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## Effect of Difference Weed Control Methods to Yield of Lowland Rice In The SOBARI

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### Abstract

Weed competition will reduce rice yield. The research aimed to study the effect of difference weed control methods on rice yield in SOBARI. It has been conducted from October 2013 until February 2014, using Randomized Block design with five treatments (A = manual weeding, B = unweeded control, C = herbicide containing Penoxulam + Cyhalofop-butyl, D = Bispyribac sodium, and E = 2, 4 D + Methyl metsulfuron). The results showed that weed control using herbicides containing Bispyribac sodium and 2.4 D + Methyl metsulfuron showed similar results as manual weed control on rice yield.

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### INTRODUCTION

Rice is a major food staple for most people of Asia, especially Indonesia. The rice production has to be increased to meet demand due to population growth [3]. One of the important things on increasing rice production is to minimize crop loss which is caused by weed competition because weeds do not only reduce the rice production but also have an adverse effect on rice grain quality.

The best paddy rice growth occurred in a depth of 2-25 cm stagnant water. Meanwhile, at this time condition of water resources is increasingly limited so that it is necessary to find a method to overcome the existing problem. It includes the water management in lowland rice farming. One of the technologies that can be applied is the approach of System Organic-Based on Controlled Aerobic Rice Intensification (SOBARI).

SOBARI is a holistic system of rice production based on integrated local input (straw compost, bio fertilizers, and other inputs) with the concept of LEISA (low external input sustainable agriculture). Water management in SOBARI method requires only half to one-third of the conventional way, saturated wetland or flooded. It saves water

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usage by up to 30%; however, these conditions will stimulate the growth and development of weeds compared to flooded rice field [19].

Mostly, weed species population is getting decrease with the increasing of water depth. Flooding irrigation will depress weed growth but will not disturb the growth of rice plants. It shows that the flooding considerably affect to the rice crop and weed growth. On the other hand, SOBARI uses muddy level only, this certainly will enhance the growth of weeds either type or amount. If unchecked, it will lead to a relatively large yield loss, because the weeds grow since the beginning of rice planting, so that the competition has been started from earlier and longer.

In rice cultivation system, the longer presence of weeds in rice cropping paddy, the greater reduction of grain yield. Results of previous studies showed that rice yield loss on systems using intermittent irrigation (SRI) is greater than in conventional system, because the weeds in the rice areas were allowed to grow until the harvest. Loss of rice yield in SRI system (which uses intermittent irrigation) was about 98.02%, while the yield loss in the conventional system was only 74.03% [2]. Therefore, weed control becomes one of the important parts of cultivation that can affect the production of rice plants.

Commonly, weed controls used are water management, mechanically hand weeding and chemical herbicides weeding [8]. The traditional method of weed control practice in Asia countries is hand manual weeding by hoe and hand pulling. Usually, hand weeding is conducted in two or three time during the planting season [1]. Manual weeding, although effective, is becoming difficult due to labor scarcity, cost increase and depend on weather conditions. Moreover, it is incomplete and impractical due to escape or regeneration of perennial weeds having many flushes. Delayed weeding cause crop loss and decreased production. Thus herbicide usage seems indispensable for weed management [18]. It offers selective and economical control of weeds since the beginning, giving the crop an advantage of good start and competitive superiority [15].

Herbicide rotation and mixture herbicide use are two major strategies to prevent development of herbicide resistance in weeds, herbicide with different mode of action when mixed together, bind to different target site in weed and prevent the probability of target site resistance in susceptible species [13]. Technological developments mixing herbicides with different active ingredients aiming to get a broader spectrum control, and is expected to slow the emergence of weeds resistant to herbicides, reduce production costs, and reduce herbicide residues [7]. Based on above explanation, it is necessary to study the effect of difference weed control methods on lowland yield rice in SOBARI cultivation.

## **MATERIALS AND METHODS**

The study used a randomized block design experimental method, with five treatments and three times replications. Treatment consisted of five difference weed control methods namely: A = manual weeding, B = UN weed control, C = herbicide containing Penoxulam + Cyhalofop-butyl, D = herbicide containing Bispyribac sodium, and E = herbicide containing 2, 4 D + Methyl metsulfuron. All treatment was done at age 20 day after planting (DAP), except the manual weeding which was done at the age 20 and 45 DAP. Each plot has an area of 4 m x 5 m, with a spacing of 35 cm x 35 cm.

The experiment has been conducted at Sadang Mukti Farmers Groups rice field, Sadang Sari Village, Bandung, West Java at 668 m above sea level, from October 2013 until February 2014. The soil characteristics of the experimental site: soil type: clay, pH: 7.2 (wet), organic carbon 3.25 % (high), available of P: 2.14 ppm (very low), available of K: 10.00 ppm (very low).

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