

Hydrological Analysis for Urban Water Management

Authors : Ranjit Kumar Sahu, Ramakar Jha

Abstract : Urban Water Management is the practice of managing freshwater, waste water, and storm water as components of a basin-wide management plan. It builds on existing water supply and sanitation considerations within an urban settlement by incorporating urban water management within the scope of the entire river basin. The pervasive problems generated by urban development have prompted, in the present work, to study the spatial extent of urbanization in Golden Triangle of Odisha connecting the cities Bhubaneswar (20.2700° N, 85.8400° E), Puri (19.8106° N, 85.8314° E) and Konark (19.9000° N, 86.1200° E)., and patterns of periodic changes in urban development (systematic/random) in order to develop future plans for (i) urbanization promotion areas, and (ii) urbanization control areas. Remote Sensing, using USGS (U.S. Geological Survey) Landsat8 maps, supervised classification of the Urban Sprawl has been done for during 1980 - 2014, specifically after 2000. This Work presents the following: (i) Time series analysis of Hydrological data (ground water and rainfall), (ii) Application of SWMM (Storm Water Management Model) and other soft computing techniques for Urban Water Management, and (iii) Uncertainty analysis of model parameters (Urban Sprawl and correlation analysis). The outcome of the study shows drastic growth results in urbanization and depletion of ground water levels in the area that has been discussed briefly. Other relative outcomes like declining trend of rainfall and rise of sand mining in local vicinity has been also discussed. Research on this kind of work will (i) improve water supply and consumption efficiency (ii) Upgrade drinking water quality and waste water treatment (iii) Increase economic efficiency of services to sustain operations and investments for water, waste water, and storm water management, and (iv) engage communities to reflect their needs and knowledge for water management.

Keywords : Storm Water Management Model (SWMM), uncertainty analysis, urban sprawl, land use change

Conference Title : ICEWRM 2015 : International Conference on Environment and Water Resource Management

Conference Location : Tokyo, Japan

Conference Dates : May 28-29, 2015