

## RINGKASAN

Desa Serang Kecamatan Karangreja Kabupaten Purbalingga merupakan sentra produksi hortikultura termasuk tanaman kentang. Budidaya kentang di Desa Serang umumnya masih dilakukan secara konvensional melalui penggunaan guludan vertikal dan pupuk pestisida kimia yang berdampak negatif pada kelestarian lingkungan. Budidaya kentang secara konvensional menyebabkan erosi yang tidak terkendalikan. Penerapan sistem guludan horizontal (memotong lereng) pada budidaya kentang terbukti cukup efektif mengendalikan erosi, namun belum optimal meningkatkan produktifitas tanaman terutama pada musim hujan akibat kondisi *waterlogged* (jenuh air) pada guludan. Oleh karena itu, diperlukan pengembangan sistem guludan horizontal yang dipadukan dengan lebar guludan, guna meningkatkan keefektifan guludan horizontal dalam menunjang produktifitas kentang maupun konservasi lingkungan. Penelitian ini bertujuan untuk mengetahui dinamika sifat fisik tanah (kadar air volumetrik, kerapatan isi, konduktivitas hidrolis, dan dinamika nutrisi (N dan P) pada budidaya kentang dengan variasi lebar guludan horizontal.

Penelitian ini dilaksanakan pada bulan Mei-November 2017 di lahan pertanian tanaman hortikultura Desa Serang, Kecamatan Karangreja, Kabupaten Purbalingga, Laboratorium Teknik Pengolahan dan Pengendalian Bio Lingkungan (TPPBL), dan Laboratorium Ilmu Tanah/Sumber Daya Lahan Universitas Jenderal Soedirman. Analisis data pada penelitian ini menggunakan metode grafis. Pengambilan data dengan metode destruktif dilakukan dengan cara menghancurkan beberapa sample pada penelitian ini. Variabel yang diukur antara lain: kadar air volumetrik tanah, kerapatan isi tanah, konduktivitas hidrolis tanah, N-total dan P-total tanah pada lebar guludan 30, 40, dan 50 cm.

Hasil penelitian menunjukkan bahwa dinamika sifat fisik tanah (kadar air volumetrik, kerapatan isi, dan konduktivitas hidrolis) pada guludan horizontal berfluktuasi, dimana nilai optimal kadar air volumetrik tanah dan kerapatan isi tanah terdapat pada lebar guludan 50 cm masing-masing sebesar  $0,45 \text{ cm}^3 \text{ cm}^{-3}$  dan  $0,73 \text{ g cm}^{-3}$ . Nilai optimal konduktivitas hidrolis tanah terdapat pada lebar guludan 30 cm sebesar  $0,027 \text{ cm s}^{-1}$ ; serta nilai optimal N-total dan P-total terdapat pada lebar guludan 40 cm masing-masing sebesar  $4.111,48 \text{ kg ha}^{-1}$ ; dan  $2.212,89 \text{ kg ha}^{-1}$ .

## SUMMARY

*Serang Village, Karangreja Sub-district, Purbalingga Regency is a horticulture production center including potato's plant. Potato's cultivation in Serang village is generally done conventionally through the use of vertical bundle and chemical pesticide fertilizer that negatively impact on environmental sustainability. The conventional cultivation of potatoes causes uncontrolled erosion. The application of horizontal bundle system (cutting slopes) on potato's cultivation proved effective enough to control erosion, however bit increase of crop productivity, especially during the rainy season due to waterlogged conditions in the bundle. Therefore, it is necessary to develop a horizontal bundle system combined with the width of bundle, in order to increase the effectiveness of horizontal bundle in supporting the productivity of potatoes as well as environmental conservation. This study aimed to determine the dynamics of soil physical properties (volumetric water content, content density, hydraulic conductivity, and nutrient dynamics (N and P) on potato's cultivation with variation of horizontal bundles.*

*The research was conducted on May-November 2017, on the horticultural cropland in Serang Village, Karangreja Sub-district, Purbalingga Regency, Laboratory of Processing Technique and Control Bio Environment (TPPBL), and Soil / Land Science Laboratory of University Jenderal Soedirman. Data analysis in this research using graphical method. Data collection by destructive method is done by destroying several samples in this research. The variable were measured in this research such as: volumetric water content, content density, hydraulic conductivity, N-total and P-total soil at the width of 30, 40, and 50 cm bundles.*

*The results showed that the dynamics of soil physical properties (volumetric water content, content density, and hydraulic conductivity) on the horizontal bundle was fluctuated, the optimum values of soil volumetric water content and content density were presented in the bundle (50 cm width) i.e.  $0.45 \text{ cm}^3 \text{ cm}^{-3}$  and  $0.73 \text{ g cm}^{-3}$  respectively. The optimum value of soil hydraulic conductivity was presented in the bundle (30 cm width) i.e.  $0.027 \text{ cm s}^{-1}$ ; as well as the optimum N-total and P-total values were presented in the bundle (40 cm width) i.e.  $4,111.48 \text{ kg ha}^{-1}$ ; and  $2,212.89 \text{ kg ha}^{-1}$  respectively.*