

**DEVELOPMENT OF A MANUALLY-OPERATED THREE-ROW  
GARLIC (*Allium sativum* L.) PLANTER**

**GABRIEL O. CABIEDES  
NADINE B. DUMALE**

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## ABSTRACT

**CABIEDES, GABRIEL O. and DUMALE, NADINE B.**, Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **June 2022**, **DEVELOPMENT AND PERFORMANCE EVALUATION OF A MANUALLY-OPERATED THREE-ROW GARLIC (*Allium sativum* L.) PLANTER**

Adviser: WENDY C. MATEO, Ph.D.

The study was conducted to design and fabricate a manually-operated three-row garlic planter in order to improve existing single row designs of Yasmeen et al. (2010), Nare et al. (2014), and Gajakos et al. (2015) as well as mitigate the labour-intensive practice of traditional garlic planting in the Philippines. The planter was evaluated on a 10 m x 9 m farm area in Brgy. Licaong, Science City of Muñoz, Nueva Ecija, Philippines.

Overall dimension of the garlic planter is 700mm x 800mm x 719mm (LxWxH). The garlic planter has six components: the hopper, the metering device, the main frame, the drop tube, the furrow opener and ground wheel.

The performance of the garlic planter was evaluated using various planting depth of 3cm, 5cm, and 7cm. The statistical analysis of the study involves the utilization of conducting the study using Completely Randomized Design (CRD) experimental layout at 5% level of significance for the analysis of variance. The garlic planter was evaluated through the following parameters: multiple index, miss index, planting efficiency, effective field capacity, and field efficiency.

The mean multiple and miss index at 3cm depth are 10.26% and 7.70% respectively. This was followed by 5cm with results of 17.36% and 19.41% respectively. Lastly are at 7cm with 23.05% and 38.90%. Results from the analysis of variance show that there is a significant difference between the 3cm and 7cm depth; however, the 5cm depth has no significant difference with the other two variables when it comes to the said parameters.

Planting depth at 3cm has the highest recorded planting efficiency at 81.25%, which is followed by 5cm with 68.06%, then at 7cm with 50.00%. In terms of effective field capacity, the highest result was still at 3 cm depth with 429.39 m<sup>2</sup>/hr. This is followed by 5cm with 390.31 m<sup>2</sup>/hr and 7cm with 395.17 m<sup>2</sup>/hr. For the last parameter, which is the field efficiency, the 3cm yield the highest result of 93.61% followed by 5cm and 7cm with 85.08% and 79.09% respectively.

Simple cost analysis regarding the operation of the garlic planter has shown that its investment cost is Php 25,343. The fixed cost, variable cost, annual operating cost and cost of operation per day are Php 24,075.85, Php 25,459.76, Php 49,535.61, and Php 825.59 respectively.

Keywords: garlic planter; three-row garlic planter; manually-operated garlic planter

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