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ORIGINAL ARTICLE

Performance Assessment of the Small and Medium-Scale Coconut Weeder Cum Fertilizer Applicator Developed by Rajarata University of Sri Lanka

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Abstract

The enhancement of coconut yield significantly hinges on proper weeding and chemical fertilizer application. In Sri Lanka, several mechanical methods have been introduced for weeding and fertilizer application of coconut, but the traditional manual approach persists most popular, despite being time, labor cost intensive. Moreover, the introduced technologies were suited for large-scale coconut cultivation and could not cope with medium or small-scale. Furthermore, most of them are designed for a single application; weeding or fertilizing. Thus, the Faculty of Agriculture, Rajarata University of Sri Lanka (RUSL), developed a coconut weeder cum fertilizer applicator for medium and small-scale coconut cultivations. However, it has not been properly evaluated and recommended for farmers. Consequently, this study sought to evaluate the performance of the above machine by conducting a comparative performance evaluation with the conventional method. A healthy, well-maintained, proper-spacing coconut plantation was selected from the faculty research unit, and each weeding and fertilizer application method was replicated ten times. In terms of performance parameters: effective field capacity, field efficiency, and weeding efficiency in mechanical and manual methods were 0.172 ha h-1, 61.86%, 66.62%, and 0.048 ha h-1, 55.34%, 60.35%, respectively. Statistical analysis indicates the mechanical method had higher field capacity and efficiency than the manual method, while weeding efficiency was not significantly different ($p \leq 0.05$). In addition, the machine had a fertilizer spreading uniformity of around 99.98% when operating at an optimum speed of 1.45 km h-1. Fertilizer application rate and performance index as a weeder were 1.7 kg/min and 1145.86, respectively. Furthermore, the fuel consumption rate of the machine was 0.733 L h-1 and its break-even point was recorded as 2.85 ha yr-1. Consequently, the coconut weeder cum fertilizer applicator proves suitable for medium and small-scale coconut cultivations in Sri Lanka.

Keywords: *Break-even point, Coconut cultivation, Manuring, Performance evaluation, Weeding*

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