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A Discussion on Pollution of Groundwater

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Abstract: Groundwater is crucial to any region's development. It supplies most industrial, agricultural, and drinkable water. It was thought dirt and rock filtered groundwater. Wells may reveal groundwater contamination. This paper reviews groundwater contamination and pollution studies, pollutant types, and public health effects. The biological, chemical, and physical factors that control subsurface pollutant fate and mobility are widely studied in groundwater contamination studies. Water with excessive chemical concentrations may be harmful. Epidemiological study links bad drinking water used as a key transit route to many waterborne infections. Many man-made compounds and bacteria may pollute groundwater. Drinking germy water raises your chances of cholera or hepatitis. Lead causes learning impairments in children, nerve, kidney, and liver problems, and increased pregnancy risk. Protection methods are cheaper and easier than groundwater contamination remediation. The best treatment strategy depends on site-specific characteristics and cleaning goals like human health and environmental protection.

Keywords: Contamination, Groundwater, Pollution, Toxins, Monitoring

REFERENCES

- [1]. H.I.Z. "Al-Sudani, Hydrochemical Evaluation and Utilization of Groundwater". Khanaqin Area, Diyala Governorate East of Iraq. Iraqi Journal of Science, 59 (4C), 2018, 2279-2288.
- [2]. S. S. D. "Foster and P. J. Chilton, Groundwater: The Processes and Global Significance of Aquifer Degradation," Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, 358 (1440), 2003, 1957-1972. doi:10.1098/rstb.2003.1380
- [3]. T. Harter, "Basic Concepts of Groundwater Hydrology. A.N.R. Publication 8083", FWQP Reference Sheet 11.1, University of California. U.S.A. 2015.
- [4]. U.S. Environmental Protection Agency. Wellhead Protection: A Guide for Small Communities, Chapter3: Ground Water Contamination, Office of Research and Development, Washington, DC 20460.144p. 1993.
- [5]. S. Selvakumar, N. Chandrasekar and G. Kumar, "Hydrogeochemical characteristics and groundwater contamination in the rapid urban development areas of Coimbatore, India". Water Resources and Industry, 17, 2017, 26–33.
- [6]. C.Z. Sun and S.S. Lin, "Review of ground water vulnerability concept and assessment", Jilin Geology,19, 2000, 30-6
- [7]. S. Foster, J. Chilton, M. Moench, F. Cardy and "M. Schiffler, Groundwater in Rural Development: Facing the Challenges of Supply and Resource Sustainability", World Bank Technical Paper 463, Washington DC. U.S.A. 2000.
- [8]. M. Amirabdollahian and B. Datta, "Identification of Contaminant Source Characteristics and Monitoring Network Design in Groundwater Aquifers": An Overview. Journal of Environmental Protection, 4, 2013, 26-41
- [9]. "U.S. Environmental Protection Agency. Wellhead Protection: A Guide for Small Communities", Chapter 3: Ground Water Contamination, Office of Research and Development, Washington, DC 20460.144p. 1993.
- [10]. "S. Foster, J. Chilton, M. Moench, F. Cardy and M. Schiffler, Groundwater in Rural Development": Facing the Challenges of Supply and Resource Sustainability, World Bank Technical Paper 463, Washington DC. U.S.A. 2000.

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International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

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- [11]. "S. Foster, R. Hirata", D. Gomes, M. D'Elia and M. Paris, Groundwater Quality Protection. World Bank, Washington DC, U.S.A., 2002, 103 p. doi:10.1596/0-8213-4951-1
- [12]. A. Fadlelmawla and M. A Dawoud, "An Approach for Delineating Drinking Water Wellhead Protection Areas at the Nile Delta", Egypt, Journal of Environmental Management, 79 (2), 2006, 140-149.
- [13]. S. Y. Feng, S. Y. Huo, S. Z. Kang, Z. J. Tang and F. X. Wang, "Groundwater Simulation Using a Numerical Model under Different Water Resources Management Scenarios in an Arid Region of China", Environmental Earth Sciences, 62 (5), 2011,961-971.
- [14]. X. H. Wang, "Conceptual Design of a System for Selecting Appropriate Groundwater Models in Groundwater Protection Programs", Environmental Management, 21 (4), 1997, 607-615. doi:10.1007/s002679900053
- [15]. W. Zhou, B. F. Beck, A. J. Pettit and B. J. Stephenson, "A Groundwater Tracing Investigation as an Aid of Locating Groundwater Monitoring Stations on the Mitchell Plain of Southern Indiana", Environmental Geology, 41 (7), 2002, 842-851.
- [16]. G. Allenby and M. Margaret, "World, Environment and People. Science Press", N.S.W., Australia. 1993.
- [17]. A.D. Viste and A.J. Rice, Major sources of groundwater contamination; "Assessing the extend of point and Non-point Contamination in Shallow. Aquifer System". Groundwater Contamination and Control. Edited by Uri Zoller. 1994.
- [18]. C. Berka, D. McCallum and B. Wernick, "Resource Management and Environmental Studies". Department of Civil Engineering, University of Columbia, Vancouver, Bc, Canada. Paper presented at: Lower Fraser Basin in transition: Symposium and Workshop, Kwantlen College, Surrey, BC, Canada. 1995.
- [19]. C.E. Boyd, Water Quality. "An Introduction. Kluwer Acad. Publisher", U.S.A. 330 p. 2000.
- [20]. M.J. Hammer, "Water and Wastewater Technology", 3rd Edition, Published by Prentice-Hall Inc, Englewood Cliff, New Jersey. 1996.
- [21]. J. Nathanson, "Basic Environmental Technology, Water Supply, Waste Management and Pollution Control". 2nd (eds) Published by Prentice-Hall Inc. 1997.
- [22]. WHO: "World Health Organization. Guidelines for Drinking Water Quality", 2nd (eds), Vol.1. Recommendations. World Health; Geneva. 445p. 1993.
- [23]. V.N. Reinhold, "Ground water Treatment Technology, 2nd Ed. Evan K Nyer". 1992.
- [24]. M. J. Beckett, "Land Contamination", Contaminated Land, Problems and Solution. Edited by Tom Cairney. Published by Chapman and Hall. 1993.
- [25]. E. G. Blight, "On Isolating a Landfill from the Surrounding Water regime". Microbiology of Landfill Sites, Eric Senor, 2nd ed, Published by C.R.C. Press. 1995.
- [26]. U.S. Environmental Protection Agency. "Wellhead Protection: A Guide for Small Communities", Chapter 3: Ground Water Contamination, Office of Research and Development, Washington, DC 20460.144p. 1993.
- [27]. "V.N. Reinhold, Ground water Treatment Technology", 2nd Ed. Evan K Nyer. 1992.
- [28]. Y.Y. Zhao and Y.S. Pei, "Risk evaluation of groundwater pollution by pesticides in China: a short review". The 18th Biennial Conference of International Society for Ecological Modelling, Procedia Environmental Sciences, 13, 2012, 1739 -1747.
- [29]. Briffett, L. Houlden, S. Kirk, A. McMahon, P. Miles, R. Stephenson and E. Walker, "Groundwater Pollution Research Reviews. Geraghty and Miller International", Inc Conqueror House, Vision Park, Histon. Cambridge.85 p. 1996.
- [30]. C.A.J. Appelo and D. Postma, "Geochemistry, Ground water and Pollution", A.A. Balkama, Rotterdam. 536 p. 1999.
- [31]. A.D. Eaton, L.S. Clesceri and A.E. Greenbury, "Standard methods for the examination of water and waste water", American Public Health Association, American Water Works Association and Water Environment Association, Washington D.C., U.S.A. 1995.
- [32]. W. Merit and D. Press, "Water Quality and Pig Performance". Facts sheet; Ministry of Agriculture, Food and Rural Affairs, Ontario. 1997.

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International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 3, Issue 5, June 2023

- [33]. D.A.M. Barzinji and D.G.A. Ganjo, "Water Pollution", Limnological Investigations in Kurdistan region and Other part of Iraq. International Journal of Science, Environment and Technology, 3 (3), 2014, 776–799
- [34]. C. Barid and M. Cann, "Environmental chemistry". 3rd Edition, W.H Freeman and Company press, pp 425. U.S.A. 2005.
- [35]. M. Ford, J.H. Tellam and M. Hughes, "Pollution-Related Acidification in the Urban Aquifer, Birmingham", UK. Journal of Hydrolongy, 140, 1992, 297-312.
- [36]. J.H. Tellam, "The Groundwater Chemistry of the Lower Mersey Basin Permo-Triassic Sandstone Aquifer System", U.K. 1980 and Pre-Industrialisation Urbanisation. Journal of Hydrology, 161 (1-4), 1994, 287-325
- [37]. D.N. Lemer and J.H. Tellam, "The Protection of Urban Groundwater from Pollution. Journal of the Institute of Water and Environmental Management", 6 (1), 1992, 28-37.
- [38]. M.P. Henton and P.J. Young, "Contaminated Land and Aquifer Protection. Journal of the Institute of Water and Environmental Management", 7(5), 1993, 539-547.
- [39]. H. Robinson, J. Gronow, P.S. Durrant, M. Taylor, C.E. Reeve, P.G. Mackey, R. Mull and J.P.L. "Dearlove, Groundwater Protection in the U.K. Assessment of the Landfill Leachate Source Term. Journal of the Institute of Water and Environmental Management", 6 (2), 1992, 229-236.
- [40]. U.K. Singh, M. Kumar, R. Chauhan, P.K. Jha, A. Ramanathan and V. Subramanian, "Assessment of the impact of dumpsite on groundwater quality: a case study of the Pirana site in western". India. Environmental Monitoring Assessment 141, 2008, 309-21.
- [41]. K. S. Makey, "Natural Buffers for Sludge Leachate Stabilization, Groundwater", 20 (4), 1982, 420-429.
- [42]. R.Muralidaran, G.Muthaiyan, M.Nicky wifred joseph, M.Sugumar, S.Suresh babu, "Analysis of Surface and Ground Water in Ranipet Industrial Area" SSRG International Journal of Civil Engineering 4.3 (2017): 54-57.
- [43]. P.L. Walker, S. Munro, C.L. Hawkings, and F.E. Shepherd, "The Application of Risk Assessment to Contaminated Land The British Gas Experience". Journal of the Institute of Water and Environmental Management, 8 (6), 1994, 607-614.
- [44]. J.A. Cole, R.L. Norton and H.A.C. Montgomery, "Countering Acute Pollution Events Procedures Currently being adopted in the United Kingdom" Water Science and Technology, 29 (3), 1994, 203-205
- [45]. P. Bardos and H.J. "van Veen, Review of Longer Term or Extensive Treatment Technologies". Land Contamination and Reclamation, 4 (1), 1996, 19-36.
- [46]. B.J. Alloway and A.P. Jackson," The Behavior of Heavy Metals in Sewage Sludge Amended Soils". Science of the Total Environment, 1000, 1991, 223-257.
- [47]. B.J. Alloway and D.C. Ayres, "Chemical Principles of Environmental Pollution, Blackie, Glasgow". 1994.
- [48]. K.J. Readdy and J.M. Lin, "Nitrate removal from groundwater using catalytic reduction. Science direct research" .34 (3), 1999, 14.
- [49]. L.J. Puckett and K.C. Timothy, "Transport and Fate of Nitrate in a Glacial Outwash Aquifer in Relation to Ground Water Age, Land Use Practices, and Redox Processes". United States Geological Survey USGS. American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America. Journal of Environmental Quality 31, 2001,782-796.
- [50]. R.C. Leyland, "Vulnerability Mapping in Karst Terrains, Exemplified in the Wider Cradle of Humankind World Heritage Site". MS.c thesis University of Pretoria, South Africa. 2008.
- [51]. N. Goldscheider, "Karst groundwater vulnerability mapping: application of a new method in the Swabian Alb", Germany. Hydrogeology Journal, 13, 2005, 555–564.
- [52]. Margane, "Management, Protection and Sustainable Use of Groundwater and Soil Resources in the Arab Region". Guideline for the Delineation of Groundwater Protection Zones. Vol. 5, ACSAD-BGR Technical Cooperation Project. 2003.
- [53]. A.O. Akankpo and M.U. Igboekwe, "Monitoring Groundwater Contamination Using Surface Electrical Resistivity and Geochemical Methods". Journal of Water Resource and Protection, 3, 2011, 318-324

DOI: 10.48175/568

ISSN 2581-9429 IJARSCT



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International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

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- [54]. S.Y. Chen, G.T. Fu, H.C. Zhou and G.L. Wang, "Fuzzy analysis model and methodology for aquifer vulnerability evaluation". Journal of Hydraulic Engineering. 7, 2002, 23-30.
- [55]. S.Y. Chen and G.L. "Wang Fuzzy optimization interaction model for assessing groundwater pollution potential and case study". Journal of Dalian University of Technology. 39, 1999, 811-5.
- [56]. Z. Fang, C.L. Xiao, X.J. Liang and B. Feng "Fuzzy comprehensive evaluation of the groundwater vulnerability in songnen plain". Journal of Jilin University (Earth Science Edition), 3, 2007, 546-50.
- [57]. L.J. Zhang, Z.Y. Gong and X.T. "Sun Fuzzy comprehensive judgment of groundwater environmental vulnerability". Natural Sciences Journal of Harbin Normal University, 17, 2001, 109-12.
- [58]. H.G. Brutland, "World Water Day Thursday 22 March. Help Make the difference". 2001.
- [59]. W.C. Michiels and D.L.E. "Moyson, Bacteriological Analysis. Handbook of Water Analysis"; edited by Leo M.L.Nollet. Published by Marcel Dekker Inc. 2000.
- [60]. UNEPA/WHO: United Nation Environmental Program Agency/ "World Health Organization. A practical Guide to the Design and Implementation of fresh water quality studies and monitoring". Edited by Jamie Bartram and Richard Balance. Publish on behalf of UNEPA/WHO. 1996
- [61]. M. Stevens, S. McCounell, P. Nadehaum, M. Chapman, S. Ananthakumar and J. McNeil, "Drinking Water Quality and Treatment Requirements": A risk based Approach. Water, 12-16. 1995,
- [62]. W.R. Mackenzie, N.J. Hoxie, M.E. Proctor, M.S. Gradus, K.A. Blair, "A massive outbreak in Milwaukee of cryptosporidium infection transmitted through public water supply". New Engineering Journal Med. 331 (3), 1994, 161-167.
- [63]. P.A. Roefer, J.T. Monscvitz and D.J. Rexing, "The Las Vegas cryptosporidiosis out break. JAWWA", 88, 1996, 95-106.
- [64]. E. E. Geldreich, "Microbial Quality of Water Supply in Distribution System". Publisher C.R.C. Press Inc, Co-operate N.W. Boca, Roton, Florida 33-41. 1996.
- [65]. WHO: World Health Organization, "Guideline for drinking water quality. Recommendations". 4th Ed. Geneva, World Health Organization. 520 p. 2011.
- [66]. F.G. Lee and J.L. Anne, "Public Health Significance of Waterborne Pathogens in Domestic Water Supplies and Reclaimed Water". 1993.
- [67]. R.Pakuththarivaalan, D.Ramraj, S.Shyam sunder, M.Shylaja, N.S.Ashik "Quality Analysis of Ground Water in Cuddalore District Neyveli Block using Conventional Method", International Journal of Engineering Trends and Technology (IJETT), V46(3),162-168 April 2017.
- [68]. D. Jennings, S. Paul and D.W. Diane, Nitrates in Drinking water. "Washington State Department of Health (WSDOH)". An electronic media retrieved from the website: http:// www.doh.wa.gov/ehp/dw. 1997.
- [69]. J.A. Hueb, "Improving Water, Planning and Management Worldwide". New World Water. Publication of World Water Council, France. 2001.
- [70]. H.I.Z. Al-Sudani, "Hyrogeological System of Debagah Basin In North of Iraq", Ph.D. Thesis, University of Baghdad, College of Science. 153 p. 2003.
- [71]. M.R. Rosen, R.R. Reeves, S. Green, B. Clothier and N. Ironside, "Prediction of Ground water nitrate contamination after closure of an unlined sheep feedlot. Vadose Zone Journal". 3 (6), 2004, 990-1006.
- [72]. D.Y. Kong, Z.L. Zhu, L.L. Shi, Z.J. "Shan and D.J. Cai, Effect of pesticides on groundwater under sweetpotato-based cropping systems in northern China". Journal Agro-Environ Sci, 23, 2004,1017-20.
- [73]. B.H. Li, Z.Y. Ren, H.H. Chen, X.J. Cao and F. Liu, "Residues of organochlorine pesticides in shallow groundwater of agricultural region in Taihu basin", Journal of Agro-Environ Sci.26, 2007, 1714-8.
- [74]. G.X. Huang, J.C. Sun, S. Wang, H.Y. Du, Y.D. Lu, B.F. Zhi,
- [75]. "Elementary research of organochlorine pesticide in groundwater of Pearl River delta". Journal Agro-Environ Sci, 27, 2008, 1471-5.
- [76]. A.O. Akankpo and M.U. Igboekwe, "Monitoring Groundwater Contamination Using Surface Electrical Resistivity and Geochemical Methods". Journal of Water Resource and Protection, 3, 2011, 318-324
- [77]. I.M. Al-Shamaa and B. M. Ali, "Hydrochemical Pollution of Groundwater in Badra-Jassan basin / Eastern of Iraq. Diyala Agricultural Sciences Journal". 3 (2), 2011, 669-679.

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International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

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[78]. S. Lo Russo and G. Taddia, "Aquifer Vulnerability Assessment and Wellhead Protection Areas to Prevent Groundwater Contamination in Agricultural Areas": An Integrated Approach. Journal of Water Resource and Protection, 4, 2012, 674-685

DOI: 10.48175/568

