INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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SHORT ABSTRACT

In the present study, various statistical methods were utilized as tools for water quality assessment of Brahmaputra River and its seven tributaries (Baralia, Puthimari, Pagladia, Beki, Manas, Kolong and Kameng River) as well as Deepor Beel, Assam (India). The study has been carried out in four phases. First phase includes the survey of study area as well as the collection and analysis of water samples. In the second phase, cluster analysis (CA), discriminant analysis (DA) and principal component analysis (PCA) were applied on the observed water quality data-sets. CA grouped all the sampling sites into three clusters, i.e. relatively less polluted (LP), medium polluted (MP), and highly polluted (HP) sites based on the similarities of the characteristics they possess. Result from CA was verified using DA, which helped in determining the continuous variables that discriminate two or more naturally occurring groups. PCA applied to the three separate datasets obtained from CA resulted in six, five and five latent factors explaining 77.9, 91.68 and 79.29% of the total variance in the water quality datasets of LP, MP and HP sampling sites respectively. In the third phase, Information entropy was used for developing a general water quality index based on the drinking water quality standards, heavy metal contamination index and an irrigation water quality index. A multi-criteria decision making method (TOPSIS) was also made use for overall ranking of sampling sites on the basis of entropy weights. Fourth phase was associated with the investigation of water quality variability and identification of ideal monitoring locations using entropy based diversity and disorder indices. Therefore, present study illustrates the necessity and usefulness of environmetrics methods for analysis and interpretation of large complex datasets with a view to get better information about the water quality and design of monitoring networks for effective management of water resources.