

PREFACE

In this study, the influencing aspects of various groundwater prospects in Pune District are taken into account using remote sensing and GIS methodologies. For the purpose of creating the various groundwater potential maps using the frequency ratio (FR) technique, a number of contributing factors, including lithology, geomorphology, slope, soil, lineament density, drainage density, land use, and rainfall, are evaluated individually as well as collectively. All of the thematic layers in the ArcGIS Pro software are created utilising various satellite imageries and traditional data sets that are collected from various sources. Using the FR Technique, all of the maps are converted into a GIS environment with high-definition raster format. With the help of Frequency ratio model, we were able to detect the groundwater potential zones in the study area. Using Random Forest (RF) algorithm a classified map was generated showing the presence and absence of groundwater in the district. An accuracy of 80.311 percent was obtained (Kappa Statistics). With the help of several conditioning factors a dominant factor graph was generated based on the variable importance to show the potential zones. Validation is a crucial part of modelling the significance of the research from a scientific standpoint. The receiver operating characteristic (ROC) curve's area under the curve was used in this study to evaluate the models. The ROC, a graphical depiction, assesses the performance of the models in a diagnostic test. The Y-axis of the curve represents the true-positive rate (sensitivity), and the X-axis represents the false-positive rate (1 - specificity). Model predictions for the presence and non-occurrence of spring and wells were evaluated using the area under the ROC curve. The area under the curve (AUC), which ranges from 0 to 1, is a measure of how well the model is performing; the higher the value, the better. Graph showing the ROC curve for random forest model with AUC value of 82 percent was generated for validation purpose. An Artificial Recharge zone map has been generated with the help of the groundwater potential factors and other parameters.