

SUMMARY

SRI cultivation is one of the methods to increase irrigated rice productivity which includes changes in cultivation, soil, water and nutrition management when compared to conventional methods. SRI method is very close to organic farming system, where all input given is using organic materials, even though that is not always the case. Inorganic farming system emphasizes on maximal production achievement, so it emphasizes on the use of chemical input such as; synthetic chemical fertilizer and pesticide. Its use can increase the residue of synthetic chemicals in the soil so it can reduce the nutrients in the soil. The purpose of this research is ; 1. To identify the dynamics of nutrients in soil, 2. To identify the factors that influence the nutrient dynamics, and 3. To know the soil fertility level and the yield of rice productivity.

This research held at a screen house in Laboratory of Bio-Environmental Management and Control Engineering, Jendral Soedirman University, from December 2016 to April 2017. This study used 4 treatments those are; SRI-Organic (SO), SRI-Organic using charcoal as soil amendment (SOA), SRI-Organic with application of chemical fertilizer (SOK) and Inorganic-SRI with application of chemical fertilizer only (SK). The variables observed included plant growth (plant height and amount of saplings), climate (temperature and solar radiation), soil nutrient (total and available N, P, K), Organic-C, and yields (amount of grains per pots and weight of dry grain harvest).

The results of this research indicate the dynamics of nutrient (total and available N, P, K) during the paddy cultivation. Nutrient content level is influenced by factors, such as; temperature, moisture content, soil pH, and crop requirement on nutrients. Soil fertility can be determined by looking at the levels of Organic-C in the soil. The highest Organic-C is found on treatments which soil amendment (biochar) combined with organic fertilizer and inorganic fertilizers (SOA and SOK) that is 2,157% and 2,008% that organic fertilizer only or inorganic fertilizer only without combinations with soil amendment shows lower Organic-C content (SO and SK) that is 1,920% and 1,896%. Rice productivity of SRI method in this research is the best on treatment of SK that is 1.4 ton/ha compared to treatments of SOK, SOA and SO with results are 1.37 ton/ha, 1.21 ton/ha and 1.04 ton/ha respectively.

I. PENDAHULUAN

A. Latar Belakang

Padi (*Oryza sativa L.*) merupakan bahan pangan utama dan komoditi pertanian strategis bagi Indonesia. Data Badan Pusat Statistik menunjukkan bahwa produksi padi tahun 2015 sebanyak 75,36 juta ton gabah kering giling (GKG) atau mengalami kenaikan sebanyak 4,51 juta ton (6,37 %) dibandingkan tahun 2014. Produksi padi nasional tersebut pada kenyataannya belum mampu mencukupi kebutuhan penduduk Indonesia meskipun telah banyak kebijakan pemerintah seperti penggunaan varietas unggul, pembangunan sarana irigasi, subsidi benih dan pupuk. Hal ini dapat dipengaruhi oleh belum optimalnya penerapan kebijakan yang dilakukan (Alavan *et al.*, 2007).

Budidaya padi *SRI*, merupakan salah satu metode untuk meningkatkan produktivitas padi beririgasi yang meliputi perubahan pengelolaan penanaman, tanah, air, dan nutrisi bila dibandingkan dengan cara konvensional (Usman *et al.*, 2014). Menurut Kasim (2004), budidaya metode *SRI* menghemat pemakaian benih, menghemat pemakaian air, menghindari stagnasi bibit, meningkatkan jumlah anakan, memperpendek umur panen serta meningkatkan produktivitas. Agar dapat tumbuh dengan baik, tanaman padi memerlukan unsur hara yang cukup dan seimbang. Unsur hara yang kadarnya berlebihan dalam tanah sangat merugikan tanaman karena dapat menghambat pertumbuhan tanaman (Winarso, 2005).