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[JWARP](#) > Vol. 3 No. 11, November 2011



Remote Sensing & GIS Based Spatio-Temporal Change Analysis of Wetland in Dhaka City, Bangladesh

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ABSTRACT

Landscape of Dhaka city—one of the fastest growing mega cities in the world, is continuously changing due to un-planned urbanization. For example, the wetlands of the city have been shrinking. This study evaluates wetland changes in Dhaka Metropolitan Area (DMA), Bangladesh, between 1978 and 2009. Spatial and temporal dynamics of wetland changes were quantified using four Landsat images, a supervised classification algorithm and the post-classification change detection technique in GIS environment. Accuracy of the Landsat-derived wetland maps ranged from 87% to 92.5%. The analysis revealed that area of wetland and Rivers & Khals in Dhaka city decreased significantly over the last 30 years by 76.67% and 18.72% respectively. This changing trend of wetlands makes the drainage system of Dhaka City vulnerable, creating water logging problems and their consequences. Land filling and encroachment were recognized to be the main reasons for shrinking of the wetlands in the city. Development and alteration of the existing water bodies should consider the natural hydrological conditions.

KEYWORDS

Wetlands, Remote Sensing, GIS, Dhaka City, Bangladesh, Change Analysis

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References

- [1] A. H. Dani, "Dacca: A Record of Its Changing Fortunes. Ahmed Hasan Dani," Mrs. S. S. Dani, Dhaka, 1962.
- [2] J. I. C. A., "Master Plan for Greater Dhaka Protection Project (Study in Dhaka Metropolitan Area)," Japan International Cooperation Agency (JICA), Dhaka, 1991.
- [3] S. U. Ahmed, "Dacca: A Study in Urban History and Development," The Riverdale Company, Glenn Dale, 1986.
- [4] U. N., "Urban Geology of Dhaka, Bangladesh, Economic and Social Commission for Asia and the Pacific," Atlas of Urban Geology, United Nation (UN), New York, 1999.
- [5] N. Islam, "Mega City Problems: The Case Study of Dhaka'," In: N. Islam, Ed., Dhaka from City to Mega City, USP, Dhaka, 1996.
- [6] World Bank, "Dhaka Metropolitan Development Plan Strategic Environmental Assessment," SENES Consultants Limited in Association with Techno Consult International Ltd., Dhaka, 2007.
- [7] A. S. M. M. Kamal and S. Midorikawa, "GIS-Based Geomorphological Mapping Using Remote Sensing Data and Supplementary Geoinformation: A Case Study of the Dhaka City Area, Bangladesh," *International Journal of Applied Earth Observation and Geoinformation*, Vol. 6, No. 2, 2004, pp. 111-125. doi: 10.1016/j.jag.2004.08.003

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- [8] N. Islam, " Dhaka Now: Contemporary Urban Development," Bangladesh Geographic Society (BGS), Dhaka, 2005.
- [9] N. I. Khan, " Assessment of Water Logging Conditions Using Integrated GIS and Remote Sensing Techniques: A Study of Dhaka Mega City," *Oriental Geographer*, Vol. 45, No. 2, 2001, pp. 41-54.
- [10] M. S. Khan, et al., " Wetlands of Bangladesh," Bangladesh Centre for Advanced Studies (BCAS) in Association with Nature Conservation Movement (NA-COM), Dhaka, 1994.
- [11] N. Islam, " Dhaka: From City to Mega City," The University of Dhaka, Dhaka, 1996.
- [12] B. B. S., " 2004-Statistical Yearbook of Bangladesh, Bangladesh Bureau of Statistics (BBS)," Ministry of Planning, Government of People' s Republic of Bangladesh, Dhaka, 2004.
- [13] O. Mark, et al., " A Mouse GIS Study of the Drainage in Dhaka City," Surface Water Modeling Center (SWMC), Dhaka, 2001.
- [14] S. Rahman and F. Hossain, " Spatial Assessment of Water Quality in Peripheral Rivers of Dhaka City for Optimal Relocation of Water Intake Point," *Water Resources Management*, Vol. 22, No. 1, 2008, pp. 377-391. doi:10.1007/s11269-007-9167-y
- [15] Ramsar Convention Bureau, " Ramsar Handbooks for Wise Use of Wetlands," Gland, 2000.
- [16] ESCAP, " Urban Geology of Dhaka, Bangladesh," United Nations Economic and Social Commission for Asia and the Pacific, New York, 1999.
- [17] A. M. Dewan, and Y. Yamaguchi, " Landuse and Landcover Change in Greater Dhaka, Bangladesh: Using Remote Sensing to Promote Sustainable Development," *Applied Geography*, Vol. 29, No. 3, 2009, pp. 390-401. doi:10.1016/j.apgeog.2008.12.005
- [18] T. M. Lillesand and R. W. Kiefer, " Remote Sensing and Image Interpretation," John Willey and Sons, New York, 1999.
- [19] A. N. M. G. Reza and M. S. Alam, " Wetland Transformation in the Western Part of Dhaka City (1963-2000)," *Journal of Geography*, Vol. 21, 2002, pp. 23-40.
- [20] A. M. Dewan and K. T. M. Nishigaki, " Flood Hazard Delineation in Greater Dhaka, Bangladesh Using an Integrated GIS and Remote Sensing Approach," *Geocarto International*, Vol. 21, No. 2, 2006, pp. 33-38. doi:10.1080/10106040608542381
- [21] J. I. C. A., " Master Plan for Greater Dhaka Protection Project, Flood Action Plan, FAP 8A, Main Report and Supporting Reports I and II," Flood Plan Coordination Agency (presently WARPO), Dhaka, 1992.
- [22] W. A. S. A., " Dhaka Regional Groundwater and Subsidence Model," Dhaka Water Supply and Sewerage Authority (WASA), Dhaka, 1991.
- [23] J. U. Chowdhury, M. M. Kamal, N. I. Khan and M. A. Salam, " Impact of Land Use Change upon Storm Water Drainage and Wetlands in the Eastern Part of Dhaka City," *Integrated Water Flow Model*