JWARP> Vol.1 No.2, August 2009

OPEN ACCESS

Health Risk Assessment on Rural Drinking Water Safety —A Case Study in Rain City District of Ya ' an City of Sichuan Province

PDF (Size:272KB) PP. 128-135 DOI: 10.4236/jwarp.2009.12017

Author(s)

Fuquan NI, Guodong LIU, Huazhun REN, Shangchuan YANG, Jian YE, Xiuyuan LU, Min YANG

ABSTRACT

Taking Rain City District of Ya ' an for example, this paper based on ComGIS (Component Object Model Geographic Information System) platform takes comprehensive and systematic detection on the exposure dose of chemical carcinogens and non-carcinogens from drinking water sources in this region and discusses health risk assessment of single factor and the whole health risk assessment. As, Hg, Cr, Pb, Cd and fluorides in some drinking water sources of Rain City District are analyzed according to Standards For Drinking Wa-ter Quality (GB5749-2006). A health risk assessment model called USEPA is also applied to drinking water health risk assessment and management countermeasure is proposed. The results show that the greatest health risk for individual person per year is caused by Cr(VI). The health risk of carcinogens is much higher than that of non-carcinogens: the greatest risk value due to non-carcinogen pollutants is caused by fluoride (F), achieving 1.05×10-8/a. The ranking of risk values due to non-carcinogen pollutants by drinking water is Pb>fluoride (F)>Hg, within Pb accounting for 44.77%, fluo-ride (F) accounting for 34.30% and Hg accounting for 20.92%. The average individual carcinogenesis annual risk of Cr(VI) is the greatest, achieving 8.91×10-4/a. The ranking of risk value due to chemical carcinogen by rural drinking water of Ya ' an is Cr6+>As>Cd, within Cr6+ accounting for 91.12%, As accounting for 5.89% and Cd accounting for 3.00%. Based on this, the strategy and measures of the health risk management are put forward. This study has worked efficiently in practice. Compared with the same kind of methods which have been found, the paper has the outstanding results for the health risk assessment of the rural drinking water safety.

KEYWORDS

Rural Drinking Water Safety, Health Risk Assessment, ComGIS, Ya ' an

Cite this paper

F. NI, G. LIU, H. REN, S. YANG, J. YE, X. LU and M. YANG, "Health Risk Assessment on Rural Drinking Water Safety —A Case Study in Rain City District of Ya ' an City of Sichuan Province," *Journal of Water Resource and Protection*, Vol. 1 No. 2, 2009, pp. 128-135. doi: 10.4236/jwarp.2009.12017.

References

[1] [1] F. Wang, " Water pollution, unneglectable point, " Eco-logical Economy, No. 7, pp. 142-145, July, 2006.

[2] [2] M. Luo, " Analysis of the relationship between drinking water and health, " Guide of Chinese Medicine, Vol. 6, No. 14, pp. 160-161, July 2008.

[3] [3] F. Ni, et al., " Drinking water safety decision support system for rural areas in Ya ' an city of China, " in Pro-ceedings of the 5th International Conference on Urban Watershed Management & Mountain River Protection and Development, Vol. 2, Sichuan University Press, pp. 669-677, April 3-5, 2007.

[4] [4] D. Wang, et al., " Applications of the health hazard as-sessment for the environmental quality, " Environmental Pollution & Control, No. 5, pp. 91-92, July 1995.

[5] [5] U. S. National Research Council, " Risk assessment in the federal government: Managing the process, " National Academy Press, Washington, D. C., 1983.

• Open Special Issues
• Published Special Issues
• Special Issues Guideline

JWARP Subscription

Most popular papers in JWARP

About JWARP News

Frequently Asked Questions

Recommend to Peers

Recommend to Library

Contact Us

[6] [6] USEPA, “The risk assessment guidelines of l 986,” EPA Report, No. EPA/600/18-87/045, Washington, D. C..

[7] [7] “Superfund Public Health Evaluation Manual,” USEPA/ 540/186060, EPA.

[8] [8] J. Gao, L. Zhang, S. Huang, et al. “Preliminary health risk assessment of heavy metals in drinking waters in Beijing,” Environmental Science, Vol. 25, No. 2, pp. 47-50, 2004.

[9] [9] G. Zeng, L. Zhuo, Z. Zhong, et al., “Assessment models for water environmental health risk analysis,” Advances in Water Science, No. 3, pp. 212-217, September 1998.