

***STUDY OF THE POTENTIAL FOR SEAWATER INTRUSION INTO AQUIFERS IN
THE COASTAL AREA OF GLAGAH, KULONPROGO REGENCY
SPECIAL REGION OF YOGYAKARTA***

By

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ABSTRACT

Excessive groundwater withdrawal will cause distortion at the interface which encourages seawater intrusion into groundwater. Saltwater intrusion degrades water quality of wells and consequently the water becomes unfit for use. This study aims to examine and analyze the potential for seawater intrusion into aquifers in the coastal area of Glagah, Temon District, Kulonprogo Regency, using the following analytical approaches: flownet pattern of unconfined groundwater; aquifer characteristics based on hydrostratigraphic reconstruction; groundwater characteristics based on unconfined groundwater hydrochemistry in the study area; and analyze the potential for seawater intrusion in the study area in terms of the three methods.

Data collection and measurement of groundwater level and electrical conductivity values were done by sensus, while unconfined groundwater sampling was done by purposive sampling. Analysis of the pattern and direction of groundwater flow data was done by using linear interpolation. Hydrostratigraphic reconstruction based on geoelectrical estimation was obtained from secondary data in Santosa (2010). Data on the major ion content of groundwater samples were obtained from laboratory analysis and then the Charge Balance Error (CBE) was calculated to test the sample quality. Groundwater hydrochemical analysis was carried out based on the Expanded Square-Piper Diagram and Stuyfzand methods.

The results showed that based on the three approaches taken, groundwater at the study site was not detected by seawater intrusion and was generally fresh. The pattern of groundwater flow follows the topography of the area, from high to low elevation, which predominantly flows towards the sea. Hydrostratigraphic reconstruction shows that there are four layers of aquifer zoning and distribution of material types. Unconfined groundwater is found in a layer saturated of fresh water made of marine sand, below the aeration zone layer. The layer below is an aquitard which is composed of marine clay material mixed with silt and fine marine sand and contains brackish groundwater. The last layer is composed of clay material in the form of aquicludes containing brackish to salty groundwater. Hydrochemical analysis based on the Expanded Square-Piper Diagram method divides the types of groundwater into two groups which are bicarbonate (I) and semi-bicarbonate (II). Hydrochemical analysis based on the Stuyfzand method of groundwater types is divided into F2-NaMix(Ø), F1-NaMix(Ø), g2-Ca(HCO₃)₂(+), and F3-NaHCO₃(+).

Keywords: *Unconfined groundwater, Seawater intrusion, Flownet, Hydrostratigraphy, Hydrochemistry*