

## ABSTRACT

*The development and progress of the city caused by population growth and as a consequence, economic and social activity is growing. The city's development affect the areas around it, it encourage land use changes. The watershed, especially the Opak River, is one of the objects that is very vulnerable to the development in DIY regions. The purpose of this study was to analyze the impact of existing land use on water quality in Opak River for chemical parameters (BOD, COD, Ammonia).*

*Water quality from the lab test results is classified using the Pollution Index method. The average results of the pollutant index the value of the pollution index ranged from 2,8 to 3,63. Site 4 is classified as moderately polluted and the others site is low polluted. The width of the watershed obtained by digitizing the DEM data was 1751.54 km<sup>2</sup>. Whereas the settlement area is 534.41 km<sup>2</sup> (30%), forests are 114.73 km<sup>2</sup> (7%), gardens are 175.37 km<sup>2</sup> (10%), rice fields are 368.98 km<sup>2</sup> (21%), others are 558.6 km<sup>2</sup> (32%). The watershed area and water quality were correlated with the Spearman method. The results of the Spearman correlation of separate watersheds showed a positive correlation obtained by BOD in the rice fields has a value 0.035, COD in settlements 0.041, COD in rice fields 0.006, and ammonia in settlements 0.004 and ammonia in rice fields 0.018. While the negative results were obtained by BOD in settlements has a value 0.055, BOD in rice fields 0.123, BOD in forests 0.233, COD in rice fields 0.051, COD in forests 0.426, ammonia in plantation 0.106 and ammonia in forests 0.085.*

*The results of the Spearman correlation of combined watersheds showed a positive correlation obtained by COD in settlements with a value of 0.028, COD in rice fields 0.038, COD in plantation 0.021, and ammonia in settlements 0.044. Whereas negative results were obtained on all land (settlements, rice fields, plantation, forests) for BOD parameters with values 0.085, 0.123, 0.269. The COD parameter is only forest which has a negative correlation 0.149. Ammonia in a rice fields, gardens and forests have a negative correlation with value 0.08, 0.085, 0.075. The results of this correlation are influenced by several factors, namely the influence of the sampling location and total sampling locations, sampling time, the season effect, the purification ability of the Opak river and human activities on each site.*

*Keywords: BOD, COD, ammonia, opak river, pollution index, spearman correlation*

## ABSTRAK

*Perkembangan dan kemajuan kota diakibatkan oleh pertumbuhan penduduk dan sebagai konsekuensinya kegiatan ekonomi maupun sosial semakin berkembang. Perkembangan kota tersebut berpengaruh terhadap daerah di sekitarnya sehingga mendorong perubahan penggunaan lahan. Daerah aliran sungai khususnya Sungai Opak adalah salah satu objek yang sangat rentan terhadap pembangunan dan perkembangan wilayah di DIY. Tujuan dari penelitian ini adalah untuk menganalisa dampak penggunaan lahan eksisting terhadap kualitas air di Sungai Opak untuk parameter kimia (BOD, COD, Amonia).*

*Kualitas air hasil uji lab di klasifikasikan menggunakan metode Indeks Pencemaran. Hasil rata-rata indeks pencemar nilai rata-rata indeks pencemaran berkisar antara 2,8 sampai dengan 3,63. Semua site lainnya tercemar ringan. Luas DAS hasil digitasi data DEM didapat 1751,54 km<sup>2</sup>. Sedangkan luas pemukiman 534,41 km<sup>2</sup> (30%), hutan 114,73 km<sup>2</sup> (7%), kebun 175,37 km<sup>2</sup> (10%), sawah 368,98 km<sup>2</sup> (21%), lainnya 558, 06 km<sup>2</sup> (32%). Luas DAS dan kualitas air dikorelasikan dengan metode spearman. Hasil korelasi Spearman DAS terpisah menunjukkan korelasi positif diperoleh BOD di kebun dengan nilai 0,035, COD di pemukiman 0,041, COD di kebun 0,006, serta amonia di pemukiman 0,004 dan amonia di sawah 0,018. Sedangkan hasil negatif diperoleh BOD di pemukiman 0,055, BOD di sawah 0,123, BOD di hutan 0,233, COD di sawah 0,051, COD di hutan 0,426, amonia di kebun 0,106 dan amonia di hutan 0,085.*

*Hasil korelasi Spearman DAS tergabung menunjukkan korelasi positif diperoleh COD di pemukiman dengan nilai 0,028, COD di sawah 0,038, COD di kebun 0,021, serta amonia di pemukiman 0,044. Sedangkan hasil negatif diperoleh di semua lahan (pemukiman, sawah, kebun, hutan) untuk parameter BOD dengan nilai berturut-turut 0,085, 0,123, 0,269. Parameter COD hanya hutan yang memiliki korelasi negatif yaitu 0,149. Amonia sawah, kebun dan hutan memiliki korelasi negatif dengan nilai 0,08, 0,085, 0,075. Hasil korelasi ini dipengaruhi oleh beberapa faktor yaitu pengaruh lokasi sampling dan banyak lokasi sampling, waktu pengambilan sampling, pengaruh musim, kemampuan purifikasi sungai Opak dan aktivitas manusia di setiap sitenya.*

*Kata kunci: BOD, COD, amonia, sungai opak, indeks pencemaran, korelasi spearman.*