU Water Forum**	**Time: 10:00 to 17:00 Hrs.**