

RINGKASAN

Daerah aliran sungai (DAS) Serayu menjadi salah satu DAS kritis karena semakin banyak metode pertanian yang mengabaikan prinsip konservasi. Pengolahan lahan di DAS Serayu sering kali dilakukan secara terus-menerus sehingga mempengaruhi tingkat kesuburan tanah. Fosfor (P) merupakan salah satu unsur hara esensial yang tingkat kelarutan dalam tanahnya rendah. Hal ini mengakibatkan perlu dilakukan pemupukan fosfor untuk menyediakan unsur P tanah bagi tanaman padi. Tujuan penelitian ini yaitu (i) mengetahui peta sebaran unsur hara P pada pertanaman padi lahan sawah DAS Serayu Tengah di Kecamatan Mandiraja, Kabupaten Banjarnegara, (ii) mengetahui sifat kimia tanah dan nilai korelasi antar variabel di lahan sawah yang digunakan untuk budidaya tanaman padi di Kecamatan Mandiraja, Kabupaten Banjarnegara, serta (iii) mengetahui rekomendasi pemupukan hara P yang optimum untuk memaksimalkan hasil padi di lahan sawah DAS Serayu Tengah.

Penelitian ini dilaksanakan pada bulan Februari sampai Agustus 2024 di DAS Serayu Tengah Kecamatan Mandiraja, Kabupaten Banjarnegara dengan menentukan titik sampel berdasarkan peta Satuan Lahan Homogen (SLH) skala 1:50.000 yang dibuat secara *overlay* beberapa peta tematik seperti peta administrasi, peta kemiringan lereng, peta jenis tanah, dan peta penggunaan lahan sawah. Penentuan titik sampel juga didasarkan pada metode transek yang dibuat tegak lurus dengan aliran sungai di lokasi penelitian. Pengambilan sampel tanah dilakukan secara komposit di setiap lokasi penelitian dengan cara pengeboran tanah pada kedalaman 0-25 cm dan 25-50 cm. Pengambilan sampel daun tanaman dianalisis dua daun pada setiap tanamannya pada fase vegetatif akhir. Pengambilan sampel malai tanaman dilakukan pada saat panen sekitar 18-20 malai. Variabel yang diamati pada penelitian ini meliputi pH H₂O, pH KCl, daya hantar listrik (DHL) tanah, potensial redoks tanah, P-tersedia tanah, serapan P pada daun dan gabah, serta hasil tanaman.

Hasil penelitian menunjukkan bahwa ketersediaan unsur P di wilayah Kecamatan Mandiraja cenderung rendah yaitu 13,99 ppm P₂O₅ pada kedalaman 0-25 cm dan 10,28 ppm P₂O₅ pada kedalaman 25-50 cm. Nilai serapan P daun tanaman sebesar 4,07 mg P₂O₅/daun tanaman dengan nilai kadar P₂O₅ daun sebesar 1,67%. Nilai serapan P gabah tanaman sebesar 3,37 mg P₂O₅/gabah tanaman dan 69,13 mg P₂O₅/malai tanaman dengan nilai kadar P₂O₅ gabah sebesar 1,97%. Nilai koefisien determinasi antara P-tersedia tanah dengan hasil tanaman adalah $R^2 = 0,0814$. Nilai koefisien determinasi antara serapan P dengan hasil tanaman adalah $R^2 = 0,0284$ pada daun tanaman dan $R^2 = 0,0123$ pada gabah tanaman. Rekomendasi pemupukan P untuk pertanaman padi sawah dilakukan pada seluruh titik pengamatan di Kecamatan Mandiraja dengan rata-rata sebanyak 118,32 kg SP-36/ha dan 92,60 kg TSP/ha.

Kata kunci : DAS, fosfor, tanaman padi, sifat kimia tanah, pupuk P

SUMMARY

The Serayu Watershed has become one of the critical watersheds because more and more agricultural methods ignore the principle of conservation. Land cultivation in the Serayu Watershed is often carried out continuously, thus affecting soil fertility levels. Phosphorus (P) is one of the essential nutrients with low solubility in soil. This results in the need for phosphorus fertilization to provide soil P elements for rice plants. The objectives of this study were (i) to determine the distribution map of P nutrients in rice planting in the Serayu Tengah Watershed rice fields in Mandiraja District, Banjarnegara Regency, (ii) to determine the chemical properties of the soil and the correlation values between variables in rice fields used for rice cultivation in Mandiraja District, Banjarnegara Regency, and (iii) to determine the recommendations for optimum P nutrient fertilization to maximize rice yields in the Serayu Tengah Watershed rice fields.

This research was conducted from February to August 2024 in the Serayu Tengah Watershed, Mandiraja District, Banjarnegara Regency by determining sample points based on the Homogeneous Land Unit (SLH) map on a scale of 1:50,000 which was made by overlaying several thematic maps such as administrative maps, slope maps, soil type maps, and rice field land use maps. Determination of sample points was also based on the transect method which was made perpendicular to the river flow at the research location. Soil sampling was carried out in a composite manner at each research location by drilling the soil at a depth of 0-25 cm and 25-50 cm. Plant leaf sampling was analyzed for two leaves on each plant in the final vegetative phase. Plant panicle sampling was carried out at harvest time around 18-20 panicles. The variables observed in this study included pH H₂O, pH KCl, soil electrical conductivity (DHL), soil redox potential, soil available P, P absorption in leaves and grain, and crop yields.

The results showed that the availability of P elements in the Mandiraja District area tended to be low, namely 13,99 ppm P₂O₅ at a depth of 0-25 cm and 10,28 ppm P₂O₅ at a depth of 25-50 cm. The P absorption value of plant leaves was 4,07 mg P₂O₅/plant leaf with a leaf P₂O₅ content of 1,67%. The P absorption value of plant grain was 3,37 mg P₂O₅/plant grain and 69,13 mg P₂O₅/plant panicle with a grain P₂O₅ content of 1,97%. The coefficient of determination between soil-available P and plant yield was $R^2 = 0,0814$. The coefficient of determination between P absorption and plant yield was $R^2 = 0,0284$ in plant leaves and $R^2 = 0,0123$ in plant grain. The recommendation for P fertilization for lowland rice planting was carried out at all observation points in Mandiraja District with an average of 118,32 kg SP-36/ha and 92,60 kg TSP/ha.

Keywords: Watersheds, phosphorus, rice plants, soil chemical properties, P fertilizer